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PUBLICATIONS OF THE DEPARTEMENT OF ECONOMIC
HISTORY OF THE UNIVERSITY OF GÖTEBORG
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67

JAN JÖRNMARK

COAL AND STEEL IN WESTERN EUROPE 1945–1993

INNOVATIVE CHANGE AND INSTITUTIONAL ADAPTATION

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AKADEMISK AVHANDLING

som med vederbörligt tillstånd av styrelsen för Handelshögskolan vid Göteborgs universitet för avläggande av filosofie doktorsexamen framläggs till offentlig granskning lördagen den 5 juni klockan 10 på ekonomisk-historiska institutionen, Samhällsvetenskapligt Centrum Hörsalen Sappören, Sprängkullsgatan 25, Göteborg

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Abstract

COAL AND STEEL IN WESTERN EUROPE 1945–1993: Innovative Change and Institutional Adaptation. (Publications of the Departement of Economic History of the University of Göteborg, 67) ISSN 0072–5080, ISBN 91–85196–38–X, 375 pages. Göteborg 1993.
Author: Jan Jörnmark.
Doctoral dissertation at the Department of Economic History, Gothenburg School of Economics, University of Göteborg. (Written in English)
Distribution: The Department of Economic History, University of Göteborg. Postal address: Skanstorget 22, S–411 22 Gothenburg, Sweden.
Key words: Innovation, adaptation, organization building, integrated world markets, segmented markets, oxygen steel, mini-mills, socioeconomic reevaluation, group fragmentization.

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A Schumpeterian model is used to discuss the process of evolutionary change in two economic sectors in Western Europe after 1945. In order to view the impact of innovation upon existing socioeconomic groups, an Olsonian model of group formation is used.
The existing West European mode of organization is placed in a historic setting, in order to explain the persistence of the older modes of production and organization.
The main innovations that provides the background to the discussion of the coal sector is the opening up of the Mid-east and North African oil fields, together with the declining freigth rates, which also made imports of cheap Extra-european coal possible. It is argued that the chock that cheap oil implied to the existing West European coal producers, led to the emergence of segmented energy markets, as structures evolved that centered on a safeguarding indigenous coal production. These structures started to dissolve after the two oil chocks of the 1970s, when the emergence of an international market for steam coal increased the costs of the existing solutions.
The first innovations discussed in connection to the steel industry is the coming of the Basic Oxygen Process and the emergence of integrated world markets for raw materials. It is argued that these innovations worked to the disadvantage of several traditional West European steel-producing districts. But as these districts were often dependent upon coal production, as well, the redevelopment of their steel industries was seen as crucial in order to revitalize their entire economies.
This adaptive tendency was combined to a wave of coastal plant construction. Taken together, these tendencies led to the emergence of escalating "over-capacities" by the mid 70s. This phenomena was exacerbated by the break-through of two other innovations in the period after the mid 60s: continuous casting and the mini-mill. These innovations, together with the excessive debt-burdens inherited from the adaptive phase, forced a thorough rationalization of the traditional industrial structure during the 80s.
Together, the "strategies of propping up" that had been used in order to counter the problems of both the coal and the steel sectors, had produced very serious problems of structural over-extension. Thus, the processes of industrial rationalization that were evident after the late 70s had to be accompanied by processes of organizatorial adjustment, as well. The result of this need was that political forces advocating "de-regulation", "privatization" and "neo-liberalism" started gaining in force.

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Foreword

Aquarius had spent the best part of his early manhood in the context of a sofa, it was a sofa that was to become extraordinarily important to his political thinking.

There was a very special breed of anarcho-liberalism that grew out of that sofa during the early 80s - long before the happenstances of the late 80s/early 90s, the members of the "parliament of the sofa" ("*Soffans Parlament*") had analyzed all of the ultimate shortcomings of collectivism.

As the years went by, there started to grow an urge inside Aquarius, to try to formalize the quite extraordinary insights that the sofa had provided him with. This thesis must, therefore, very much be seen as the collective work of some excellent brains, the thinking of which only having been communicated to the public by the author. In view of this he has to express his deepest gratitude to Lennart, Perka, Pelle, Tomas, Jannis, Berra, Kjell and all the other participants in the recurring discussions of the period 1979-87.

In a scientific sense, I am even more indebted to Lars Herlitz, Bengt Berglund and Jerker Carlsson.

Lars is a true Nemesis to anyone that's writing a thesis. Equipped with a true eagle's eye, he has managed to spot almost all of my "I don't really care spots". Always forcing me to be more specific and more to the point, he has managed to make a book out of (too often) freely flowing ideas and quite dreadful metaphors.

Bengt have, during the last year, invested quite enormous amounts of time and work, in order to make this book readable and interesting to the potential reader. In short, he has been pivotal to the final design of the study. Jerker have, over the years, become a highly regarded friend. His advice and support have always been quite invaluable.

Other persons who offered advice as to the final design of the thesis includes Erik Ruist, Hans von Delwig, Jan Beckeman and Alf Abrahamsson from the Swedish Steel Producers Association, (*Jernkontoret*). Martin Fritz offered valuable advice at that stage of my work, as well.

Martti Rantanen provided me with invaluable help with regard to the final design of the manuscript.

All shortcomings in the final manuscript emanate, needless to say, out of my inability to fully digest -or comprehend- the advice that was offered by these persons.

Among colleagues at the institution Birgitta Jansson, Jan Bohlin, Luis Bertola, Torbjörn Mårtenson and Urban Herlitz needs special mentioning, for their inspired conversation, as well as providing support from the left. Åke Kihlström have drawn the excellent map. Gudrun Hagenfeldt have always been extremely helpful, in different ways. Per and Monica Lindblad helped out with regard to problems concerning lingustic traps.

The librarians at the economic division of the university library have been very helpful, as well.

In my family, my wife Ulrika must be singled out, along with my brother Ola. Both of them were, at different stages, crucial to the completion of the book. Without my parents and Fjärde Långgatan, not a single word would have been written.

All other -forgotten and unforgotten- friends and lovers who provided me with inspiration and different kinds of help are thanked here.

The book is dedicated to my two sons, Jack and Dennis.

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"Capitalism itself is, both in the economic and the sociological sense, essentially one process, with the whole world as its stage".[1]

1. Aims, perspectives and perceptions

1.1. The setting of the study

This study concerns itself with one basic problem. In a basically Schumpeterian model, we discuss the interdependence between innovations and institutions.

Our main problem is rather simple: To discuss a process where, after the second world war, a large number of very traditional West European industrial and institutional solutions came under increasing pressures. These were pressures that had been identified earlier, it was only that they deepened progressively during the period 1945-93.

To Schumpeter the concept of innovation was central to the understanding of the capitalist system (sect 1.2.1). The process of evolutionary economic change is, thereafter, a function of the manner in which these innovations are accepted into the economic system. This, in turn, has to depend upon the existing, hereditary, socioeconomic solutions (institutions).

The relationship between innovation and institutional change is a complex one. Viewing institutions as functional solutions to problems of industrial/national organization and socioeconomic coherence etc, we recognize that truly paradigmatic innovations will require a) functional changes in existing institutions, and/or b) the emergence of entirely new institutional solutions. If existing institutions are seen as functional to the existing socioeconomic equilibrium, this implies that radically changing production functions will upset not only strictly economic relations, but also their whole institutional set-ups. This is why technological, geographic or economic innovation cannot be understood without a discussion of its full institutional context.

It is at this junction that the process of evolutionary economic change turns into a deeply social process, as innovation has the potential to explode important parts of the existing socioeconomic structure. Here, the

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[1]Schumpeter J (1939), p 666.

actions of older modes of production will be central to the process of change:

> "Groups and classes are the real agents in the social process. By their actions or even by their mere existence, they help to determine (to restrict) the possibilities for economic and institutional change and even what is to be considered, at any time or place, as economic or institutional progress or retrogression, as good or bad, as just or unjust... It follows that only in a very special case can we speak of a nation's policy or politics. In general, declared politics are nothing but verbalizations of group interests and attitudes that assert themselves in the struggle of parties and for points in the political game, though every group exalts the policies that suit it into eternal principles of a 'common good' that is to be safeguarded by an imaginary kind of state. Nobody has attained political maturity who does not understand that policy is politics[2]."

Then, if the basic character of capitalism must be constant change, the character of existing institutional solutions -firms, cartels, communities, democratic states etc.- will be to control and/or regularize change. The final, socioeconomic, outcome of capitalist structural change will be the result of a struggle between these warring and interdependent institutions.

Thus, our study needs to discuss the concept of change at different levels. First of all we need to discuss the general problem of innovation, long term economic change, and the rationale for collective action (sections 1.2.1 and 1.2.2).

Thereafter, we try to trace the development of something that we tentatively call "the West European mode of production and organization", (sections 1.3-1.4). We recognize that West European capitalism grew out of somewhat different socioeconomic conditions, as compared to the American blend of capitalism, but that the two systems, in the medium- or long run, had the same technological innovations to handle.

In this context the differences with regard to institutional innovations between America and Western Europe needs special attention. And, the institutional innovations that emerged in Western Europe after the second world war has to be seen against the background of the continent's earlier patterns of organization and production. We need to identify the characteristic socioeconomic (institutional) features that developed in Western Europe. We will try to discuss their functions, in order *to try to explain why a special kind of corporativist capitalism developed in*

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[2]Schumpeter J (1991-1-a), p 440. See, as well, Mokyr J (1992), p 325-37.

Western Europe. The breakdowns that occured during the 1970s and 80s will, hopefully, be explained as logical consequences of the area's hereditary socioeconomic developmental patterns. Social and economic compromises were the very lifeblood of the continent, in the end there was to be a limit to consensus.

It is because of these fundamental assumptions, that our discussion of innovativon and adaptation in a West European context, deals with the societal basis of earlier industrial paradigms ("innovative blocks") as from the very beginning. It is only when the totality of the West European raw material-industrial complex is fully recognized, that the close to incredible persistence of the industrialism of the 19th century can be fully understood. It is in this context that we discuss the social and economic formation of the late 19th century (Rosenberg), and the interwar period (Rosenberg, Svennilson). In our view, these were developments of vital importance to the mould of corporativist/ regularized capitalism that emerged in Western Europe after 1945.

> "Actually capitalism did not fully prevail *anywhere* on the Continent. Existing economic interests, 'artificially' shaped by the autocratic state, remained dependent on the 'protection' of the state... They were creatures of mercantilism and even earlier periods, and many of them huddled together and protested against the affront of being forced to depend on their own ability. They cried for paternalism, for protection, for forcible restraint to strangers, and above all tariffs. They met with partial success, particularily because capitalism failed to take radical action in the agricultural field... Even less did it affect the spirit of the people, and least of all their political goals. This explains why the features and trends of autocracy -including imperalism- proved so resistant, why they exerted such a powerful influence on capitalist development, why the old export monopolism could live on and merge into new.
>
> These are facts of fundamental significance to an understanding of the soul of modern Europe... The social pyramid of the present age has been formed, not by the substance and laws of capitalism alone, but by two different social substances, and by the laws of two different epochs. Whoever seeks to understand Europe must not forget this and concentrate all attention on the indubitably basic truth that one of these substances tends to be absorbed by the other... /he/ must not overlook that even today its life, its ideology, its politics are greatly under the influence of the feudal 'substance', that while the bourgeoise can assert its interests everywhere, it 'rules' only in exceptional circumstances, and then only briefly..."[3]

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[3]Schumpeter J (1991-2-a), p 208-09. See, as well, Olson M (1982), p 92-94.

Reducing our problem to its skeleton, we need to understand capitalist change, inside a social formation to no small degree alien or hostile to it. Thus, we need to recognize the (socioeconomic) elements inside the structure that is hostile to change, while also identifying the elements (innovation and its agents) that ultimately destabilized the structure described by Schumpeter, above.

To get an overview of this process we discuss, in the next stage (sect 1.5), the general evolution of the West European economies in the post-1945 period, in order to place these events within a presumed "long economic wave".

Then, in the last stage, we move on to the real subject matter of the study; that is, we discuss the process of evolutionary economic change within two specific economic sectors: coal and steel.

In the context of coal and steel, we recognize innovations with regard to the raw materials sector, placing the innovations that appeared here within a picture of radically changing supplies of primary commodities. We are arguing that an integrated global raw material economy was on its way of emerging, something that surely had to upset older modes of production and organization[4].

With special regard to the steel industry, we discuss the concept of innovation in the industrial sphere. Even though the steel industry may well be regarded as a "mature" industry by 1950, it was by no means to be dominated by technical stagnation after that point in time. Quite to the contrary, it was the subject of several very important innovations, which were, ultimately, to change its appearance beyond recognition.

As we are dealing with a basically Olsonian concept of institution building, where institutions will tend to accumulate over time (sect 1.2.2.)[5], the choice of coal and steel as examples of the process of evolutionary economic change is of some special interest: a plentitude of possibilities will be given to illustrate how existing institutions try to

a) mould innovation to existing patterns of organization and production

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[4]An innovation in the raw material sector of the economy will, in many cases, tend to stimulate some existing (industrial) invention. The innovative complex will, in this case, consist of the simultaneous appearance of industrial innovations directly connected to the development of new production functions for primary commodities. This case will be discussed several times in the text; the emergence of these innovative development blocks is, really, of pivotal importance to the development of the two sectors discussed here.

[5]Something that makes "traditional" industrial sectors more resistant to change, as compared to "young" industries.

b) restrict entry into the sectors

c) try to strenghten the coherence of the existing institutions (while also trying to change their earlier character).

In the last instance, though, our study deals with the assumption that innovation will have to be accepted into the economic system, if some kind of autarky is not to be resorted to.

Choosing coal and steel as examples means that we will be provided with (because of the very slow-moving character of the solutions introduced in order to cope with innovatory pressures) exceptionally clear examples of the process of evolutionary change at the micro-level of the economy.

1.2. Break on through to the other side: Innovation and socioeconomic change

1.2.1. Innovation, the development of economic waves, the socieconomic character of adaptation - the Schumpeterian view

The concept of "innovation", in a technical as well as institutional and sociopolitical sense, is the centrepiece of the study. When used in its Schumpeterian sense innovation, and the consequent process of economic evolution, is mirrored as a continuous development. The original innovation[6] upsets older lines of production, which leads to a secondary

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[6]Schumpeter defined an innovation as:
"This concept /innovation/ covers the following five cases:
(1) The introduction of a new good - that is one with which consumers are not yet familiar- or of a new quality of a good.
(2) The introduction of a new method of production, that is one not yet tested by experience in the branch of manufacture concerned, which need by no means be founded upon a discovery scientifically new, and can also exist in a new way of handling a commodity commercially.
(3) The opening of a new market, that is a market into which the particular branch of manufacture of the country in question has not previously entered, whether or not this market has existed before.
(4) The conquest of a new source of supply of raw materials or half-manufactured goods, again irrespective of whether this source already exists or whether it has first to be created.
(5) The carrying out of a new organization of any industry, like the creation of a monopoly position (for example through trustification) or the breaking up of a monopoly position."

wave of adaptation, when the older lines of production has to transform to the "new way of doing things".

To Schumpeter the process of innovation and adaptation was central to the understanding of the rise of capitalism as a dominant economic system. Innovation was the creator of "new economic space" -i.e. it is this alone that makes profits[7], economic growth and positive rates of interest[8] possible.

The capitalist system thus rests upon the pillars of innovation, adaptation and growth. The transformation of the system is articulated in the process of "creative destruction". (Destroyed are the outdated production functions, forced to give way to emergent lines of production). Then, the process of innovation and adaptation must be a movement through stages of profound disequilibria, where costs and profits are in a state of more or less constant turmoil. The deepest expression of this movement is the long business cycle (the Kondratieff wave), ultimately describing the process of capitalist evolution through sociopolitical and economic structures[9]. The Kondratieff wave is interfoliated by cycles of shorter duration, the most important of which being the Juglar cycle, with a duration of 8-10 years.

Thus the economic cycle as such, is characterized by distinct phases of change, as the process of economic evolution gathers and looses speed.

A depression stands out by deflationary pressures, low real rates of interest and increasing rates of unemployment; characteristics that appear when waves of innovation works their way throughout the economic system, thereby creating relatively fewer opportunities for investment and entrepeneurial profit. The depressive momentum reaches its strongest articulation in a process of auto-deflation, characterized by abnormal rates of liquidation. It is in this phase that depressive phenomena may feed on each other, creating a depressive "vicious circle" when part of the debt structure crumbles.

This spiralling process creates a new momentum where the increasingly disparate tendencies for relative prices and demand for different goods open up new possibilities for entrepeneurs and innovators, paving the way for economic recovery through the introduction of new and emergent

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Schumpeter J (1951), p 66.
[7]Schumpeter J (1951), p 128-156.
[8]Schumpeter J (1951), p 157-211.
[9]Schumpeter J (1951), p 212-255.

production functions. These new production functions[10] would not have been able to penetrate the economic system in earlier phases of the cycle, when the by now weakened leading sectors still dominated credit markets, job markets, capital goods markets and, indeed, the political markets. The connection between economic events, and sociopolitical formation is clearly underlined by Schumpeter (below).

In the next phase of the cycle, revival, the "new way of doing things" will, once again, disturb the traditional industrial structure, which is still producing at the old production functions. In this phase the path-breaking innovations will become increasingly visible, as they penetrate the system, producing "new economic space" and create possibilities for adaptation. This, in turn, produces secondary opportunities for adaptation throughout the system, as the true potential of the innovating sectors becomes apparent.

As this adaptive wave gathers strength, moving the cycle into a distinct phase of prosperity, the process produces distinct problems of its own:

> "...since entrepreneurial activity upsets the equilibrium of the system and since the release of the new products, in particular, brings disequilibrium to a head, a revision of values of all elements of the system becomes necessary and this, for a period of time, means fluctuations and succesive attempts at adaptation to changing temporary situations. This, in turn, means the impossibility of calculating costs and receipts in a satisfactory way... hence, the difficulty of planning new things and the risk of failure are greatly increased..."[11]

As uncertainty increases, the business situation turns all the more speculative and fragile, turning the prosperity into a recession, and ultimately into a depression; it is in this downward phase of the cycle that the process of "competing down" is accentuated. The prosperity phase has provided "economic space" for everyone, but in the deflationary mood of the recession and depression, the now outdated and wasteful ways of doing things have to give way. Summarizing, the intensification of the process of "competing down" is a constituent part of the evolutionary pattern of the capitalist system, *creative destruction being the very life-blood of the capitalist system.*

To Schumpeter this cycle of creativity and destruction was, essentially, the foremost accomplishment of capitalism. The depressions of the 1820s,

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[10]Innovations that produces along wholly new production functions, i.e. from new cost curves.

[11]Schumpeter J (1939), p 135-36.

1870s and the 1930s[12], were the result of earlier waves of innovation, which, after having revolutionized the economic system, had spent their creative force. Then, during the recessions and depressions induced innovation and rationalization insures that the excesses of prosperity is eliminated:

> "...much dead wood disappears. There is, thus, a good deal of truth in the popular saying that "there is more brains in business at large during recession than there is during prosperity..."[13]

Again: the capitalist system cannot exist without depressions - in essence, periods of retrials of the existing myriads of production functions. *It is this concept of change that, ultimately, distinguishes capitalism from earlier absolutist-mercantilistic societies, where the stationary society was emphasized.*

Viewed in this context, the process of evolutionary economic change becomes, fundamentally, a social process, when old modes of production are overtaken and transformed. The continuing vitality and viability of capitalism will ultimately depend upon the sociopolitical system's ability to handle these continuing upheavals[14]. The pessimism expressed by Schumpeter as to the continuing survival of the social system of capitalism emanated from his views on this process of sociopolitical change. He saw the period from the mid 19th century up to the beginning of the 20th century as the "age of the bourgeois", an age dominated by the political and cultural manifestations of these "new" industrial and commercial classes[15].

The early 1900s, on the other hand, had seen the gradual erosion of the preeminent position of this bourgeois class, as the early spirit of

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[12]And, it will be argued in this study, the 1980s.

[13]Schumpeter J (1939), p 143.

[14]"But no therapy can permanently obstruct the great economic and social process by which businesses, individual positions, forms of life, cultural values and ideals, sink in the social scale and finally disappear. In a society with private property and competition, this process is the necessary component of the continual emergence of new economic and social forms... These changes are theoreticaly and practically, economically and culturally, much more important than the economic stability upon which all analytical attention has been concentrated for so long. *And in their special way both the rise and fall of families and firms are much more characteristic of the capitalist economic system... than any of the things that can be observed in a society which is stationary in the sense that its processes reproduce themselves at a constant rate.* " (authors italics) Schumpeter J (1951), p 255.

[15]Schumpeter J (1939), p 305.

"individual achievment"[16], was withering away. Early, rugged, capitalism was, during the neo-mercantilist Kondratieff of the early 20th century loosing out, fighting an uneven game against the forces of corrupt party politicking and managerial rule[17].

It was in this context that the capitalist engine was running out of steam, a victim of accelerating institutional inertia and factionalist infighting, as the political process was degenerating into a struggle between self-seeking interest groups. In a key passus Schumpeter summed up the *raison d' être* of collective-political action:

> "*...the social meaning or function of parliamentary activity is no doubt to turn out legislation and, in part, administrative measures.* But, in order to understand how democratic politics serve this social end, we must start from the competitive struggle for power and office and realize that *the social function is fulfilled, as it were, incidentally - in the same sense that production is incidental to the making of profits.* " (authors italics)[18].

It was in this socioeconomic context that Schumpeter placed the slow recovery from the 1929-33 depression and the changing political

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[16]Schumpeter J (1950), p 124.

[17]"Gone is the moral support of the community that used to be extended to the employer struggling with infractions of discipline. Gone finally is... the old attitude of governmental agencies; step by step we can trace the way that led the way from backing the master to neutrality... to backing the trade union against both employers and the individual workmen. The picture is completed by the attitude of the hired business executive who, knowing that if he claimed to be fighting for a public interest he would not even rouse indignation but only hilarity, concludes that it is more pleasant to be commended for progressiveness -or to go on holiday- than to incur obloquy or danger by doing what nobody admits to be his duty". Schumpeter J (1950), p 214.

[18]Schumpeter J (1950), p 282.

Schumpeter was even more explicit in his analysis of the political system in one of his last articles:

"There is no scientific sense whatever in creating for one's self some metaphysical entity to be called 'The Common Good' and a not less metaphysical 'State', that, sailing high in the clouds and exempt from and above human struggles and group interests, worships at the shrine of that Common Good. But the economists of all times have done precisely this. While perfectly aware, of course, of the fact that the business process must be understood from the businessman's interest, most of them have been blind to the no less obvious fact that *the political process and hence political measures that affect economic life must be understood from the politician's interest...* And political science itself was in general as little concerned about the facts of its subject matter and as prone to philosophize on this very same common good and popular will. It was, therefore, a major scientific merit of Marx that he hauled down the state from the clouds and into the sphere of realistic analysis," (authors italics). Schumpeter J (1949), p 199.

See, also, Downs A (1957), esp. p 279-94, and sect's 1.3-1.4.

conditions after the second world war. The demoralization of the bourgeois, the growth of the modern, bureaucratic corporation -tending to make innovation automatic and de-personalized- the growth of anti-saving attitudes (saving being the very essence of the capitalist bourgeois mentality[19]), increased taxation and inflation were all elements of a pattern of growing anti-capitalistic attitudes.

It was this pattern that was making for the increasingly regulatory political climate of the 20s and 30s, a trend that was fettering capitalism, i.e. regulation was, to an increasing extent, making the capitalist system unworkable, making the ultimate coming of collectivism (socialism) unavoidable. The capitalist system wasn't working -not because capitalism didn't have the potential to work, but because it was impeded from working. To no small extent this was something that had come about, because the sociopolitical system was, to an increasing extent, lacking the nerve to let depressions clean up the economic system. To Schumpeter this was the real explanation of the popular acceptance of (for example) "the New Deal" and "Keynesianism" during the 30s. In the Schumpeterian sense, these strategies have to be understood as programs aiming at the propping up of socioeconomic structures that couldn't stomach the process of "Creative Destruction". In fact, it could be argued that Schumpeter even saw socialism as a way out of this *Sackgasse* of ever-increased politicizing, socialist planning at least having the theoretic

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[19]As saving had been the very essence of the capitalist bourgeois mentality, Schumpeter clearly viewed the rise of what has been termed Keynesianism with great alarm, and, indeed, intellectual ridicule: See his "Review of Keynes's General Theory":
"Since Mr. Keynes eliminates the most powerful propeller of investment, the financing of changes in production functions, the investment process in his theoretical world has hardly anything to do with... the actual world, and, any proof, even if successful, that (absolutely or relatively) falling 'Inducement to invest' will produce underemployment would have no greater practical importance than a proof that motor cars cannot run in the absence of gasoline"; "The less is said about the last book the better. Let him who accepts the message there expounded rewrite the history of the French ancien regime in some such terms as these: Louis XV was a most enlightened monarch. Feeling the necessity of stimulating expenditure he secured the services of such expert spenders as Madame de Pompadour and Madame du Barry. They went to work with unsurpassable efficiency. Full employment, a maximum of resulting output, and a general well-being ought to have been the consequence. It is true that instead we find misery, shame and, at the end of it all, a stream of blood. But that was a chance coincidence." Reprinted in Schumpeter J (1991-1-b). (Originally published in Journal of the American Statistical Association, Dec. 1936 p 791-95).

potential to resolve this impasse of self-seekers, influence peddlars, rake-offs and political kick-backs:

> "/Through socialist planning/ The relations between agriculture and industry, small-scale and large-scale industry, steel-producing and steel-consuming industries, protectionist and export industries will -or may- cease to be a political question to be settled by the relative weights of pressure groups and become technical questions to which technicians would be able to give unemotional and unequivocal answers"[20].

1.2.2. The logics of collective action and the impact of innovation upon existing institutions

The analysis carried out by Mancur Olson as to the relationship between institutions and innovations, is also of central importance to our study, as it offers a possible solution to the double problem of institution formation and institutional change.

Institutions is, in the Olsonian concept, strictly functional organizations, set up in order to benefit their members, by increasing their respective shares in the provision of collective goods[21].

But institution building will not be a symmetrical phenomena, as some important pre-conditions is of central importance.

First of all: the possibilities of organizatorial formation (as such) and its eventual success, will be directly related to the size of the group that is to be organized. If the organization is relatively small and homogenous, this will directly increase its chances of coming into being. Size is of crucial importance, as the advantages collectively reached by the organization will be equally split by its members. The benefits reached by mass-organizations will thus tend to fizzle out over relatively large populations. The incentives to organize will be an inverse function of group size[22].

Smaller and more homogenous groups, on the other hand, will especially at certain critical points in time, have very obvious reasons to form. In Olson's "privileged" and "intermediate" groups there are solid foundations for group formation, as a very limited number of potential

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[20]Schumpeter (1950), p 302.
[21]Olson M (1971), p 14-15.
[22]Olson M (1971), p 22-36, 48; Olson M (1982), p 29-35, 43-44. Buchanan J/Tullock G (1971) p 68 ff.

members has clearly defined incentives to organize in order to obtain a collective good. Then, the collective good may be obtained through internal action (a higher price), or through lobbying (a tariff etc)[23]. Larger groups, in Olson's terminology dubbed as "latent" groups will, on the other hand, need additional selective incentives, in order to form.

The main point about the Olsonian discussion is that it provides us with a powerful framework in which the assymetric formation of groups can be understood, i.e. why certain associations will be more capable of formation, in order to express their interests as a group[24].

Then, all groups are plagued by the "free rider-problem", that is the interest of each of its members to reap the benefits (collective goods provided) of organization building, while simultaneously avoiding the costs that the organization represents (for genuine group upholding, as well as in the form of a lower production). This problem creates a rather acute need for some kind of a stabilizing (coercive) force in most groups. In some groups coercion will be central to their ability to function, in other groups some egoism/cheating may be tolerated, as the benefits reaped by the largest members of the group will be sufficient to make them bear a relatively larger share of the costs. This is, of course, a central advantage of the "privileged" groups: as the interests of a few members are easily identified, the disproportionate interest that these members have not to wreck the organization will induce them to carry a very large share of group costs[25].

A stable society will, over time, accumulate an increasing number of special interest groups, organized in order to provide their members with some collective goods. These groups will develop group-specific functions and activities (collective sales organizations, collective bargaining functions etc.), in order to provide potential members with selective incentives to join the group[26]. The ideal goal will, naturally, be to attain a situation where membership is compulsory, if the individual

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[23]Olson M (1971), p 49-50, 141-45. Buchanan J/Tullock G (1971) p 115-16.

[24]Olson M (1982), p 36-37.

[25]One example that directly sticks to mind is the lengths that Saudi Arabians went to, in order to uphold the existing price structure for oil, between 1973-85. In the recessions of 1975 and 1977 they carried the lions share of production cut-backs, between 1982-85 they lowered their production progressively, in order to uphold the existing price structure. Then, in 1986, they resorted to, in effect, coercion of the other OPEC-members, by demonstrating their potential power to destruct the cartel's price structure.

[26]Olson M (1971), p 137-41, 153-58.

member of the group is to be able to attain his share of the collective good. For labor unions the "closed shop" goal sticks directly to mind[27], producer organizations will strive most intensively for the same goal in situations where increasing competition and innovative change are tending to destabilize the industrial equilibrium[28], (by erecting barriers to entry, etc). We will see acute examples of the *need* for group coherence and the *need* for coercion, when we discuss the ECSC steel industry during the later 70s (sections 1.6 and 5).

The nature of the relationsship between the state (and, in our examples, the transnational organization) and the interest group is a central question to our discussion. The functions that the state can fulfill with regard to the interests of the group are clear: it can provide the group with stabilizing powers through the use of legislation, tariffs and regulations regarding entry and general competitive conditions.

As democracy exists under a fundamental condition of uncertainty (neither government, opposition parties, nor voters have access to perfect knowledge as to the ultimate outcome of either legislation or social change) this condition may in itself give rise to a skewed playing ground, which rewards interest group action. The organized groups produce a political good (information about the needs of certain parts of the citizenry) which places them in a position to influence policy making in a disproportionate way [29].

The logics of farming out sectoral politics to special interest groups becomes a rational political behavior, because parties have to seek information and support (form vote-winning coalitions) from the best organized (the most concerned) groups:

> "However, every government decision concerns a few men directly and immediately... /the group interests/ are not limited by any need for accuracy; in fact, they have every reason to exaggerate... Since most people do not express any views directly to the government[30], it must listen to the lobbyists..."[31]

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[27]Olson M (1971), ch. 3.
[28]Olson M (1982), p 58-65.
[29]Downs A (1957), p 95; Olson M (1982), p 25-27.
[30]In the phraseology of Olson: Are members of latent groups, with a limited interest in the questions that highly concerns the special interest group. The drawbacks to the general public (the latent group), will have to be very substantial indeed, to counter the concentrated interest of the group consisting of the few and informed.
[31]Downs A (1957), p 91.

It is, naturally, highly functional for the organized socioeconomic groups to penetrate and influence the state structures. Through the control or use of the political process, the inherent logic of the process of economic change (creative destruction) may be either delayed or entirely stopped[32]. Most probably, the political agents in control of the state structure will be especially sensitive to the needs of the interest groups during certain periods in time. If this is true, we may see a more or less total incorporation of the interest groups into the state structure, as the state apparatus starts developing an increasing number of corporativist solutions[33].

Olson's conception of the innovative momentum is central, in order to understand how technological change may fragment these interest groups. Favorable exogenous factors such as "major technological innovations or resource discoveries"[34] will undermine the technological homogenity of the group, thus destabilizing the existing socioeconomic equlibrium[35].

To group members and their political allies, the choice between potential innovation and a steady-state technology will be a problematic one. The steady-state condition will be satisfactory to the existing industrial structure as a group, but to each of the members the possibility of innovation may represent a possibility of increasing their potential profits. To governments the same problem is evident. Steady-state conditions furthers existing socioeconomic solutions, but innovation may represent a possibility to further the interests of either society as a whole, or the interests of emerging groups.

As a whole, this argument implies that existing industrial interest groups (organized in cartels, trade associations etc) will be careful in introducing technological change into an industry, if decisions are to be made in some kind of unanimosity, as innovation will threaten the interests of the industry as a group. If possible, the industry will, using help from governments, erect barriers to entry, in order to avoid the threat that outsiders would represent to this organization.

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[32]Olson M (1982), p 63-65.

[33]Olson gives an example of this tendency to bring interest groups into the political process for the USA (during the inter-war period) in Olson M (1982), p 226-29. See, as well, sect 1.3.3, below.

[34]"... (it is) innovations that mainly explain economic growth and progress" Olson M (1982), p 61.

[35]Olson M (1982), p 62, 86, 210, and his note 22 p 254.

It is important to see the dynamics that innovations will introduce into different industries, if sufficient barriers to entry do not exist, and if several existing industrialists chooses to utilize the new possibilities opened up. In that case, the new innovation(s) will make for a heterogenization of the existing industrial structure. Olson mentions the possibility that

> "An economy may enjoy a boom in which the loss from its distributional coalitions is less than normal, and this can bring about a similar spiral of favorable effects until the special-interest groups have adjusted to the new situation, the promising investment opportunities have all been exploited, and so on."[36]

In the West European steel industry after 1945 this is, approximately, what happened up to ca. 1975[37]. The point is, thereafter, that an "innovative boom" such as this will never benefit all producers to the same extent. In both the coming of the boom, and to an increasing extent in its aftermath, we will see the results of these heterogenous possibilities to innovate and adapt. It is here that we ought to be able to view the processes of industry (group) fragmentization, as well as its results.

Olson singles out, in the West European context, two conditions that should have worked to undermine the existing interest group structure, thereby increasing the pace of technological change in the post-1945 period.

a) The disrupting effects of the second world war brought havoc to the existing structures of interest group organizations in, primarily, Germany, France and Italy. In the aftermath of the war, existing structures had been undermined, which made the appearance of new production functions more likely[38].

b) The foundation of the ECSC and the EEC brought further havoc to the existing West European interest groups, when boundaries were changed. Olson stresses the importance of three different aspects of these organizations: *free trade*, *free mobility* of labor, capital and firms and the *shift in decision-making authority* [39].

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[36]Olson M (1982), p 210.

[37]See sect's 4-5, especially 5.2.1.1 and 5.3.

[38]Olson M (1982), p 75-76, 130. On the concept of change in controlled situations see, as well, Lee D R/Orr D (1980), p 113-24 and Baysinger B/Ekelund R B/Tollison R D (1980) p 244 ff, both in Buchanan J et al ed (1980).

[39]Olson M (1982), p 119 ff.

This last aspect needs some further consideration. The ECSC (or the EEC) was not a "simple" trade union. Right from the beginning it was intended to evolve into a singular economic entity. Very important decisions concerning competititive conditions, industrial structure etc. were transferred to the transnational level.

This implied, to the existing national interest groups, that they would have to adjust their organizations, in order to be able to act on a Community-wide arena. In itself, the increased number of actors should have served to make concerted group action less likely, and more troublesome[40], especially if the increased number of actors were technically heterogenous[41].

To sum up: In the Olsonian scheme, the West European debacle in the second world war should have represented an unique chance to these nations, as they were stripped off older organizations that had lost their legitimacy after 1945. The contemperaneous coming of the ECSC/EEC structure represented a strengthening of this chance, as the existing organizations had to accomodate to a much wider (new) "national" context. Sooner or later, this ought to have resulted in escalating interest group fragmentization, when industry structures tended to become more heterogenous.

1.3. Economic change and the social meaning of depression in an European context

1.3.1. Hans Rosenberg

Hans Rosenberg's study of the great depression between 1873-96 is a thoughtprovoking study, which deals with the process and character of institutional formation and change in Europe. Rosenberg's analysis provides important insights into the working of the European political system, in a period of intensified socioeconomic pressure. In short, Rosenberg places the depressive phase of a long "Kondratieff" wave within its socieconomic frame. In this study Rosenberg's work will be used as one point of departure for our discussion of this subject matter.

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[40]Olson M (1982), p 53-58.
[41]Producing along different cost curves.

In his study of Germany and Austria in the period 1873-96, Rosenberg charted the economic forces that was upsetting the existing socio-economic system -the rapid pace of industrial change was contrasted to the forces working in the direction of a maintenance of the status quo, i.e. certain agricultural interests and craftsmen, but also large-scale industry, in a period when rapid technological change made for "profitless prosperities". The simultaneous rise of the laboring class was making a process of political and social retrenchment inevitable. It was in this context that protectionist policies and social legislation were resorted to, in order to reach a new social equilibrium, in a contained political and economic system, through the institution of a

> "...machtpolitische manipulierte Fürsorgestaat /for the/... Überwindung des Klassenkampfgedankes und damit die Stabilisierung der bestehenden konservativen, sozialen und politischen Ordnung trotz fortschrittende Industrialisierung auch ohne durchgreifende Staats- und Gesellschafts-reform erreichbar seien"[42].

What Rosenberg is clearly hinting at is a policy of trying to *introduce industrialization without having to accept any thorough sociopolitical innovations*. To Rosenberg, and to this study, this is a central theme. Industrialization was, in its European context, no unconditional process -on the contrary it was a process deeply imprinted with the conditions of the European *ancien regimes*[43]. These regimes tried to accomodate industrialism on their own conditions, something which had to lead to the emergence of new coalitions (between heavy industry and agriculture), and to a growing extent, the emergence of new contradictions within these coalitions, as well as between these coalitions and new, emerging, production functions.

This pattern of changing coalitions is implicit in the Rosenbergian scheme, as every long recession-phase will have to require new institutional solutions. These new institutions must accomodate the structural solutions of the traditional socioeconomic setup, as well as the economic forces that have emerged during the innovative economic phases[44]. The character of these new and changing structural

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[42]Rosenberg H (1967), p 225.

[43]See, as well, Schumpeter J (1991-1-b).

[44]By the 1980s, for example, agricultural protectionism -a remnant of the depression of the 1870s- had to be accomodated within the truly global economy that had started to emerge after the second world war...

compromises are instrumental to our understanding of the post-war period.

Thus, Rosenberg contrasted the period of strife (1873-96), and its social articulations, with the articulations of earlier and later prosperities, something which illustrates the different dynamics at work in depressions, as compared to prosperities:

> "Um die Psyche des Zeitalters zu verstehen, darf nicht vergessen werden, dass in der stürmischen Expansionsepoche der Industriellen Revolution, /1849-73/ die namentlich auch für die Deutsche Landwirtschaft eine höchst profitable Blüteperiod gewesen war, auf allen sozialen Ebenen die Ansprüche und die optimistische Erwartung gesteigen waren und eine höheren materieller Lebenstandard durchgesetzt hatte"[45].

The kernel of Rosenbergs argumentation is, thus, that there exists a correlation between the growth and transformation of modern industry and the growth of 19th/20th century corporativism. The modern collectivist state was the result of the marriage between agricultural interests in need of protection, industrialists pressed by "profitless prosperities", and a traditional patriarchalistic-repressive state apparatus. *It was in this context, that there was room for the formulation of a common interest, in order to get control of the social articulations of modernization:*

> "In historische Perspektive gesehen hätte die fortschrittende Industrialisierung und Umschichtung der sozialen und ökonomischen Klassenstruktur in jedem Falle auf kollektivistische Tendenze in Theorie und Praxis und damit zugleich auch auf einen Funktionswandel des Staates hingedrängt. Selbst in den Vereinigten Staaten, wo der ökonomische Liberalismus alten Stiles besonders in der Ideologie ungewöhnlich beharrlich blieb, ist eine solches Entwicklung mit erhelicher Historische Verspätung schliesslich eingetreten... In Amerika war das entschiedene revolutionäre politische und soziale Ergebnis der 1929

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[45]Rosenberg H (1967), p 56. In note 114 on p 118 in the same book Rosenberg is even more explicit in his interpetration of social ideas/attitudes as expressions for long economic trends:
"Dass beispielsweise gegen Ausgang des 18 Jahrhunderts bei den Ostpreussischen Rittergutsbesitzern Adam Smith und Arthur Young unter den intellektuellen führung von Professor Kraus in Königsberg so populär werden konnten, war ein Prosperitätsphänomen... Man kann daher auch besser verstehen, dass während und nach der Preussischen Reformzeit die auf die Agrarpolitik zurückwirkenden Lehren der Preussisch-Deutschen Agrarromantik mächtig an boden gewannen; ihr Konjunkturansteig war ein Depressionsphänomen."

> entsetzende Grossen Depresssion der "new Deal", in Deutschland war es das Nationalsozialismus"[46].

So, the central theme of the analysis is that long economic waves give rise to distinct sociopolitical phenomena.*Throughout downswings particularily strong pressures will be exerted from threatened interests/groups, pressures that will be articulated through protectionism, nationalistic myths and increased social strife,* whereas in upswings these tensions will ease, so as to create a climate of political and economic "progress" and tolerance[47]. What interests us is, of course, the depressive context, and how this wave produces protectionism, corporativism and nationalistic patterns. The direct mirror-image to these nationalistic patterns will, naturally, be how they are able relate and accomodate, to the international context.

1.3.2. Sidney Pollard

It is in this context that Sidney Pollards Pan-european industrialization pattern is of interest. He places an especially heavy emphasis on the Pan-european character of the economic processes of the 19th and 20th centuries: they became Pan-continental as the development of any one technology, source of raw material or industrialization in any new region, tended to create the possibilities for a continuation of the process,

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[46]Rosenberg H (1967), p 171-72.

[47]It is rather interesting to note the tensions that were created in an international context by those policies:

"To the student interested in the more general historic impact of business variations... it would be a tempting task to analyse the history of Austro-German-Russian diplomatic maneuvres up to Bismarck's anti-Russian credit prohibition of 1887 and the Russo-German tariff war of 1893, in relation to and in terms of grain prices,harvest cycles, cattle plagues, veterinary police measures, tariff and currency fluctuations and railroad and shipping freigth rates. /It/ would not only deepen the understanding of the European alignments and alliances; it would also reveal more clearly the international contradictions of Bismarck's policies. The predominantly pro-agrarian tendency of his protectionist economic policy... accounts largely for his domestic difficulties as well as for the growing alienation of German-Russian relations. It thus undermined the ultimate objectives of his defensive peace policies, which in their final outcome were further endangered by the combination of a policy of national self-sufficiency with one of world wide expansion." Rosenberg H (1943), p 72.

For Rosenberg's critical views on Schumpeter, see Rosenberg H (1940/41), p 96-99.

through adaptation and/or induced innovation. Industrialization turned into a self reinforcing process, with the potential of a bonfire.

Pollard's Pan-european pattern of industrialization[48] is crucial to the interpretation presented in his study of the restructuring of the West European economy in the period 1800-1970[49]. In the case of the coal and steel industries these "regions of 19th century industrialization" are easily identified. Coalfields -North-Eastern England, Scotland, South Wales, Northern France, Vallonia, Saar, Ruhr, Silesia- were ideal locations for heavy industry, because of the high cost of transporting coal. Later on the iron-ore districts of Lorraine increased in importance, when its low-yielding ores made them uneconomic to transport in unfinished form. These patterns of industrialization were obvious by 1914, as each of these areas had, more or less in turn, used their comparative advantages in order to industrialize.

The pattern is truly Schumpeterian. Different innovations were the backbone of the viability of each of these areas -new trading patterns for the export of coal, new uses for coal, distinct characteristics of the regions coal- and/or ore mines etc. It was, moreover, an evolutionary pattern that made this early, hereditary, system of European industry sensible to the continuing process of innovation and creative destruction. New production functions will always threaten structures like these, through the processes of "creative destruction". The likely outcome of struggles such as these will consist in institutionalized resistance and, ultimately, adaptation or death.

Pollard reaches a conclusion on the line of Rosenberg's, on the problems that beset this pattern of industrialization. The conservatism of the older ruling stratas combined to create a situation where nationalism and industrialism was joined, so as to create a "fateful bond between the two most powerful drives in nineteenth century Europe..."

By the 1870s this made for a "parting of ways", as the integrating European society instead turned towards protectionism. In Pollard's view this process was started by the impact of falling grain prices, leading to

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[48]"The /19th/ century as a whole had seen the economic integration of Europe to a degree unknown and unthinkable before industrialization. The countries affected by the industrial revolution did not industrialize independently, growing like separate flower-pots. Their transformation was a single process, the changes in each depending on the stages reached by others, on the supplies, technologies and markets of its neighbours". Pollard S (1974), p 35.

[49]Pollard S (1974).

agricultural protection and compensatory protection for manufactures. Pollard traces the evolution of protectionism and its influcence upon the political structure, again reaching a conclusion in unison with Rosenberg: protection and its companion nationalism, tended to foster an international climate dominated by increasing international pressures, which partly explains the periodic phases of warfare and international strain[50].

1.3.3. Ingvar Svennilson. The functions of consensual politics

The continuing tensions between "nationalism" and "industrialization" during the inter-war period are described by Pollard[51], but the dynamics of the situation may, perhaps, have been most vividly summarized by Ingvar Svennilson.

Svennilson describes the logical continuation of the pre-1914 structures of protectionism. The inter-war European economy was, in his view, dominated by several truncated processes of industrial change, as the development of new technologies[52] was calling for:

> "...a second revolution in the organization of agriculture, industry, distribution and the economic system as a whole" [53].

It was this impending change that conflicted with the short-term goals and vested interests of industralists as well as politicians. Logically, the

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[50]"While the positive influence of protection is much in doubt, its negative influence on foreign trade and the international division of labour is not in dispute. Given the nature of the political state in its competitive setting in Europe, its obstructive role in the evolution of an integrated European economy is as 'natural' as that evolution itself. But it is surely not entirely fanciful... to see in the opposition of the political authority to the underlying economic logic of European industrial development one of the roots of tensions and wars of the period c. 1865-1945. It may even be that there is a similar link between the astonishing progress of the European economy since that date and the decision of the political authorities... to work within rather than against, the integrating tendencies of European industrialization." Pollard S (1973), p 647. This analysis should be compared to Rosenberg's (as presented in note 47, sect 1.)

[51]"The dissection of Europe into its component parts, each trying so far as possible to live an independent existence, was achieved not merely by tariffs, as before 1914. The modern state disposed of an armory of new weapons, many of which were not only more effective, but also more destructive" Pollard S (1974) a a p145.

[52]The correspondence between this interpretation and the Chandlerian analysis (below) should be noted.

[53]Svennilson I (1954), p 20.

inter-war economy was marred by a considerable growth of economic as well as political nationalism, ("neo-mercantilism")[54].

What we need to emphasize here are some of the characteristic features of this period. The lagging rate of adaptation in Europe to the emergent technical possibilities, was making for a rather striking contrast to the situation in the United States. In short: as new technologies created new production functions, tensions increased between forces making for change and forces of conservatism. It was in this context that cartels were initiated, in a close cooperation between state, industry and labor unions, cementing all sorts of imperfections in the competitive system.

In Svennilson's analysis of the means and goals of this growing national corporativist entity, he confronts us with a most important insight into the functions of this evolving state:

> "The functioning of the European economic system cannot be understood if one does not take into account that *this was a transitional period between economic liberalism and national economic planning.*" (Authors italics)[55].

But if the strategy is to introduce increased planning or centralization, the structure (nature) of the planning or centralizing authorities is of central importance.

Crucial in this context is the interests of two actors: politicians and different economic interest groups. Politicians, confronted with organized and escalating demands for "protection", "guarantees" etc, have to make choices between distinct alternatives, in situations where uncertainty -about the future, about real electoral preferences etc.- is of central importance. Evidently, this uncertainty will increase in recessions and depressions, when the old socioeconomic structure is upset to its very breaking point.

It is in this context that the traditionalistic/conservative European state apparatuses started to develop an accelerating number of functions that "normally" should have been provided by regular market forces. As Svennilson put it:

> "...imperfections of the old liberal economy were partly replaced by imperfections in State intervention... Political parties and economic groups, such as the trade unions and industrial associations, were nationally organized; they gained their influence within the framework of

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[54]Svennilson I (1954), p 36-37.
[55]Svennilson I (1954), p 36.

> national institutions. It was therefore natural that they should in the first place claim a right to a share in national resources and income...[56]"

In this context corporativism, or corporativistic planning, becomes ways of centralizing previously decentralized (delegated) economic functions, used in order to increase group coherence. In this case, it is highly functional, and indeed necessary, to utilize the existing interest groups and their already functioning organizations. These organizations are able to both organize and run the new structures concerned with planning and centralization (of rationalization and investment decisions, of pricing and marketing etc). If order and coherence is to be infused into these new structures, the existing interests groups must be incorporated into them.

To the economic agents (the existing interest groups) this represents a possibility to regularize structural change. To the political actors, it represents a possibility to bring the directly concerned groups into the decision-making process. Trade unions, trade associations, farmers organizations etc. presents political decision makers with ready-made tools, through which corporativist steering can be performed. Thus, a firm cedes functions -to a trade association, a state administered corporativist planning agency etc- in order to materially benefit from this infringement on its (nominal) independence. It is of importance to recognize that these strategies are conservative, in every normal sense of the word, aiming at the propping up of threatened production functions. *Planning and increased interest group centralization (administered by the state) becomes a way of avoiding organizatorial and industrial restructuring.*

At the level of the firm, this makes for drastically altered entrepreneurial strategies, as compared to a traditional market-oriented behavior. The implications of this altered strategy are discussed in the next section.

> "New equilibria are constantly being formed in place of the older ones... it is only when large-scale organizations become more flexible and can eliminate some of their bureaucratic vicious circles, that they can overstep significant stages of growth. Decentralization now seems... to be the necessary condition for further growth..."[57]

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[56]Svennilson I (1954), p 36-37.
[57]Crozier M (1964), p 299.

1.4. Institutions and pressures for organizational change

1.4.1. Arthur Chandler

The development of the modern firm, and the growth of its organic links to the political sphere, may, in fact, constitute one of the most intriguing problem-complexes of the 20th century.

Arguing along the lines of Schumpeter, Rosenberg and Svennilson -that the corporate sector developed a symbiotic (corporativist) relationsship with the state during a long period of European history- implies that we need to view this development as a coherent strategy. In this context Alfred Chandler's analysis of the modern capitalist firm may provide us with a direct mirror-image to the European strategies. To no small extent what happened in the USA during the 20s and 30s was a prototype of what was to happen in Western Europe, only several decades later. The traumatic experience of rationalizing industrial entities (corporations), in line with changing technological paradigms was to be a long delayed, but no less necessary, process.

Chandler confronts us with the apparent paradox of the modern bureaucratic large-scale corporation, when it is viewed in the context of its results. Traditionally the growth of a multi-layered, bureaucratic unit should be a sure sign of growing ineffeciencies, yet the modern corporation has shown iself[58] able to exploit possibilities in a unprecedented manner.

To Chandler the growth of this entity is explained by a connected set of events, dating back to the second half of the 19th century. Until then manufacturing had been a labor-intensive, small-scale, one-unit activity, but this old "paradigm of manufacturing" was overturned in a remarkable way with the coming of railways (which were the first companies to adopt a multifunctional structure) and a whole set of new techniques that arrived almost simultaneously in several different industries around 1870:

> "It was the development of new technologies and the opening of new markets, which resulted in economies of scale and scope and in reduced

[58]This is not a reification of the company. I am fully aware that a company is not an entity, but only a sum of its parts. But, and this will be clear from reading the rest of the

transaction costs, that made the large multiunit industrial enterprise come when it did, where it did, and in the way that it did it"[59].

"It was not until the 1870s, with the completion of the modern transportation and communication networks... and of the organizational and technological innovations essential to operate them as integrated, that materials could flow into a factory or processing plant and finished goods move out at a rate of speed and volume and with the precise timing required to achieve substantial economies of throughput... The essential first step in exploiting the new technologies of production -the step that led to the creation of the modern enterprise- was, therefore, the investment in production facilities large enough to exploit the full potential of the... new or improved technologies. The critical entrepeneurial act was not the invention... it was the construction of a plant of optimal size..."[60].

"The new technologies transformed the processing of tobacco, grains, whiskey, sugar, vegetable oil and other foods. They revolutionized the refining of oil and the making of metals and materials, glass, abrasives... They created brand new chemical industries /etc./..."[61].

These elements make up the backbone of the developments covered by Chandler. It provides us with both a model of capitalist transformation, and a setting in which the European experience can be discussed.

First of all the critical developments in Chandler's argument must be identified: a (nearly) simultaneous transformation in communications and distribution (railways, telegraph) which makes the utilization of new industrial processes feasible.

Due to their capital-intensive nature and unprecedented capacities for production -being continuous, semi-continuous or large batch- these processes created a demand for entirely new organizational structures.

In its early stages these new organizatorial structures -large scale and multi-functional corporations- had to be able to exploit economies of scale and speed, i.e. economies of very large capacities, rapid throughputs and rationalized internal material and product flows. At a somewhat later stage economies of scope was exploited, i.e. enterprises started to diversify into related product areas, making more effective use of their deployed resources.

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text, the modern corporation has been unique in this ability to transform and adapt itself, in order to make its constituent parts go on operating as an entity.

[59]Chandler A (1990), p 18.

[60]Chandler A (1990), p 26.

[61]Chandler A (1990), p 62.

To utilize these techniques to their full extent enterprises grew more and more capital-intensive, as it was necessary to make "the three-pronged investment" - that is, firms had to invest not only in production, but in distribution and managerial capabilities, as well.

The three-pronged investment was necessary because of the need for enterprises of this size to control their environment. With unprecedented productive capacities, the control of markets (distribution, i.e. product flows out of the factories) became a very urgent consideration. Then, as the new industrial processes were demanding unheard amounts of capital, while simultaneously industrial activities was sprawling out into related fields (backwards into suppliers, forward into distributors, horizontally through fusions) the need for internal coherence and control became imperative (management capabilities).

This last proposition is crucial to Chandler's argument. *It is the development of a coherent organizatorial superstructure that has saved modern capitalism from the inherent inefficiences of bureaucracy.* After the development of the large-scale enterprise a period of reorganization was inevitable -trustification, mergerization, diversification- when firm strategies aimed at getting control over their environment through relatively unsophisticated strategies of cartellization, firm combination and all-out expansion into related product areas. The critical point in these developments was reached when growing industrial entities had to adjust their internal structures to fit this growth. The strategies of cartellization and expansion led to internal problems (breakdowns in communications, overload at head-offices) and, generally, problems of profitability directly related to the incoherent nature of enterprises. In Chandler's words:

> "...growth without structural adjustment can only lead to economic inefficiency"[62].

Now, as Chandler's case studies clearly bears out, this process was often a hesitant and painful one, where management was, in the normal case, converted under the gallows[63]. The task that most enterprises were

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[62]Chandler A (1962), p 16.

[63]In "Strategy and structure", Chandler gave thorough accounts for four corporations, that relatively early developed multi-divisional, decentralized, structures: Du Pont, General Motors, Standard Oil (Jersey) and Sears and Roebuck. Du Pont was losing money even in prosperities on their diversified product lines, and was bleeding rapidly in the downswing when reorganization came. GM was a conglomerate on the verge of a total breakdown when a total reorganization was made. Jersey had been detached from

confronted with was, essentially, similar: finding a structure suitable to changing and flexible markets and technologies.

The growing size and complexity of internal structures were making decentralization necessary. Over-centralization was avoided through the creation of (operationally) independent, product-oriented divisions. Head-office management was divorced from the day-to-day running of these divisions. Instead, it was able to specialize upon "environmental control and internal coherence"; i.e. long-term strategy formulation, planning, coordination, evaluation and implementation of overall strategy. Essentially, this is the logic of the philosophy of "the visible hand of managerial capitalism". The new large enterprises, with internal flows and responsibilities cleary defined, should in the ideal case be able to control their environments, thus replacing the invisible hand of market forces.

To reach these goals of streamlined production and internal control truly painful measures are necessary: rationalization of production in order to make maximum use of economies of scale and speed, elimination of possible double-commands inside the organizations[64], and the rational defining of functions and responsibilities. In the process production facilities are normally closed *en masse*, previously independent managers are eliminated, or their functions redefined. In order to gain rationality, control and flexibility, the internal structure of the bureaucracy must be thoroughly overhauled.

In our discussion of Western Europe we need to underline one point here. The coherent nature of this entity is a radical move away from the *raison d' être* of earlier trust or merger movements. The motives for these fusions were much less sophisticated: To gain control over their markets (and suppliers), through combinations *without any real internal fusion and reorganization* [65]. *It is only when fusions are followed by internal rationalization that the full economies of the merged enterprises can be realized.*

It is possible, that it is in this last paragraph that the most critical differences between American and European enterprises can be

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Standard Oil in the dissolution suit, and was in a major need to define clear strategies and react to technical change, Sears was a mail-order corporation that had had to react to changes in markets as well as in techniques.

[64]This is: the elimination of separate and unintegrated companies. Such entitities are most often the remnants of earlier trustification movements and mergers.

[65]For the trust movement and its nature, see, for example Chandler A (1990), p 73-75.

identified. The inherent conservatism of what we may term "the West European regularized solution"; i.e. trade associations, cartels and trusts, stabilized by the state action, is crucial to our analysis [66].

1.4.2. Socioeconomic adjustment in Western Europe. Its *raison d' être*, and reasons for the collapse of consensual decisionmaking

As the corporativist community of interests between industry and the political superstructure in Europe is emphasized in this study, we need to define the functional relationsship between these two actors. The need to define a functional role for the governments *inside* the existing structure of firms, as a mechanism intended to shore up organizations bent upon retaining the status quo is crucial to this picture of a corporativist Community.

As well, we need to try to identify the drawbacks that a structure such as this will contain. At some point in time, the elaborate structural solutions developed to handle a controlled status quo may start to crumble, if the interests of several of the main actors involved are no longer satisfied. In situations such as these, a process of fragmentization will start that will lead up to important breaking points. These processes will be necessary to identify in our study.

Michel Crozier's study of the functions and dysfunctions of the centralized bureaucratic system of organization provides us with a link between the macro-level activities described by Rosenberg and the micro-level activities of the firm. As already discussed, the search for protection, state-controlled trade associations etc. is a most important strategy, in order to uphold an increasingly outmoded industrial structure. According to Crozier this centralized, bureaucratic and state

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[66]The basic problem has been summed up by Schumpeter: "The progressive trustification of economic life facilitates the permanent continuance of maladjustments in the great combines themselves... Furthermore, in consequence of the financial strength of some firms, especially the older ones, the adjustment is not always very urgent... There is also the practice of outside support being extended to firms or whole industries in difficulties, for example government subsidies, given upon the bona or mala fide assumption that the difficulty is only a temporary one. In times of depression there is also frequently an outcry for protective duties. *All this acts in the same way as the financial strength of old businesses.*" (Authors italics). Schumpeter J (1951), p 244.

dependent system was the typical French mode of production[67]. To Crozier, it was a central problem that the system was on its way of becoming outmoded.

The advantages that Crozier's analysis offers us, is that it provides[68] a framework for understanding the actions of the West European state structures. In the West European context the functional relationship between the firms and the state had very old origins. The bonds had, moreover, been strengthened during the inter-war period. In the period after 1945, the continuing evolution of this functional relationsship was of central importance. The state was, in several instances, to act as an intermediator in the adjustment that had to be made by traditional West European firm's to the Chandlerian' paradigm. The role that the state had to play in this process is underlined and systematized by Crozier.

If, in this process of adjustment, the functional relationship that had developed between the state and the firms hampered continued rationalization and economic change, this had to lead to either one of two very distinct reactions (outcomes):

1) Either this could provoke an *increased* tendency towards protectionistic centralization, as the recurring economic crisis led to ever accelerating demands for "protection" and "social mediation". *This is, of course, the socioeconomic genesis and the true meaning (function) of the "vicious circles"*, as discussed below.

2) On the other hand the recurring economic breakdown may provoke "chock tactics" by the state, in order to open up a system no longer able to fulfill the roles assigned to it. Both of these cases are discussed below, and they are of central importance to our study.

According to Crozier the "bureaucratic system of organization" is primarily recognized by its extreme centralization of decision making, its reliance upon impersonal and pre-set formalized rules and its formalization of communication and responsibilities between and within the structure's different strata. Thus, the "bureaucratic system" becomes a system where each strata within the organization leads separate and essentially independent lives, in touch with each other only through the use of pre-set rules. The role of the center becomes one of an arbitrator in feuds, over the application of these ritualized rules[69].

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[67]Crozier M (1964) .
[68]Together with the discussion made by Elbaum/Lazonick, below.
[69]Crozier M (1964), p 188.

Change, flexibility and the development of lines of communication *between* different strata is the absolute negation of what this organization is up to, as this would make for the disintegration of the existing structure. Hence, *change can only be introduced into the system during crisis situations,* if and when dissatisfaction with the dysfunctions of over-centralization becomes acute enough. In situations such as these outside forces may be released (primarily by changing state action, as the firms are dependent upon state intervention) into the system, introducing change into a structure developed to handle the problems of a "stalemate society" (below)[70].

There is nothing metaphysical about this scheme of organization and change, rather, the view taken is strictly functional: the bureaucratic mode of organization -*aiming at controlled immobilism* - had been the functional adaptation of the *ancien regime*, in order to meet new organizatorial demands:

> "One may argue that its /the bureaucratic mode of organization/ development in France is associated with the resistance of older ways of life which was brought to a special perfection before the industrial revolution. Resistance to participation, and preference for centralized authority and the stability and rigidity of a bureaucratic system of organization, by preserving for each member a minimum of autonomy and individual discretion, proceed from the same values which peasants, craftsmen, and noblemen embodied in the delicate balance of human relations that characterized the art de vivre of the traditional France... competition has been institutionalized... its formalism has, at least partially, the same protective value as the older ascriptive rules"[71].

Thus, the function of the system was one of smoothing change[72] -the system allowed "the introduction of the exact amount of change that was tolerable without endangering the bourgeois equilibrium"[73]. This produced an accord between continuity and change. The continuing survival of this accord was dependent upon

a) the interaction and cooperation between the private economic (firms) bureaucracies and the political bureaucracy, and

b) the similarity in outlooks and interests, that existed between these two centers.

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[70]Crozier M (1964), p 195-97.

[71]Crozier M (1964), p 208.

[72]I use the term "regularize(d) structural change" several times in the text.

[73]Crozier M (1964), p 258. We are again encountering the search for a strategy which would make the eating of the cake possible while still being able to keep it.

Because the firms does, self-evidently, become dependent upon the political framework in this model. As the organizatorial structure is bent upon inward looking strategies of rule application, firms depend upon the political superstructure for the formalization of protection against outside forces (competition), as well as against rebellions -i.e. industrial action from trade unions. With intra-firm communication reduced to a minimum and strata isolation systematized, the only possible mean of communication between strata becomes dramatic actions. In this context the dependence upon state intervention (as an arbitrator, mediator or trouble-shooter), makes up for the lack of intra-firm communication[74].

It is easy to see how "vicious circles" develops in systems like this:

> "The dysfunctional consequences of displacement of goals -i.e., difficulties with customers, poor communication with the environment, and the unsatisfactory adjustment to it, difficulties in achieving a task, a lower productivity, etc- cannot and will not lead to greater flexibility within the system. The only weapon that can be used by the people who must make decisions is a greater elaboration of rules and further centralization. Also, individuals and groups who directly face these difficulties... at the field level do not apply pressure to obtain more autonomy. *On the contrary they attempt to use the dysfunctions to reinforce their position vis-a-vis the public and inside the organization.* Their struggle against centralization is not directed toward helping the organization to adapt better to the challenge... *but rather toward safeguarding and developing the kind of rigidity that is protecting them*"[75].

Hence, we are confronted with a bureaucratic structure bent upon the exact opposite to the one discussed by Chandler[76]. The Crozerian firm,

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[74]Crozier M (1964), p 244-50.

[75]Crozier M (1964), p 193.

[76]Crozier was very aware of this basic problem -the differences between firm behavior in the United States, as compared to France. The study's very aim is to explain these differences, by providing a historical and functional framework to the French experience, thus simultaneously explaining its changing character after 1945.

In a wider context, though, the differences between West Europe and the USA shouldn't be exaggerated. In the US, the critical move from multifunctional to multidivisional (decentralized and rationalized) firm structures occurred during the 20s and 30s, as a direct reaction to widening markets, diversification and technical change, i.e. crisis situations along the lines described by Crozier (in the American steel industry the move was extremely late in its appearance).

The *exact* timing of the move in the US as compared to Europe is not our primary concern, though; it is the basic characteristics of these two ideal types of firms that we need to discern, while also recognizing the therapeutic functions that the development of

and its associated political structure, are both bent upon a pattern based on formalism, privilege and the breeding of ineffeciencies. Change can only come about as the result of a deeply felt crisis, if and when enough vicious circles develop, which render the system ineffective in the achievement of its primary goal: the preservation of a negotiated social peace.

According to Crozier, the critical stage in the distinctively French mode of bureaucratic organization was reached after 1945, when change was introduced into the system in order to cope with a dynamic environment. The earlier mode of organization was yielding decreasing returns to the political superstructure, something that led to politically induced institutional innovations -nationalizations, planning, the introduction of the philosophy of *économie concertée*[77]. It should be recognized, though, that these were ambvivalent structures. At the time of their (French) introduction they may have been progressive forces; in other instances they could, just as clearly, be turned into structures used in order to contain the socioeconomic equilibrium.

In this context the institutional innovations become inseparable from the economic innovations introduced through them. Innovation (economic growth) creates escalating pressures for change at increasingly more parts of the system. New policy styles create pressures for change in firm structures; growth opens up new career oppurtunities, which creates pressures on older economic centers; and new demands from firms and the public upon the state furthers these imbalances to an even greater extent. All of these factors thereafter tend to create situations of overload within the system. This is where the "regularized West European market economies" found themselves by the mid 60s[78].

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close links between the centralized, unreformed, firm and the state may have. Combinations, cartels and trade associations needs strong rules and policing actions; the state may -through direct or indirect participation- provide these prerequisites to delayed rationalization.

[77]Crozier M (1964), p 300-05.

[78]"The citizen, who once refused state intervention as much as he could, is now continually asking for more services. Thus servicing... is taking the precedence over controlling. Increasing numbers of new roles must therefore be created, which do not fit into the old system. The system is tending to disintegrate because it has overextended. Specialization and differentiation... entail another logic of bureaucracy that can be reconciled with the logic of centralization only in the short run. In the long run... the general equilibrium of the system is completely disturbed..." Crozier M (1964), p 312. See, as well, Buchanan J (1988), p 13 ff.

What Crozier saw by the mid 60s was an old organizational system on its way out, leaving confusion in its wake. The functions essential to the developing economic paradigm -managerial planning, the evolution of lines of communication between stratas etc- were still underdeveloped. The problem that this underdevelopment presented the state with (the build up of pressures for escalating state action) was evident to Crozier. This problem was only to become more acute during the 70s.

The similarities between this analysis of the French firm and its functional relationship with the state, and the discussion presented by Bernard Elbaum and William Lazonick[79], on the reasons for the "British disease", are rather striking.

They present a string of case sudies, all demonstrating the problems that traditional British firms were confronted with, at least from the inter-war period[80]. Summarizing, we conclude that British staple industries were, in general, confronted with increased international competition, a need to adopt new technologies and -ultimately- a need to develop efficient institutions to deal with these interconnected forces.

The old structure of small family-controlled firms in staple industries[81] were under threat, something which provoked pressures for increased state intervention. As the existing firms were unable -or disallowed, due to socioeconomic pressures[82]- to reform the structure into a more progressive one, something else was called for:

> "What British industry in general required was the visible hand / in its Chandlerian sense, see above/ of coordinated control, not the invisible hand of the self-regulating market. Given the absence of leadership from within private industry, increasing pressure fell upon the state to fill the gap" [83].

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[79]See Elbaum B/Lazonick W (1986).

[80]Lazonick W (1986); Elbaum B (1986); Tolliday S (1986); Lorenz E/Wilkinson F (1986); Lewchuk W (1986); Hall P (1986), all in Elbaum/Lazonick (1986).

[81]Compare this to Crozier, on the atomistic French firms: Crozier M (1964), p 270-86.

[82]We will see examples of this in the case of steel, England, below. Elbaum/Lazonick summarizes the pressures that will always bear upon institutional innovators:
"Coordinated attempts to eliminate excess capacity were confounded by numerous conflicts of interests between owner-proprietors, outside stockholders, managemant groups, banks and other creditors, and local union organizations. In particular, the involvement of national banks in the attempts to rationalize industry was aimed more at salvaging their individual financial positions than at developing a coherent plan for industry revitalization" Elbaum B/Lazonick W (1986 a), p 8.

[83]Elbaum B/Lazonick W (1986 a), p 10-11.

Hence, Britain was

> "...impeded from adopting ... modern technological and organizational innovations by the institutional legacy associated with atomistic, nineteenth-century economic organization... Britain's problem, however, was that economic decision-makers, lacking the individual or collective means to alter existing constraints, in effect took them as given"[84].

It is in this context that the evolving relationsship between the state and the firms should be viewed. To firms, banks and trade unions the state became the ultimate source of the good in greatest demand: survival and security. It was the state that was able to infuse stability into trade associations and cartels, through legislation and increased protection.

The -socioeconomically necessary- conservatism of the state insured the survival of outmoded lines of production, something that in no way had to change when ownership of these resources shifted in the post-war period. Industries, when nationalized, were confronted with the same basic problems of technical and organizational inefficiencies.

For our discussion this is a very important point to make. State intervention -and its logical extension, nationalization- need never be something innovatory. On the contrary, intervention will, in many cases, aim at a retention of the status quo[85].

This problem represents our gordian knot: It was the constant necessity for "social compromises" in the West European socioeconomic context that made for corporativist solutions, where firms, governments and trade unions worked together towards the salvation of outdated structures. It should be recognized that nationalization, in the normal case, are the ultimate corporativist solution: capital owners get "compensated" and losses are socialized, unionized members are "guaranteed" jobs, and the state provides funds for new investments.

But the strategy of "propping up" will need new structural innovations, as well. Structures will have to be developed where communication between these three agents (capital owners, trade unions, governments)

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[84]Elbaum B/Lazonick W (1986 a), p 2.

[85]Elbaum and Lazonick notes that "Public ownership overcame the problem of horizontally fragmented private ownership, but not the inherited problems of productive structure, managerial organization, and union job control. Nationalized enterprises still had to confront these problems while attempting to overcome the technological leads already established by competitors". Elbaum B/Lazonick W (1986 a), p 14. See, as well, Olson M (1982), p 62-63.

are regularized[86]. Then, as time and problems progresses, structures regularizing deeper intervention will have to evolve. It may, in fact, be at this stage that nationalizations or quasi-nationalizations are made.

If and when intervention is regularized (through nationalizations), structures for communication between government, specialized departments and nationalized firms will have to be developed, *in order to solve all the structural problems that were at hand before the start of intervention.*

In general, this implies that the wave of increased intervention and nationalization that we trace to ca. 1965-80 in the text, has to be seen as a logical continuation of the old consensual process. In its West European context, nationalizations cannot be regarded as occuring out of strategies of "radicalism"; rather they were the ultimate structural expression of sometimes absurd strategies of socioeconomic conservatism. Simultaneously, the trend didn't augur well for the future of consensus. It implied that one of the partners -private capital- was on its way out of certain economic sectors, a sure sign of an escalating process of fragmentization within the corporativist structure.

1.5. The changing role of the economic-institutional framework over the long cycle: The actual setting of our study

1.5.1. The long-term trend and institutional upheaval

This is summary of our preceding discussion, as well as an introduction to sections 3-6. Being an introduction, it touches upon several subjects that will be much more widely discussed in the coming sections. The reader should, thus, not judge section 1.5 too harshly at this early stage. It is in the full context of the book that some of these rather wide-ranging conclusions should be seen.

Obviously, Western Europe was in a need for solutions able to deal with the problem of adjustment in the staple industries at least from the 1920s - probably even earlier. We have discussed the evolution of strategies meant to take care of this need. We have placed their appearance, or at least their intensification, to the inter-war period. We

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[86]Capital owners, trade unions and the governments.

have described their aims to have been, generally, the evolution of planned-corporativist modes of organization (consensual politics, facism).

After the war new strategies emerged -aiming at (controlled) modernization and supra-national coordination[87]- which required new structural solutions. It should be recognized right from the beginning that this development was still closely controlled at the national levels, anything else being practically impossible at this point in time[88]. As governments continued in the driver's seat along with private capital, they did this in the search of, as Crozier put it: "the introduction of the exact amount of change that was tolerable without endangering the bourgeois equilibrium". Crozier is, probably, right in viewing the late 40s/early 50s as important turning points, when governments were releasing new forces into the system, *although still on the basic assumption that overall control over system could be kept.*

But, as change impinged on the system and the new strategies and structural innovations[89] had to be accomodated within the old atomistic and bureaucratic structure, situations of overload (as described by Crozier above) developed throghout the structure. The very success of the new strategies implied a need for ever greater adjustments, and at some point in time a reevaluation of policies had to be made, getting the overall structure in line with these innovative forces.

There is a close correspondence between this line of reasoning, and the analysis made by Schumpeter on the characteristics of the depressive phases of the economic cycle. In my view, we are dealing with two sides of the same coin. In the depressive phase of the cycle the strictly economic side of the system is plagued by "... disequilibrium is brought to its head, due to entrepeneurial activity and the release of new products and a revision of all elements of the system becomes necessary."[90]

But the simultaneous development and movement in the political superstructure, when confronted with the same basic economic forces, must turn into a direct mirror-image of this economic upheaval and reevaluation. Returning to Rosenberg, we note that it was during the deep depressions of the 1870s and 1930s that economic and social strains

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[87]The evolution of plans on the lines of Monnet and Sinigaglia, in an international context the evolution of the ECSC, EEC, GATT, EFTA etc.

[88]See sect 2.2.2.1: The thwarted American plans for federal solutions in Western Europe.

[89]Again: plans, the evolution of supra-national organizations etc.

[90]Schumpeter J (1939), p 135-36.

became crystallized enough to provoke the release of massive doses of totalitarianism, corporativism and protectionism into the system.

Viewing the *results* [91] of the institutional innovations of the late 40s and early 50s in a Rosenbergian sense, we are able to view the movement up to the mid 60s as, at least partially, prosperity phenomena. The economic forces released during this prosperity phase of the cycle carried enough force to upset the existing societal fabric by the onset of recession[92], and as the recession got under way, this had to provoke a reevaluation of policies and socioeconomic structures.

Analyzing the recessive and depressive phases of the cycle (which we place somewhere from the mid 60s up to ca 1982/83) we remember the role of the state as a carrier of innovation (in the Crozerian sense) during the prosperity phase. This is to be contrasted to the significant increase in state-led intervention that occured all over Western Europe after the mid 60s. These seemingly divergent tendencies are important to consider, as they signal the coming of an everincreasing overload situation. Confirming this view is the fact that numerous "vicious circles" opened up, as the 70s progressed[93]. The state, having been relatively successful in its role as an innovator and institutional mediator in the preceeding period, expanded its role as a direct answer to the escalating pressures that were articulated during the recession. This expansion was essentially undertaken on the lines outlined by Rosenberg: intervention, protectionism and corporativism (tripartism etc.) were increasing in importance. The state, having pushed innovative strategies during the 50s and 60s, was turning into the private sector's garbage-can, during the rationalization phase of the cycle.

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[91]That is: the way they actually evolved ("worked"). As it was, a Community such as the ECSC could have turned out to be virtually anything, given the duality of its constitution (and the duality of the aims of its founding members).
Our point is simple: Had this institutional innovation arrived in time to catch a recession-depression, it would have been something very different from what it turned out to be, arriving just in time to catch the prosperity phase of the Kondratieff.

[92]Through the "weeding out" process described by Schumpeter, sect 1.2.1. It should be remembered that it is the recessive (and depressive) phases of the cycle that are the most formative ones (at least in the acute sense of the word). It is during this phases that the overcapacities open up, and the old production functions are eliminated at an accelerating rate.

[93]Dysfunctions that had emerged because of interventionist strategies and their structural articulations were countered by stepped up intervention and centralization.

Our analysis emphasizes the coming and strengthening of the "vicious circles", as well as their increased costs. Likewise, the changing character of the new institutional innovations of the 50s, during the recessive phase of the cycle[94], needs consideration. In this line of analysis the vicious circles and the emerging situations of overload are instrumental to our conception of the cycle's turning points. Thus, somewhere around the bottom of the wave -we note signs of this by 1978, increasing in force radically by the early 80s- we discern a movement out of the institutional and technological paradigm of the preceding period. As the recovery phase of the cycle gathers in force (after the very acute depression of 1980-83) this movement seems to gather pace, not least as the result of the virtual implosion of the earlier corporativist-protectionist structure.

The new movement must, in our view, be understood as the logical reaction to the crisis that Crozier had seen coming as early as 1964, a crisis which became acute when innovation worked its way through the West European socioeconomic system, provoking a virulent clash between the inherent forces of accomodation and the emergent forces of change. It was becoming impossible to accomodate these divergent forces within the old corporativist structures:

> "In short, the Thatcher government came to power as much because of a backlash against the system of functional representation which had become central to economic policy-making in Britain as because that system produced poor results"[95].

Thus, the state had to reevaluate its strategies, and when this occured, firms had to reevaluate their strategies, as well. It was this process that caused consternation and confusion (not only in Western Europe, but,

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[94]Again: the EEC, the ECSC, planning, Keynesianism etc. In the initial phase of the recession-depression these innovations increased in importance, whereas after the mid 80s they either decreased radically in importance or were remoulded, to fit the new situation emerging during the recovery phase. The evolution of the conception of the European Communities is highly significant. After 1965 and during the whole of the downswing it was regularily used as a concept for protectionism, by 1985-87 it had turned into a vision for a concieved strategy of a Europe without boundaries by 1992. EMS (the European Monetary System), which had been stillborn in 1970, and broke down under pressure from increasingly "nationalistic" policies, was rejuvenated by 1979. By the later 80s, it had become a potent force in the moves towards West European convergence and integration. These developments must be viewed as "recovery phenomena". (One needs only note what happened to the EMS, and the vision of the future of Europe, during the recession of the early 90s).

[95]Hall P (1986), p 290.

indeed, all over the world) over the role of the state and politics during the 80s. As the older structures had to be disposed off, new strategies had to evolve, something that clearly required the evolution of new structural solutions. The old consensual, nationalistic and bureaucratic structure started to dissolve, as the process of evolutionary economic change manifested itself in a period of increased uncertainty. This resulted in an intensified political-economic search process.

Likewise, economic sectors virtually abandoned by their political superstructures[96] had to be strategically and structurally adjusted, to be accomodated to this new situation. It is in this context that policies of "privatization" are encountered. Privatization solves as few problems as nationalization, if the basic structural problems of the firms are not adjusted (these problems may well be addressed prior to the actual privatization).

These structural problems will consist of at least two elements. First of all the basic problems of the rationalization of the industrial structure and the evolution of coherent decision-making centers and lines of communication within the firms are again encountered. Secondly, new problems may have emerged during the periods of increased intervention. Vicious circles and situations of overload[97] had often been created when stagnant sectors were connected to each other by interventionist strategies. These connections ("tie-ups") had tended to create structural solutions which satisfied the need for consensus, rather than innovation and growth.

Hence, our discussion of the 80s does not center upon privatization *per se*. We are instead interested in the environmental changes that became apparent during the recovery phase of the cycle, and in the functional

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[96]This is, of course, an exaggeration. What we are hinting at is that certain sectors that had been turned into centerpieces of sociopolitical action for several decades (and which had all been considered to be of central importance during the recessionary wave after ca 1965), such as coal, steel, agriculture, textiles and shipbuilding, all found themselves in deep trouble with their political superstructure after the early 1980s.

[97]Situations of overload will, in this interpetration, emerge if demands are put upon a sector, which only can be fulfilled in politically administered situations (structures), such as (naming just three examples): demands for national autarky, demands for guaranteed deliveries at administered -low- prices and demands for total safety of employment. How situations such as these may lead to endless vicious circles, and how they may render "privatization" totally meaningless, if the whole environment isn't changed, is equally clear.

adjustment at the level of the firm to these changing conditions -i.e. the firms strategic and structural adjustment.

The state have, no doubt, been instrumental in the formation of economic strategies and structures in Western Europe. We have, therefore, discussed the changing character of this intervention during different periods up to the 1970s. Thereafter the mediating position upheld by the state seems to have changed in character, as it became impossible to accomodate rapidly changing social and economic demands within an increasingly outdated structure. This has given birth to entirely new phenomena, such as the internationalization of firms (rather than just increasing trade).

Overall, in the development of West European industry during the post-war period, three factors are emphasized:

1. The role of innovation, that is the new production functions introduced into the economy.
2. The impact of these innovations upon older lines of production, especially during recessions (or depressions), when the impact of growing over-capacities should be most pressing upon previously dominant production functions.
3. The functional relationship between state and the enterprise sector.

1.5.2. The factor of time: The long-term trend and conjunctural change

Providing our study with clear time-frame is necessary, if we are to discuss change in the context of a presumed "long wave". If the "great depression" of 1930-33 is accepted as the "depression phase" of a preceeding Kondratieff "long wave", then events taking place in post-1945 Western Europe should have been deeply influenced by the prosperity and recession phases of the next Kondratieff.

The recovery phase initiated during the 30s should have been interrupted by the 1938-39 and 1948-49 Juglar recessions. The next Kondratieff wave starts from this point, its prosperity phase (the introduction of new techniques) stretching some two decades, interrupted by Juglar recessions in 1957-58 and 1966-67.

The prosperity phase should then -somewhere in between the Juglar recessions of 1957-58 and 1966-67[98]- have weakened, as original innovation was followed by adaptive and imitative investment. That is, we encounter the phase of the Kondratieff when the "new ways of doing things" had to be accepted and accomodated by traditional producers, something which implies two things: the need for massive rationalization (weeding out of outdated production functions) and an increased instability with regard to prices, as well as social values:

> "...since entrepeneurial activity upsets the equilibrium of the system and since the release of the new products, in particular, brings disequilibrium to a head, a revision of values of all elements of the system becomes necessary and this, for a period of time, means fluctuations and succesive attempts at adaptation to changing temporary situations. This, in turn, means the impossibility of calculating costs and receipts in a satisfactory way... hence, the difficulty of planning new things and the risk of failure are greatly increased..." (citation see note 11).

The wave-like movement in inflation rates and GDP growth rates are demonstrated in fig 1.1 and 1.2, below. We note a slow down in growth after the early 60s, while simultaneously price instability greatly increases. The advantage of using aggregate figures to demonstrate the working of a "long wave" is, in our scheme, that it presents us with an economic average - we do not risk being fooled by the problems presented by branch figures (below), where the very elements of the wave create disturbances. Using aggregates, on the other hand, means that we are able to "see through" the billions of -rising or declining- production functions that makes up the wave. The averages presented in GDP figures, or overall inflation rates (as opposed to relative price developments), represent, in short, the overall working of all the forces within the Kondratieff wave.

On the other hand, and for the very same reasons, in all other cases aggregates are, if possible, avoided throughout this study. Aggregates can provide averages, but, by doing just that, they hide the sectoral character of change. To our point of view -emphasizing the unique character of innovation- this is extremely dissatisfactory: what we are aiming to explain is the different implications that innovation implies to different producers, and we are running a very real risk of losing track with both the unique and the cumulative character of innovatory change, if too much use is made of aggregates:

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[98]The Kitchin recessions ocurring in 1953, 1962, 1971, 1977 and 1986.

> "This really casts doubt on the possibility and meaning of any statement that turns on any but the most outstanding features of our graphs... /they/ *invite to erronous interpretations if the series is not studied in relation to the history of the industry and its technology, which alone gives the key to its meaning...* (authors italics)"[99].

We can foresee rather tumultous events during the depressive phase of the Kondratieff. Investment will make the system more unstable as time proceeds, when relative prices as well as basic socioeconomic conditions are disturbed by "the release of new products", (i.e. as the new production functions penetrates the socio-economic system).

We date the intensification of the recession (the movement from recession into depression), from somewhere after the Juglar recession of 1966-67, up to the two "oil chocks"[100] of 1973 and 1979-80; chocks that inaugerated the two deepest Juglar recessions of the long wave (1974-75 and 1980-83).

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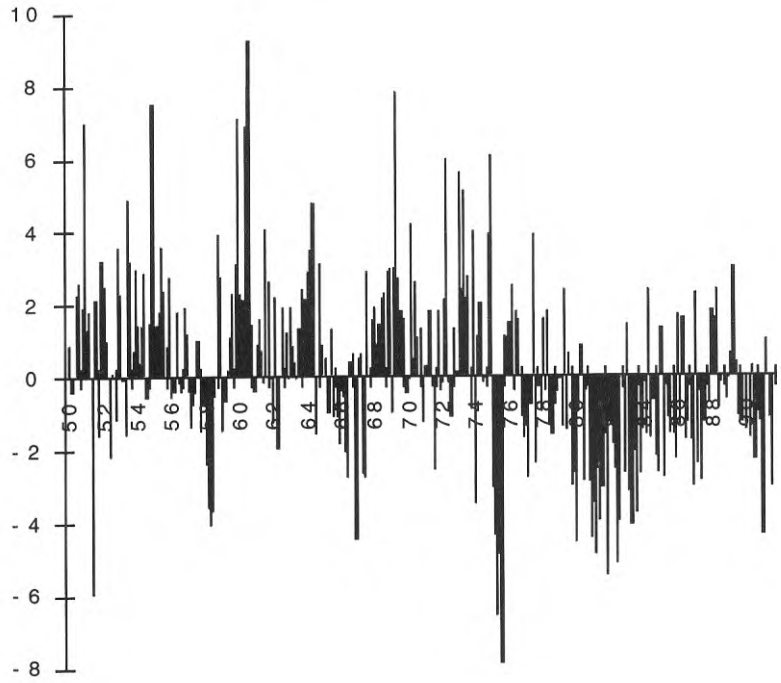
[99]Schumpeter J (1939), p 484.

[100]These chocks are in our analysis (sect's 3-5) internal to the system. Essentially, they were the result of the socioeconomic wave of adaptation, that had been provoked by the innovations (the possibility of extra-continental oil and coal imports into the USA and Western Europe) of the 1950s. In my view, the only truly external chocks that can hit a system will be major natural disasters and apocalyptic diseases (if the oil chock had been caused by supernatural intervention eradicating all oil tankers from the face of the Seven Seas, then the "chock" would have been external to the system).

As it happened, the chock was a sociopolitical, as well as economic, process. In my view it was, in fact, the logical culmination of the Kondratieff. It would, in fact, be hard to overemphasize the role of new sources of petroleum as a "leading sector" in the Kondratieff; disturbances in petroleum flows were associated with all Juglar recessions after 1955. The Suez crisis was associated with the one of 1957-58, which also had rather upsetting effects on indigenous production of oil (USA) and coal (Western Europe). The 1966-67 recession is less associated with the six-day war of 1967, but its mesmerizing effect on West European coal mining is more readily in evidence. The 1974-75 and 1980-83 recessions has become intimately tied up with the oil chocks, and the recession of the early 90s was, again, blamed upon Mid-Eastern producers of crude.

Hence, any theory of "long waves" that deals with the "oil chocks" as external to the system lacks in logical coherence. If oil producers were pivotal to the working of the wave, they cannot -by chance- have gone mad at randomly selected points in time, releasing doom and gloom upon Western socities by their whims. Quite to the contrary, I would argue, that Mid-Eastern and North African oil producers became an integral part of the Western socio-economic arena, at least from the early 50s, as the need to react to the new production function was increasingly felt all over the Western world (sect 3).

Figure 1.1. **Gross Domestic Product 1950-91. Yearly divergences from trend rates in Western Europe.**



Note: Yearly divergence from GDP trend rate. Trend 1950-91: Fra: 4,1%; Bel: 3,4%; Ita: 4.3%; FRG: 4,5%; NL: 3,8%; Lux 3,8%[101]; UK 2,3%.

Sources: Trend calculated from Yearbook of International Financial Statistics (IMF, New York). For *separate years* in the 1950-53 period, use was made of Mitchell B (1992).

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[101]For Luxembourg the trend period is 1950-90, as the 1991 GDP figure still wasn't available in the March 1993 edition of the International Financial Statistics.

This period should, if it was a real depression, be marked by the intensification of trends apparent during the early downgrade - i.e. an intensified pressure upon the production functions that had,

a) already been deeply disturbed after the early 60s, and,

b) the least efficient of "new" producers that had made their appearance after ca 1960. According to our scheme, the adaptive wave should, by the late 60s, have reached the production functions least able to benefit from the new "technological paradigm" apparent during the 50s. That problems center on these two instances during the depression is pivotal, if we are to speak of a "long wave". *If problems foremostly hit what had been introduced in the prosperity; and a renaissance was apparent in the branches that had been troubled in the 60s, then there would have been no wave, only a circular movement in and out of crisis situations.*

Likewise, the wave of corporativism and protectionism that should be expected after the mid 60s, ought to be concentrated upon the shoring up of these threatened production functions.

Then, if we accept that the recessive-depressive movement is an integral part of the working of the capitalist system, we are able to see the absolute necessity of the phase. It is the weeding out of sub-optimal producers during the recession, "the clearing of dead-wood through the process of competing down", that allows innovation to transform the system. What ought to remain in the system after a recession-depression, is the most effective producers introduced in the preceeding Kondratieff wave, and the embryonic but growing production functions introduced during the severe downswing (production functions directly introduced to cope with the shortages and disturbances of the depression).

Understanding depression as a period of profound social disturbance and economic disparity (greatly increased price instability), we can understand why the room for innovative behavior should be expected to increase during a depression[102].

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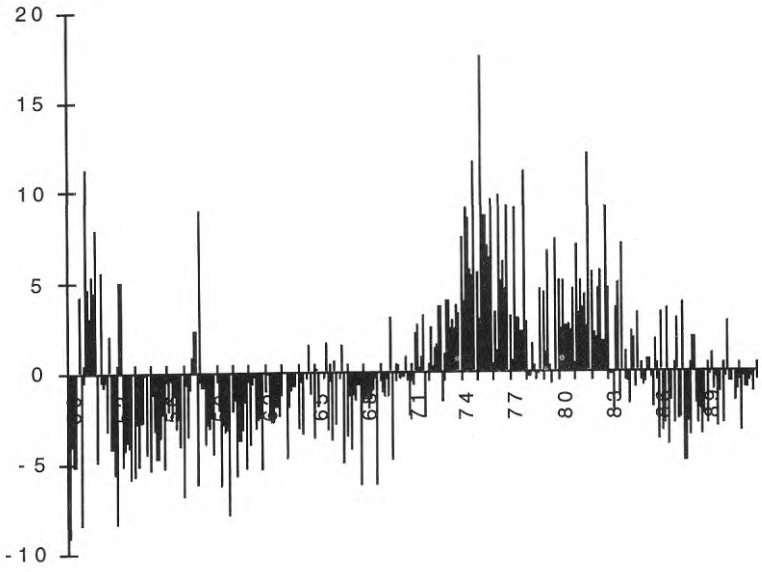
[102]That is: For political as well as economic entrepeneurs.

Figure 1.2. Inflation 1950-91. Yearly divergences from trend rates in Western Europe.



Note: Yearly divergence from inflation trend rate. Trend 1950-91: Fra: 6,3%; Bel: 4,2%; Ita: 7,5%; FRG: 3,0%; NL: 4,3%; Lux 3,8%; UK 6,8%.

Source: Yearbook of Financial Statistics (IMF, New York).

As disparities and disturbances greatly increase, this increase will, by itself, introduce a very acute element of choice into political as well as economic process. During prosperities, and during the early phase of recession, which is characterized by the massive increase in production made possible by the introduction of new techniques during the prosperity[103], growth will make accomodation and adaptation possible. On the other hand, during the depression the scope that "automatic

[103]As Schumpeter points out: the recession is the period of "harvesting what has been sown in the prosperity". The recession turns into a severe recession or depression, because these new production functions introduces a very severe element of "competing down" into the system.

growth" provides to strategies of general accomodation will greatly decrease. At these critical points in time, very clear choices will have to be made by decisionmakers. Either consensual solutions aiming at a contained equlibrium will have to be pursued, or solutions aiming at the controlled retreat out of blocked situations will have to be preferred.

The ultimate choice must, in the final analysis, be dependent upon how the old system has performed -in a social and economic sense- in the preceding period. If corporativism satisfies its primary socioeconomic objectives, the consensus-models will survive. If, on the other hand, consensus has been found wanting (in the face of interest group fragmentization, growing stagflationary tendencies, problems with international competitivity and escalating social dissatisfaction), then a situation may emerge where the system will be opened up by one or more of the earlier partners.

Hence, the significant elements of the late 60s and 70s, should be:

a) At first: increased attempts to accomodate and adapt the new innovations to disturbed activities, and,

b) after, and during the depression: increased elements of choice are introduced, accelerating the weeding out of counter-productive protectionism-corporativism, ("institutional dead-wood"). This reflects a simultaneous and related industrial process of concentration, where the most effective production functions will be most likely to survive.

The revival (the last phase of the Kondratieff) ushered in around 1983, should have been deeply marked by these developments. In the political superstructure there was a continuing upheaval, as political strategies were being shifted (we will try to give an organic explanation to the coming of "neo-liberalism"), which created a need for new sociopolitical structural solutions. In the field of specific industrial activities (in our case coal and steel), the development should be expected to concentrate upon continuing rationalization of sub-optimal production functions[104], while the "new" elements introduced during the intensified downgrade should still be rather embryonic.

The Juglar recession of the early 90s should have served to expose them, though. A recession always implies increased pressure upon sub-optimal producers, but this recession -coming upon a still weak Kondratieff recovery- should, in the Schumpeterian scheme, be expected

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[104]Although the most radical elements in this process should have been made by, say, 1984 (during the depression, when pressure for change was at its strongest).

to be rather severe (the underlying economic innovations still rather newborn and weak, the old forces making for rationalization still strong). Hence, during this relatively severe recession, new and superior production functions should have been able to demonstrate their potential, as well as the impact of innovation upon still unrationalized economic structures. What was being crystallized and exposed during the early 90s were tensions, which should be traceable into much earlier phases of the long cycle.

1.6. Coal and Steel as examples of the process of West European evolutionary economic change

There are several reasons for our choice of coal and steel as case studies of the process of evolutionary economic change.

First, and foremostly, they are the archetypal examples of the traditional industries that were instrumental in forming corporativist-protectionist bonds between industry, agriculture[105] and the state.

Secondly, they were again singled out for special treatment when new institutional innovations were created after the second world war. The changing character of the ECSC[106] -an institution halfway between innovation and tradition, and its relationship to the different national interests involved- are extraordinarily interesting to discuss, in order to understand the character of the socioeconomic adaptations undertaken to try mastering industrial and institutional innovation.

Thirdly, they provide us with exceptional examples of the interconnected processes of innovation in "the raw material sphere of the economy" and "the industrial sphere of the economy". They demonstrate, indeed, that any attempts to create some kind of "clean breaks" between these two sectors can never be made.

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[105]If time and general fatigue hadn't placed natural constraints upon the author, he would have liked to include the agricultural sector in this study. When the EEC was formed one sector was singled out for special treatment - agriculture, giving birth to one of the great monsters of the post-1970 era.
It may be an event of some significance that the traditional (post 1870) sectors of corporativist action -agriculture, energy (coal) and heavy industry (steel)- were still, in the time of the recession-depression of the 1970s and 80s organized along traditional lines.

[106]The European Coal and Steel Community.

Fourthly, we will try, in connection with points 1-3, to demonstrate that the process of evolutionary change will have to be a process of innovatory feedbacks between the "sociopolitical sphere" and the "technological-economic sphere".*That is, the process of evolutionary cumulative change is not viewed as a "neutral" process; on the contrary, it is regarded as an active socioeconomic search process,* where uncertainty and the need for some sort of societal consensus are central variables.

Fifthly: Our aim is, thus, to discuss the social adaptations necessary to accomodate industrial innovation, and the institutional innovations that this process will give rise to. The varying emphasis that was given to changing structural and industrial solutions in different periods is seen as crucial and revealing variables in this process.

Sixtly: This will hopefully make us able to view the different phases of the post-war long wave as a coherent whole.

1.6.1. Points of reference with special importance to our point of departure

Several earlier studies have emphasized the double-sided process of economic change in the West European coal-steel complex in the period after 1945.

Around 1960 three important books concerning the ECSC appeared, all of them written by American authors. The manner in which these studies treated the problem of West European sectoral integration was rather similar. This study owes, in several ways, much to these early studies.

Thus, Haas[107], Diebold[108] and Lister[109] discussed the background to the plans for a "pooling" of West European coal and steel production. They did, as well, discuss different aspects of the integrative process.

All of these authors emphasized the limitations placed upon the integrative process by different surviving national economic structures, something that made the adjustment process long, and littered it with both supranational and national compromises.

On the other hand, especially Haas noted that the Community had increased significantly in importance as a decision-making arena during its relatively short period in existence. Once the ECSC had come into

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[107]Haas E (1958).
[108]Diebold W (1959).
[109]Lister L (1960).

existence -as a market and as a set of supranational political-economic structures- it tended to become a relevant and accepted arena for interest-group action. Moreover, this arena was in no way as hostile to national interests as had been anticipated by several national interest groups before its inception[110]. The continuing importance of national interests, especially with regard to energy policies, was underlined by Haas and Lister. That both of these studies arrived after the West European coal market started collapsing (in 1957) was probably of some importance in this connection.

Overall, these studies tended to be rather ambvivalent as to the future of the Community, and to its possibilities of pursuing strategies of innovative change in its member countries. While admitting the importance of the new structural innovation that the Community undoubtedly represented, they all emphasized the important elements that, necessarily, tended to make its decision-making structures rather conservative.

In the discussion on the connection between the national and Community-wide structures, this study is, as already noted, related to these studies. We place the same importance upon the continuing relevance of national solutions, which aimed at finding some kind of consensus between innovation and socioeconomic traditionalism. Overall, though, the international context would always have to be recognized, especially if and when a declining growth rate tended to shrink the room for accomodation.

As already mentioned, one factor that turned out to be important to the conclusions offered by both Diebold and Lister, was the coming of a "surplus situation" in West European energy markets. The impact of Mid-east oil and (to a lesser extent) US coal had blown the bottom out of West European coal mining by the late 50s. These developments represents the coming of the very first of the "structural crises" that were to become rampant during the 70s and early 80s.

Thus, Diebold and Lister emphasized the importance of the traditional West European socioeconomic compromise in the reaction to these

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[110]This was, of course, the main factor behind the resistance offered by, for example, the French steel producers to the coming of the ECSC.

forces. These patterns were, a decade later, discussed by Gordon[111] and Adelman[112].

Both of these authors analyzed the effects of the coming of Mid-East oil upon traditional producers of energy in West Europe (Gordon), as well as in the US (Adelman). They stressed, especially, the threat that integrated world markets for raw materials represented to traditional patterns of supply[113], (eliminating earlier regional comparative advantages).

Hence, Gordon, as well as Adelmann, stressed the limits that existing socioeconomic institutions placed upon the ability of new innovations to penetrate economies. To Gordon, this was -as it had been to Diebold and Lister a decade before- the central theme in the development of the ECSC. The institution had, in short, become a way of regularizing structural change at the national level. By the mid 70s, markets were strictly segmented, coal producers were nationalized and strictly supervised by governments.

To later writers concerned with steel the same pattern have been evident. Stegeman[114] showed, quite clearly, that interpenetration had been limited and producers had been mostly concerned about stabilizing home markets. In the same vein, several authors have discussed the tendency evident, with regard to both firms and national governments, to pursue policies of "industrial patriotism", primarily in the period leading up to the early 1980s[115].

But, as is clear from Stegeman, as well as from the other authors that discussed these tendencies, these nationalistic strategies were becoming problematic to manage in a Community-wide consensus. By the mid 70s

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[111]Gordon R (1970).

[112]Adelman M A (1972).

[113]In this connection Johnson D G (1973) and Johnson D G (1975) should be consulted, as well, although Johnson discuss the effects of agricultural protectionism. To this author it seems significant that several studies concerning this problem started to emerge around 1970-75. The immediately preceding period (late 50s-early 70s) had seen great new possibilities emerge in several of these sectors, possibilities that provoked protectionist reactions among older producers. It seems logical to view many of the problems of the 70s as emanating out of this innovative-protectionist pattern.

[114]Stegeman K (1977).

[115]For only some examples of these tendencies, see: Messerlin P (1987); Richardson J/Dudley G (1987); Eisenhammer J/Rhodes M (1987); Hayward J (1987); Capron M (1987).

tensions were increasing in the market place, while the costs of the pursued strategies escalated significantly.

These problems were directly tied up with the innovations that had appeared on a broad front during the 50s and 60s. New sources of raw material prompted new locational patterns to emerge. Moreover, this was coupled to the coming of the Basic Oxygen Process and the wide strip mill, both of these technologies greatly tending to increase the scale of optimal steel mills. The interdependence of these processes have been discussed by, for example, Cockerill[116] and Schenk[117]. On the other hand, and this is something that is clearly recognized by several authors[118], the nationalistic phase of the cycle was not only a way of maximizing investment, as well, it was a mean used to regularize the innovative momentum.

As Hogan[119] noted during the early 80s, this led to the most nationalistic phase of our whole period, as almost all existing West European steel companies were nationalized and/or put under close governmental supervision.

Our study discusses the evolution of these nationalistic complexes, but, as well, we discuss the dissolution of these same complexes, something that started to come about after the late 70s/early 80s. This is done in the same vein as the other studies cited, as we focus upon institutional solutions, and the feasability of these solutions. Moreover, we are trying to connect the development of institutions to the innovations that occured in a more strict "technical" sense.

In is because of this, that our study tries to discuss the impact of innovation upon the existing producers at the level of their productive facilities. The different impact felt by different producers will be crucial to recognize, if we are to discuss processes of interest group fragmentization and increased industrial heterogenousity. These processes may possibly provide us with some kind of answer to the problems of institutional and organizational change.

Thus, the concept of technical change is important to our study, but the concept of "regularized technical change" is even more central. As discussed in sections 1.2.2, 1.3 and 1.4, we deal with the assumption that

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[116]Cockerill A (1975).
[117]Schenk H (1967); Schenk H (1968).
[118]See Richardson J/Dudley G (1987), and Hayward J (1987).
[119]Hogan W (1983).

mechanisms for regularization of innovative change has been part and parcel of West European society for more than a century. The double-sided process of innovation and smoothing of change is, hopefully, visualized in the study.

1.6.2. The apparent trend in coal and steel

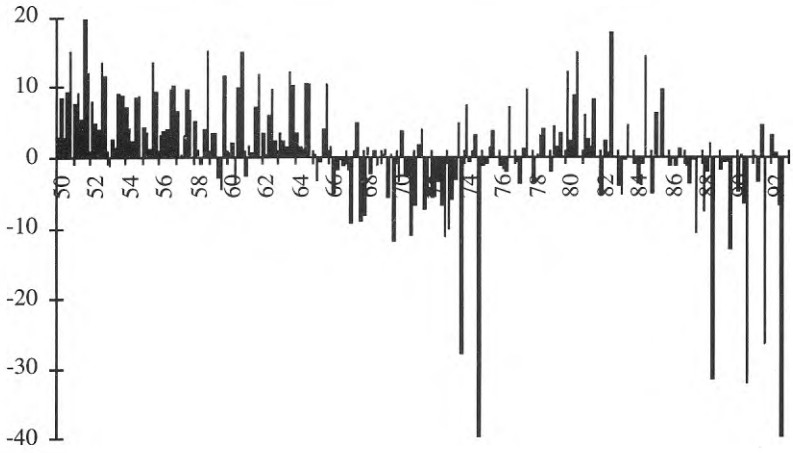
Dealing with coal and steel, we need to place these sectors within the trend discussed above. This is, in fact, done all through sections 3-6, but the main points discussed in these chapters are summarized here, essentially for the sake of clarity, in order to explain why we concentrate on certain points within the development of these sectors.

1.6.2.1. Coal

West European indigenous coal production had been beset by problems at least from the inter-war period. The corporativist and protectionist measures instituted during the 20s and 30s, were after 1945 supplemented and intensified through nationalizations. These were attempts to create conditions that could make for the long-term viability of a sector, where an earlier equilibrium had been upset by substitution, increased competition and labor-saving techniques.

With the coming of steadily cheapening alternative sources of energy (innovation: Mid-Eastern and North African oil) and falling international freigth rates (innovations: welding, pre-fabrication, increased ship sizes), forces making for the restructuring of the West European coal sector tended to gain in strength, in a rather dramatic way. This innovative paradigm was to mature during the downgrade of the Kondratieff. The Juglar recessions of 1957-58 and 1966-67 were hallmarks in the sad story of deep-mined West European coal, spelling doom to traditional patterns of energy supplies, and signalling the ushering in of a period of increased corporativist institution building in order to phase, or delay, the retreat out of an imploding sector (fig 1.3).

Figure 1.3. Coal Production 1950-92. Yearly divergences from trend rates in Western Europe



Note 1: Yearly divergence from Coal production trend rate. Trend 1950-92: Fra: -3,5%; Bel: -11,1%; FRG: -1,5%; NL: -10,7%[120]; UK -2,3%.

Note 2: Figures for the France adjusted for 1963; for the UK adjusted for 1972,1974,1984,1985[121].

Note 3: The maximum figured used in the diagram is 40% (in order to increase the visibility of changes). In reality, declines have been more than 40% in some instances (Bl 1992; Nl 1974 and 1975).

Sources: 1950-88; Mitchell B (1992); 1989-92, Energy, Monthly statistics, (Eurostat, Luxembourg)[122].

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[120] NL-trend period 1950-74 (when production ceased).

[121] Due to strikes. Averages for 1963 and 65 (France), and for 1971 and 73; 1973 and 75; 1983 and 86 (the UK) were used in order to calculate alternative production rates.

[122] Coal production rates are notorious for diverging between different sources, (this depends upon if they are given incl. slurry or not, if they include estimates for self-consumed coal etc.) Typically enough, for 1988 Mitchell and Eurostat gives different figures for coal production in UK, France and Germany. Overlaps have been used in these years. (The rate of divergence between Mitchell and Eurostat in 1988 have been extrapolated up to 1992).

The divergences in production rates from the general trend in GDP-rates (fig 1.1.) after 1973 serves to underline our point about the desirability of avoiding aggregates when discussing intra-industrial structural change. Thus, the corporativist solutions introduced around 1960 visavi the coal sector were accelerated during the intensified downgrade, as strategies of coal protection became a most important part of the institutional dead-wood that was having its triumph in the period of protectionism (1973-83). Thus, it was the subsequent dismantling of the paradigm of the 60s and 70s that made for the rapid contraction of deep-mined coal production in the revival after 1983. The sector's contraction was an important part of the changing strategic emphasis and the economic revival of the 80s. The innovatory growth of a West European market for steam coal, has represented a move away from traditionalistic and uneconomic coal-mining. It has, as well, signalled a stop to the West European mono-dependence upon oil imports from the Mid-east.

Consequently, the decline of production of deep-mined West European coal, represents a continued overhang in rationalization needs. The mirror-image to this rationalization has been the rapidly growing West European market for Extra-european coal, a market that had been stagnating in the period up to 1973, in the shadow of coal protectionism. The move towards strip-mined French and English coal in the same period is a sign of the same forces. Indeed, the "competing down" of deep-mined indigenous coal had been the prerequisite to the growth of these emergent sectors, after the early 80s.

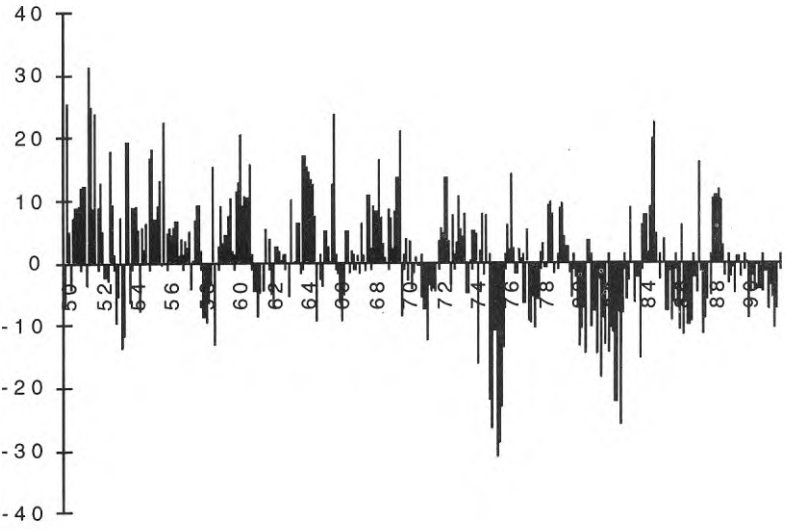
1.6.2.2. Steel

The aggregated figures for steel production (figure 1.4) serves to hide much more then what is being revealed.

True, we are able to see the intensity of the prosperity phase of the Kondratieff, likewise we are seeing a general slackening in the rate of growth as the 60s progresses. The traumatic effects of the depressive phase of the wave, and the initial stages of recovery are, as well, clearly in evidence in the figure.

But, what the figure doesn't reveal is -again- the very sectoral character of the crisis.

Figure 1.4. Steel Production 1950-91. Yearly divergences from trend rates in Western Europe.



Note 1: Yearly divergence from Steel production trend rate. Trend 1950-91: Fra: 1,9%; Bel: 2,7%; Ita: 5,9%; FRG: 2,5%; NL: 5,9%; Lux 1,1%; UK 0,0%.

Note 2: Figures for the UK adjusted for 1980[123].

Sources: 1950-88 Mitchell B (1992); 1989-91 Siderurgie Annuarie (Eurostat, Luxembourg). Western Germany 1990-91: Glückauf 3/1993 p 231.

Several innovations had come on stream during the prosperity: oxygen steel making, wide strip mills, Extra-european high yielding ores (the new freigth possibilities again being crucial to the imperative of change)[124]. These innovations were, up to the mid 70s, responsible for

[123] Because of strike action. The average of 1979 and 1981 is used instead.

[124]These are all points much more widely discussed in sect 4; but it is nevertheless crucial to point out that all these innovations were moulded into one technological complex. Oxygen steel making made unprecedented capacities viable, while wide strip

unparalleled rates of expansion, an expansion increasingly releasing the forces of rationalization (after the mid 60s).

As the cycle entered its intensified recessionary stage, the sheet market continued to grow, but expansion rates were much lower than during the preceding period. As this slackened market coincided with the coming of continuous casting of slabs (see below), which increased yields at existing plants by some 15%, and the coming on stream of a string of investment projects undertaken during the early 70s, this made a speeding up of the rationalization-cycle necessary. As this general shift in the conditions of the sector coincided with quite revolutionary developments in the production of long products, an atmosphere of crisis developed. Generally, during this period (ca 1975- to the early 80s), protectionist and corporativist strategies, already well entrenched in the sector, were intensified. After the early 80s a withdrawal from these strategies were -somewhat hesitantly- pursued, as costs started to exceed the marginal sociopolitical utility of "neo-mercantilism".

But, even more crucial to our discussion of the depressive phase and the recovery, were the innovations that were introduced on a broad front after ca 1965. While the coastal/oxygen/wide strip mill complex had changed the very face of steel production -flat capacities[125] increasing in importance- these new innovations centered, initially, upon long product capacities. Ultra-high power electric furnaces was not a new concept, continuous casting had been in the pipeline for decades, the innovation here was the combination of these new techniques to a new concept -the mini-mill. With the stabilization of scrap prices after the late 50s, the

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mills -being extraordinarily capital intensive- made these capacities necessary, in order to lower unit costs of construction.

The size of these new plants -and their consequent need for large flows of raw materials- made coastal locations preferable when shipping, ore and coking coal costs was progressively lowered (50s/60s). *What we are seeing is the development of an innovative block:* coastal steel-making units of enormous scales, based upon the concept of overseas transportation of coking coal and ores, giant blast furnaces (lowering fuel demands, lowered unit costs of construction), oxygen steel making plant and wide strip mills.

[125]Flat capacities: plates, sheets. It was for the production of sheets that wide strip mills was necessary, thus it was for the production of this specific product that rolling mill techniques had been revolutionized, the gigantic size of these new mills demanding unheard of capital costs.

Long capacities: rails, heavy and light sections, wire rods. The revolution in techniques that hit this sector by the mid 60s (electric arcs and continuous casting -which only some 5-10 years later spread into the flat section of the market) did, quite to the contrary of developments with regard to flat capacities, lower capital costs.

spread of ultra-high power electric arcs and the initial commercialization of continuous casting, a new production function had made its appearance on the steelmaking scene. Right from the outset making a radical break with the capital-intensive concept, mini-mills operated without sintering plants, cokeries, blast furnaces, primary mills and adjacent steel-making equipment for the disposal of circulatory scrap. All that was needed was a scrap yard, a relatively small electric arc, a continuous caster and an inexpensive rolling mill for the production of rebar.

These two widely divergent tendencies (the coastal/oxygen and the mini-mill) and the continued commercial success of continuous casting[126] are necessary to comprehend, in order to trace the continued development of the long wave in the case of steel production. Radical growth was experienced, up to the 70s, with regard to coastal, oxygen-produced steel and sheet production, simultaneously the lowered costs of imported raw materials was tending to serve as a comparative disadvantage upon the traditional, long products specialized steel-making centers. What really hit these traditional producers, though, was not coastal steel: It was the mini-mill.

The complete inability of traditional long product producers to compete with the minis, when their traditional comparative advantages -the Minette ores and/or regional sources of coking coal- had been eliminated, was apparent by the mid-70s. To Lorraine, Saar, Luxembourg and Vallonia this spelled disaster.

The realization of the fact that the traditional comparative advantages were gone had (during the recessionary phase, ca 1965-80) been followed by an adaptive oxygen-based wave, as imported ores were brought into the heart of Europe, despite the transport costs that this implied. Because of this wave, the traditional producers became burdened with the double costs of capital intensive plant and high cost raw materials. In the phase of the intensified recession (after 1975) the adaptive wave was first strengthened. Then, as the realization that this was really a "no win" situation dawned upon decision makers, the mini-mill innovation had to be accepted. The trend towards non-traditional, non-integrated steel making was evident in the recovery after 1983. It was even more in evidence in the Juglar recession of the early 90s, and by this time the ultimate further development of continuous casting was threatening upheaval in the flat section of the market, as well. Thin slab casting (and,

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[126]CC's move into the flat section of the market.

down the line, direct strip casting), was placing the sheet market within the grasp of non-integrated mills.

Our discussion of the coal and steel sector emphasizes these two developments:

A) We try to construct a disaggregated -sectoral- picture of the crisis. That is, we will try to demonstrate how the changing costs of raw materials and the changing technological imperative tended to place certain sectors, solutions (production concepts) and regions at a comparative disadvantage. Some sectors tended to become increasingly pressed quite early in the downgrade, it was a weakness that only served to expose them even more violently to the appearance of new technologies.

B) The coming, the rise, and the fall of "neo-mercantilism". It is within the logic of the sectoral composition of the crisis, that our discussion of interventionism is carried out; we analyze the roots and goals of corporativist-protectionist strategies within the socioeconomic and technological complex discussed above. The relationship between coal and steel interventionism is underlined, as this connection tended to develop into one of the strongest and most persistent "vicious circles" (in the Crozerian sense, where ineffeciencies tend to breed on, and reinforce each other) experienced in Western Europe after the second world war. Just like the oxygen process and the wide strip mill created a "technological block", *these problems tended, to create a "problem block", of deeply related and intertwened problems.* The ultimate unravelling of this complex during the 80s and 90s, must in our perspective, be seen as a process of "clearing of dead-wood". In the depression/recovery phases of the hypotethic Kondratieff wave, these processes ought to be clearly visible.

2. The background to the West European coal-steel complex, and the evolution of functional institutional solutions

This section is intended as a background to sections 3-5. First of all, we present an an historical outline of the evolution of the West European coal-steel complex[1]. This overview is of interest in view of the locational immobility of the two sectors. Most of the areas hit by massive structural problems in the 1920s/30s and/or 1970s/80s have their industrial roots in the evolution described in sect 2.1. A short summary of these developments is therefore called for, to place later developments in a historical context.

As the problems discussed in sections 3-5 had made their appearance by the 1920s, it is, as well, of general interest to present an overview of the different institutional solutions introduced in order to cope with them during the inter-war period (sect 2.2.1). In several ways, these solutions were forerunners to later schemes, which were, as well, to aim at the regularization of structural change.

Thereafter, the most important structural innovation of the post-1945 period -the ECSC- is presented, together with a brief outline of its general development. The functional tasks confronting the organization *at different points in time* are discussed, as it is emphasized that the innovative-economic momentum (the "general business situation") that the Community arrived in time to meet, must be regarded as critical to the further development of the organization.

2.1. The evolution of the West European Coal-Steel Complex

All of the innovations introduced from the early 18th century up to the mid 19th century[2] influenced the location of industries in important manners. It was during this stage that the industry moved towards what

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[1]For full discussions of the introduction of the new techniques in the West European and American steel industries, see, for the UK: Carr J C/Taplin W (1962). For Western Europe: Pounds N/Parker W (1962); Burn D (1961a); (1961b). For the USA: Temin P (1964); Hogan W (1971).

[2]The introduction of coal-based iron-making, the puddling process, the introduction of the hot blast in blast furnaces.

was to become very traditional industrial areas: the Black Country (coal), Scotland (splint coal), South Wales (iron ore, later coal).

The introduction of the acid (1856) and basic (1879) Bessemer-processes, and the acid (1861) and basic (1879) open-hearth processes were crucial to the next phases of the evolution of the modern steel industry. Much of the rest of the crisis ridden structures of the 1970s and 80s were created at this stage.

The acid processes demanded low-phosphorous ores, which implied that vast resources of ores were useless for about two decades. The regions most able to make use of imported, or internal, low phosphorous ores developed rapidly in this period.

This picture changed in a radical way with the introduction of the basic processes, which spread with great speed during the last decades of the 19th century. The possibility of utilizing the huge reserves of Lorraine, Lappland, Minnesota etc., provided incentives for a new wave of steel-capacity construction.

The basic characteristics of these processes, which were to dominate steel-production up to the late 1960s, are necessary to outline:

	Time required	Possible scrap charge	Quality
Open Hearth, (OH)	7-9 hrs	100%	Excellent
Converter,(Bessemer)	30-40 min.	15-20%	Problematic

With regard to the two *basic* processes it is important to note that the converter process required ore of not less than 2% phosphorous content, while ores with phosphorous contents of 1-2,5% were more suited to the OH process. Finally, it is important to note the higher capital-intensity of the converter-processes: it was a "tonnage" production method, which also had a low acceptance of scrap. This made it necessary for converter producers to integrate their plants, i.e. with cokeries and blast furnaces, for their supply of raw materials. Even though OH-shops were often integrated as well, the process still offered unintegrated producers an opportunity to undertake scrap based steel making.

Now, this configuration of factors made for a whole range of choices, which were still very visible in the Western steel industry during the 1960s. Mid-European -French, Saar, Vallonia, Luxembourg- steel was heavily dependent upon the highly phosphoric ores of Lorraine (=basic

Converter)[3]. In the coal districts of the Ruhr and, to a lesser extent, in Northern France, the availability of river- or seaborne imports of different ores created a combination of these two processes. The older acid processes lingered on longest in the UK where relatively high wages and diversified steel-consuming industries combined to give the industry a higher quality profile in the period up to the first world war (as evidenced by the high proportion of ship-plates and sheets (tinplate) in total production).

The occurence of iron ore and coal deposits were, thus, crucial to the location of the iron and steel industry. The early industries of Scotland, the Black Country and South Wales in the UK are obvious cases in point. In the rest of Europe this pattern was evident in the Ruhr and in the Lorraine-Luxembourg-Saar-Vallonia complex. In the US the early concentration of industry to the vicinity of Connelsville was an example of the same pattern.

The limitations of some of these deposits showed themselves rather early. As every location was a specific answer to certain problems associated with steel-making techniques and/or need for raw materials of specific qualities (the evolution of comparative advantages) these locations were always subject to retrials, when new techniques or supplies of raw materials (=new production functions) appeared on the scene.

In the UK the limitations of the early inland deposits of coal and iron ore were obvious as early as the 1870s, when imported Spanish ores displaced Scottish and Welsh ores. The unsatisfactory nature of the Black Country coal deposits were also marked at an early stage of the industry's development. It was this that pushed the industry, by the turn of the century, towards coastal locations at the Tee-side and in South Wales (where coal reserves were abundant and imported ore was readily available). Later on the industry was to show obvious locational lethargy, as the remnants of the early uphill locations lived on to mar the industry. Ebbw Vale and Ravenscraig will be discussed at length later.

In continental Europe, the emerging importance of the Ruhr (after the 1850/60s, when the rich coal-beds were utilized) was underscored with the coming of the Thomas-process, which made the phosphorous ores of Lorraine and Lappland possible to utilize in large scale steel-making. The sites on the river Rhine have grown in importance ever since, as opposed

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[3]In the US the less phosphoric Mesabi ores had created an industry dominated by the basic open-hearth.

to the earlier sites in the eastern area of the Ruhr and the Siegerland. The parallell to the Welsh experience, where industry moved from the hills towards the coast, is evident in this riverside migration, which wed internal coal to imported ores.

The French, Vallonian, Saar and Luxembourg steel industries are further elaborations on this pattern. In these areas internal deposits of coal (Northern France, Vallonia, Saar) and internal deposits of ore (Luxembourg, Lorraine) combined to create a hyper-industrialized and rather export-dependent area, after the emergence of the Thomas-process, which was pivotal to the rise of Lorraine-Luxembourg. The obvious weakness of this industrial configuration was the relative poorness of the coal deposits -the Ruhr had an exceptional position with regard to coal on the European continent- and the low iron content (ca 30%) of the ores. The same weaknesses were obvious in the other West European steel-making districts that emerged before the second world war. The most important examples of this later tendency is the Peine-Salzgitter and Northamptonshire districts (Corby) both of which were inland sites based on the utilization of internal ores of low iron content[4].

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[4]These patterns of development are further parallelled to some extent in the United States. The early steel-industry was heavily centralized towards the (in the 1870-80s) western parts of the country: Pittsburgh, a railroad center on a riverside location with exceptional reserves of coking coals nearby (Connelsville), replaced the early eastern, up-state locations of Pennsylvania and New England. Somewhat later a combination of several factors made for the spread and dispersement of facilities in the period up to the 1930s. Thus, the continuing westward movement of the industrial frontier provided ample markets far to the west of Pittsburgh. Thereafter, the coming of the US Steel and its pricing policy (Pittsburgh plus) guaranteed the profitability on investment some distance away from Pittsburgh. A final factor making for the rapid emergence of the Chicago district, was the discovery of the Mesabi ores in Minnesota. These factors also provides part of the explanation for the rapid growth of steel-making facilities at several other locations on the Great Lakes: Cleveland, Buffalo, Detroit; as well as the new importance of the Ohio Valley locations, to the south of Lake Erie.
To the east, another company (Betlehem) emerged, when imported ores were utilized at a seabound location (Sparrows Point), another advantage was reaped from the nearness to the building markets of New York (Betlehem). On the USA, see, for example, Warren K (1973), Temin P (1964) and Hogan W (1971). See, as well, sect 5.3.

2.2 Coordinaton of the traditional West European Coal-Steel complex

The interdependence evident in an industry such as this -producing very much the same products, demanding the same raw materials- can, of course, lead to two distinct patterns of evolution:

a) Market sharing and organized production (the emergence of combinations and/or cartels) or

b) Integration of productive facilities (the rise of merged and thoroughly rationalized entities).

If the inter-war period saw the formation of very important mechanisms based on the first of these principles, then the post-war period can be said to have seen the formation of a political-economic Community based upon the *possibility* of reaching the second principle. Equally significant, though, was that this Community had important elements of the first principle contained in its constitution, and, even more importantly, in its way of operating. Most probably, the post-war Community *had to* be influenced by hereditary interventionism.

2.2.1. The pre-war solutions to the need for organizational restructuring

2.2.1.1.Steel

Up to 1925 there existed no real need for international steel cartels, as Germany was forced by the Versailles treaty to import steel from Alsace-Lorraine, Saar and Luxembourg on a duty free basis. As this situation drew to an end, a negotiated settlement of trade -an international cartel- became necessary, as the central Europe steel-belt was dependent upon Germany, as a market for steel and for supplies of coke[5].

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[5]See Hexner S (1943), p 66-69, 120-21. Luxembourg had been a member of the German customs area before 1914, Saar had been a part of Germany, and most of Lorraine had been exploited by German firms before 1914. After the war a restructuring of production facilities in Lorraine was undertaken, as most mills had been unintegrated up to 1914, sending its pig iron into Ruhr. Because of this, construction of steelmaking facilities and

The first phase of the cartel was inaugurated in 1926 and was able to function smoothly up to the crisis of the early 30s, when the immediate need for exports (cheating) reduced the cartel to shambles by 1931. The easy market conditions of the mid 20s had been reflected in the relatively loose structure and goals of the cartel. Primarily, it had been designed to avoid an unhampered expansion of steel capacities. This goal was sought through the imposition of fines on over-production, as compared to the period before quotas[6]. Hence, as the structure of the cartel reflected the conditions in which it was created -the upswing of the late 20s- it had weaknesses that mirrored these circumstances. It was deficient with regard to effective means which could have been used to regulate the sale of different steel products. Moreover, the weakness of national trade associations in some member states made them unable to control constituent firms[7]. These defects made the cartel arrangements unsuitable to withstand the pressures of a *Wirtschaftskrise* of the dimensions encountered by 1929/30.

In these conditions the cartel broke down, a rush for exports and counter-protection followed and as prices fell in a dramatic fashion[8], the need for an internally coherent cartel was urgently felt. The new cartel set up in February 1933 reflected the need for a more coherent structure, a coherence much helped by the development of stronger national industrial organizations. These organizations provided, together with the reconstituted product comptoirs, the nucleus of the new organization[9].

What emerged in the period from 1933 up to the war was a full-fledged and expanding supra-national cartel, growing as more countries felt the need for regulated markets. The UK joined in 1935, the US in 1938.

The national groups constituted the fundamental building-block of the system, being collectively responsibile for overproduction commited by any member in their respective group. The constitution of coherent national groups was thus a pre-requisite for the effective functioning of any member country within the international cartel.

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additional rolling mills was undertaken, in order to integrate these facilities (sect 4.3.1). This tended to exacerbate the areas potential oversupply problem.

[6]Hexner S (1943), p 75-77, 175.

[7]Hexner S (1943), p 78-79.

[8]Svennilson I (1954), p 127-31.

[9]Hexner S (1943) p 84-88, 110, 139.

Producers in Germany, France, Luxembourg (with few and homogenous producers) and the UK[10] were both able and willing to organize into controllable-contained units, where *Gruppenschutzklausel* were used to restrict the enlargement of plants by member units. Belgian producers proved more of a problem, because of the unusually high frequency of independent rolling mills in the country. The natural antagonism between integrated producers and re-rollers, dependent upon outside producers for their supply of raw steel, made the formation of a national cartel unusually tedious. Pressure exerted by owners and foreign governments[11] forced the Belgians to follow suit; the large producers and the government policing the independents[12].

The respective product comptoirs[13] were the international nuclei of the cartel, having full responsibility for the regulation of exports. This was done through the use of pre-determined quotas, the upholding of uniform prices and sales conditions[14], the regulation of distribution by licensing a limited number of sellers (merchants/agents) and by organizing distribution cartels[15]. It was, moreover, in the comptoirs that the possibility of making national groups responsible for overproduction was vested.

Now, what we are encountering here is, in fact, a nearly idealized cartel structure. No management autonomy was transfered to the central organization, as there was no written "constitution" and only a very diminuitive central office[16]. Infringements on the traditional autonomy of member firms were possible to avoid. What the cartel members were able

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[10]After the formation of the Brittish Iron and Steel Federation (BISF) in 1932. Compare these developments -into contained national cartels- to the developments experienced in the coal-mining industry, sect 2.2.1.2.

[11]Germany threatened to subsidize their own steel exports, which would have undermined Belgian markets.

[12]On the national groups, see Hexner S (1943) p 67-68, 87-88, 110-138. The history of the Belgian re-rollers is worth remembering when the Italian Bresciani of the 1970s are encountered, in sect 4.4.

[13]Hexner S (1943), p 139-143.

[14]This should be compared to the demands for price transparancy when the ECSC was inaugerated. It was these needs that resulted in the system of published basing point prices. The interests of consumers in price transparancy and published prices are often stressed, while the great interest that *producers* have in published and uniform prices are sometimes overlooked. Producers need published prices and transparancy in order to keep control over outsiders and aggressive marketing.

[15]Hexner S (1943), p 164-170.

[16]Hexner S (1943), p 94-99.

to reach was, essentially, the continuing existence of an unrationalized firm and industry structure, where all producers were left to do what they had traditionally done[17].

2.2.1.2. Coal

The West European coal mining industry had entered a period of recession after the first world war. By the depressive phase of the long cycle -the late 20s/early 30s- these problems had created all of the necessary pre-conditions for the emergence of an enormous complex of cartels and trade restrictions.

The basic problem of the situation emanated out of the weakened position of coal in certain markets. Coal was being replaced as a source of energy in transportation uses (in railways and ships)[18]. Moreover, there was an increased efficiency in its use in thermal power plants, and the increased importance of the OH process in steelmaking implied a decreased importance for the blast furnace route to steel[19].

The virulent outbreaks of protectionism during the inter-war period[20], were added to the problems of oil and electricity competition. Stagnating

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[17]Hexner cites several interesting comments upon this state of affairs. John Craig, who was head of the Scottish steel-makers Colvilles, foreshadowed arguments of the 1960s and 70s in a presidential adress to the Iron and Steel Institute in 1940: " '...the old policy which clamored for more competition, ever more competition, would not stand the strain of modern social development...' He attacked the Manchester school which believed... that competition is synonymous with price-cutting... he expounded the theory that what is called non-price competition should be the fair objective of governments, consumers and industry, and that a fair price is more advantageous for the consumer than an unreasonably low price."
The Economist, on the other hand, commented on the same development (March 1939): "An entirely novel form of industrial organization is creeping upon us unawares... The result has naturally been to revolutionize the attitude of industry to the State: the policeman has turned Father Christmas... The edicts of the steel cartel have been very widely criticised... the fact remains that, to judge by what we have seen of it to date, the self-governing of industry leads to the indefinite postponement of true rationalisation and a strong bias in favour of high prices..." Citations in Hexner S (1943), p 60-61.

[18]International Labour Office (1938), p 82-89.

[19]International Labour Office (1938), p 90-99. See, as well, Svennilson a a p 105-11, on the problems of the European coal industry during the inter-war period.

[20]International Labour Office (1938), p 142-56.

productivity in certain very important coal-producing districts underscored these problems[21].

Clearly, the coal crisis that was to become a rampant problem after the 1957-58 recession, had reached its initial stages by the 1930s. Competition was increasing, productivity was lagging and substitution had begun. A radical reorganization of the West European coal mining industry was required.

In Germany the cartel system was strengthened, as the syndicates were empowered to set output quotas as well as minimum prices at which the coal of all mining companies had to be delivered to the cartel. Sales were handled by the Cartel, the *Umlage* (a compensatory, self administered industrial tax) subsidizing sales into contested areas[22], where competition had to be met[23].

In the UK the extent of the crisis had made for the passing of a coal act by 1930. Thus, regional boards were set up, and output was regulated among collieries (through a quota-scheme). In France a system for the limitation of imports through the use of quotas (protecting indigenous coal from international competition) was introduced in 1931. In a similar fashion, a national regulative system was introduced along the lines of the British and Germans: regional quotas combined to governmental price-fixing powers[24]. The Belgians and Dutch introduced similar systems, as well[25].

Overall, the basic goals of all these schemes were deeply related:

The schemes that evolved in the inter-war period (sometimes with roots back to the early 20th century), were all trying to mend the coal-industrys' structural deficiencies through cartel action, while avoiding the large-scale reorganization of it. The character of operations had given rise to a very dispersed structure of ownership, with low levels of concentration. It was this industrial structure that produced a direct need for governmental intervention, in order to stabilize the cartels, complete with their marketing schemes and price equalization strategies. The formation of regional and national cartels thereafter led to increased governmental intervention, as outside support was needed in order to deal with the built-in instability of cartel solutions.

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[21]International Labour Office (1938), p 106-10.
[22]Exports, Hamburg, Bremen, the Eastern half of the country.
[23]International Labour Office (1938), p 235-39.
[24]International Labour Office (1938), p 232-35 (The UK) and p 243-46 (France).
[25]International Labour Office (1938), p 246-47.

Internationally, the support of governments was even more necessary, as the international coal market turned into an absurd picture. Barter trade was becoming the order of the day[26].

Hence, by the late 30s the national governments were safely entangled in a complicated web of coal regulation. The nationalizations after the war -in France, the UK- must be seen in this context. It was an industry in deep trouble with a percieved need for massive investment that was taken over, or intervened in.

2.2.2. Coordination after 1945. The European Coal and Steel Community of the post-war period

The character of the post-war European Coal and Steel Community has reflected the changing conditions that the industries have encountered during different periods. During its inception its founders toiled with a distinct set of expectations about the future, a pattern that relatively early showed themselves to have a rather limited relevance to the real set of problems that emerged after the mid 50s.

Changing realities turned the community into a flexible organization, as it had to deal with unanticipated problems. During the 60s and early 70s this made the whole relevance of the Community somewhat doubtful, as it was ekeing out a shadowy existence beside its sister-organization, the EEC.

After the mid 70s the organization emerged out of the shades, when the potence of its original constitution was tested to the full. The social and economic conditions that this transformation occured in are crucial to our analysis. The actions undertaken, and their structural patterns, ought to be able to provide us with an understanding of some of the ultimate goals and limitations of economic-political action.

We will try to analyze the different phases of the evolution of the two sectors in a coherent way. The analysis is conducted towards an institutional background, in order to highlight the different interests involved, and to understand the logic of their actions.

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[26]International Labour Office (1938), p 179-93.

> "The European Coal and Steel Community is sometimes critized for having created so tangled a web of economic and political relationships between the member states as to have destroyed from the outset all possibility of economic rationality. But such criticism disregards the previous history. To arrive at anything simpler the Community would have had to unravel a skein of politico-economic relationships which had already become almost untractable in their complexity"[27].

2.2.2.1. The ECSC. The history of its inception and the motivations of the organization. The case for supra-nationality, within contained national structures

The essence of the ECSC was, that Europe in 1945 was both a very different *and* a very unchanged place, as compared to the Europe of 1939.

The war had revealed the limitations of the pre-war patterns. The weakness of the European pattern of development, as compared to the American, had been demonstrated in a most unsettling way, as the US industry had been turned into an armory of never-known dimensions[28]. The final victory of this war-machine, and the continuing dependence on American technology, as well as military and economic help, presented Western Europe with a very clear choice after 1945:

> "Europe's fate was now in the hands of the United States...The next generation of Europeans had no choice but to meet the challenges of this age or succumb to them..."[29].

But, even though the war had revealed the limitations of the earlier pattern, the fundamental economic and social provisions of the pre-war period did still exist. All of the socioeconomic problems of the 1930s were to re-emerge after the war. Coming to terms with structural changes that had been visible for decades was, in fact, even more of an acute problem by May 1945.

A continent torn between modernization and cementation had to make a choice, and it is in this process that the ECSC became a supra-national building block in the formation of national policies. The ultimate choice between national or supra-national decision-making was clear from the

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[27]Milward A (1984), p 380-81.
[28]Gillingham J (1991), p 78-96.
[29]Gillingham J (1991), p 95.

very start of the organization, and the potential antagonism between nationalism, regionalism and internationalism is the leading themes of the Community's history.

The antagonism of the early period is clearly seen. The Ruhr was still the heart of Western European problems, and the French, set upon the road to industrial modernization with the Monnet Plan[30], had to make some kind of final decision about its industrial and political relations to this key industrial and raw material-supplying area.

If France was unable to go it alone, for lack of energy supplies as well as other comparative advantages, the choice was even clearer in the Benelux countries. Luxembourg and the Netherlands had always been dependent upon German markets and raw materials, a state of affairs that made accomodation with Germany very necessary. Belgium, like Luxembourg dependent upon a very export-oriented, heavy industrial sector faced the same choice, especially after the UK had abandoned free trade in 1932-33[31].

Thus, it was clearly not by chance that the ECSC was formed by the war's losers. If France and the Benelux countries had lost in 1940, only to be liberated by the US, the concept of losers was even more evident with regard to the last two members of the original six: West Germany and Italy. Germany, of course, had been able to show its enormous industrial supremacy in a West European context, in the early stages of the war, but faced with an all-out *Kampf* on several fronts the *Reich* lost out, splitting Germany into its constituent parts for more than forty years. Clearly, a Germany without Silesia, Brandenburg-Preussen and Saxony was very much less of a self-contained and dominant entity, as compared to the *Altreich* of 1938. In this situation integration with Western Europe was necessary to what remained of the country.

Italy was in a similar position, only that its industrial weaknesses had been much more clearly revealed during the war. When leaving the war as a humiliated loser, Italy could be set on a course very similar to the one chosen by France in 1945. Modernization, industrialization and European integration was sought, as means to remedy a desperate situation.

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[30]For further discussions of the French post-war economic policies, sections 3.1 and 4.2.1.

[31]For a short summary of the limited possibilities facing the Belgians, see Milward A (1988), p 437 f.

Although the need for some kind of regional solution and harmonization was clearly percieved, the years immediately following the war saw no firm vehicle for integration emerge. The Americans, with their minds set upon uniting Western Europe, in order to avoid perennial wars and to create a prosperous Western alternative to the threatening communist empire[32], missed out with their early attempts at federalism[33]. Meeting resistance from all corners of the continent, but primarily from the still empire-bound Britons, these attempts seemed doomed (using the benefit of hindsight) as from the very beginning[34].

It was with the added urgency of West German re-integration into the industrial world that the functional approach to integration grew in strength. Armed with plans supported by the US for industrial development, France, Italy and the Benelux all needed some kind of settlement with the Germans. The French, blocked by the Americans in their hopes for a deindustrialized and French-linked Ruhr, was faced with the only possible option of co-operation, if their own Monnet plan wasn't going to break down for lack of raw materials as well as markets. On the other hand, the turn-around in French policy shouldn't be exaggerated. Both Gillingham and Nordengren have demonstrated that the concept of integration with the Ruhr was alive in the minds of the French politicians for several years before 1950[35].

Although the need for an agreement was recognized in all quarters, the character of the ECSC was in no way settled with the coming of the

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[32]For a thorough analysis of the US strategies, see Milvard A (1984) p 282-99, and Schwabe K (1988), p 211-39.

[33]Attempts that bears the clear hall-marks of false starts on a too early road towards all-embracing federalism.

[34] "/The OEEC/ was called into being by the United States as the first stage in the political and economic integration of Western Europe, the embryonic hope for a Western European government... in spite of the power of the United States, and of the fact that in the first five years of /its/ foundation there was a rapid move towards economic integration in modern European history, OEEC ended by being no such thing... It measured the real limits of American power in Western Europe. It marked the defeat of American ambitions for one, common, unregulated market... which the ECA wanted to see as the first step towards the United States of Europe. It demonstrated the impractability of any form of European integration other than for specific and limited purposes... Above all it demonstrated that the shifting pattern of temporary alliances... was... the basis for all international policy-making in Western Europe." Milward A (1984) p 168.
See Milward A (1984), p 208-11 for the reasons of the failure of the OEEC.

[35]Nordengren S (1972), esp. p 66-70, Gillingham J (1991) p 148-77.

Monnet-inspired[36] Schumann-plan in May 1950. The original proposal was modified before ratification, and it was not until early 1953 that the organization was operative. Its rather unique character -being a compromise between free-market solutions, the old national coal-steel interests, and the desire to create an economic strait-jacket for the Ruhr- was clearly revealed in its constitution, in the reactions it provoked and in the slow-moving character of its internal harmonization.

The reorganization and break-up of the Ruhr concerns was a necessary pre-requisite to the formation of the ECSC[37], but the character of the reorganization made a refusion of the old firms inevitable. Overall, the use of the anti-cartel regulations had to be selective and hesitant. The existence of state-owned monopolies in the coal sector[38], the parlous state of Belgian coal-mining, the initial weakness of Italian steel and, above all, the continuing importance of national political considerations and trade associations in policy-formulation, were all factors that set early limits to this experiment in supra-nationalism.

In fact, the organization was a venture into an unknown territory and future. The fact of the matter was, that when West Germany was allowed to reindustrialize, some integrative mechanism had to be found. As it was evident by the late 40s/early 50s that international cartels on the pattern of the ISC was once more on their way in, the choice boiled down to, in Monnet's words:

> "There is no such thing as free enterprise in the steel industry and the alternative you offer to administrative dirigisme is a dirigisme of the interests"[39].

This does, indeed, sum up the problem-complex behind the creation of the ECSC. The strategic goals of the creators are evident: to safeguard national plans, national security and national goals in an international context. Given that this created a new international dimension to the problem of modernization and development, a flexible path would have to be struck between supra-nationality and industrial and political patriotism. It was the visionary elements of the strategy -international integration, the acceptance of the need for technical change, industrial

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[36]See, for example, Lynch F (1988), p 117-29.
[37]Gillingham J (1988), p 422-32.
[38]State monopolies or near monopolies existed in France and the Netherlands.
[39]cited in Gillingham J (1991), p 236.

restructuring and free(r) trade patterns- that implied that elements of uncertainty had to be integrated into the Community's way of operating.

The threat that this uncertainty seemed to imply to the existing socioeconomic structure is revealed by the opposition that the founding of the Community provoked, organized foremostly from within the coal and steel industries themselves. The campaign against the Community that was organized in France[40] by the steel producers is very telling indeed. The industry didn't want the ECSC, because they felt much more at home with quota systems and regulated markets. The same elements of industrial opposition to the new concept was evident in Belgium[41] and in Germany[42].

In fact, it was the articles 65 and 66 of the constitution (anti-trust and anti-cartel) that raised the suspicion of organized industry, as it was trustification and cartellization that could have provided an easy path towards the re-emergence of the pre-war security of international cartels:

> "/The industral interests/ would have wished any such agreement to preserve the home market and allow imports on equal terms only when there was "excess" demand in the domestic markets... All would have preferred to see a return of the Cartel, secure home markets, and no increase in governmental supervision..."[43].

This opposition is understandable, bearing in mind the different views that the founding governments and industry articulated. The rift between government-led modernization and industry had been clearly visible in France, when the Monnet plan was launched[44], and it was, essentially, the same antagonism between expansion and cartel-led industrial malthusianism[45], that emerged again.

Politicians, on the other hand, were unable to transcend the boundaries set by the development of socioeconomic forces. The fundamental truth of the catch-phrase "policy is politics"[46] is clearly borne out by the tightrope ride performed by the ratifying governments. As the politicians balanced between strategies of hazily percieved change and social

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[40]See Ehrmann H (1957), p 407-19.
[41]Gillingham J (1991), p 247-49; Milward (1988), p 446 ff.
[42]Diebold W (1959), p 70-71.
[43]Milward A (1984), p 402.
[44]Ehrmann H (1957), p 286-88.
[45]As reflected in market-sharing mechanisms and *Gruppenschutzklausel*.
[46]Schumpeter J (1991-1-a), p 441.

structures bent upon status quo, this basic contradiction had to be reflected in the structure of the ECSC.

Thus, the constitution provided for free trade between member countries, it provided for emergency quota measures both with regard to over-supply, (paragraph 58, the cartel tradition), and in the case of shortages of raw materials, (international control over Ruhr coking coal), in which case pro-rationing among members was to be resorted to.

Prices had to be published, creating unitary Community-wide prices, as dual pricing between home- and export markets was forbidden. The prices were quoted at a multitude of regional basing points[47]. The implementation of the basing-point system[48] meant that the national character of the industry could be kept for an extended period, as basing points were chosen close to international boundaries, (such as Thionville, Saarbrücken, Oberhausen).

Technical and locational change will necessarily work to undermine basing point systems (or, indeed, Pittsburgh plus systems, i.e. systems with only one basing point[49]), but during transitionary periods of often considerable length, they may serve as a powerful incentive to keep producers in business, as well as to create new capacity at some distance away from basing points, that is, capacity with possibilities to collect phantom freights[50].

With regard to rebates and possible competition from outsiders, the decision to demand published prices and forbid secret price deductions was very important. Demanding published prices created a powerful instrument for the dominant producers to keep their traditional control over markets. Even more important in this context, though, was that

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[47]Avoiding a system on the lines of the old American Pittsburgh plus (which should have been impossible to implement in Europe, where the industry was much less concentrated than in the US), the basing point system was, of course, a very strong instrument in order to keep the "national character" of the steel industry, and avoid restructuring and relocation. Penetration of markets will primarily occur in areas where foreign basing points are closer than internal, i.e. South Germany.

[48]The alternative would have been a system where prices were quoted fob mill.

[49]For the fall of the Pittsburgh plus and the US basing point systems, see Warren K (1973) p 196-212.

[50]Prices in a basing point systems are cif prices to the consumer from the base point. Those producers that are located at a distance from the base point that they are quoting can collect proceeds from phantom freigths, (i.e. freigth costs that the producers doesn't really have).

producers were allowed the right to align on other basing points in contested markets.

This meant that if the big German or French producers were undercut in price from another, relatively distant basing point, they weren't compelled to change their basic price structure in order to meet this competition. Instead they could align their prices in the contested areas on the prices of the aggresive competitor, while keeping their old prices in their main sales area[51].

Strong cartel and concentration provisions were incorporated into the constitution, but the interpretation of these measures was to be a different matter. State subsidies (that was to become a central theme to the organization) were forbidden; in reality the Community rulings that concerned subsidies were (nearly) always to be rather flexible, indeed[52].

Clearly, a Community with these aims could turn out to be virtually anything. The general market conditions, in the context of technical change, were to become all important to the development of the Community.

The structural construction of the organization had, as well, to satisfy the diverse goals of the ratifying states. The necessity of using both braces and belts are evident again. The original outline of the organization, as it had been expressed by Schumann, that "...the entire French-German production of coal and steel be placed under a common High Authority..."[53], had to be modified during the negotiations. A direct limit to supra-nationalism was set by the institution of a Council of Ministers, (*directly* controlled by national governments), which would have the ability to overrule the High Authority, if national interests were threatened[54].

The actions of the High Authority (after 1968, the EC Commission) were always to be influenced by the awareness of the different national interests involved in the further developments of the two industries. Throughout the history of the ECSC, the necessity for international consensus building have continued to influence the actions of the

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[51]They are, in effect, absorbing freigth costs in those contested areas. For a thorough description of the basing point system in the ECSC market up to 1975, see Stegeman K (1977), esp p 12-37.

[52]Diebold W chs. 1 and 9; Haas E (1958), p 52-58.

[53]Cited in Diebold W (1959), p 1.

[54]Haas E (1958), p 487 ff.

Authority[55]. Most likely, it is the contradictions inherent in a pattern where several organizational centers are able to influence industrial strategies, that has created the remarkable evolutionary patterns evident in the West European energy and steel industries in the post-war period. The origin of the specific West European choices ought to be traceable back to this fragmented decision-making process.

The most important structural solutions that influenced this evolutionary pattern are necessary to summarize, in order to analyze the contradictions of the chosen strategies.

1. At the international level, powers have been shared by the Authority/ EC Commission and national governments. A delicate balance has had to be struck between the national interests, and the ability of the organization to continue to function as a supra-national entity[56]. A pattern of give and take had to develop, something that also created possibilities for national governments to take refuge behind the international dimension in complicated situations.

2. At the national level the ultimate effect of national plans on other member states, have had to be recognized. The relationsship between the national and international level could turn out to be very troublesome, especially since the energy and steel industries figured eminently in the industrial policies and plans developed by the political engineers of the period 1950-90. Somewhere in between these considerations, a balance has had to be struck between governments and industries.

3. At the level of the firm this has meant that the development of the industrial entity has, in important ways, been dependent on centers exogenous to it. This has created scope for strategies influenced by political as well as economic considerations.

The interdependence and interactions between these three structural levels are crucial to the continuing discussion. The socioeconomic limitations to change will necessarily assert themselves at all levels, most importantly when the firm level fuses with the national level. It is here that we may sense the ultimate contradictions and problems of industrial policy-making. The politization of economic decision-making may blur economic rationality, if the existing factors of production are able to dominate political decision-making (through the use and development of corporativist structures such as trade associations or nationalized state

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[55]Haas E (1958), p 455-57, 460-61, 472 ff.
[56]Haas E (1958), ch. 12.

corporations[57] etc). Transfering the investment decision from the ordinary credit market onto the political market will pose obvious problems to the process of economic change about, for example, the nature of investment and entry/exit decisions.

Yet more contradictions will be evident when these corporativist structures exist in an international dimension. If six, nine or twelve states are bound together, the impossibility of exact convergence in industrial policy will always be a reality, but especially -for quite self-evident reasons- during periods of recession. Exit-decision by unanimous vote will never be a very likely outcome of structural change.

But, even though the weaknesses at the international level are easy to see, it is despite this, a level where important decisions concerning structural change will have to be taken. In times of crisis the international decision making center may have to be awarded extraordinary powers, *if the transnational structure is not to break down due to corporativist-protectionist pressures*. At a certain point in time national policies will have to relate to the policies of other states[58], where other economic or social forces will be at work. It is in this context that the simultaneous and disaggregated analysis of the strategies in all member states gets crucial to the understanding of the totality.

Community considerations will blur with strictly national antagonisms that are evident in this process of evolutionary economic change. The corporativist pattern of decision making may outgrow its expediency to member states[59], if budgetary limits are placed upon state action and economic change makes for a fragmentization of existing socioeconomic configurations. It is here that the international dimension may provide the national decision-makers with an international "refugee" option. Moreover, the advantages of remaining in the organization are likely to increase over time as trade expands, interdependence increases and co-

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[57]The nature of nationalized industries are, fundamentally, hard to settle. I hope to convince the reader that the nature of the West European state enterprises concerned with steel and coal were, essentially, corporativist entities, even though they may have been percieved as something else at the time of their inception. The nature of the evidence clearly points to the conclusion that the state enterprises, in their strategies and ways of operating, shouldered the mantle of the trade associations. See, as well, Olson M (1982) p 62-63.

[58]As well as to budget constraints.

[59]On the political need for periodical reconsideration of the use of interest groups, see Downs A (1957), p 91-93.

operation is deepened. The decisive moment in this process towards interdependence may have been the 1957 decision to create the sister organization EEC. The two organizations fused their decision-making structures in 1968[60].

We have underlined the significant confusion that was built into the Community, as well as the need for a discussion of national strategies, in order to understand the international dimension. The national strategies pushed during the early 50s were varied in different countries, and these differing strategies were directly reflected in the constitution of the Community. It would, in fact, be hard to single out any country that was solely interested in free trade, except possibly the steel-importing Dutch, but even in this case the need to safeguard an emerging infant steel industry was evident. On the other hand, the need to rescue national expansion plans[61] did, in themselves, enforce *seemingly* contradictory measures, as the percieved need for free access to Ruhr coal collided with demands for safe markets. The possibility of invoking emergency measures -quotas- were potentially powerful, but the need for unanimousity in these cases, among six very different nation-states, made these measures more of a potential than real possibility.

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[60]The development of both the ECSC and the EEC must essentially be seen as, using the words of Rosenberg, "prosperity phenomena". The earlier origins of the ECSC are clearly reflected in its constitution: "Those who concieved the idea of a coal and steel community did so against the background of considerable uncertainty and some anxiety... the Paris Treaty /became/ a significantly dirigiste document. By contrast when the Rome Treaty came to be drafted conditions were such as to give less ground for anxiety/1955-56/. The atmosphere was one of buoyancy and expansion... The Rome Treaty with its flavour for free trade and competition owes much to the economics of Adam Smith. Competition is well entrenched within it..." Citation from Swann D (1983), p 14, 15.
The deviations that were made from the principles of free trade, primarily demanded by the industrially relatively weak French, are discussed in Willis F R (1965), p 251-64.
In our discussion, though, what is important is not these exceptions, not the growth of the CAP, and not even the dirigiste elements of the Paris Treaty. Instead, what is important is the way that the EEC evolved up to the early 1970s: In the context of massive economic expansion the dirigiste elements was not very important, and, as seen in the case of coal, dirigisme could be accomodated within overall expansion. When depression struck ("the industrial cleaning up process" (Schumpeter)) in a severe way after the mid 70s, the member countries were already bound together economically to a point of no return.

[61]"The Schuman Plan was invented to safeguard the Monnet Plan" (Milward).

2.2.2.2. Born unto trouble. A summary of destabilizing trends in the coal and steel-complex after 1950, and their relevance to the working of the ECSC

The outstanding feature of the Community during the later 1950s and 60s is that its percieved *raison d´ être* disappeared after 1958.

The complete restructuring of European energy markets that began in the late 40s and early 50s[62] changed the economic, geographic and political setting of the Community. When American coal and Mid-East oil could be had for prices below Ruhr coal, this implied that the golden goose was turning into a problem child.

In itself, the possibility of importing coal from the US shook the existing locational pattern of heavy industry to its foundations. For integrated steelplants tide-water locations became ideal to utilize imported coal as well as ore. In the market-conditions of the 50s and 60s, with demand for primarily flat products expanding heavily, these new possibilities were readily used, new capacities being constructed all along the West European shore-lines.

Super-natural gifts would have been required to forecast in 1952, how radically conditions would have changed by 1965. To expect the founding members of the ECSC to have foreseen oxygen steel-making, tidewater plants, radically falling freigth rates and mass-importation of US coal, Mid-east oil and Brazilian ore is nothing but prepostrous. What is important is, instead, that the extremely flexible structure of the ECSC made it possible for different nation-states[63] to pursue seperate strategies with regard to the steel and energy complexes during the period. It was the relaxed market conditions up to the mid 60s that hid the enormous problems inherent in these policies. It was not until markets tightened, subsidies mounted and inflation rates diverged by dozens of percentage points, that convergence became an explosive issue.

Instead, the ECSC served, to no small extent, as a shoring up mechanism, to the benefit of collapsing national structures. In the coal sector any interest in free trade was gone by 1963. Thereafter all efforts

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[62]See sect's 3.1-3.2.

[63]Rather than firms. It is an important argument in this study that the level of the firm for decision making in West European heavy industry was rather restricted up to, at least, the period before the mid 80s. This theme is developed in the sect's 4-5 below.

were -for nearly three decades- concentrated to the goal of allowing national plans to work inside the overall ECSC structure. The subsidy regulations of 1965 left room for almost any national plans to operate within the Community[64]. The coke-subsidy agreement of 1966-67 is also important in this context. It was, apart from the CAP, the only truly Pan-european effort to finance and regulate Intra-community trade in a commodity.

By the mid 60s imported coking coal was competitive with Community produced coal throughout Europe, and national schemes in order to subsidize consumers had started to flourish. Simple import-bans was threatening to undermine the international competitivity of the steel industry, if it was forced to rely on expensive Community coke. The subsidy agreement of 1966/67 fell short of the CAP in some respects[65], but it did -on the lines of the CAP- allow for a screening off of European markets from the outside world. It was, moreover, coupled to a partly shared financing of a scheme aiming at regularized structural adjustment.

In fact, the subsidy regulations of 1965 and 1966/67 was even more important than a first glance may appreciate: what was at stake by the mid 60s was the continuing survival of much of the central European coal-ore-steel belt, as its comparative advantages was vanishing with US coking coal and Brazilian ore. *Subsidizing Lorraine-Saar-Ruhr-Belgian coal was becoming pivotal to the survival of integrated steel making over much of this area* [66].

If actions visavi the coal industry was dominated by a nearly total acceptance of almost any national subsidies, the same matter of conduct

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[64]Gordon R (1970), p 242-44; Kerstan F (1970c), p 1040-43; Kerstan F (1971a) p 194-97; Jamme H P (1971) p 231-34.

[65]The subsidization of national consumers was carried by the separate national governments, the subsidization of intra-community exports covered from a common equalization fund, which the coke exporting Germans had to finance the better part of. On the coke-subsidy, see: Jamme H P (1967), p 1219-25; Schumm O (1970), p 756-61; Reichert K H (1977), p 235-37.

[66]The problem is discussed at much greater length in sect's 3-5, and the expression here is a dramatization of what was happening as early as 1965/66. Moreover, the conditions for different producers (in different areas and in different product lines) were very heterogenous. Overall, though, no inland steel producer was in the position to withstand the combined drawbacks of expensive coal, low-yielding ores and inland locations by the mid 60s. At this point in time the choice was clear -either a total freeing of coking coal imports (which, anyway, would have placed the inland locations under freight disadvantages) or common subzidation.

could never be wholly applied to the steel industry. In the coal sector national schemes didn't interfere with the interests of neighboring countries (as no internationally competitive ECSC producers existed after ca 1960). Significantly enough, in the one case where exports were of any importance (Ruhr coking coal) a Community wide scheme was developed[67].

In steel, on the other hand, there existed multitudes of firms and plants with widely differing production costs in the mid 70s[68], when crisis struck and the matter of subsidies became urgent.

Thus, policies which allowed the distribution of unlimited amounts of monies to less efficient producers didn't primarily strike Extra-european producers[69]; in the case of steel the cost of subzidation befell, directly, the efficient Intra-community producers[70].

It was in these circumstances that the evolution of something which could be termed "a common ECSC steel policy" had to be a rather problematic task. When the "steel crisis" came calling between 1975-78, and made a renewed visit with strengthened force between 1980-85, there were immediate calls for the implementation of paragraph 58 (manifest crisis- distribution of production quotas). In the real world, though, these demands had to be adjusted to the existing Intra-ECSC competitive structure[71]. It was in this context that the ECSC-structure was to be confronted with a task of veritable proportions.

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[67]The significant thing of the ECSC coal policies was that there was something in it for everyone. Those who wanted to import Extra-european coal (during the 60s the Italians, after 1973 the French, the Dutch and the Danes), were allowed to do that, while those who wanted to subsidize internal producers (the Germans, the British, the Belgians and the French) being allowed to do that. Those who were in most need of a continuation of German coking coal exports (German mines and the Luxembourg steel industry) were favored by the coking coal subsidy.In the case of petroleum (all these matters are fully discussed in sect. 3) import limitations were never really in question after 1959. What the ECSC provided for was a continued segmentation of markets and a continued more or less free reign of national policies in the field of energy.

[68]See sect's 4-5.

[69]Or, in the case of the CAP, Argentinian farmers.

[70]Extra-european import penetration in the case of steel was never a very big problem in the Community. See sect. 4.4.4

[71]The situation is discussed in sect's. 4.4 and 5.1.

3. Coal and Energy in Post-war Western Europe

In 1950 coal was the dominant source of energy in Western Europe. In the period up to 1973 this pattern underwent a profound change, as Mid-east and North African oil transformed the market. The possibility of large-scale imports of American coal exacerbated this structural change in the West European markets for energy.

To highlight these developments, and their impact on the coal mining industry of Western Europe, we may distinguish five distinct phases:

1) The immediate post-war period, when overall primary energy demand was almost totally satisfied by internally produced coal.

2) The prosperity phase of the post-war period, which stretches up to the mid 60s, was still dominated by internally generated coal, but the period was one of increasing tensions. Imports of oil and coal grew in a disproportionate way, as their prices declined relatively to prices of West European coal. The period was marked by growing tensions between these rising forces and the declining strength of the traditional coal-mining areas. These tensions were greatly increased by the business cycle downturns of 1957-58 and 1962-63, when the least cost-efficient producers became increasingly hard-pressed (as it was no longer possible to raise prices in order to shield the least efficient producers).

3) As growth tapered off, and the post-war economic cycle entered its recessionary phase by the mid 1960s, the severity of cyclic swings increased. The downswing of 1966-67 made matters urgent, as even the most efficient West European coal producers had to make very distinct choices.

By the early 70s the energy market had reached a hybrid form, as freely flowing crude petroleum and natural gas had gained market shares in a dramatic fashion, while internally produced coal was still an important and protected source of energy[1]. Other aspects of this complicated system were the early beginnings of nuclear power, and scores of national policies towards energy markets and energy security[2].

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[1]The impact of the new sources of energy had been similar in the USA, where import quotas had been introduced during the downswing of 1957-58, to protect Texan producers (below).

[2]This situation is an obvious example of what Schumpeter called "...the time where the Kondratieff slides down /the recession/, which is always characterized by an increase -in some respects spectacular increase- in physical production..." Cited from Schumpeter J (1991 a), p 308.

4) With markets and policies in a flux, real energy prices started increasing from the early 1970s. It was at this point in time that policies and goals of consumer and producer nations (these are, in themselves, ambvivalent notions), became increasingly confused and hazy.

The outcome of this period was decided by the structural changes that the recession triggered off. As the relative prices of different energy commodities increased in a truly revolutionary way, restructuring centering on the energy sector intensified, especially when petroleum prices trebled once again, between 1979-81 (developments that coincided with the deepening of the recessionary phase into a depression).

For energy producers these developments had to provoke profound changes, especially when demand started leveling off.

5) Up to the early 80s, the increased international oil prices served to hide structural problems in the sector, but when oil demand collapsed in the depressive phase (after 1980), energy prices started falling as well. As prices continued to decline after 1982 -developments most vividly illustrated by the total collapse in oil prices during the winter of 1986- old structural problems returned with full force. Overall, the 80s saw a process which might be described as a further intensification of the trend towards a globalized, integrated, raw material economy.

3.1. The immediate post-war period

West European energy policies in the immediate post-war period was completely dominated by the percieved need for a revitalization of the areas coal resources[3]. This was no mean task, considering the production losses of the war period, and the structural deficiencies that had been recognized already during the inter-war period[4].

I cite this passage to underline what I see as the fundamental nature of the West European economy of the later 60s/early 70s. The economy had entered its recessionary phase somewhere around the mid 60s, when the most innovative investment into the leading sectors, gave way to investment that was essentially "more of the same". So, we are about to enter the phase of the cycle where production from new processes starts increasing at an accelerated pace, ultimately forcing rationalization among the older production centers.

[3]For the sake of convenience and comprehensiveness, all Figures concerning Coal production (Figure 4 SA), Coal productivity (Figure 5 SA) and Coal industry investment (Figure 3 SA) are placed in the back of the book (Statistical Appendix).

[4]Svennilson I (1954), p 105-10.

The limitations to this strategy is crucial to recognize. The contradictions between the structural changes in the supply and demand for energy, produced a developmental pattern that placed rigid limitations upon the continuing evolution of the ECSC, by placing sometimes rigid limits on the patterns of change in the energy sector.

a) Internally produced coal -or coal imported from neighboring areas in the Community- made up 80-95% of energy needs in the respective nations around 1950[5] (on the relative importance of coal, as compared to petroleum, see fig. 3.3).

b) Alternative sources of energy were thought to be of limited, or at most of complementary importance. Mid-east petroleum had made an appearance in the inter-war period, but its importance was as yet a pale shade of things to come[6]. American coal, the second option, was clearly produced at lower cost. Wheras European coal-mining was a comparatively labor-intensive industry, the US industry had adapted to its peculiar factor endowments. Strip-mining was disproportionally important, and in underground mining the pillar-and-room method was dominant, both methods drastically reducing labor requirements. As long as freight rates proved prohibitive, though, the less productive European coal-mining industries had a natural protection against the US.

c) This double-sided feature of post-war European energy policy -the dependence on internally produced coal, and its percieved lack of substitutes- was, as already stated, crucial to the institutional development of the economies: it was important to the emergence of the ECSC, and it was important to the development paths taken inside the Community.

In **France** the need for a vitalization of the internal energy industry explains the very considerable resources that were allocated to coal mining in the Monnet plan. The simultaneous nationalizations of the mines and electricity generation (1945-46) were seen as necessary measures, in order to regenerate these resources. The "short-sightedness" of traditional market forces were seen as the crucial factor behind the stagnation and crisis of the sector during the 1930s. The limited time-horizon of the private investor or credit institution was deemed to be unsatisfactory, in view of the long-term need to further develop the industry[7].

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[5]Lister (1960), see his table 2-4 on p 437-38.

[6]On the rise of the Mid-East producers: Williamson et al (1959), p 726-33.

[7]Gordon R L (1970), p 29-34, 67-68; Baum W (1958), p 18-19; 190-92; 197 ff.

This was followed by a period of relatively high investment in French coal-mining, as coal capacities and cokeries (primarily in Lorraine) were developed, to the benefit of the expanding steel industry. The relatively good natural endowments of this area made it possible to increase output, while reducing the dependence on coke supplies from Ruhr[8]. The disadvantages of the relatively more important coal fields in the Northern area of the country (Nord-Pas de Calais) continued to be apparent, though[9].

In **Germany** there were similar forces at work. The coal mines were singled out by the occupation forces for redevelopment at a very early stage[10], but after the Erhard reforms of 1948 new signs of disequilibria emerged between the rapidly growing consumer industries and heavy industry (coal mining, steel, electricity generation etc). The intensity of the boom, and the implications of it, were summed up by Fritz Baade (contemporary director of the Kieler Instituts für Welwirtschaft) as he indicated that the traditional coal interests were leaving the sector altogether:

> " /Investieren/ nicht in den eigenen Betrieben, sondern z. B. in Schuchwichfabriken oder in einem volkswirtschaftlich vollkommen unsinnigen Tankenstellennetz"[11].

It was out of this boom that the "Investment aid" (the *Ruhrhilfe*) to heavy industry, together with the accelerated depreciation programs (1952) emerged[12]. In these circumstances investment in coal mining was accelerated between 1952 and 1955 (SA fig 3).

The situation in **Belgium** was especially critical. The mines in the southern fields were in an obvious need of thorough restructuring, having the lowest productivity in the Community (SA fig 5) but the very grave social implications of a move like this, made the political superstructure very reluctant to initiate it (nearly one tenth of Belgian industrial employment was related to coal mining). Instead, the industry was shielded for a five year-period after the country's accession to the ECSC,

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[8]All production, productivity and investment statistics are available in the Statistical Appendix.

[9]French coal in the 50s : Müller-Berghoff B H (1957a), p 91-93; Fritz R (1958), p 542-45.

[10]Abelshauser W (1984), p 44-50.

[11]Abelshauser W (1984), p 68.

[12]On the *Ruhrhilfe* : Abelshauser W (1983), p 76-84; Müller W (1964), p 1454-56; Bankmann J (1965), p 1084-85.

and the most productive mines in the Community (the German and Dutch) were taxed to subsidize investment in Belgian mines[13].

The odd man out in the ECSC was **Italy**, where coal mining was virtually non-existent (except for a very limited production on Sardinia).

Instead it was here that one of the important innovative cathalysts to change in the West European energy pattern emerged. AGIP[14], the nucleus of ENI[15] (1953) had been created by the fascist government as a national petroleum company in 1926. Its early role inside the Italian state apparatus (see sections 4.2.3 and 5.2.3), is apparent from its Italian nickname: "Azienda Generale Infortunati Politici" (General Enterprise for Politicians in Distress).

In the special circumstances that prevailed in the post-war period, it was possible for this organization to act as an innovative force on the West European scene. AGIP's discovery of domestic natural gas resources (1949) provided it with a significant cash-flow, which made it possible for the company to develop a growing net of gasoline stations. Appearing as a near monopsonist of crude oil on the rapidly growing Italian market, ENI was able to take advantage of the growing oil-glut in the 1950s. Significantly, crude prices declined faster in Italy than in other countries[16] (SA fig 2).

ENI continued this policy of expansion during the 50s, as it integrated vertically into fertilizers, syntethic fibres, chemicals etc. Seeking to expand its retailing of gasoline and products, ENI

> "...launched an attack on the oligopoly of the oil majors. His /Matei, the MD of the company/ intention was to lay pipelines across the Alps to refineries in Bavaria and Switzerland. This threat was too great for the companies to ignore; they countered by bringing forward their own similar projects by several years and undercut /ENI/ by cross subsidization within their international operations"[17].

Although this discussion of ENI strategies during the late 50s may seem somewhat premature, as compared to the discussion of policies in other countries during the early 50s, it is nevertheless essential to illustrate the

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[13]On Belgium in the 50s, see: Fritz R (1957), p 1184-86; Fritz R (1959), p 80-83; Milward A (1988), p 438-43.

[14]Azienda Generale Italiana Petroli.

[15]Ente Nazionale Idrocarburi.

[16]Adelman M A (1972), p 184-87.

[17]Lucas N (1985), p 144-45. For an overview of Italian energy strategies from the 50s up to the early 80s , see Colombo U (1984), p 31-49.

vastness of the possible scope for actions during this period. For several West European countries the option of choosing *not* to make use of "...the potentialities of cheapened supplies of foodstuffs and raw materials and an adjustment to the potentialities of the new leading sectors..."[18] did still exist during the 1950s. The strategies discussed above, in the cases of France, Germany and Belgium, are all evidence of the continued existence of this option. Measures such as nationalizations, cartellization (the Ruhr) or combinations of international and national intervention (Belgium), were all aiming at the creation of some kind of corporativist entity, where price equalization schemes shielded the weakest and the state subsidized investment[19].

As long as external sources of energy were relatively more expensive than indigenous coal this policy was possible to pursue without major disturbances, except for a continuing increase in the relative price of energy (figure 3.1). It was only when the great innovations of the period -Mid-east and North African oil and the further development of the shipping industry (tankers)[20]- penetrated the economies of Western Europe, that the structure started to dissolve, inevitably producing major socioecionomic tensions in its wake.

Given the circumstances discussed above, coal prices couldn't but increase during the 1950s. Investment was high, coal was the dominant source of energy, there existed a strong political interest in further investment in the coal-mining industry, while marginal fields were kept in operation. During an extreme seller's market coal producers were able to take advantage of the markets, while still dominating the political limelight.

The most immediate threat to this position was imported crude petroleum. During the late 40s/early 50s this commodity was still relatively overpriced as compared to coal, but its potential oversupply at the going market prices was considerable. World market prices were, at this point in time a function of US pro-rationing among Texan producers[21], but this system was eroded in the post-war period, when the true extent of the Mid-east and African fields became apparent.

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[18]Rostow W W (1978), p 218-19, when discussing the reactions of West European countries to the economic forces of the inter-war period.

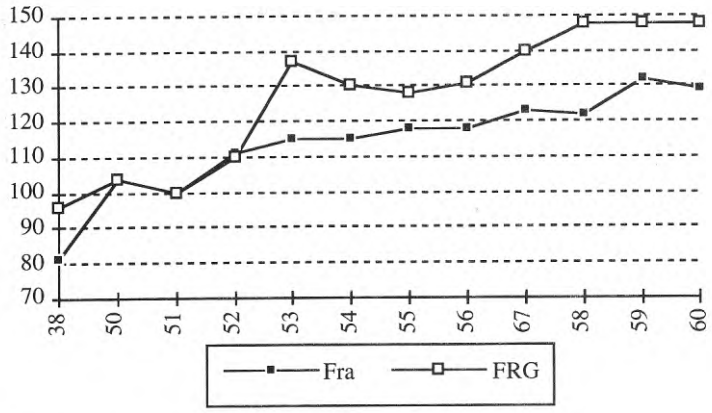
[19]Gordon R (1970), p 58-62, 176-94, Diebold W (1959), p 274.

[20]On the development of freight rates and their contribution to the falling costs of imported energy, see SA fig 1.

[21]Adelman M A (1972), p 134 ff.

Figure 3.1. Development of coal prices relative to wholesale prices 1938-60 (France, Germany).

1951=100.



Source: Adapted from Gordon R (1970), p 138.

Before 1958 this gave rise to a pattern where thinly veiled controls were imposed upon the oil majors, as very significant political pressures were exerted from the US administration upon them not to destroy the politically administered distribution system of the Texas Railroad Commission (TRC)[22]. For the companies this implied a possibility of earning significant resource rents from the newer fields, but the system did invite to cheating, while simultaneously providing incentives to the development of independent importers and/or producers (e.g. ENI). Inevitably, by the 60s "independent" oil producers (among them the French) were all over Algeria and Libya.

As long as the US still produced 50-55% of the free world's oil, while simultaneously Mid-east crude was controlled[23] by relatively few and

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[22]Adelman M A (1972), p 148-55. One of the citations used by Adelman, from a report issued by the Antitrust (!) division of the Justice Department, is extraordinarily telling about American attitudes towards the TRC (the Texas Railroad Commission):
"even moderate liberalization of controls in one area might swamp stabilization efforts in others... and wipe out precisely those independent elements... which are so necessary to competition" Cited in Adelman M A (1972), p 149.

[23]Up to the early 70s the main concern of host country governments were always to get the companies to pump more oil.

homogenous companies, this was a pattern that was possible to uphold. But as Mid-east and North African shares of world production started booming, and the West European market increased in importance[24], there was room for escalating an number of independent importers and producers[25], as the incitements to "overproduction" and price cutting grew.

3.2. The tide is turning: Coal in Western Europe during the late 50s and early 60s

The further development of the West European energy sector has to be understood in the context of overall socio-political developments. The situation in the coal mining areas was getting dramatic by 1958-59, as falling oil prices and declining freigth rates combined to make imported oil as well as US coal cheaper than indigenous coal. Adding to these problems, the overall situation made clear-cut policies of coal protection hard to follow.

Of utmost importance was the unsatisfactory development of coal prices in the preceding period (fig 3.1) which strengthened inflationary pressures, and had obvious political consequences. A German example may illustate our point:

> "Die Ankündigung einer Preiserhöhung um 4,70 DM für Kohle und 6,25 DM für Koks, die einen Tag nach der Bundestagswahl vom 15. September /1957/ erfolgte, erregte die Medien... und sollte das Ansehen des Ruhrbergbaus in der Öffentlichkeit und inbesondere beim Wirtschaftsminister in kritischer Zeit schwer belasten... Sie bleiben deshalb konsequent bei ihrem Beschluss und gestatten dem Wirtschaftsminister nicht, wenigsten sein Geschicht zu wahren, obwohl Erhard unverholen damit drohte, "die ganze Kohlenpolitik neu zu überprüfen" und alles Rohren" zu schiessen"[26].

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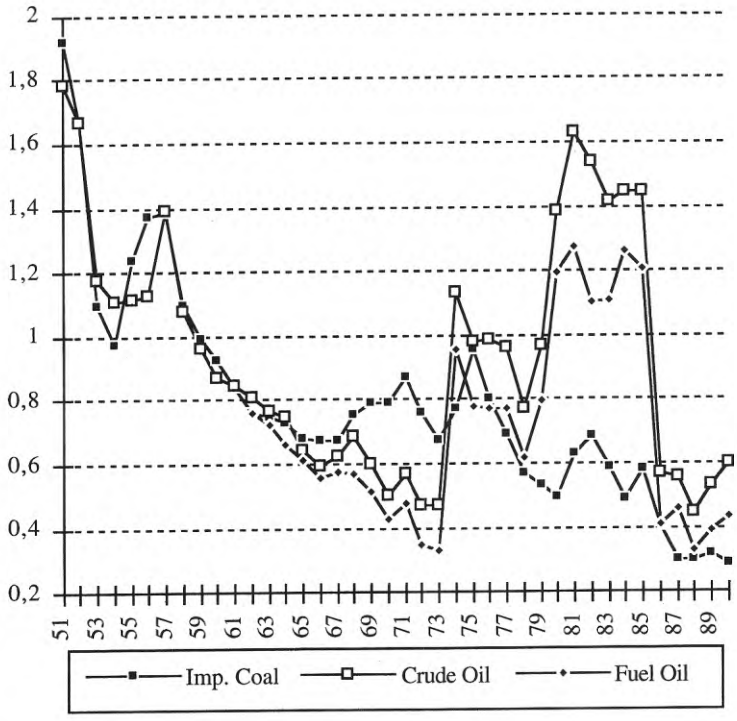
[24]SA Figure 6.

[25]And new exporters. It was precisely at this junction (1958-59) that the USSR appeared as a seller in West Europe, an exporter, typically, introduced by the Italians.

[26]Abelshauser W (1984), p 88. See, as well, Lenel H-O (1981), p 165.

Figure 3.2. **Coal prices. Development of Internal Community prices in relation to imported fuels, 1951-90.**



Note 1: Prices for imported fuels are Dutch prices (cif), for Crude Petroleum, Fuel Oil (after 1962), and Imported Coal (US Coal up to 1973; thereafter all imported coals.

Note 2: Internal price: List price for Fettkohle III and IV, Ruhr (= 1 each year)[27].

[27]Dutch prices are used for imported fuels, as they represent an approximation of potential cif prices for the whole North Sea area (Dunkirk, Hamburg, Scunthorpe, Ghent etc.). Imported US coal (rather than all coal imported) is used between 1951-73, to avoid the price influences from imported German coal. From 1974 all imported coals are used, as German coal had become insignificant on Dutch markets, while simultaneously

Sources: **Internal coal prices:** List prices, as cited in Statistik der Energiewirt-schaft, 1985/86 and 1990/91; (1956-90); Statistisches Jahrbuch der Bundesrepublik Deutschland (1951-55). DEM converted to USD by exchange rates as quoted in Yearbook of Financial Statistics. **Imported Fuels:** Derived from Commodity Trade Statistics. UN Statistical Papers, Series D. (New York.)

Given the collision course between overall economic goals and the development of coal prices, new priorities had to be formulated. In consequence with earlier signals from the department of finance[28], oil prices were allowed to decrease during 1958-59, while American coal was able to penetrate Germany. By late 1958 US coal was competitive with German in the Ruhr itself[29].

In the other countries of the Community (and, indeed, the UK) the general economic recession of 1957-58 had similar consequences. As petroleum prices fell in the recession, demand for coal receded dramatically, making for the build up of stocks to unprecedented levels, while oil imports rose by 8-10%. When the general conjuncture rebounded heavily during the early 60s, crude oil imports continued taking off in a manner never seen, while coal consumption stagnated or fell. The coal crisis was, very clearly, structural to its nature (figure 3.3-3.4).

The beginning of the "coal crisis" was a transitional period. West European coal producers were being moved out of the highly expansionary strategies of the period up to ca 1957. Instead, after the late 50s, strategies aiming at controlled retreat were to be pursued.

The conditions and policies seen during the transitional period (ca.) 1958/59-62/63 should be contrasted to these evident during the immediate post-war period. In a longer perspective, though, the real task was of a much more fundamental nature -in the long run deep mined West

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imports from other countries (Australia etc.) increased in importance. On the relevance of the general trend for relative prices of energy (as outlined in figure 3.2), SA fig 2.
On the relevance of Ruhr prices for the prices for Community produced coal as a whole, see Kerstan F (1971c), p 310-16.

[28]In the summer of 1956, when coal prices were freed "...beseigte die Bundesregierung den Heizölszoll von bisher 15 DM/t und erlaubte das Kontraktsfrist für den einfuhr von US-kohle und für Heizöl von 18 monaten auf drei Jahre ausgedehnt werden könnte." Cited from Abelshauser W (1984), p 89.

[29]See Rummert H-J (1958), p 1862-66.

European coal was uncompetitive with other sources of energy (fig 3.2) hence, the sector had to be slimmed down beyond recognition. A self-contained structure (fig 3.4 a-b), had to broken as production was phased out. Sooner or later the possibilty of cheap imports would have to be accepted. As indicated from the above-mentioned figures, the process was to be a hesitant one.

The self-sufficiency of the Community during the 50s was indeed remarkable[30]. It was only France was a coal-importer of any considerable importance. Instead, the relatively modest rise in Extra-european coal imports after the mid 50s, provoked an instantaneous outbreak of import bans and related corporativist measures[31].

Some features of the general timing of events are clearly in evidence in figs 3.4. By the mid/late 60s decreased production (self sufficiency) was accepted among the highest cost-producers, but the full implications of Extra-european coal imports wasn't accepted before the early/mid 80s. After ca 1983 an intensified adjustment process was evident, even in the two most important coal producing countries in the ECSC[32].

It was the early stages of this process that had to be passed during the late 50s. It was here that a specific West European solution, consisting of a relatively free market for crude petroleum, and a closely controlled one with regard to coal, was formed. Given the pre-history of the continent, it is hard to understand how this pattern could have been avoided.

In **Germany**, the overwhelmingly most important coal producer in the ECSC, the political will was, as we have already seen, in favor of increased oil consumption. With political pressures mounting, as stocks rose and in consonance with increased redundancies of miners, these policies were only slightly modified. Extra-community imports of coal were regulated by a quota system, but the tax on heavy fuel oil was only moderately increased. Despite the fact that the indigenous coal market was reserved to German coal, this implied that oil continued to be allowed to replace coal in non-controlled uses (below)[33].

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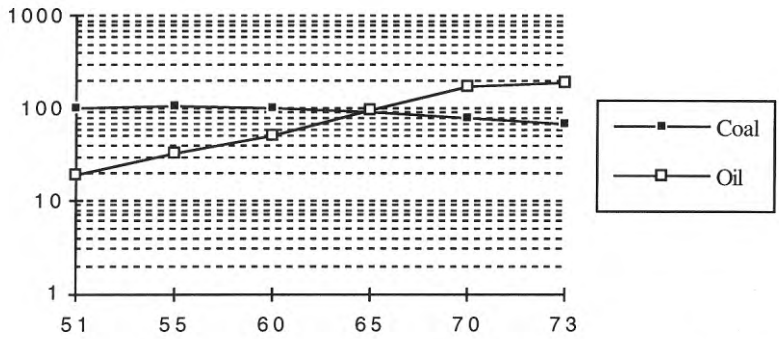
[30]This should be compared to the equally remarkable self-sufficiency with regard to the steel industry, see sect 4.4.4.

[31]The UK was, of course, not a member of the ECSC at this point in time, but the general features of the developments with regard to coal was to no extent to bypass this country, either. See sect 3.3.2.4.

[32]Note the quite small, but important, changes in import penetration- and self sufficiency-ratios for the UK and Germany after ca 1983.

[33]See, for example Burckhardt H (1959), p 1554-61; Burckhardt H (1961), p 1507-14.

Figure 3.3. Western Europe. Coal and crude oil availabilities 1951-73.



Note 1: Western Europe=Germany, Belgium, the Netherlands, Italy, France, the United Kingdom. Crude Petroleum converted to mtce.

Note 2: Coal availabilities in 1960 (457,9 mtce) = 100.

Sources: 1951, 1955: ECSC Countries: Statistische Information, Vierteljahrshefte zur Wirtschaftlische integration Europas, 1962 1/2: Energiestatistik (Statistisches Amt der europäischen Gemeinschaft, Brussels). UK Coal availabilities calculated from Quarterly Bulletin of Coal Statistics for Europe; Petroleum availabilities: Imports, as given Commodity Trade Statistics, (UN). 1960-73: Statistics of Energy (OECD, Paris 1974).

The problems were more pressing in **Belgium**, where the inferiority of most of its coal production was even more obvious than it had been in the first half of the 50s. Moreover, the coal crisis of 1958-59, coincided with the end of the five-year transition period that the mines had been allowed when the ECSC was formed. Here stocks were, relatively[34] highest, and the industry had to make a major strategic decision in consonance with the government (which would have to finance its continuing existence) and the High Authority.

To the Belgians the preferred action would have been the use of an earlier plan, put forward by the High Authority in early 1959. This had proposed to solve the coal crisis through the use of article 58. In a four-

[34]As a proportion of production.

tired plan, it contained the establishment of coal production quotas upon all member countries as well as the regulation of third country imports into the Community. Stocks were to be jointly financed, miners were to be provided with income guarantees[35]. The rejection of this plan in the Council of Ministers is important, in order to understand the further developments during the 60s. As it was, the Belgians turned out to be the only ones whole-heartedly supporting it.

The Germans weren't interested in a program that sacrificed relatively high-yielding Ruhr mines to the benefit of Vallonia; the French were expanding *their* relatively high-yielding mines in Lorraine, and were already dependent upon imported coal; whereas the Italians had every reason in the world to be interested in cheap imported supplies of energy. The simultaneous development of plans for large integrated coastal steel works in Italy (Taranto), France (Dunkirk) and the Netherlands (extending Ijmuinden) were also making for an interest in imported coal[36]. Placing limitations upon oil imports would have been even more undesirable in the circumstances of the late 50s. The Italians, the Dutch (Shell) and the French were all on their way of developing export-oriented refinery-industries, while the Germans had an interest in price stability and their overall economic development.

These circumstances are important to summarize, because they demonstrate not only the forces that the Belgians were up against, but also the forces that all West European coal producers encountered in 1958-59. The emphasis that US analysts of the West European coal mining industry has placed upon the protectionism and defensiveness of the Europeans in the face of change[37] -"The Reluctant Retreat From Coal"- is justified. The Europeans were, of course, protecting internal vested interests by slowing down the pace of the phaseout of the industry.

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[35]See Rummert H-J (1960), p 358.
[36]See, for example, Abelshauser (1984), p 101-02.
[37]Adelman M A (1972), es (p 155-56, 227-28; Gordon R (1970), ch 2.

Figure 3.4. a. Coal import penetration ratios. Belgium, France, the UK and Germany 1951-91.

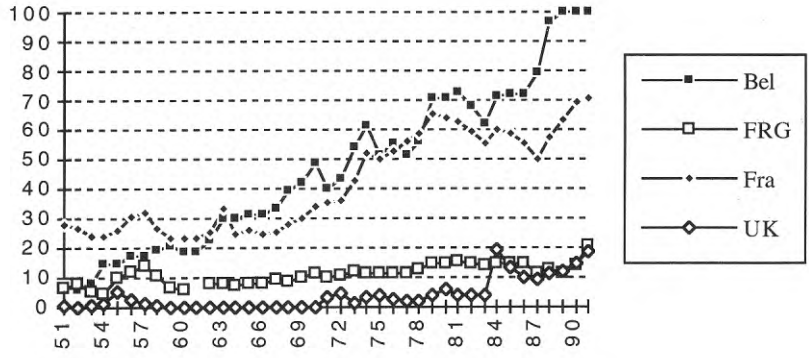
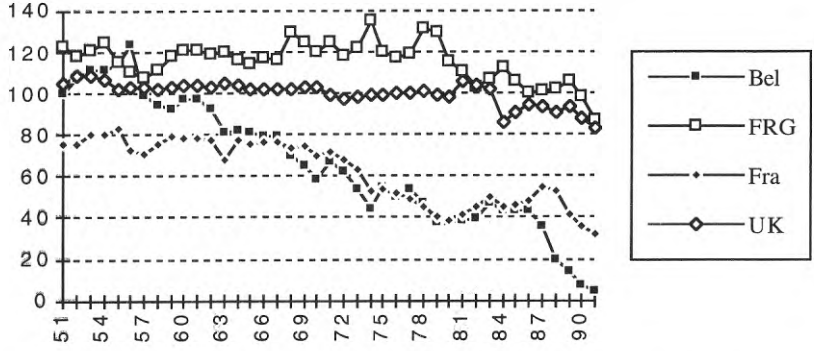


Figure 3.4. b. Coal self-sufficiency ratios: Belgium, France, the UK and Germany 1951-91.



Note 1: Saar is included in Germany all through the period in this figure. In order to include the Saar figures with the German, the following source was used: Statistisches Bulletin Kohle und Stahl no 4/1961, (ECSC, Luxembourg 1961).

Note 2: In all other figures or tables in this book, Saar is included with Germany, except figures 4.6 and 4.7.

Sources: Calculated from: 1951-65: Quarterly Bulletin of Coal Statistics for Europe (Geneva); 1966-90: Annual bulletin of Coal Statistics for Europe (Geneva); 1991: Eurostat: Energy, Monthly Statistics (Luxembourg)

On the other hand, there is a certain risk of oversimplifying the task in front of the ECSC countries (and the UK). There was never, at least after 1959, any risk of *real* protectionism and energy autarky. A strategy of (relatively) cheap energy was the preferred option, but it had to be developed in the context of the existing West European industrial society, a society with extraordinarily deep roots in the coal-mining districts, the traditional location of the continent's heavy industry. Therefore, structures had to be developed that were able to be dynamic (because of massive change) and socially mediating ("just"). In several countries the question was one of clearing the deadwood that hadn't been done away with for half a century[38].

The Belgian solutions to the coal crisis exemplifies this point. The original panacea of the High Authority having been turned down, a new proposal was worked out, something that, in itself, illustrates the great flexibility of the ECSC[39]. Thus, article 37 was used, referring to the coal crisis as a "deep and continuing disturbances" in the Belgian economy, due to the working of the ECSC. If the problems of the Vallonian mines really could be blamed on the ECSC is, in reality, a wholly different question. The important point to consider, is that the flexibility of the

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[38]See our discussion of Svennilson and Pollard on the inter-war period.
There were some remarkable corner-stones in the post-1945 shoring up process, one of which clearly being the instigation of the CAP (Common Agricultural Policy). In the conditions of the 50s and 60s it seems to have been absolutely necessary to develop mechanisms protecting the old mainstays of the West European economy against a too threatening wave of innovative change. The interventive mechanisms developed towards agriculture, energy (coal) and heavy industry (steel) were, obviously, part and parcel of the same process: Developing out of the 50s and 60s, they evolved into monsters during the 70s, to convulse and collapse in the 80s and 90s.

[39]This was before the general subsidy decision of 1965. In 1959-60 some other member states (primarily the Germans), had an interest in free trade within the Community, combined to a regulation of coal imports into the Community. Ideally Belgian subsidies should have been set in such a fashion as to make production competitive with other Community producers (not being high enough to make it possible to underprice Belgian coal in France or Germany), while Community imports into Belgium were deregulated, and Extra-Community imports continued to be regulated. The "coordinated European energy policy" that the coal interests dreamed of during the 60s would have been Siphysos come true, if it had been realized. (Coordinating/segregating production and imports from within and outside the Community of coal, crude petroleum, natural gas etc.) It may not have been impossible to create, though -witness the CAP.
See: Reintges H (1966), p 1389-96, for a view of how German coal interest regarded European energy coordination during the 60s .

ECSC-charter again made a compromise between the national and international level possible.

That conditions were changing, by degrees, as compared to 1951-52 are obvious. In the early 50s the Belgians had been allowed, in effect, to continue their mining outside of the Community for five years, being subsidized by the Germans and the Dutch, without any real conditions (demanding structural change) being attached. In December 1959 the situation had changed enough for a modified strategy to be implemented. The imposition of art. 37 was tied to rather strict conditions, imposed by the High Authority, as production was to be cut back by 9,5 mn t/y until the end of 1963[40].

The Belgians, in turn, had to develop some tool that was able to ration these cutbacks among different coal producers. The impending process of rationalization (selection) required that clear responsibilities for the further development of the sector were defined.

As the acute phase of the crisis began, the sheer size of the cutbacks implied increased social unrest (strikes 1959-60, antagonisms between Valloons and Flemings) in a situation where these responsibilities weren't clearly defined (between collieries and different parts of the government). The Belgian Senate's direct interference in one case of an attempted closedown was the direct reason for the creation of the Directory of Collieries:

> "...die Regierung unter der bestehenden Gesetzgebung keine Möglichkeiten besass, die als richtig befundene Schliessung... durchzusetzen. In der Debatte vor dem Senat wurde... ausdrücklich auf den Fall der vom Staatsrat wieder aufgehobene Verfügung zur Stillegung der Schachtanlage Gosson hingewesen. Der Berichterstatter des Auschusses für Energie, De Winter, meinte dazu ergänzend: 'Unser bestehendes Abbausystem scheint nicht mehr dem Umfang der zu lösende Probleme gerecht zu werden. Um aus dieser Sackgasse herauskommen, kann man sich zu einem allgemeinen Laisser-faire entschliessen oder zu einer einfachen Verstaatlichung. Die erste Lösung ist unannehmbar... die zweite entspricht nicht dem Wunsche der Mehrheit...' "[41].

It was in this situation that the Directory of the South Belgian mines was instituted. Someone had to take responsibility for the rationalization of the mines, when clear lines of communication had to be developed between the state (which had the necessary resources, and was responsible

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[40]See Rummert H-J (1960), p 357-60.

[41]Fritz R "Das belgische Bergbaudirektorium", Glückauf, Heft 3/1962 p 185.

for the overall implementation of the High Authority's decisions, but lacked the will to formally nationalize the industry) and the individual collieries. The Directory was set up in order to overcome these problems by vesting the potential powers of the politicians over the industry, in a -theoretically- depoliticized form. The Directory was then vested with the formal and ultimate responsibilities for the restructuring[42].

In **France** matters were deeply influenced by the discovery of huge resources of oil in Algeria. Earlier the policy towards cheapening oil had been rather ambvivalent, as taxes on fuel oil had been increased in order to protect indigenous coal mining[43], but after 1958 the possibility of developing an indigenous source of oil in Sahara ("Europe's Texas", in the words of the French minister for industry), made it possible to overcome these hesitations.

This was, indeed, the logical continuation of earlier French energy strategies. It had always been dependent upon imported coal, controlled by the Germans, and imported oil, controlled by the Americans or British. In order to overcome dependence upon these foreign controlled energy sources, policies of accelerated development of coal mining had been resorted to, as well as giving rise to early trials adressed to the development of an internal refinery industry[44]. If they were able to benefit from a massive exploration of oil in Algeria, this could at last fulfill the old goal of developing a major French energy industry. Moreover, this would make it possible to establish an important export industry (for refined products as well as crude) something that was seen as highly preferable, given the obvious weaknesses of the economy, in the face of the establishment of the EEC. The eventual loss of Algeria in 1962 was not, in itself, a major obstacle to these plans. In the Treaty of Evian (granting independence to Algeria) the supreme position of the French, with respect to oil exploration, was recognized for a period of ten (later extended to 15) years[45].

During the acute crisis of 1958-59 it had been possible for the Charbonnage de France to avoid massive cutbacks and build up of stocks, as the whole adjustment had been shifted over to imports through the use

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[42]ibid, p 184-86.

[43]Adelman M A (1972), p 155, 234; Haas E (1959), p 188-90.

[44]See, for example, Williamson et al (1959), p 735; Giraud A (1983), p 165-66.

[45]Lucas N (1985), p 13-16 on the impact of Algerian oil on French policy making. (Lucas: "The important question of the time was: How far to let oil penetrate the market to the cost of social stability and political security").

of the state controlled import monopoly ATIC. On the other hand, the hour of restructuring was, unavoidably, approaching: Given the combination of massive oil discoveries in the Sahara, and the parlous financial state of the indigenous coal industry[46], the first plan for a phased reduction of the French coal mining industry had to be implemented. The Jeanneney Plan was presented in 1960, and proposed a fall of 7 mn t up to 1965 (from 60 mn t/y to 53 mn t/y[47]).

3.3. Dancing on the edge of danger: The decade preceding the oil-chock

The Juglar downswing of the late 50s had demonstrated the weaknesses of the traditional coal-mining sectors of the West European economies. The continued impact and penetration of falling international freigth rates[48], crude petroleum and imported coal during the Kondratieff downswing of the 60s -a decade characterized by the massive increases in production that should be expected during a downswing- did, at last, reveal the true extent of the structural adjustments necessary.

What we ought to expect is, then, a period of massive relocation and increased social strain, when the socioeconomic complex had to cope with structural change. Remembering that economic change needs to be translated into institutional change, we recognize that structural solutions had to be found to deal with these escalating innovative pressures.

A short summary of the character of earlier problems and institutions highlights this fact. The most burning issue in Western Europe in the period 1945-50 was to get control over the Ruhr, to revitalize indigenous energy producers and to avoid the social problems associated with the closedown of marginal mines (this was a dimension that already existed during the inter-war period). The strategy chosen had been to create nationalized or corporativist structures with direct channels to the state for aid to investment etc., and the instigation of the ECSC structure, which had to become an ambvivalent structure, when heterogenous member states were confronted with massive change.

In the earliest phase of the coal crisis the need for new institutional innovations was evident in the solutions found in Belgium and France to

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[46]Gordon R (1970), p 171, 180, 188.
[47]See, for example: Leichter F (1960), p 234-37.
[48]Freight rates - SA fig 1.

cope with change. The Coal Directory that was put in charge of the Vallonian mines was a direct response to the existing structural deficiencies in a fundamentally altered situation[49], in France the evolution of the Jeanneney plan was a reflection of the same fact. Some superstructure, flexible in the face of unexpected change and carrying decisive final powers in the face of repeated emergencies, had to take the responsibility for overall rationalization and coordination of energy policies[50]. It is in this institutional context that the development of special plans, round table talks etc. should be viewed.

3.3.1. The overall picture

The basic fact that had been laid bare by the situation in 1958-59 (only reemerging much more forcibly in 1963 and 1966-67) was that indigenous coal faced a profound structural crisis due to the penetration of Extra-european energy producers. A short summary of trends in the seperate main markets for coal underlines this fact, and provides us with some tentative explanations for the strategies selected, when coal-producers had to be defended from international competition[51].

Overall, coal use was declining rapidly but, importantly, the picture was varied with regard to different uses:

In the transportation sector coal-fired locomotives were rapidly becoming obsolete, as electric and diesel engines penetrated the railroad sector (figures 3.5-6; 3.8-10). Similar forces were at work in shipping, where coal's role as a fuel was drawing to an end in this period.

In the gas sector coal was disappearing. Gasification of coal was phased out, the commodity being replaced by natural gas (figures 3.5-6; 3.8-10).

The household sector, which had been an important consumer of coal as well as coke, was declining. Households were replacing coal, as new fuels were preferred (light fuel oil, central electricity). These were declining in price, relative to coal or coke. Similarily, they were easier to handle (figures 3.5-6; 3.8-10).

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[49]See the comments made by mr De Winter in the parliamentary subcommitte for energy, cited above.

[50]See Leichter (1960), esp p 235 and 237.

[51]For a reasoned discussion of coal and coke markets in the mid 60s see Sandner N (1965), p 214-221. See, as well, Lenel H-O (1981), p 171-73.

The direct use of coal and coke in industry was losing ground even more rapidly, basically due to very similar reasons that were at work in the household sector (figures 3.5-6; 3.8-10).

Hence, what remained to coal was its role as a supplier of fuel in thermo-electric plants, and the impossibility of replacing coke in blast furnaces for the production of pig iron -although coal faced severe problems in the blast furnaces, as well (see section 4.2).

In electric plants coal faced threats from cheapening alternative fuels (heavy fuel oil, natural gas). By the 1970s nuclear power was becoming an alternative, as well.

On the other hand, coal was becoming increasingly (technically) productive in thermal plants, as requirements of coal per generated kwh fell distinctively[52], a development that must have strengthened the competitive position of the commodity[53].

But, this strength couldn't cover up the basic weakness of coal. Its relative price was increasing, as supplies of residual fuel oil grew, when refinery capacities grew[54]. Fuel oil was, thus, starting to replace coal in electricity generation by the middle 60s. What continued to make for the use of coal in electricity generation thereafter was that it was a convenient solution to basically socioeconomic problems. State owned/controlled electric utilities, with rapidly increasing demand, could be compelled to sign long-term contracts with coal producers at uneconomic prices, as costs for this policy could be spread over their whole productive capacities, paid for by state subsidies or passed on to millions of final consumers.

In the iron and steel industry coal served two main purposes. Of overwhelming importance was its role in blast furnaces, but there was a smaller one in steel-works (as fuel for the OH's) as well. In this second

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[52]On the reasons see Joskow P L (1987), p 17-37.

[53]The argument that coal was on the way of making itself "technically obsolete", by decreasing its own potential demand (as less and less coal was needed per unit of generated electricity), could only be true if demand for electricity failed to rise at a faster rate than the relative demand for coal declined, and if coal had a monopoly position as a source of electricity - a situation that was, by the 1960s, clearly not at hand.

[54]Refineries were in the first place constructed in order to serve the rapidly growing markets for more expensive oil products (gasoline etc.), but an unavoidable by-product of this process was that the supply of residual fuel oils increased. This rest product had to be disposed of at the best price possible, something which explains the apparent contradiction inherent in the fact that residual fuel oils -a refined product- is regularily cheaper than crude oil. See Gordon R L (1970), p 128, and Figure 3.2.

role coal use was, in consonance with other industrial uses during this period, decreasing rapidly (being replaced by fuel oil and natural gas).

In blast furnaces there was something to be saved, though. In its role as a providor of support to the burden and a reduction agent, coke wasn't readily replaceable. Unfortunately there were countervailing forces at work here, as well. With improved ore-burdens (high-yielding ores, sintering), and with the increased use of fuel oil in coke's traditional third role in blast furnaces as a providor of heat, coke rates were falling sharply. A third force making for, ultimately, decreased consumption of indigenous coke was the construction of several steel-works in coastal locations. For these plants cheap imported coal was preferable, and the competition that this implied meant that plants in older locations had to adjust their costs as well[55].

So, when agreements were struck between indigenous coal producers and steel-makers, these had to recognize this basic fact about the latters need to be internationally competitive. In this instance costs couldn't be spread over an immense number of final consumers.

These were, then, the main problems faced by coal in different markets after 1958. The different characteristics of different sub-markets demonstrates, as well, why some of these uses were deemed to be beyond redemption, and why the last two were selected for strategies aiming at reducing (controlling) the rate of retreat. Electricity generation, as well as steel production were seen as growth industries in the mid 60s. Moreover, they were controlled by relatively few agents (minimizing the number of counterparts that the governments had to deal with). Lastly, both industries were either heavily subject to government interference, or were directly controlled by the state[56].

3.3.2. The National experiences up to 1973

3.3.2.1. Belgium and the Netherlands

In both Belgium and the Netherlands strategic decisions to settle the fate of coal mining had to be taken during the mid 60s. Although they had

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[55]See sect's 4.2 and 5.2.1.1.

[56]For steel, see below sect's 4-5.

their points of departure in somewhat different circumstances, the final outcomes of policies were still rather similar.

Belgium. The first steps in the long-term reorganization (winding up) of Belgian coal mining had been taken with the foundation of the Coal directory in 1962, and the instigation of medium-term plans for the clearance of the problem of the Vallonian (Southern) mines.

By 1964-65 it was obvious that these had to be speeded up (due to the price and consumption trends described above). It was not only that plans for the South would have to be accelerated, the mines in the North were in need of a major reconstruction as well. Consumption was decreasing, Belgian mines were uncompetitive and imports had to be increased in a controlled manner (figures 3.4-3.5[57]). Figure 3.5 confirms the general problems discussed above, i.e. the virtual disappearance of major coal markets by the mid 60s.

Energy policy was -as from the mid 60s- directed at the long-term goal of phasing out coal production as fast as possible, a retreat necessary to conduct in a socioeconomically feasible manner. That this wasn't any mean task is clear enough, considering the circumstances in which the phaseout had to be undertaken. In Belgium, the problem of lingual dualism turned the question into a problem between Valloons and Flemings, and in early 1966 there had been acute and major disturbances in Zwartberg in connection with the rationalization of production there, events that served to underline the potential explosiveness of issues. These disturbances had not ended until an agreement had been struck where the government guaranteed that no shutdowns would be made, unless alternative work opportunities were offered to redundant miners [58].

So, although an overall strategy was very clearly spelled out in the Martens plan of 1967, the goals would have to be very carefully implemented:

> "Die Gesamtheit unserer Kohlenfördermenge besitzt keine direkte oder indirekte wirtschaftliche Bedeutung mehr; sie könnte sofort aufgegeben werden, ohne dass bei den Energiverbrauchern oder auf irgendeinem Sektor unserer Wirtschaft dauerhafte Schwerigkeiten hergeworfen würden. Als einzig notwendige Auswirkung erscheint in diesem Zusammenhang diejenige, die vom sozialen Sektor ausgeht. Das Bergbaudirektorium hat deshalb... die Forderung aufgestellt, das der Rückgang... die sozialen und regionalen Probleme Bergbaugebiete nicht

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[57]See, for example, Kerstan F (1971b), p 235-36.

[58]Kerstan F (1968), p 215-19, and, Kerstan F (1987), p 890-94.

übergehen darf; diesen müssen aber mit den langfristige Zielen der Energiepolitik in Einklang gebracht werden"[59].

In order to be fully able to coordinate this withdrawal, the government had to intervene in Northern (Campine) coal mining as well. A fusion of the mines in this district was a necessary pre-condition for thorough reorganization.

The mine owners were interested in a fusion of the mines, if this involved guarantees from the state for the assets brought into the new company, and for the covering of future losses. To the Belgian state this was a price that had to be accepted, in order to get overall control over a potentially damaging situation, without the use of a formal nationalization.

The discussions between the mine owners and the government began in early 1963. For the mine owners the objective was to get as much out of their holdings as possible, while the government had to thread very carefully onto these sensitive areas. Unsettled political conditions around 1965 (cabinet crises) and the relatively better conditions in the Campine (as compared to Vallonia) up to the mid 60s, were factors that served to prolong the road leading up to the fusion[60]. It was not until 1966 that it was possible for the mine owners and the government to arrive at a settlement. The owners of mines were guaranted compensation from the state for their assets (valued at 1381 mn BEF), at the time of the final closures (nominally compensations were to come from the new company, but the state gurantees for these debts were, of course, essential). In the case that closures hadn't been effected by the end of 1977, the rest of the original claims on the new company was to be paid by six annuities. The original owners were compelled to invest 50% of these compensations in the Campine[61].

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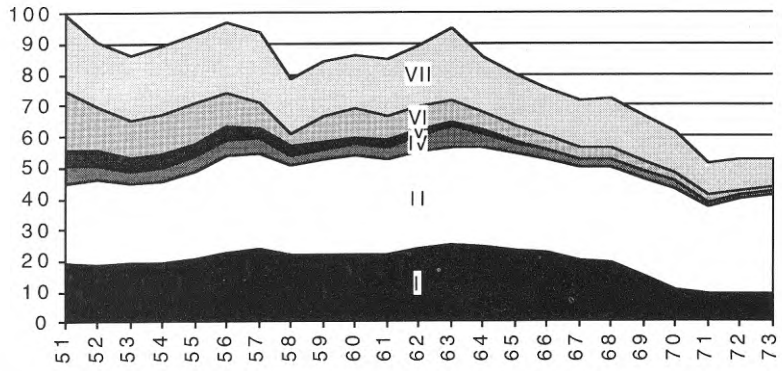
[59]Cited in Kerstan F (1970b), p 1003.
[60]See Kerstan F (1968) esp p 216, for the pre-history to the fusion.
[61]See Kerstan F (1972a), p 112-16.

Figure 3.5. Belgium. Coal Consumption 1951-73, breakdown by sectors.

Total consumption 1951=100.



Note: I– Electricity generation; II– Use in cokeries; IV– Use in patent fuel plants (mainly household consumption; V– Transport; VI– Direct use in industry (including self-consumption by mines); VII– Miscancellous uses (mainly households).

Sources: 1951-58: Statistische Information, Vierteljahrshefte zur Wirtschaftlische integration Europas, 1962 1/2: Energiestatistik (Statistisches Amt der europäischen Gemeinschaft, Brussels); 1959-73: Statistics of energy (OECD, Paris 1974).

After the fusion the mines were run on the terms set by the state. For sales they were wholly dependent upon state supported contracts with steel-producers and electricity generators. In order to the cover losses (which were alive and growing[62]) they were dependent upon subsidies. The subordinance of the company to the policies laid down by the government were clearly spelled out in the treaty that instigated the company[63].

The reasons for the government to enter into an agreement such as this, which was undoubtedly to bring losses of staggering proportions in the

[62]Kerstan F (1972a).
[63]Kerstan F (1987), p 891.

years to come, seem rather clear. The risk of unexpected closures was reduced to zero when the state was provided with a single partner. Moreover, the very concept of an *Einheitsgesellschaft* implied that new possibilities to ration jobs between the remaining mines were created, when cutbacks had to be made. Thus, the structural set-up increased the possibilities of coordinating social policies toward the region[64].

With regard to sales, the state was the key player. Selling coal at increasingly uncompetitive prices, as compared to fuel oil and imported coal (fig 3.2.), clearly required a broker equipped with extraordinary powers. For the reasons stated above (sect 3.3.1) these efforts had to be concentrated on steel and electricity. Steel producers bought a guaranteed 6 mn t of coke from indigenous producers, while the state subsidized the steel industry for the extra costs of buying Belgian rather than imported coal[65]. Electricity plants took an additional 3,5 mn t of coal, and passed on the cost to the final consumer[66]. This system was changed in the mid 70s, when the electric industry agreed to continue to buy Belgian coal, but only at the prices prevailing in a "fuel pool", constructed out of a weighed average of international prices for fuel oil and imported coal[67].

Thus, we can percieve the evolution of a strategy -the orderly retreat from coal- which in turn tended to create a specific structural setting, where the state shouldered increasing responsibilities, with regard to the coal industry's further developments. To solve the problem of future production levels etc., the creation of the Directory and the *Einheitsgesselschaft* was necessary. For the marketing of the commodity, the state-sponsored long-term contracts with carefully selected final users were pivotal.

The situation in the **Netherlands** was heavily influenced by the discovery of enormous amounts of natural gas around Groningen in 1962-63. This made for a somewhat different development in Holland, as compared to other countries in the Community.

Although the country had a relatively high productivity (SA fig 5), it was decided to opt for a strategy of rapid exit from coal. Behind this choice were several factors, one of which -the preference for the use of indigenous natural gas in electricity generation- was peculiar to the

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[64]The social implications are discussed in all of Kerstan's articles, but see, especially (1970b), p 1004-05.

[65]For the ECSC arrangements for the subsidation of coke, see sect 2.2.2.2.

[66]For the various arrangements made: See Kerstan F (1970a), p 34-38.

[67]Kerstan F (1987), p 892-93.

Netherlands. Other factors were similar to the ones influencing choice in other countries. The doomed position of coal in the general industrial and the household sectors, the competitive situation of industry in general, the costal location of the main steelwork - these were all factors making for a rapid retreat from indigenous coal.

In fig 3.6 these trends -the virtual disappearance of several sub-markets for coal by the mid-60s- are visible.

With the mining plan of 1965, it was decided to cut back coal mining drastically, although in a socioeconomically controlled way. As the plan progressed it was evident that cutbacks were possible to make at an accelerated pace (between 1965-67 it was possible to reduce employment from 45.000 to 17.000 men), and by 1969 a second plan was introduced. This time a date for the cessation of all Dutch coal-mining was set at 1975[68].

The Dutch experience may seem outstanding, when compared to other countries in West Europe, but it does essentially reflect much of the same experiences as the Belgian example. For small countries such as the Netherlands and Belgium, both extremely dependent upon foreign trade, it wasn't possible to place the rest of industry under the strains of comparatively high energy prices:

> "Nachdem der ehemalige Standortvorteil, den die eigenen Kohlenvorkommen boten, durch billige Substitutionsenergier abgelöst wurde, verfügt die belgische Volkswirtschaft nur noch über einen naturliche Vorteil, der in seiner geografischer Lage innerhalb der Gemeinschaft gesehen wird"[69].

> "Zwar hätte man den Absatz durch Abmachungen mit Grossverbrauchern im Inland sichern können, /through long-term treaties guranteed by the state (author's remark)/, aber solche für den niederländischen Steinkohlenbergbau nützlichen Vereinbarungen hätten eine Belastung der nationalen Wirtschaft dargestellt"[70].

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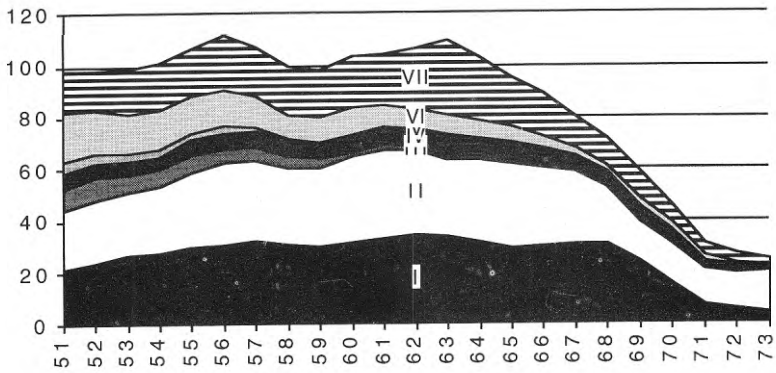
[68]See van Dijck J M (1970), p 436-39.
[69]Schmidt C-D (1969a), p 180.
[70]van Dijck J M (1970), p 437.

Figure 3.6. Netherlands. Coal Consumption 1951-73, breakdown by sectors.

Total consumption 1951=100.

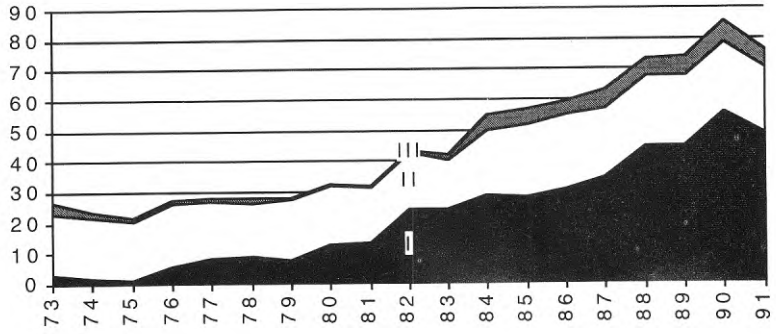


Note: I– Electricity generation; II– Use in cokeries; III-Gasification IV– Use in patent fuel plants (mainly household consumption; V– Transport; VI– Direct use in industry (including self-consumption by mines); VII– Miscancellous uses (mainly households).

Sources: See fig 3.5.

Figure 3.7. Netherlands. Coal Consumption 1973-91.

Total consumption 1951=100.



Note: I– Electricity generation; II– Use in cokeries; III– All other uses.

Sources: See fig 3.14.

Solutions to these problems were found with the rapid contraction of mining, under socially controlled circumstances. The more rapid pace of the Dutch withdrawal is partly an illusion, as the size of the Belgian industry was much larger. Besides, the Dutch had discovered very considerable amounts of indigenous gas, while setting the date for the cessation of coal-mining in such a way as to leave the industry practically dead by the time of the "oil-crisis" of 1973. In case Dutch mining had been of any major importance by, say, October 1973, it is very possible that the industry would have been salvaged for another decade.

Instead, as discussed below (sect. 3.4.1.), it was the closedown of mining and the disturbances that hit the international petroleum market after 1973, that left room for a comeback of coal onto the Dutch energy market (fig. 3.7). When freed from the impediment of protected internal high-cost coal producers, the Dutch (and West European), coal market was able to take off in a rather spectacular way. As predicted by Gordon in 1970[71], this led to a rapid growth of the international coal market, when low-cost producers were allowed to penetrate this market.

3.3.2.2. Germany

The crisis of 1958-59 set off a period of increased rationalization in the German coal industry, as marginal mines were closed, while the number of coal faces inside individual mines decreased dramatically, work being concentrated to the high-yielding seams[72] (SA fig 5).

To speed up the process of rationalization -increasing the cost-effectiveness of coal, when the possibility of increasing prices had been barred- incentives to concentration was introduced (mid 1962), as *Stillegung Premien* were introduced, the government paying DEM 12,50 per ton of production permanently closed down. The idea was to give incentives for old, marginal, mines to leave the industry[73].

The risks of this policy were evident from the outset. There existed a possibility that an essentially uncoordinated and uncontrolled exit from the industry could be provoked.

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[71]Gordon R (1970), p 123-24.
[72]See Reintges H (1973a), p 407-17.
[73]Abelshauser W (1984), p 106-09; Hentrich W/Zydek H (1964a), p 51-53.

The initial need for a centralization of decision making led to the formation of the *Rationalisierungsverband*, which was instituted in the fall of 1963. The *Verband* was operated on the assumption that the industry should be able to take care of rationalization itself, the task of the *Verband* only being to coordinate closedowns between neighboring mines, while suggesting fusions of collieries to increase efficiency etc.[74]. The role of the state, on the other hand, was rather restricted at this point in time, only called upon to provide half of the premiums (now totalling DEM 25/ton) the *Verband* providing the other half, through a self-imposed and self-administered industry tax.

The problem was, of course, that the industry could only rationalize itself if someone was interested in expanding. Instead, the start-up period coincided with an intensification of the *Absatskrise*, as coal use started declining again in 1963-64, due to the increased competition from fuel oil. The general picture is rather similar to the one already encountered in the cases of Belgium and the Netherlands.

The arrival of October 31 1964 (the last day of the season to report planned closedowns, hence registering eligability for premiums) heralded the intensification of the crisis, rather than the rationalization of the industry, as 26 million tons of capacity was registered for closure. The dramatic increase in the pace of closedowns stands out: 6,6 mn t had been closed up to 1962 without premiums, 8 mn t had been closed in the intermediary period of premiums without Verband. A stream was turning into a deluge, when the premium scheme was speeding up a process of wholesale closedown[75].

Clearly, a major change in strategy would have to be undertaken, especially as the crisis was exacerbated in the Juglar downturn of 1966-67. The strategy selected was the politically necessary one, in the face of rapidly increasing social tensions in the Ruhr[76]. An ordered, although essentially unplanned, retreat from coal had to be made. The means chosen, and the structures that ultimately evolved, bear a close resemblance to the Belgian experience.

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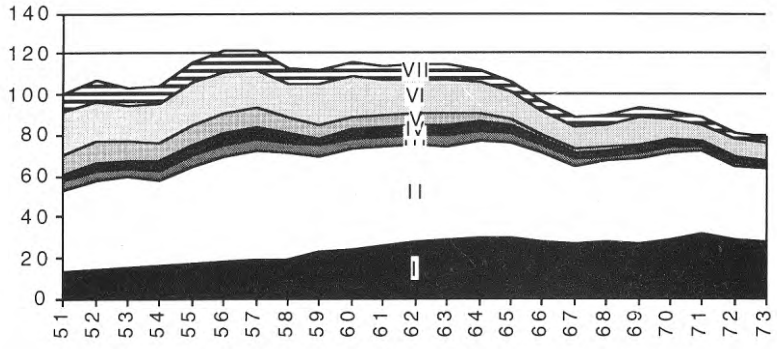
[74]For a full discussion of the Rationalisierungsverband, see Hentrich W/ Zydek H (1964a), p 51-63, and, Hentrich W/ Zydek H (1964b), p 102-111.
[75]Unnamed Author (1964), p 1516-20.
[76]Abelshauser W (1984), p 116 ff.

Figure 3.8. Germany. Coal Consumption 1951-73, breakdown by sectors.

Total consumption 1951=100.



Note: I– Electricity generation; II– Use in cokeries;III-Gasification IV– Use in patent fuel plants (mainly household consumption; V– Transport; VI– Direct use in industry (including self-consumption by mines); VII– Miscancellous uses (mainly households).

Sources: See fig 3.5.

To steady demand treaties were made with electric utilities (*Verstromungsvertrag*) and steel makers (*Hüttenvertrag*) in the usual fashion, the state paying the difference between world market levels and internal prices. Moreover: to the German coal industry the ECSC dimension was essential, as it was a traditional exporter of coking coal to other member countries. Thus, the ECSC coking coal subsidy had a special importance in this country, which explains the German willingness to shoulder most of the costs for the scheme.

The steel industry had a major part to play in this drama. It was, together with the state, the most important owner of collieries, while also being a very important consumer of the commodity (a role that was increasing proportionally, as other uses were declining).

The inherent problems of this position is easily seen. As the steel industry had major problems of its own to cope with, it was obviously in the interest of the traditional steel producers of the Ruhr to leave the coal sector and start importing cheaper American coking coal. The managing director of Hoesch (Ochel) was, for example, a proponent of the

nationalization of mines, implying that continued coal-mining wasn't possible to undertake within a strict market economic set-up[77].

This solution was acceptable neither to the government nor to the branch organization[78]. The branch organization dreaded the attempts by the steel producers to leave mining "*ohne Federn zu lassen* ", and was heavily in favor of restricting petroleum imports, in order to leave the industry with a continued production of, at least, 117 mn t/year[79]. The government, for its part, was interested in some kind of concerted action in consonance with the mining companies, as it was recognized that state action implied the "nationalization of losses" in some way or another. The era of *Konzertierte Aktion* between state and private capital was approaching, the era of the "*Korporative Marktwirtshaft* " running out of steam.

Given the impossibility of running mines on the conditions set by the market, and the corresponding impossibility of introducing biting limitations on oil imports (given the overall competitivity of German industries), a structure had to be found that satisfied both the demands of the steel-makers and the demands for job security. With nationalization eliminated as a solution, the concept of the *Einheitsgesellschaft* was developed, in view of the undesirability of leaving the state with sole responsibility for the future of an industry that was, for all practical purposes, doomed. The similarities to the Belgian case is obvious.

The question of financial compensation to the original owners, that were to become shareholders in the Ruhrkohle AG (RAG) was solved through state guarantees for a loan of 3,3 bn DEM. This loan was to be used to pay the *Altgesellschaften* in 20 annuities. The compensation payments were tied to a policy of compelled reinvestment in the mining areas[80].

With the fusion of the Ruhr mines, the major parts of German production was concentrated into three major companies. In Saar production was consolidated in the Saarbergwerke, which had been in state ownership since the French had nationalized the mines (1954). After the accession to Germany, the shares were transferred to the German

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[77]Ochel is cited in Abelshauser W (1984), p 125.

[78]Die Industriegewerkschaft Bergbau und Energie.

[79]See, for example, Unnamed author (1965), p 1050-53; Burckhardt H (1965), p 1505-11.

[80]Abelshauser W (1984), p 139-148; Hawner K H (1968), p 1123-27; Esser J/Fach W/Dyson K (1983), p 115.

state (central level 74%, local level 26%). The coal sector had been dependent upon the French market, but the newly developed Lorraine mines were able to outperform Saar's. The area's main problem, though, was the increased penetration of oil (through pipelines) into Southern Germany[81]. In the Aachen area holdings were concentrated in the Eschweiler Bergwerksverein, which was controlled by the Luxembourg steel producer Arbed, which needed German coke for its steel production[82].

With the industry consolidated and under overall state control, it was possible to rationalize what remained of coal mining. Mining was streamlined in the period up to 1973, as operations were concentrated to the most effective mines. With a unitary mining organization it was possible to provide jobs at alternative mines, while welfare plans covered the costs of early retirement schemes and other social costs. The basic problem of the industry remained, though. It was very far from being internationally competitive, thus it was, forever, to be dependent upon state subsidies and different corporativist solutions[83].

What was being fought had to be a rearguard battle, with production on a slippery slope (SA fig 4)[84]. It is in this context that we are able to see the main advantage of the *Einheitsgesellschaften* and the long-term

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[81]See Rolshoven H (1960), p 1576-91 and Hertel B/ Wrede H-G (1970), p 959-64.

[82]Lister L (1960), p 436; Schmidt C-D (1969b), p 1023-26. It should be noted that this, in part, explains the very awkward position of the Luxembourgers inside the ECSC. With steel dominating its economy, at least up to the 1980s, they were wholly dependent upon German imports of coke. Hence, this state had a need for policies which subsidized ECSC production of coal, although it didn't produce any coal itself. In Luxembourg the problem of the dependence upon ECSC sources of coal and/or iron ore took on an added importance. Thus, in Germany, France and Belgium it was, at least, possible to treat the problems of Saar, Ruhr, Lorraine, the *Nord* and Vallonia as being of a regional nature; in Luxembourg it was the mainstay of the national economy that was at stake.

[83]Kuhnke H-H (1971), p 947-54. Indeed, some saw the instigation of the Ruhrkohle AG as a very doubtful measure, as the "Grundlage einer Wettbewerbswirtschaft -die Verknüpfung von Gewinnaussischt und Verlustrisiko- auf die Dauer der Boden entzogen..." Abelshauser W (1984), p 148.
This fact only serves to underline the main theme of our argument: as a really socioeconomically critical point was reached, wholly market-oriented strategies and structures was deserted, to the advantage of strategies concieved of as more feasible politically. As these strategies evolved -at least over the period from the onset of the crisis in 1958-59 up to the late 60s- they would, necessarily have to find a functional form (a structure), in which to operate, when ad-hocceries were regularized and routinized.

[84]For the actions undertaken up to 1973, see Abelshauser W (1984), p 130-31 and 149 ff, and, unnamed author (1973), p 414-17.

treaties with the two main user industries. They were functional tools to be used in order to regularize structural change.

3.3.2.3. France

As we have seen, the implications of oil had been accepted in France by 1959-60. The rapid pace of the penetration and the extent of the long-term fall in oil prices, hadn't been recognized, though[85].

Moreover, falling oil prices provided the French government with a major policy tool to carry out its intended restructuring of French industry. The stabilization plan of 1963, which was intended to cope with structural deficiencies and inertias, used freed (thus lower) oil prices for exactly this purpose[86]. Oil imports, formally on a quota system, were pushed in a system where incentives were used to lift Algerian crude and to continue the development of refineries as a spearhead industry[87]. Nuclear power was later to fulfill the same role.

This implied that drastic cutbacks in the high-cost[88] coal mining districts had to be made.

The nationalized -unitary- form of the industry should, theoretically, have made it easy for the government to fulfill its strategies for energy use. As the sole owner of the CDF[89], the government was formally able to push through whatever policies it deemed necessary. In reality, the social environment created by the contraction forced the appearance of parallel, corporativist, structures in France, as well.

The slow contraction phase led to social disturbances as early as in the winter of 1962/63, when coal miners went on strike, protesting against low wage increases (relative to other industries) and overall production contraction. These disturbances provoked the use of corporativist measures. "Round table" talks were instigated, with representatives of the mine owners (the state), workers and authoritative experts on mining and

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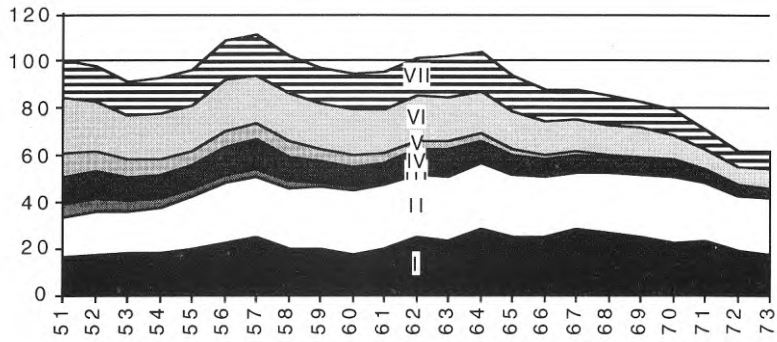
[85]On projections: Adelman M A (1972), p 224-30.
[86]Mc Arthur J/Scott B (1969), p 357.
[87]Mc Arthur J/Scott B (1969), p 354 ff.
[88]Gordon R L (1970); Jamme H-P (1966), p 1286-87; MB 630308 p 11-12; MB 630315 p 16. The high-cost mines were, foremostly, located in the Nord- Pas-de-Calais and the Centre-Midi districts, see, for example, Leichter F (1964), p 1577-78. SA fig 5 on overall French productivity, as compared to other ECSC countries.
[89]Charbonnages de France.

finance. The outcome of the "round table" laid the groundwork for the industry within the forthcoming (1965) fifth plan[90].

Figure 3.9. France. Coal Consumption, breakdown by sectors.

Total consumption 1951=100.



Note: I– Electricity generation; II– Use in cokeries; III-Gasification IV– Use in patent fuel plants (mainly household consumption; V– Transport; VI– Direct use in industry (including self-consumption by mines); VII– Miscancellous uses (mainly households).

Sources: See fig 3.5.

The "round table" talks led to some alterations in the original Jeanneney plan (which provided for cutbacks of 1 mn t/y). The final report of the "round table" had acknowledged the financial difficulties suffered by the CDF and recognized the need for consumer industries to be provided with competitively priced energy resources. In total logical incoherence to this recognition, it then proceeded to propose a *decrease* in the rate of cutbacks (to 49,9 mn t in 1970 = ca 0,5 mn t/y).

Something had to yield. In the fifth plan the production target was set at 48 mn t, but it was generally recognized that this was an unrealistic goal[91], as it would lead to enormous losses. Beside setting targets, the

[90]Leichter F (1964), p 1576-79, Desrousseaux J (1971), p 828.
[91]Mc Arthur J/Scott B (1969), p 420 ff.

state provided the industry with consumers, on the lines outlined in the other countries. Long term contracts with electricity users were instituted, and subsidies were granted to the steel industry, in return for the use of indigenous coal[92]. In the circumstances of the mid 60s, this was, as we have already seen, essentially what could be done, in order to save the situation in the short run.

By 1968 the fragility of these policies were evident, losses mounting to unprecedented highs, while social disturbances in the coal mining areas reached a new all-time high, as well[93]. New "round table" talks resulted in the Bettencourt plan (Dec. 1968). The rate of withdrawal was thereafter increased in a dramatic fashion, while social measures and benefits for dismissed miners were intensified. By 1970 production was down to 39 mn t. For 1975 a production of 25 mn t was planned[94].

It is evident that French policies reached a turning mark here. The benefits of a continuation of mining were declining, as social problems continued in spite of compromises. In this situation the use of a coordinated policy of redevelopment, with social benefits in the neighborhood of 100.000 FRF (which was, anyway, what the continuation of mining was costing at several mines)[95], made for an orderly retreat. The use of round table talks in 1963/64, 1968 and again in 1971, did, in this situation provide an institutional arena used to communicate the government's overall strategy to the other actors involved, at least in the two later cases[96]. When this strategy was laid out in a determined way, as was done in 1968, the existing structure proved able to withstand the pressures put upon it.

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[92]Mc Arthur J/Scott B (1969), p 344.
[93]Desrousseaux J (1971), p 829.
[94]Desrousseaux J (1971), p 830.
[95]On the financial problems of the CDF by the late 60s/early 70s, see Gordon R (1970) p 171, 180, 188; Kerstan F (1972b), p 1161-63; Kerstan F (1973), p 1175-79; Kerstan F (1974), p 959-62; Kerstan F (1977), p 97-100.
[96]Desrosseaux J (1971), p 831-32.

3.3.2.4. The United Kingdom

In 1972 the United Kingdom acceded to the Community, hence another major coal industry beside the German became a member of the ECSC.

The sequence of events had, up to 1972, been very similar in the UK, as compared to the other European states. The coal industry had been nationalized after the war in essential political unanimity, as the failings of the cartel system of the 1930s were universally recognized. Productivity continued at low levels, the need for modernization was immense and the problem of the long tail of small and uneconomic collieries implied a need for some kind of coordinated economic-political solution, in order to handle the situation in a socioeconomically coherent manner[97].

In the immediate post-war period scarcities were the major concern, but the Plan for Coal of 1950 adressed itself to the major strategic goals of the industry. The need for new investments was coupled to the rundown of production in hundreds of low-yielding pits, whereby the fixed costs of the industry could be cut. Overall productivity was to be raised by an increased average size of producing units[98].

The plan was only partially implemented up to the crisis of 1958-59. Government controlled prices invited to excess demand at existing price levels. Thus, the overriding concern of the NCB[99] had to be to produce, at almost any cost. This policy of controlled and relatively low prices, increased investment and the continued running of uneconomic collieries, implied that the company would face problems of excessive cost as well as general over-capitalization, if the markets were ever to turn down[100].

By the late 50s, as we already know, the hour of redemption was arriving. Oil consumption (imports) had grown at accelerating rates (SA fig 6) all through the 50s, and although it was the strategy of the government to keep oil prices at excessive levels to safeguard indigenous coal[101], its continued penetration spelled the death-knell to any expansion of coal use.

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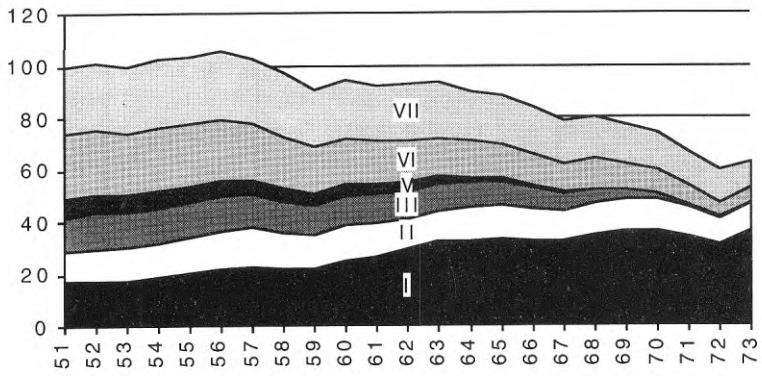
[97]See Müller-Berghoff B H (1957b), p 265-66.
[98]Ashworth W (1986), p 200-01.
[99]National Coal Board.
[100]For a general overview, see Müller-Berghoff (1957b), p 267-70.
[101]Adelman M A (1972), p 172-73, 240-42.

Figure 3.10. United Kingdom. Coal Consumption 1951-73, breakdown by sectors.

Total consumption 1951=100.



Note: I– Electricity generation; II– Use in cokeries; III-Gasification V– Transport; VI– Direct use in industry (including self-consumption by mines); VII– Miscancellous uses (mainly households).

Sources: Annual Abstracts of Statistics (London), 1953-75.

So, in 1960s, when pithead stocks had grown from 3 to 35 mn t (from early 1957 to late 1959), the need for a long over-due rationalization in the coal industry was recognized and started[102].

By the mid 60s things had grown much worse. The import ban on coal (1959)[103] couldn't help much, as the competition to coal was varied and ever-changing. Household consumption had been decreasing ever since the Clean Air Act of 1956 (as private consumers switched to fuel oil or direct heating)[104]. The gas works were replacing coal with natural gas (as

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[102]Unnamed Author (1959b), p 1155-57. On the crisis of 1958, and the dramatically increasing stocks of coal, there's an interesting article by an Unnamed Author (1960) in Glückauf Heft 19/1960, p 1220-29.

[103]The implicit conservatism of the changes undertaken after 1960 is easily recognized. Marginal mines were closed, but the importation of coal was banned, and in the same vein, low-cost strip-mining, was cut back in an attempt to extend the market for deep-mined coal. Ashworth W (1986), p 250-52; Unnamed Author (1959b), p 1156-57.

[104]Ashworth W (1986), p 243-49 (on markets in the 60s).

a result of overall government plans after the discovery of significant resources of gas under the North Sea in the early 60s), while the transportation sector was disappearing with the last steam locomotives and ships. Moreover, the steel industry's expansion had been checked by 1960, and coke rates were falling. Lastly, fuel oil had begun to appear in power generation by 1963-65, as its price had decreased faster than had been checked by new taxation. The inefficiency of many old coal-fired plants gave fuel oil a competitive edge, as well.

The Plan for Coal of 1965 confronted these problems, and drew the necessary strategic conclusions. The industry was to be drastically rationalized and streamlined, capacity was to be cut, consumption was to be concentrated to electricity generation and the steel industry[105].

Between 1965-70 these plans were carried out, and a remarkable restraint was evident on the hand of the trade union, the NUM[106], as well. The labour government that had implemented these plans followed a policy on the lines of comparable countries, as the consumption of coal was safeguarded in the electric utilities. Thus, the nationalized electric utility industry (CEGB[107]) was compelled to burn ever-increasing amounts of coal through the use of government grants[108]. The projected expansion of the British steel-industry could only offer limited and short-term consolation, though. In this industry plants were being concentrated to coastal locations, where imported coking coal would be preferable when the ban on imports was revoked.

The ban was removed in 1970 by the ingoing conservative government, as part of its program to remove structural constraints on the development of the Brittish economy. In its further dealings with the coal industry it got, however, bogged down in detail[109], overall strategic decisions becoming clouded in an atmosphere of increased uncertainty. Unsettled debts and problems -social and economic- were coming to a head in the UK in the 1970s. The coming years were going to expose the deficiencies of the existing corporativist structures, when they were

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[105]Kobusch B (1966), p 25-29; Pienz H (1967), p 105-111; Schweikert H (1968), p 146-48.

[106]National Union of Mineworkers.

[107]Central Electricity Generating Board

[108]Ashworth W (1986), p 248, 284-85.

[109]There was, amongst other things, a protracted discussion over whatever the NCB brick factories should be privatized or not. See, for example Young S/Lowe A V (1974), p 141-43; Ashworth W (1986), p 328.

confronted with rapid innovative change, requiring the implementation of a strategy that confronted new and disparate economic and social forces.

The accession of the coal industry to the ECSC was of no great importance in this connection. Instead, the representatives of the coal industry stressed, rightly, the dominant influence of individual governments on the operations of the ECSC. Ashworth summed up much of the West European coal experience in the period 1960-70 in his book on the British coal industry in the post-war period:

> "The coal undertakings and trade unions of all the member states found a common interest in acting together to formulate common programmes, which they could press on national governments, to safeguard the use of coal..."[110].

The pressures confronting the Brittish economy and energy sector were much more universal in its nature, rather than being forces awakeneded by the accesion to the EEC-ECSC structure. To the contrary, they were the final outcome of a process of economic change with roots in the 1920s and 30s, a process that had evolved to a chock-wave by the mid 60s, as the rationalization period of the long wave was appearing. The innovative economic forces of the post-war period were working their way through the economic system, upsetting older production functions.

The similarities of the Brittish and continental coal sectors in the post-war period deserves attention in order to illustrate exactly this point. Even though the Britons had chosen isolation from the continent in 1951 and 1957, and had been rejected by De Gaulle during the 60s, their experiences were variations on a common theme, anyway.

3.3.3. Concluding remarks on the developments in the coal sector up to the first 'oil chock'

Summarizing the period up to 1973, some obvious features stand out, with respect to all of our case studies.

First, and most importantly, Western market economies had to react to one outstanding innovation during the period - the coming of Mid-east/North African oil. Of considerable importance was, as well, the innovations in the shipbuilding industry, which dramatically lowered freigth rates. In the years 1950-75 a process was accelerated, which

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[110]Ashworth W (1986), p 318.

ultimately was to integrate the global raw material economy to an unprecedented extent[111].

For the old coal producing West European countries this implied that very far-reaching changes had to be accepted and implemented, as old comparative advantages turned into deep structural problems and/or socioeconomic straitjackets.

These tendencies had been visible during the 1920s and 30s. The second world war had merely postponed the need for adjustments, by breaking off normal patterns of supply.

During the later 50s and 60s, though, this tendency towards globalization turned into a deluge, as Extra-european raw materials started penetrating and upsetting traditional markets and structures.

These developments provoked the coming of some rather similar policy measures in most of the discussed countries:

A) Autarkic tendencies were reinforced during the war, and the period that followed it (ca 1945-the late 50s). New investment entered the indigenous coal industries through, for example, the Monnet Plan and the *Ruhrhilfe*. Moreover, it was during this phase that the ECSC was formed -typically enough in order to solve the West European energy problem through shared control over the Ruhr.

Other important institutional changes were the nationalization of coal industries. In France, as well as in the UK, this was a measure carried out in essential consensus between conservatives and social democrats, in order to regularize patterns of intervention already visible during the 30s (sect 2.2.1.2). Then, after nationalizations had been carried out, investment patterns aiming at reinforced autarky and socioeconomic peace were followed. Significantly, several countries pursued policies (strategies) of expensive petroleum prices at this stage, in order to avoid the consequences of Extra-european raw material supplies.

B) After ca 1957/58 it became impossible to avoid the consequences of Mid-east oil and US coal, though.

Thus, it was at this stage that policies of controlled retreat towards the coal sectors were resorted to. As coal started to loose markets at an accelerated pace, several measures were implemented.

Generally, electricity generation and blast furnaces were reserved to indigenous coal producers, which gave birth to, or strengthened, several "vicious circles" and "iron triangles". This was a market strategy that had

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[111]The same tendencies with regard to iron ore is discussed below, sect's 4 and 5.2.1.1.

to be supplemented by strong measures that aimed at the rationalization of the industry (as other markets were lost and costs increased when world market energy prices declined).

Overall, a hesitant process of structural change got started, despite the fact that two very important industrial sectors were reserved to uneconomic coal producers in most countries.

When rationalization got under way, structural solutions that aimed at the regularization of the new patterns of intervention had to be instituted. The concept of *Einheitsgesellschaften* evolved out of this need. In countries with nationalized companies, general plans aiming at the restructuring of the industry became paramount, in order to formulate/negotiate the terms of withdrawal from the sector.

What was to show itself rather unfortunate in this process, was the *segmental* monodependence that it tended to foster with regard to different energies and different markets. International trade in coal stagnated (sect 3.4.1), as markets were reserved to expensive European coal, making petroleum the (virtually) sole alternative to this commodity.

3.4. The mid 70s and beyond: The depressive phase of the Kondratieff, and the early stages of a recovery

3.4.1. The general development

In 1973-74, and again in 1979-80, energy prices underwent revolutionary changes. By contemporary judges, these developments were thought to herald a renaissance for West European coal producers. By the mid 80s it was evident that this was not to be the case.

International oil prices had started to increase in 1970, in connection with economic demands made by the Lybian government upon crude producers, and as the Libyan's were able to push through their demands, other producers jumped the bandwagon[112]. The next rounds of negotiations, in Tripoli and Teheran, marked the beginning of an era of increased price militancy on the part of producer countries. During the period 1960-70, they had been able to increase their share of posted

[112]Events of 1970-71 see Adelman M A (1972), p 250-62 (a general overview of events is given in Jörnmark J (1990), p 16-17).

prices from 50 to 80%[113], while an everdecreasing margin was left to the companies. As this strategy reached its natural limitation, when the "oil majors" were reduced to, in effect, tax collectors, the logical next objective was to emphasize strategies which aimed at increasing posted prices. Ultimately, the final moves towards producer country control over production and pricing were necessary to take[114].

The limit to prices was to be decided by the ability of producers to control production, in order to prevent the potential over-supply (at the going cartel-set prices) from reaching the market. This ushered in a decade-long game where the possibilities of the market were tested. The period started with the Tripoli agreements of 1970, to be continued with the traumatic events of 1973-74, when the producers were able to tail the spot market to set an unprecedented new price level[115]. Upon this followed the even more remarkable events of the winter of 1978-79, when oil prices doubled and tripled, as the Saudi Arabians cut production, while assuring everyone that they were trying to increase it[116].

When oil gluts appeared, in the recessions of 1975 and 1977, the cartel was able to cut production, but only as the largest producer, the Saudis, cut disproportionally ("the swing producer"). By the early 80s prices could only be upheld because two major producers -Iran and Iraq- had left the scene altogether, engaged in a battle over the control of the region's oil. Even in this extreme situation prices started to sag by 1982. As these countries started a rather modest comeback as exporters, prices got even weaker, even though the Saudis had cut back exports by 60% by 1985:

> "Saudi Arabia made two serious mistakes in the 1979-85 period; first letting prices go up from USD 12 to USD 36 per barrel, and second, in defending the price through production cuts"[117].

Locked in a no win situation the Saudis started exporting again in the winter of 1985/86, and prices collapsed[118].

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[113]That is: They were able to increase their ground rents, see Adelman M A (1982), p 39.
[114]Adelman M A (1990), p 7 ff.
[115]Adelman M A (1982), p 44; Seymour P (1980), p 103-17, Terzian P (1985), p 184-85.
[116]Adelman M A (1982), p 46.
[117]Singer F S (1987), p 447.
[118]On the events after 1979: Singer F S (1981/82), p 115-21; Singer F S (1983), p 456-77 ; Singer F S (1987), p 445-70; and Adelman M A (1990), p 15-18.

As the leading producer regained some kind of control over the cartel, prices stabilized, by the late 80s, at a (real) level some one third of what it had been in 1980-81. As these prices proved unsatisfactory to the leader in Baghdad, a new war developed. The outstanding fact of the disturbances during 1990-91, is their relatively low intensity with regard to international oil prices. The war did only manage to raise prices moderately for about six months, despite the fact that two major producers were again cut off from export markets[119].

The main problem for producers was that oil consumption had declined drastically, especially after 1979. Substitution was at work, oil being replaced by nuclear power, coal and natural gas, but there were even more fundamental forces at work. Overall intensity of energy consumption was declining drastically all over the OECD-area, as relatively more energy consuming motor vehicles, industrial processes etc. were replaced by more energy efficient processes and solutions[120]. As demand for energy decreased, the fundamental problem confronting energy producers is easily percieved. There was an enormous potential over-supply of oil at the cartel-set price.

With regard to international coal prices, this changing situation was evident rather early. Coal prices had followed oil in 1973-79, but by the early 80s a gap was opening up between coal and crude oil prices (fig 3.2). It is significant, as well, that these developments started at a time when coal supplies were upset by another major external chock. The slow-moving breakdown of the repressive Polish regime led to major socioeconomic troubles, mirrored in falling coal exports into Western Europe[121].

During the rest of the 80s coal supplies showed themselves to be remarkably price elastic, as exports started growing from low-cost exporting countries: the US, South Africa, Australia, Canada and Colombia (figure 3.11).

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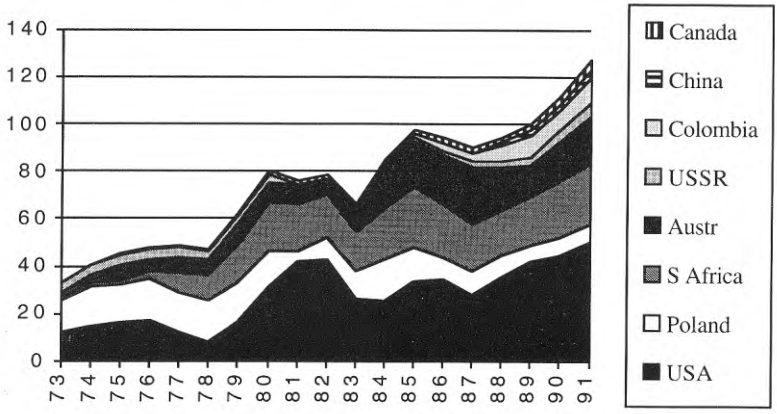
[119]In January 1990 Professor Adelman wrote, prophetically: "Political strife is good for oil prices. The Iran-Iraq helped. If Iraq occupies Kuwait, or the Saudis take over the states to their south, that will also help." Adelman M A (1990), p 18.

[120]See, for example: Bending et al (1987),p 185-219; Thoreson R/ Rowberg R E (1985), p 165-98; Hirst E et al (1983), p 193-244; Schwartz P (1987), p 397-414; Williams R H et al (1987), p 120-45. For an overview, see Jörnmark (1990), p 24-28, 33.

[121]See Steenblik R P & Wigley K J (1990), p 352-53.

Figure 3.11. Imports of coal into the EEC 12 area 1973-91, by exporting country.



Note: In million tons; including coking coal, but excluding coke. There is also a small amount that has arrived from "other countries", most usually ca 1-2 mn t/y.

Sources: 1973-78: Annual Bulletin of Coal Statistics for Europe (Geneva); 1979-91: Jahrbuch für Bergbau, Öl und Gas, Elektrizität und Chemie (Glückauf, Essen).

By the mid 80s prices fell even further, as the exchange rate for the USD declined[122], and falling oil prices were putting an added pressure upon coal (fig 3.2).

These extraordinarily important developments are evident from figs 3.11-3.13.

The take-off in coal imports into Western Europe after 1973 (a trend greatly speeded up after the oil-chock of the late 70s/early 80s) implied two things:

First of all, it contributed to the falling demand for crude petroleum, as coal replaced heavy fuel oils, foremostly in electricity generation. Hence,

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[122]Compared to West European currencies. This exacerbated problems, as national coal prices were set in DEM, BEF etc. As these currencies started to appreciate against the dollar, their dollar equivalent increased. International coal prices, set in USD, were, in these conditions getting increasingly attractive, while price equalization systems were becoming much more expensive to handle.

the penetration of coal is, in the long run, tending to increase the security of energy supplies. In effect it is decreasing the potential for new price explosions, as the market widens (becomes more diversified) when the number of potential energy suppliers is increasing.

Secondly, the rise in imports represents part of the West European move out of early industrialism. The process discussed hitherto, was a process of controlled retreat out of a (virtually) self-contained market structure, which made necessary the control over major aspects of the energy markets (oil imports, coal production, coal imports, electricity generation). The ECSC had come into being as part of this self-contained structure (integrating Ruhr with Benelux and France). By the mid 60s it had developed into a tool, used in the defence of dissolving national structures.

What is in evidence in the late 80s/early 90s seems to be a different process, although it is still embryonic to its character. The upheavals of the 70s and early 80s had, initially, served to shore up the old production functions, but the underlying structural changes discussed above (i.e. the tendencies to substitution, the declining energy intensity in industry and GDP, and the falling energy prices that were a result of these changes) laid bare the underlying weaknesses of the old structure.

By 1982-83 it started to dissolve (sect 3.4.2.) as a result of the excessive costs that were associated with it. It is important to recognize that this was a result of underlying market forces, and that the new dissolution process was closely associated with the structural weaknesses evident by 1965. These processes were only intensified by the Kondratieff depression of 1980-83.

The growth of the international coal market during the 1980s, is an important phenomena, because it opened up the West European market to new low-cost production functions, a development exacerbating the problems of the dissolving structure. The depressed state of the international coal market between the late 50s and 1973 (figure 3.13), is worthy of notice in this context. Stagnating international trade was the necessary adjunct to the strategies of internal coal protection.

The terminal point in this protective process was a massive increase in the regions dependence upon oil imports. When low-cost coal producers were discouraged from producing (Gordon[123], Adelman[124]) the oil

[123]Gordon R (1970), p 123-24, 283-87. There is also an interesting discussion of the problem written by Rummert H-J (1967), p 807-09; where Rummert tries to deny the

market had to grow in importance. Following the arguments introduced by Gordon and later discussed by agricultural economists[125], it is easy to see why protective policies are able to produce major price disturbances through the internal working of the system. If major parts of the international markets (for energy or agricultural products) are cut off from the world market by the use of tariffs, quotas or import prohibitions, the adjustment to production disturbances have to be undertaken in the limited number of "free" markets. The world market becomes a residual to these protected markets. Disturbances in this "residual" world market -the part of the market which has to absorb the entire adjustment in supply or demand, in case of production disturbances- are translated into major upheavals in prices[126].

Market price stabilization requires that either the demand or supply functions should be very elastic. What happened in 1973, and the years that followed, was that supply was curtailed in one part of the world energy market (OPEC controlled petroleum). The resultant price increases should, theoretically, have led to decreased demand for oil, while simultaneously increasing the efforts of potential "alternative" energy producers to step up production.

But the process of supply and demand adjustment was a hesitant one. The regulation of the US petroleum market, which invited to excess demand at existing price levels, remained in force up to 1981. In major parts of Western Europe alternative energy systems were inhibited from

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existence of this problem. Rummert is trying -not at all convincingly- to counter arguments put forward in the German coal importers 1966 annual. These arguments seems, in fact, to be closely related to these made by Gordon in 1970. (Verein Deutscher Kohleimporteure: Jahresbericht 1966).

[124]Adelman M A (1972), is the classic discussion of how West European and American policies paved the way for the price revolutions of the 70s.

[125]Johnson D G (1973), is the seminal work on the subject. See, as well: Jonson D G (1975),p 822-28; Sampson G P/Yeats A J (1977), p 99-104; Johnson P R et al (1977), p 619-27; Shei S Y/Thompson R L (1977),p 628-37; Grennes T et al (1978),p 132-34; Abbot P C (1979),p 22-31; Bale M D/Lutz E (1979), p 512-16; Zwar A C/Meilke K D (1979), p 434-45; Sarris A H/Freebairn J (1983), p 214-24; Josling T (1977), p 261-78 etc.

[126]With regard to world energy markets: US oil producers, as well as European coal producers, were cut off from this international context. In the absence of any major alternative producers, OPEC was catapulted into the extraordinary role that it controlled by 1970-73.

emerging, as the protectionist policies were strengthened in major countries up until 1983/84[127].

Neither supply nor demand for energy were allowed to be adjusted in the most important consuming markets. Thus, dependence upon high-priced energies continued, which set the stage for another round of price-hikes, emanating out of the Mid-east.

Confronted with massive upheavals, the internal West European coal producers were, during a transitional period, able to cash in on a situation that was, to no small extent, the result of shortcomings in the protective system that had been developed since the late 50s. In important countries such as Germany and the United Kingdom, coal imports stagnated in the period when they ought to have taken off[128]. The substitution of coal for oil was, naturally, greatly impeded.

We are able to discern this perverse tendency from figure 3.12: In the UK and Germany where imports of coal was virtually prohibited, consumption of coal declined during the "oil crisis". It was only after the reversal of coal strategies in these countries (sections 3.4.2.2. and 3.4.2.4) around 1983-85, that coal consumption had any chance to rebound.

Instead, Extra-european coal imports grew into the countries that had no coal of their own or, in the case of France, where internal sources were very insufficient. The case of France (sect 3.4.2.3) is enlightening. When oil strategies deteriorated during the early 70s, coal imports were pushed as a bridging facility until the nuclear program had been implemented. Then there was an attempt (1981/82) to turn back to the older structure, a strategy only rapidly to be aborted[129].

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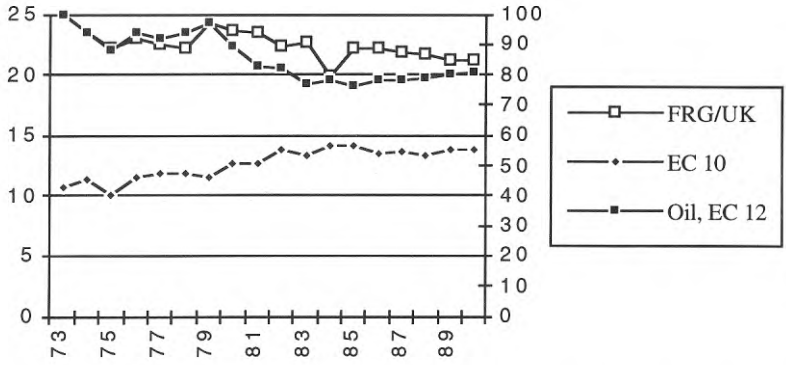
[127]A typical situation of a "vicious circle", as analyzed by Crozier M (1964). Confronted with its own shortcomings, the over-centralized and bureaucratic structure responds by attempting to cut itself off from its environment. In the final analysis, the history of the 1970s and 80s should, very probably, be described as a movement in to, and out of, "vicious circles". See text, below.

[128]In the United States oil policies were turned on their head between 1973 and the era of deregulation (after ca 1981). The system that had been developed to protect internal oil producers wasn't changed, and US crude became cheaper than OPEC produced. Hence, oil exploration in the US was discouraged (using an understatement), and the country's dependence upon OPEC increased. Thus, between 1973-79, we see how three major consumers of energy produced policies that tended to increase their dependence upon the cartel. See Levine M D (1985), p 555-87.

[129]The stagnation in "EC 10" coal consumption in evidence in figure 3.12, should be understood in connection to French strategies: Between 1982-88 French coal consumption declined by 40%, as nuclear power replaced coal in electricity generation. In 1982 "EC 10"consumption was 130,4 mtce, excluding France ("EC 9"), it was 88,9

Figure 3.12. Actual consumption of crude petroleum and coal in the EEC 12, 1973-90.



Note 1: **Left hand scale**: Consumption of coal in the UK and Germany, and Consumption of coal in the other ten member states ("EC 10"). **Right hand scale**: Consumption of crude oil in the EEC 12.

Note 2: Consumption of Crude 1973 (938,3 mtce) = 100.

Source: Derived from BP Statistical review of world energy 1984, 1991.

As coal imports grew into countries such as the Netherlands, Italy, France, Denmark etc, this led to a widening of the energy market, as demand for heavy fuel oils declined. The low-price production functions introduced, the resultant widening of the market and the structural changes discussed above, couldn't but result in falling energy prices.

Between 1980-86 coal prices were halved. As a result, the price for the upholding of the structural solutions arrived at during the 60s and 70s increased greatly, while other structural changes hinted at before tended to eliminate another important sub-market for coal. The rapid decline of

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mtce. In 1988 consumption was 125,9 mtce (incl. France); 101,0 mtce excluding France. Thus, in the nine EEC countries where imports were not impeded either by any existing treaties with the electric utilities (requring these to consume indigenous instead of imported coal) or an explosive growth in nuclear generation, coal consumption grew by about 2% per year between 1982-88.

traditional steelmaking[130] (sections 4-5) was eradicating much of the inland coking coal markets[131]. The newly introduced energy saving techniques (primarily continuous casting[132]) contributed to this tendency.

Hence, the structures developed during the preceding decades were coming under escalating pressures from two directions. Demand was decreasing, while strategies of enforced use of internal coal in electricity generation increased dramatically in cost when the price of foreign coal fell.

It was not by chance that the period after 1983 turned out to be a spectacular reversal of earlier strategies. In Belgium, the United Kingdom, France and Germany there are moves out of coal mining ("*ohne Federn zu lassen...*").

In the late 50s, West European coal (and its price leader, the Ruhr) had been hit by "... the rise of an integrated world fuel market... /which/ removed its control over /energy/ prices"[133]. Then, in the 80s, West European coal was down once and for all, hit by the rise of an integrated world coal market, which greatly tended to increase the costs of vicious circles and market segmentation.

Because these imports represented one important aspect of the West European move out of early industrialism, the structures dissolved should be expected to be extraordinarily resistant to change, whereas these changes had to *appear* rather traumatic. What we are witnessing is a move out of traditional patterns of industrial production and raw material extraction, hence, what we are discussing is not a simple process of industrial structural change (the decline of traditional iron ore mining and traditional steelmaking are[134] integral parts of this process). Rather, it is the planned dismantling and unlocking of no small amount of "iron triangles" and "vicious circles", in order to get out of coal mining. Simultaneously, new structural solution had to be found, in order to cope with the retreat out of the old complexes.

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[130]That is: Integrated inland steelmaking.

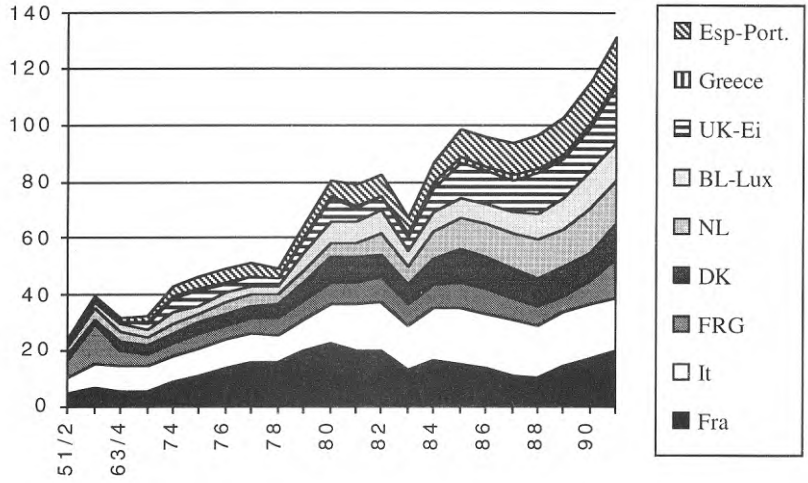
[131]Saar, Lorraine, Vallonia, Luxembourg etc.

[132]By decreasing the specific steel consumption (as less steel was needed to produce the same amounts of finished steel products, when yields increased by ca 15%).

[133]Gordon R (1970), p 64.

[134]As noticed several times above and which is discussed more fully below, sect's 4-5.

Figure 3.13. Extra EEC 12 imports of coal into the EEC 12 area 1951-91.



Note 1: In million tons; including coking coal, but excluding coke.

Note 2: Figures for 1951/2 and 1963/4 and 1973/4 are averages for these years.

Sources: Sources: 1973-78: Annual Bulletin of Coal Statistics for Europe (Geneva); 1979-91: Jahrbuch für Bergbau, Öl und Gas, Elektrizität und Chemie (Glückauf, Essen).

These complexes has to be seen as the structural articulation of the traditional West European industries. And if the period (ca) 1965-80 had seen an important increase in corporativist decision making, that outbreak of consensual policy formulation has to be regarded as being provoked by innovations[135] that was upsetting the dominant socioeconomic structures. In my view the period 1965-80 should be regarded as the last stand of this structure. Hence, very much of the structural solutions discussed in this analysis are -really- the attempts of an old mode of production to superimpose itself upon radically altered economic conditions. The regulations of electric utilities, the coke subsidy systems, the intensified

[135]And the market trends that were a result of these innovations.

pattern of intervention into the steel industry (sections 4-5), the regulations on imports, the structural development of the ECSC - all of these were attempts to regularize the process of economic change through the centralization of decision making.

What is striking about the period after ca 1980-83, on the other hand, is the dissolution of these structures. It is not only that energy markets and steelmaking has been the subject of thorough structural change, (real structural change, not the hybrid form of change that was sought up to ca 1980), the same is equally true of other major sectors -telecommunications, a variety of industrial sectors etc. Clearly, there must have been a point, somewhere in between 1976/77 and 1983/84, where the political yield of increasing the "vicious circles" decreased (as costs escalated out of proportion to potential political benefits). This is, we argue, the real significance of "neo-liberalism". "Neo-liberalism" could never have been anything but a passing fad, if it hadn't offered very tangible solutions to the underlying socioeconomic forces of the Western world.

Summarizing: Vicious Circles do not develop by mistake, quite to the contrary they are the structural expression of the old mode of production trying to accomodate to new production functions - for example, the regulation of electricity generation and the stagnation in the international coal market over a 15 year period, were the necessary effects of the continuation of uneconomic coalmining. Similarily, the structural development of the ECSC, became a reflection of these traditional patterns of steel and coal production.

It is in this context that *the movement out of Vicious Circles implies that some kind of structural void is left in their wake*, as they have been the structural outcome of regularized structural change. It is here that the movement towards "privatization" and "market solutions" can be understood. Strategies of "privatization" or "deregulation" were ways through which industrial rationalization could be performed, when the earlier corporativist solutions started falling apart. Using Schumpeter's term, they became ways used in order to unload no small amounts of "institutional deadwood".

3.4.2. National Experiences

3.4.2.1. Belgium

By 1975 Belgian production had been cut back to 7,5 mn t. In the years up to 1984, what little remained of Vallonian coal mining was phased out. But the major part of production, from the Campine, was held constant over a ten year period. This was done under the influence of a massive industrial crisis. Closedowns were a sensible subject, not least due to a percieved need for national energy security in the shade of the "oil crisis"[136].

As for consumption (figure 3.14) we are confronted with the picture already hinted at. As the steel crisis came on stream, consumption in cokeries declined, to be replaced by increased consumption in electric utilities. As discussed below, this was a policy that didn't augur well for the future, after the early 80s.

Disaster struck, for the remaining coal mines, when coal prices started declining by the mid 80s. As the BEF started appreciating against the USD, internal prices soared in dollar terms, and the equalization schemes used to subsidize users of indigenous coal got out of control[137]. The N.V. Kempensee Steenkolenmijnen, that had been running up enormous deficits all through the two decades of its existence, was obviously in need of a major reorganization.

To coordinate this reorganization, a former government official in charge of the region's coal district was called in to develop a plan for the restructuring of the mines[138]. The Gheyselinck plan appeared in 1986, setting out an overriding strategy for the future of Campine's coal industry. Its aim was to decrease losses through the phased closedown and fusion of pits, a process that was immediately started.

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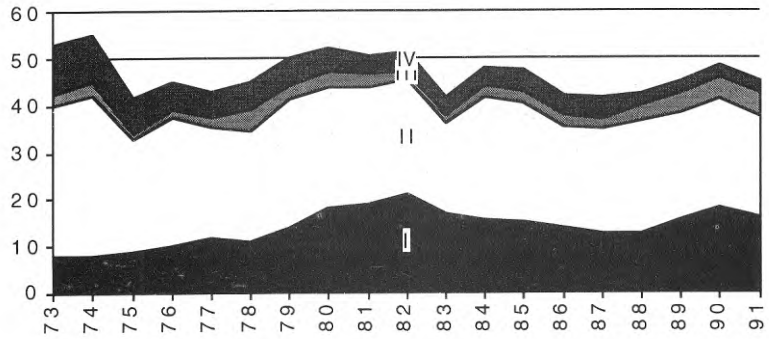
[136]IEA (International Energy Agency), (1982), p 55-57.

[137]Kerstan F (1988), p 892-93.

[138]Belgian politics were, in the mid 80s, in line with the general West European experience, passing through a phase of "neo-liberalism", an orientation of politics equally well discernable in the policies applied towards the steel sector. See sect's 4.2.2.1 and 5.2.2.1.

Figure 3.14. Belgium. Coal Consumption 1973-91, breakdown by sectors.

Total consumption 1951=100.



Note: I- Electricity generation; II- Use in cokeries; III- Direct use in industry (including self-consumption by mines); IV- Miscancellous uses (mainly households).

Sources: 1973-90: Annual Bulletin of Coal Statitics for Europe (Geneva); 1991: Eurostat: Energy, Monthly Statistics (Luxembourg)

A total phaseout by the year of 1996 was not excluded, if it proved impossible to make the company profitable (profitability was, given Belgian productivity rates (SA fig 5), absolutely impossible). A total closedown of mining was implicit in this line of reasoning[139].

The strategy was rather successful, as the phaseout coincided with the expansionary economic conditions of the late 80s. This made it possible to speed up the measures, and in September 1992 the last Belgian mine closed down. (SA fig 4).

3.4.2.2. Germany

The energy crisis created new possibilities for German coal mining, as "security" was underlined and the price-gap between indigenous energy and external sources narrowed or closed (fig 3.2), while unattractive

[139]Kerstan F (1988), p 893-94.

labor market conditions made mass redundancies in the Ruhr and Saar a sensible subject to governments concerned with reelection.

In the wake of these developments strategies for the coal industry were reversed. By 1973 a *Förderziel* of 83 mn t/y was set, checking the rapid contraction of the early 70s[140]. One year later this was increased to 94 mn t/y. Investment rebounded from earlier, depressed, levels (SA fig 3).

The problems with these policies were soon evident, as consumption failed to increase in line with the new *Förderziele*. The West European steel industry entered a decade of almost uninterrupted contraction, which undermined the markets for German coke at a time when other potential consumers failed to turn to high-priced indigenous coal, either. Accordingly stocks increased, and the government had to announce the institution of a national coal reserve of 10 mn t to accomodate these spontaneous developments[141].

A new agreement between the mines and the electricity industry (the *Jahrhundertvertrage*) was sponsored by the government in 1980, in order to help the situation. The *Jahrhundertvertrage* intended to insure the German mines of a growing market up to 1995. Its inception marks one of the high-water marks of West European coal protectionism. And to the contrary: seldom was the breakdown of West European coal mining more vividly symbolized, than when this regulative mechanism broke down during the later the 80s.

Earlier agreements had provided the mines of a guaranteed market of 30 mn t/y (rising in 1977 to 33 mn t/y), in this industry, but the *Jahrhundervertrage* raised this amount to 40 mn t/y, a level that should have been increased to 46 mn t/y by 1991[142]. The extra costs that this implied to the generators that were compelled to burn indigenous coal, were covered from an equalization fund.

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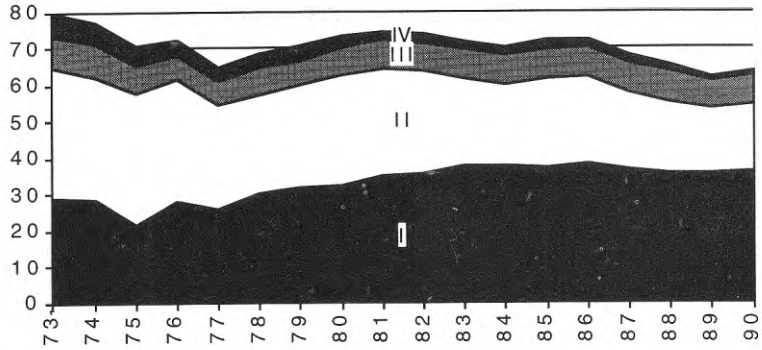
[140]Friedrich H (1973), p 1233-37, explains the goals of the government with regard to the coal industry by late 1973. Friedrich was minister for industrial affairs at this time.

[141]On the 70s Abelshauser W (1984), p 160 ff; IEA (1982), p 69-73; Reintges H (1973b), p 980-83; Reintges H (1976), p 1392-97; Reintges H (1977), p 1177-86; Fryer J (1979), p 16-22.

[142]See, for example, IEA (1982); Lucas N (1985), p 245-46.

Figure 3.15. Germany. Coal consumption 1973-90, breakdown by sectors.

Total consumption 1951=100.



Note: I- Electricity generation; II- Use in cokeries; III- Direct use in industry (including self-consumption by mines); IV- Miscancellous uses (mainly households).

Source: Jahrbuch für Bergbau, Öl und Gas, Elektrizität und Chemie (Glückauf, Essen), 1974/75-92.

This fund was raised through the so called *Kohlenpfennig*, paid by all (irrespective of whatever fuel the generator has used) final consumers as an extra item on the electricity bill[143].

The failure of coal consumption to rise despite new investment, is evident from figure 3.15, together with the escalating dependence upon to electric utilities.

Obviously, the system was getting increasingly sensible, as more and more supportive mechanisms had to be developed towards the coal industry. Moreover, new capacity was coming on stream, which increased capital costs at a time when little was done in order to reorganize older mines, where productivity stagnated (SA fig 5). All these factors implied, necessarily, that costs were increasing, but it was the added burden of

[143]On the overall goals of German energy strategy during the 70s and 80s (and the construction of the Kohlepfennig), see Suding P (1989), p 206-07, 210-12, 215-19 (esp. p 218-19 on the breakdown during the later 80s). Lenel H-O (1981), p 176 ff.

falling international energy prices that made change absolutely imperative by 1983.

In the first instance, though, the need for adjustment was still limited. It was only the costs that were associated with the coke deliveries to the steel industry that had to be dealt with, before 1986.

This was the case because the steel industry's equalization scheme was directly tied to the world market price for coal. As the equalization scheme was financed by the government, this implied that the government had a direct interest in limiting these costs when international coal prices started falling. The equalization scheme in the electricity generation *was not equally pressing, before the international oil prices collapsed:* This cost befell final users, and the scheme was (to 60%) dependent upon the price of imported oil, which was a high cost product up to 1986.

It was the depressed market conditions, and the declining international coal prices that made a reevaluation and renegotiation of the long- and medium-term strategies of the industry imperative by 1982/83. The government choose the "round table" solution to this problem, and when international energy prices continued to decline, while coke consumption refused to take off, further rounds of "coal talks" had to be undertaken (in 1983, 1987 and 1991).

The first round got under way when stocks had been increasing for more than a year. It centered upon the problem of over-capacities, and the need to bring capacity in line with declining consumption. To achieve this goal, a reduction of capacity by ca 10 mn t over a phased period was foreseen[144]. But, on the other hand, it was still possible to avoid a recognition of the structural side of the crisis. This recognition would have to await the moment that petroleum prices started falling.

Instead, the *Jahrhundervertrage* was confirmed, and the new role of the utilities as the mines main customer was confirmed, with the takeover by the utilities of much of the RAG shares earlier held by the steel companies[145].

If the first coal round mostly served to recognize that the market was shrinking, much due to the steel crisis, the second coal round was somewhat different in its nature. The continuing decline in international

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[144]On the situation in 1982-83: See WirtschaftsWoche (WiW), 46/1982 p 22-24, "Teure schwarze Berge"; WiW 24/1983, "Nur die Halden Wachsen", p 130-31; WiW 32/1983 "Wer die Zeche zahlt", p 19-20; WiW 40/1983 "Zwischen Stahl und Staat", p 60-76.

[145]WiW 21/1984 "Mehrheit für den Strom", p 128-130; WiW 35/1984 "Ausweg aus der Krise", p 84-87.

coal prices had forced the Federal government to rethink its policy of subsidizing exports of coking coal to its neighbors[146], which made new rounds of rationalization necessary. A wholesale reevaluation of German coal strategy was, on the other hand, only forced by the collapse in international petroleum prices in 1986.

The construction of the *Kohlepfennig* was, as we have seen, heavily dependent upon the level of international petroleum prices[147]. It was this fact that created a situation where currency appreciation and collapsing oil prices strenghtened the need for coherent rationalization measures. Thus, the phaseout of export deliveries was speeded up, while the need for a renegotiation of the *Jahrhundertvertrage* (below) laid the

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[146]Coke exports to other ECSC countries were still (in coking coal equivalent), ca 10-12 m t/y in the mid 80s . With the collapse in international coal prices at this point (fig 3.2), costs for these exports increased massively. See WiW 32/1986 "Aus fremden Taschen", p 77-79; WiW 14/1987 "Aus für Aachener Kohle", p 235-37.
Typically enough (see sect's 4.2 and 5.2) it was from Luxembourg, and its steel company ARBED, that protests against the phaseout of German coking coal exports was voiced. For ARBED, the coking coal subsidy had been a remarkable way of letting German taxpayers subsidize the Luxembourgian steel industry. As usual, a compromise was reached on the speed of the phaseout of export deliveries to Luxembourg, and the closedown of ARBED's German coalmining subsidiary (Eschweiler Bergwerksverein, EBV), and its Aachen mine was delayed until 1992. See WiW 14/1987; and Jackisch W (1990), p 571-72; Jackisch W (1992), p 633-34.
When the Emil Mayrisch mine (Aachen) finally closed down (921218), this event was of some symbolic importance: In the North-West European coalmining districts, (Nord-Pas-de-Calais (Fra)/Vallonia(Bl)/Campine(Bl)/Limburg(Nl)/Aachen (FRG), there remained just one coalmine after that date (Huckelhoven, FRG). See Schaetzke H J (1993), p 147-49. (On Huckelhoven and *its* impending closure, see Der Spiegel 46/1991 p 152-53.)

[147]To arrive at the excess cost of using indigenous coal an energy basket had been constructed, consisting to 60% of imported oil. When international oil prices collapsed in 1986, the excess cost increased enormously, necessiating an increase in the Kohlepfennig, from a 3,5% to a 7,5% surcharge on the electricity bills. What made the problem critical in this situation was not only that the *Kohlepfennig* made German electricity (at least) 7,5% more expensive than necessary. Furthermore, as 7,5% had been the pre-set limit of the surcharge, this implied that all costs in excess of that had to be covered by the guarantor of the treaty, the Federal Government. Thus, by 1987/88 German electricity prices were 7% higher than necessary, in a situation where the French were constructing nuclear reactors on the German border (Cattenon), while the government had to contribute an additional 6 bn DEM to finance the equalization fund: Spiegel 46/88 "Druck von draussen", p 132-35; WiW 29/1987 "Alle zahlen die Zeche", p 82-84; WiW 35/1987 "Neue Belastungsprobe", p 14-16; WiW 43/1987 "Vor der Zerreissprobe", p 20-21; Horn H (1988), p 464-70.

groundwork for a new wave of rationalization. By 1987 a capacity of 70 mn t/y was planned for 1995.

The third round set new targets for deliveries to the electricity sector. These, that had already been renegotiated (1988) to run at a level of 40,9 mn t/y up to 1995, was set to decline to 35 mn t/y after 1995[148]. How the extra cost for electricity generation is to be covered after that year, with the German electricity market on its way towards some kind of deregulation inside the EC, (which will necessiate an abolishment of the *Kohlepfennig*)[149], is an unresolved question, though. Furthermore, the *Hüttenvertrag* with internal steel producers is to be continued up to the year 2000. This implies a capacity of 50-55 mn t/y by the late 90s[150; 151].

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[148]The negotiation process for the third Coal round was, essentially, undertaken by the Mikat Commision, a coporativist organ made up of representatives of the electric utilities, the coal industry and different political parties. The outcome -a relatively modest decline of coal consumption in electricity generation, the continuation of the Hüttenvertrag- bears evidence of the continuing search for consensus. The problem -already very evident in 1992/93- was that reality kept changing at a rather fast pace. For the reasoning of the Mikat Commission, see Reintges H (1990), p 667-73 and Horn H (1990), p 664-66.

[149]The implicit assumption of the third round must be that there will be a fourth one by 1995: With German production at 55 m t in 1995; and the difference between German and imported coal prices at ca 120 USD (a conservative assumption), the cost for the disposal of this coal will be ca 6600 mn USD. Given a total employment of 100.000 men in coalmining by 1995, cost per employed person will stand at 66.000 USD, to be covered by direct subsidies after the abolishment of the *Kohlepfennig* . The chances for the continuation of a scheme such as this seems slim, indeed.

On the contrary, we need to see the Coal rounds as one last attempt to regularize structural change in German coal mining, an attempt that limited the fall in employment to ca 7-9000/year, between 1983-91 (tactics very different from these used in the UK). The problem with the coal rounds was, in short, that reality was changing at too fast a rate for any of them to be up to date for more than a short while: Steel production declined, coal prices declined, oil prices declined, coal prices declined again, the French moved head on into cheap nuclear electricity generation, coke rates declined again in blast furnaces (see note 151 sect 3), etc. etc. There may, in fact, very well be a new coal round *before* 1995. (The author would be very much surprised if German coal production was more than 30 m t in the year 2000.)

On the deregulation of the German electric utilities, French competition, and the arrival of a European electricity market, see the three interesting articles in WiW 34-36/1987: "Stromwirtschaft I: Spannung aus Paris", (34/1987 p 36-43); "Stromwirtschaft II: Unbezahlte Zeche", (35/1987 p 73-79); Stromwirtschaft III: Teure Kleinstaaterei", (36/1987 p 48-54).

[150]WiW 30/1991 "Streichkonzert", p 85-86; WiW 42/1991 "Soziale Sprengstoffe", p 16-20; HB 911104 "Brüsseler Wettbewerbshüter mahnt Bonner Politiker"; HB 911112 "Jahrhundertvertrag soll weiter gültig bleiben", p 1 and "Spielen auf Zeit", p 2; HB 911114 "Deutsche Steinkohle ist nicht länger der wichtigste Eckpfeiler der Versorgung"

The major strategic decisions undertaken since the 70s have all been marked by the very great uncertainty that policies toward the coal sector has had to cope with. The conventional wisdom of the mid- and late 70s was that the steel industry would rebound, and that demand for coke would increase. The conventional wisdom of the early 80s, was, with regard to energy prices, that oil would cost USD 100/barrel by 1990, and that prices should increase from there[152]. By the early 90s all fundamentals had changed, and there was a profound uncertainty hanging over the whole complex of future energy production. It was in this situation that the pattern that had evolved up to ca 1980 -screened off markets and specific markets reserved to specific fuels- became inoperational, as competitive and price effective international markets for coal and electricity had started developing.

But, the fundamental feasability of the structure should be seen against this background of changing circumstances. The "round table" talks provided a forum for strategy formulation and strategy communication, and the structure that had evolved earlier was able to effectuate policies

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(written by Otto Lambsdorff, the party leader of the FDP; Geisel H B "Standortbestimmung 1990- Zur neuorientierung der Kohlepolitik", Glückauf, Heft 23/24 1990 p 1131-38; Horn H (1992), p 16-20. See, as well, Glückauf 23-24/1991 p 1027-28 and 1/1992 p 7.

[151]Provided no major new technology is introduced in blast furnaces to cut coke consumption. This is just happening as powdered coal injection (PCI) is increasingly used in blast furnaces, replacing coke in its function as a supplier of heat. This method seems able to cut coke rates by 25-30% (down to ca 300-350 kg/ton of pig iron). This could, possibly, cut demand for coking coal some 3-5 m t up to the late 90s. The nearly simultaneous investment in new, giant, effective blast furnaces (in each case replacing several older, less efficient ones) by Thyssen and Preussag Stahl (formerly Peine-Salzgitter), and the impending closedown of what remains of integrated steelmaking at Maxhütte (Bavaria), and the probable closedowns (or, at least, restricted production), at Bremen and Rheinshausen, hint in the same direction, as well. Thus, German pig iron production is getting concentrated to a few extremely efficient blast furnaces, where PCI is used, and coke rates are extremely low. Simultaneously, the move towards electric furnaces in the production of long products is being speeded up in Germany (below, steel). If a German production of 20 m t/y of flat products is foreseen by 2000, (hypothesis: all long products supplied from electric furnaces, all flats from integrated producers) and a coke rate of 325 kg/ton is assumed, this would make for a demand of only 6,8-6,9 m t of coke; this would require ca 9 m t of coking coal. It is easy to see how this would necessiate a new coal round by the mid 90s (as 35+9=44, rather than 50-55).

[152]See, for example, Fesharaki F (1981), p 267-308. For a discussion of these prognosises, see Gately D (1986), p 513-38; Griffin/Teece (1982), p 207-19, particularily p 213-15; Schwartz P (1987), p 401-02.

without major social problems, allocating cuts between districts and mines. After 1983 productivity did, once again, start to increase (SA fig 5) when production was scaled back. Moreover, imports were gradually freed, something that may prepare the ground for a more diversified use of energy, and, paradoxically, an increased use of coal (coal imports increased in 1990 and 1991, figure 3.13)[153].

What is important to note about the last two coal rounds, as compared to the policies pushed up to 1983, is the growing acceptance of the structural character of the crisis. The first coal round was very much a de facto matter: consumption was declining in the steel industry, and something had to be done about the increasing stock levels. The important difference between the solutions of 1975, when a national coal reserve was instituted, and 1983 when rationalization was pushed, deserves notice, though.

The coal rounds of 1987 and 1991 ought to be viewed in a different way. *It was the collapsing prices of imported energy sources that forced an understanding of the definitive character of the crisis.* Thus, strategies of rationalization was pursued and exports of coke[154], was phased out. Then, the *Jahrhundertvertrage* was renegotiated two times. These developments are suggestive: Up to 1983 all energies were concentrated upon forcing the utilities to consume more coal, a strategy reversed by 1987/88 (the timing is crucial, it was at this junction that the Belgians started leaving coal and the Britons implemented forceful measures of structural rationalization).

In Germany, this is a process still at work today. The relationship between the German protective system and the rest of the EC is hanging in the balance[155], the financing of the coal deliveries to the utilities after

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[153]In the former GDR a large coastal power plant (at Rostock), was under construction by mid-1991, at Stendahl (former GDR, on the Elbe), the construction of a giant power plant was planned by the summer of 1992, both of these plants were designed to run on imported steam coal; both representing the very rapid restructuring of this "new"part of the country along the innovative lines that had evolved during the 70s and 80s . As we shall see in the case of steel, this tendency was equally visible in this sector. It may well be that the rapid reconversion of the former GDR will prove itself to be one of the singularily most interesting case studies of rapid structural change ever seen. On the GDR, see, for example HB 921202 p 15.

[154]Only three decades earlier these had been the cornerstone upon which the ECSC had rested.

[155]For example: VDI 920810 p 6, HB 920707 p 17.

1995[156] is unresolved and the potential deliveries to the steel industry is hanging in the balance, as well. As early as in 1992 this led to new problems, as coal stocks increased when steel production lagged (and coke use was economized). Hence, the measures decided upon during the 1991 coal round were speeded up, as mines were again phased out at an accelerated pace[157].

There will, probably, be a new *Kohlerunde* by 1994 or 1995, as the strategy of moving out of internal coal will require more or less eternal rounds of communication, negotiation and implementation. When the old structural solutions (*Einheitsgesellschaften*, guaranteed deliveries, screened off markets for coke and electricity) became untenable after, say, 1980-86, no strategy but retreat was possible.

3.4.2.3. France

The development of the indigenous French coal industry wasn't very spectacular after 1973. The speed of the French coal phaseout was merely the reflection of changed conditions in other parts of the energy complex. In their essence, it was the earlier strategies towards coal that was continued. The one exception that existed from this strategy occured in 1981-82, the quick passing of this "new policy" merely underlining the economic impotence of French coalmining.

The first events that made deep imprints on French energy policies in this period, were the new developments on the Algerian oil front in 1970-72. Posted prices and taxes were raised unilaterally by the Algerians, shortly thereafter French assets were nationaized[158]. After these traumatic events, the "oil crisis" hit with full force in 1973-74.

Although there had existed a relatively significant nuclear program before 1974, this was only a shade of what was to develop after this date. In the wake of the oil price revolution a nuclear program of literally enormous dimensions was started[159].

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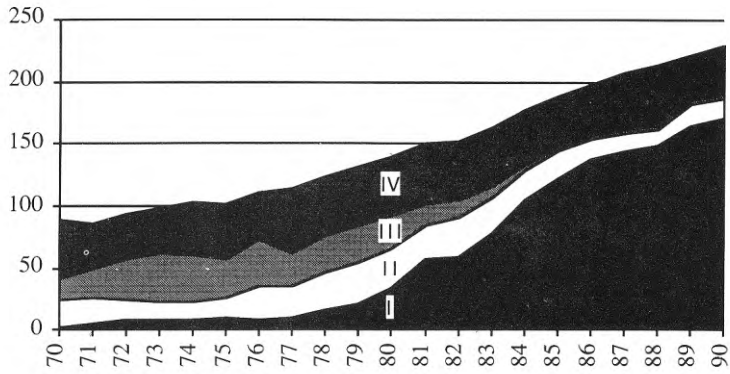
[156]See, for example, HB 911112 a a.
[157]See HB 911202 p 15; HB 930318 p 18; HB 930326-27 p 25.
[158]Lucas N (1985), p 26-27.
[159]Gardent P (1981), p 13-23; De Carmoy G (1982), p 181-83; Giraud A (1983), p 167 ff, 173-75, 184-88.

Figure 3.16. France. Generation of electricity by fuels, 1970-90.

Total production 1973=100.



Note: I- Nuclear; II- Coal; III- Fuel oil; IV- Misc. sources (foremostly Hydro and Natural gas.)

Source: Statistik der Energiewirtschaft 1985/86 and 1991/92, (Düsseldorf).

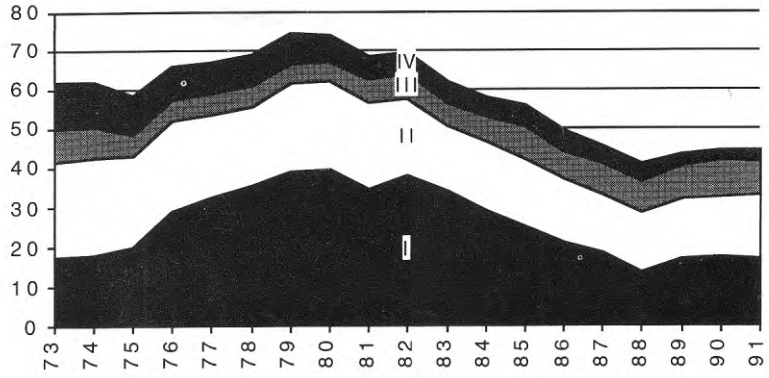
There is a certain consistency in this remarkable policy, that proceeded apace under Mitterand as well as D'Estaing. The preoccupation about the dependence upon imported energy had been a driving force behind the French led creation of the ECSC. Then, during the late 50s and 60s the same preoccupation led to the enthusiastic development of the "European Texas". As both these strategies had shown themselves futile, the development of nuclear energy did seem to hint at a possible way out of this dilemma of ever-moving targets.

The staggering expansion of nuclear energy couldn't but have traumatic effects on coal production. Alas, up to the early 80s coal entered upon an interim period, being called upon to replace oil in electricity generation[160] (fig 3.17), but the increased use of coal was the result of growing imports. Indigenous, uneconomic, production was still falling (SA fig 4).

[160]Giraud A (1983), p 175-76.

Figure 3.17. France. Coal Consumption, 1973-91, breakdown by sectors.

Total consumption 1951=100.



Note: I- Electricity generation; II- Use in cokeries; III-Direct use in industry (including self-consumption by mines); IV- Miscancellous uses (mainly households).

Sources: See fig. 3.14.

The commodity was offered a short honeymoon by the socialists, when Mitterand gained power in 1981. The socialists new energy program was promising to cut back radically on the nuclear program to the advantage of indigenous coal[161]. As the program was hastily reconsidered in the face of a continuing balance of payments crisis -these were the days of the second oil chock- it was decided to move ahead with the nuclear program. Hence, production of nuclear energy grew from 32,1 mtce/y in 1981 to 92 mtce/y in 1986 (fig 3.16).

This spelled the end to the interim period of coal burning in electricity generation (fig 3.17), as EDF's coal demand was allowed to fall away spectacularly. The middle-term supply contracts between the EDF[162] and CDF in 1984 and 1987 (for the period 1989-93) were, basically,

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[161]De Carmoy G (1982), p 183-88; Giraud A (1983), p 189-90.
[162]Électricité de France

adjustments to an existing situation, where nuclear plants were coming on stream continuously[163].

To sum up, it was the parlous financial state of the CDF[164], the decision to move ahead with the nuclear program and the effects of the general economic crisis, that combined to the U-turn in the socialists policies towards French coal mining. As the CDF was requiring ca 6-7 bn FRF per year in subsidies and lacked markets when nuclear power stations came on stream, this created an obvious need for restructuring and reevaluation. The Hug plan (1984) started this process of renewed streamlining and increased emphasis on opencast mining. The strategy was speeded up by the conservative government that took over in 1986[165].

The comeback of socialists in 1988 didn't change much of this. By 1991 production ceased in the Nord-Pas-de-Calais district, while further rationalization was under way in Lorraine and Centre-Midi. Instead production was becoming increasingly concentrated to new strip mines, while coal imports are growing, as well[166].

In France the overriding concern of energy policy was, as it always had been, the security of energy supplies. The increased emphasis upon cost effectivenes, couldn't help coal, either.*It was one of the great experiences of the socialist government in the years 1981-82, that a strategy aiming at these goals wasn't able to contain an inefficient indigenous coal industry.* As this was percieved, the sector was allowed to drop out of sight.

3.4.2.4. The United Kingdom

In the UK the turnaround in energy markets in 1970-71 released forces that had laid dormant for a decade. The rationalizations of the preceding decade, intensified after 1965, had made it possible for the NCB to operate in the black for a short period between 1969-71, a situation that was further improved by the economic boom of these years. Coal

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[163]Ernst D (1987), p 1500-01; Ernst D (1989), p 109.

[164]Ernst D (1987), p 1502-04; Ernst D (1989), p 110-11.

[165]There were some differences in policies, that tended to worsen the situation for coal even more. The socialists had increased fuel oil prices in 1984 to safegurd coal in some of its uses. The conservatives lowered this tax significantly in January 1987, in a situation where international prices had declined dramatically, anyway.

[166]Glückauf 3/1992 p 158.

consumption was increasing because of new government sponsored contracts with the power industry, and through the short-lived steel boom of the early 70s[167].

Hence, long overdue labor force tensions grew, as there at last seemed to exist room for increased wages (as compared to other sectors[168]). Choosing their own time tables for the strikes, NUM hit in the winters of 1972 and 1974, in order to maximize the inconvenience of the strikes. A rising star on the firmament was the leader of the Yorkshire division of the union, Arthur Scargill. It was the Scargill-faction that pioneered the stepped-up use of force ("the flying pickets") in order to paralyze the whole infrastructure of coal. In order to prevent the movement of stocks, distribution centers and merchants were blockaded by the "flying pickets"[169].

The appearance of Scargill is notable, as a symbol of the increased militancy and politization that was apparent by the early/mid 70s. By 1974 Edward Heath choose to turn the strike into a question of "Who Governs Britain?", as the demands of the miners and their strike were reducing his avowed income policy to shambles[170].

The fate of this government, that was brought to power on a program of modernization and structural change is worth contemplating. Rapidly caught up in the snares of an socioeconomic structure adjusted to accomodation, the free-marketering government was soon forced to a much analyzed political U-turn[171]. As the general situation deteriorated with an over-heated economy, unprecedented heights of intervention were resorted to, when controls over prices, rents and incomes were instituted (Britain was entering a period where inflation rose together with unemployment). In this situation a general election was called, on the question of a strike in one of the most archaic and uneconomic economic sectors that existed in the country.

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[167]On the conditions in the UK coal mining industry in the early 70s, see: Posner E (1973), p 585-93.

[168]Ashworth W (1986), p 302-07, Scargill A (1975), p 8-9.

[169]On Scargill's views on revolution: See Scargill A (1975), p 3-33, esp. p 24, 26, 30-33 and Ashworth a a 607-10.

[170]The conservative election slogan of February 1974. See Harris K (1989), p 15-17.

[171]Douglas J (1983), p 56-74. The Heath experience is, for example, discussed in Morgan K (1990) p 317-57.

As the government fell, a Labour administration entered the scene, giving the miners, essentially, everything that they had asked[172]. Somewhat ironically it had been the Heath government that implemented the start of a plan for new investment in coal mining. The Plan that arrived in 1974 had been drawn up by the industry in concord with the Heath government[173].

This plan aimed at creating some 42 mn t of new capacity, as an output of 135 mn t by the mid 80s was considered feasible. By 1977-78 ("Plan 2000") oil prices had reached a level which made planners envisage a production of 170-180 mn t by the end of the century[174].

Although these production levels were never to materialize, the plans provided for much new investment in the industry, while low-cost strip mining was allowed to increase. Simultaneously modern continuous drift mines were installed at the Selby field etc[175].

The basic problem of these policies was that expansion wasn't accompanied by a simultaneous rationalization of older capacities. The labour government in power was clearly aware of the problems that this implied, but failed to develop any consistent strategy towards them. Policies deteriorated to inconsistent measures, as the industry was run through a multitude of committees[176]. Instead, as markets deteriorated with the recession and a more efficient use of energy, emergency measures had to be resorted to. Thus, in its 1979 agreement with the mines, the CEGB, which was approaching a monopsonist position towards the coal industry (fig 3.18), agreed to buy a minimum of 75 mn t/year of indigenous coal, in return for increased government grants and the ability to pass on costs to final consumers[177]. The steel industry was, similarily, bound by long-term government sponsored contracts to limit their imports of foreign coal, in return for price concessions from the NCB[178].

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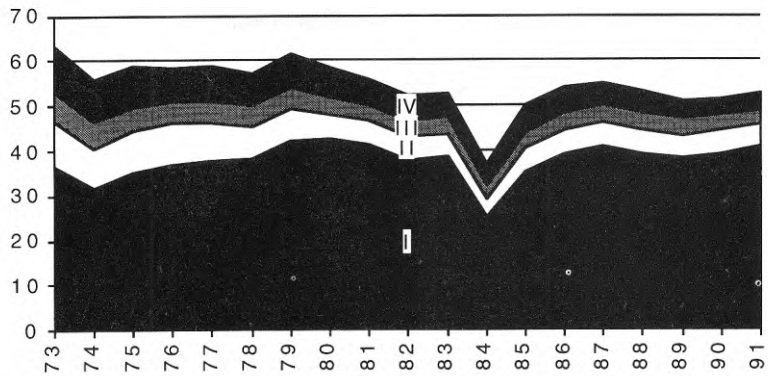
[172]Ashworth W (1986), p 338-40.
[173]For an outline of the plan: Parker M J (1975), p 16-21.
[174]Ezra D (1977), p 10-16.
[175]Rees P B (1976), p 28-34; Moses K (1981), p 501-03; Houghton A (1992), p 431-39.
[176]Ashworth W (1986), p 380-84.
[177]Ashworth W (1986), p 398-400.
[178]There is a comparison between British and German policies in Fryer J (1979), p 18-21.

Figure 3.18. United Kingdom. Coal Consumption 1973-91, breakdown by sectors.

Total consumption 1951=100.



Note: I- Electricity generation; II- Use in cokeries; III-Direct use in industry (including self-consumption by mines); IV- Miscancellous uses (mainly households).

Source: Annual Abstracts of Statistics (London), 1975-92.

These measures could only partially mend a structure that was caving in to increased pressures. By the late 70s and early 80s the combination of increased capital expenditures, stagnant markets and an ever-growing tail of uneconomic collieries combined to produce deficits of never encountered heights[179]. It was in this situation that the new conservative government of Margaret Thatcher intervened. Committed to a strategy of public sector restraint, the government set rigorous cash limits on the Coal Board, thereby provoking a major confrontation between the government and the NUM in early 1981. The NCB, placed in an economic strait-jacket because of tight cash-limits and its insatiable need for subsidies, had to develop a program for the closure of a major number of pits[180].

The NUM, by now aware of its power, and heavily dominated by the militants of the mid 70s, resorted to threats of a national strike -and in

[179]Ashworth W (1986), p 404 ff.
[180]Ashworth W (1986), p 414 ff.

this situation the government produced a major U-turn, on the lines of the Heath experiences. The pit closures became the subject of local negotiations, the cash limits on the NCB was removed, the CEGB was compelled to phase out coal imports totally and buy still more British coal. This strategic withdrawal on the brink of a major show-down was the outcome of a clear conception at governmental level[181] that it was impossible to win a battle with the NUM in the circumstances evident in February 1981: stocks were too low, imports were running at low levels and it was, again, winter.

In 1982 Arthur Scargill, the personification of militancy, gained total control over the NUM, and in the summer of 1983 the Thatcher government was returned to power with an unprecedented majority. The stage was, most obviously, set for a final showdown in the coal mining sector. By the autumn of 1983 Thatcher had placed Ian MacGregor, who earlier had led in the reorganization of the UK steel industry, in charge of the NCB. Then, by March 1984, a rather moderate plan for the rationalization of production was put forward, in a situation where the government had been building up stocks for 6 months[182]. Although cornered into a "no win" situation Scargill resorted to unconstitutional strike tactics[183], as considerable parts of the membership opposed the action.

In these circumstances the authority of the trade union was questioned. Several districts, above all the highly productive Nottinghamshire (where threatened mines were, besides, few) continued to produce throughout the strike, and when the "flying pickets" arrived they were resolutely met by the police[184]. The extraordinarily determined strategy of the government -selecting to act in the spring, resolute action towards militancy, the policy of "rule and divide" towards the miners[185], the stock levels- are all evidence of the crucial importance of the strike. It was, to a very large

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[181]Harris (1988), p 178.

[182]They had reached the truly staggering level of 50 m t by March 1984.

[183]As the NUM's statues required a national ballot on the question of a national strike, and it was evident that strike action wasn't favored by the membership (at the beginning of the strike local ballots were held in nine districts, only one, Nurthumberland voting in favor of a strike), the Scargill faction of the union was able to implement the strike by decree. Bratt C (1988), p 66-68.

[184]Bratt C (1988), p 67-72; Harris K (1989), p 180-84. The Conservative policy towards trade unions is outlined in Mitchell N (1987), p 33-45.

[185]Generous economic incentives to voluntary redundancies and miners that returned to work, no threats towards the areas with high productivity.

degree, the power industry's almost total dependence upon indigenous coal that made the economic system extremely sensitive towards the coal sector.

As the strike fell apart, rationalization was implemented at an accelerated pace (SA fig 5). The board was converted into a normal corporation (BC[186]) and stringent goals were set on costs. Thus, operative costs were to be cut by 20% between 1985/86 to 1989/90, production was concentrated to the most productive collieries where six day production was implemented, and strip mining continued to increase as a proportion of total output[187].

The privatization of the CEGB, in the form of separated and split up companies (1990) under legal constraints to adopt policies of marginal cost pricing[188], completed the structural transformation of the British energy market. What will remain of BC when the existing long-term, government guaranteed coal contracts run out in 1993, is a rather interesting question.

The strengths of the company -it has an opencast capacity of ca 20 mn t/y, and some effective fields (foremostly Selby) that have been developed after 1975- does in no way guarantee the survival of the rest of the company. Imports of steam coal have been rising vigorously the last years. By the mid 90s an import volume of 30-40 mn t/y is probable.

As BC decreased in importance and size, and its financial results improved markedly[189], the privatization of the company, "the Ultimate Privatization", became possible. With the return of the conservative government in the April 1992 elections, the date was set at early 1994[190]. Then, in October 1992 it was announced that 31 of the remaining 50 British mines were to be closed down in the period up to March 1993. As the measures were a direct consequence of the privatization of the CEGB (and the concomitant fall in guaranteed deliveries to the power plants), and the impending privatization of BC, the compromise solution reached in March 1993 had to recognize these basic problems. Thus, a direct subsidy is to be used for a two year period, in order to make a limited amount of indigenous coal competitive with alternative fuels. The

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[186]British Coal.

[187]For an outline of the continuing ratonalization of the BC, see Ernst D (1988), p 1184-90.

[188]Prior M (1989), p 208-14.

[189]In 1990/91 BC could show black figures, for the first time since the mid 70s .

[190]Glückauf 7/1992 p 499.

unavoidable process of contraction will only be relatively little delayed. During 1993/94 19 of the 31 mines will close, the fate of the remaining 12 mines is very uncertain, as it depends upon BC's ability to find some markets for this limited, subsidized, amount of coal[191]. Barring the possibility of a revolution, British coal mining will have shrunk from a capacity of 225 mn ton/year to 45-55 mn ton/year in the period between the late 50s and mid/late 90s. Employment will have shrunk from 750.000 men in the 50s to ca 20-25.000.

At least in a strict economic sense this bears evidence of the success of the strategy adopted in 1983-84. Enviseaging the ultimate goal of a depoliticized energy market in the UK, the government entered a strategy of rationalization and exceptional streamlining of the mining industry. Having emerged successful from this battle ("regaining control over the company"), the government continued to alter the structure of the UK energy markets, by severing the ties between the CEGB and the BC. The privatizations of British Petroleum and British Gas were parts of this picture where a closely interconnected, government-controlled, structure was dissolved in a very concious strategy, aimed at the final removal of a corporativist structure that had become politically counterproductive[192] (as events in 1972, 1974 and 1981 had demonstrated).

3.5. Conclusions

The ultimate strategic importance of the ECSC was not to bring down trade barriers to coal between member countries. The dices were heavily loaded against any such development: the Belgians were allowed transformation periods and the French were able to regulate imports through ATIC[193].

Instead, before the arrival of any coherent strategy stressing competition had begun to be seriously implemented, all coal producing member countries lost interest in this, as there was no internationally

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[191]FT 920123-24 p 1 and 4; FT 930327-28 p 9.

[192]On the overall objective of British privatization: Heald D (1988), p 31-48, and Young S (1986), p 235-52. The later article is extemely perceptive in its discussion of the ultimate scope and objectives of a strategy of "privatization".

[193]When conditions were finally liberalized for coal imports from ECSC countries (1961), after intervention from the High Authority, the threat to French coal production was no longer coming from the Ruhr, and ATIC was allowed to continue to control imports from non member countries.

competitive coal industries inside the Community. Hence, ECSC strategy became (at best) neutral, as the High Authority (later the EC Commision), made up of representatives of coal producing nations, and subordinated to the Council of Ministers, turned into a structure for the implementation of national policies. The passing of decision 3/65, which made virtually all subsidies legal, and the approval of schemes of indigenous coal preference in the power industries were important parts of this "nationalization" of the problem[194]. Even the coke subsidy system was part of this process, where the transnational structure turned into a virtual rubber stamp mechanism for national policies.

These were logical developments, given the fact that no coal producer in the ECSC was internationally competitive by 1960. The important thing about the ECSC was, instead, that its extreme flexibility -neutrality- made it possible to minimize the percieved disturbances to member states at the national level. Its existence was never really questioned, and in the end this very existence that made total, *continental,* autarchy impossible. Given the continuing *growth* of strong interests with an overriding interest in cheap energy (e.g. Italy and the Netherlands), it became very problematic to develop a coordinated energy policy at the ECSC level, even though this was the alternative advocated by the representatives of the coal industry[195].

In fact, it would be very myopic to overstate the interest that any country had in expensive energy. The French had found oil in the Sahara, and were very interested in ridding themselves off the dependence on the Ruhr, the Germans were, as well, interested in the competitivity of their *Wirtschaft.* The Belgians, in turn, were offered no choice, when neighboring countries turned to alternative energies. Paradoxically, it might even have been that it was the Luxembourgers, which had no coal of their own, that had the most to gain from coal protection, as it greatly helped the competitive situation of their most important industry.

Hence, the persistence of national strategies aiming at coal protection became a function of the percieved equilibrium between economic costs and political inconveniences. To play this game, structures had to be evolved at the national level. To get on top of the problem, it was necessary for the governments to gain control over the industry. This was

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[194]The transnational organization avoiding to deal with the problem in a Community-wide sense.

[195]See, for just one example, Reintges H (1966), p 1389-95.

done through nationalizations, Directories or the creation of the *Einheitsgesellschaften,* nominally privately owned, but in reality totally dependent and controlled by the state.

In order to control these entities, lines of communication had to be developed, where the governments could discuss overriding strategic considerations with the managements (in reality, it was always the governments that held the final powers over them, through the flow of funds). It was in this connection that plans and "round table" mechanisms were institutionalized.

Last, but certainly not least, sales had to be assured. As the range of potential buyers was narrowing down, it was two sectors that became possible candidates for government induced action: steel and electricity.

Steelmakers, working in internationally competitive markets had to be reimbursed directly through governments. More problematic, they turned out to be to be rather unreliable customers - at first coke rates dropped, then production collapsed. Electric utilities, on the other hand, grew progressively more important to coal producers, as all other markets collapsed. Power producers became the buyers of the last resort, as they seemed to face a growing market even in slackening economic conditions. The risks of the strategy was that the direct (government grants to the power industries), and/or indirect costs (relatively higher electricity prices than necessary) could take off in a spectacular way if international prices started to decline. Besides, it tended to wed electricity supply to a stagnant coal sector, limiting the range of possible strategies open to decision makers at any given point in time.

The strategies of the period 1983-1993 has to be seen in this full structural set-up. Thus, the ultimate goal of the privatization or phaseout of coal production is not only to gain short-term financial advantages. To be fully effective these strategies had, moreover, to address themselves to the structures created up to ca 1980. These structures included, for example, the iron triangles that reserved specific markets to specific fuels, as well as the removal of infrastructural bottlenecks that made imports of steam coal uneconomic or troublesome. The ultimate outcome of reform depended upon the ability to dissolve/reform structures -social, economic, distributive- that had shown themselves to be politically counterproductive, when direct economic and/or political costs had outrun any comparative socioeconomic or electoral advantages.

And, logically, it was in these conditions that the EC Commission could begin to show its teeth, as member countries (not least France, with a nuclear program ambitious enough to supply their neighbors, as well) showed a newborn interest in competition.

4. Steel

4.1. Introduction

In 1950 steel[1] was the most important semi-fabricated product in the industrial world. The importance and interdependence of the steel-coal complex did, as we have seen, contribute in a very significant way to the West European integration movement, through the formation of the ECSC.

With regard to steel, even more than regarding coal, the ECSC was to play a major role in the post-war development of the sector. European coal became an uncompetitive industry in decline as early as by the late 50s. As long as general uncompetitiveness and unintegrated energy markets continued to be the order of the day, the sector could remain a virtual eldorado for interest group action.

Steel was a somewhat different story. The industry expanded rapidly through the 50s and 60s, remaining the presumed backbone of several regional economies right up to the early 80s. Throughout this period technology, raw material sources and industrial policies (pursued both by member states as well as by the ECSC as an entity) were all in turmoil. Our preliminary breakdown of the period discusses these changes in the setting of the presumed long wave.

1. The 50s and early 60s were dominated by a rapidly growing demand for steel, primarily with regard to flat products. The rejuvenation of the industry, following upon the stagnation of the inter-war period, was dominated by the introduction of wide strip mills and the oxygen processes. With the adoption of these new techniques, capacity tended to increase in an unprecedented fashion.

During this same period several new sources of raw materials grew in importance -iron ores from Latin America and Africa; as well as coking coal from the US.

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[1]All figures concerning steel employment (SA fig 7); steel production (SA fig 8), steel investment (SA fig 9), steel productivity (SA fig 11) and iron ore production (SA fig 10) have been placed inthe Statistical Appendix, at the end of the book.

But, due to the extraordinarily strong imperative of demand, these new production functions did not yet spell the death-knell to the older industrial sitings.

2. The period between the mid 60s and the mid 80s was a period of increasing crisis, sometimes bordering upon near societal breakdown. New capacities were coming on stream right up to the mid 70s, while the economy was entering a recessionary path. As steel demand was levelling off and falling during the long downswing, capacity-cutting became imperative.

Rationalization of production and reorganization of the industrial structure gathered pace with the coming of a wave of mergers, after the mid 60s, when the shortcomings of the old industrial structure were becoming increasingly apparent. This made for a rather interesting period during the 70s and early 80s, when reorganization and political interference grew.

Technologically, problems were sharpened by the greatly increased efficiency of electrical arcs, something that was combined to the coming of continuous casting. Scrap based, low cost steel products strengthened the downward momentum experienced by traditional producers. This was a development that was making for an intensification of steel production -requiring less capital, less raw materials, less labor.

So, we are confronted with an industry having to cope with falling demand, as state-of-the-art technology (oxygen steel) was coming on stream, in a situation where another new technology (electric arcs) was becoming feasible. These trends intensified the problems encountered during the early 60s, which confronted the political superstructure with a challenge of veritable proportions.

3. The period after the mid 80s have seen the industry in a new regional, technological and institutional setting. The innovatory trends encountered during periods (1) and (2) have enforced, and are still enforcing, a thoroughgoing restructuring of the industry. The combined effects of rationalization and retrenchement have made the industry more efficient, while changing its its geographic context. These developments have to be seen in direct connection to the decline of West European coal-mining. What is, and has been, reorganized is much of the legacy of industrial traditionalism.

In this new setting traditional patterns are changing, as the industry even seems to be losing some of its inherited nationalism. As industrial flexibility has increased -locational and technological- the need for new structural solutions has escalated. It is this implication of innovation -its ability to upset old structural set-ups, while producing a mounting

pressure for wholly new socioeconomic solutions- that we are primarily trying to explain. As well, it is this pressure that is most likely to meet with organized pressure-group resistance.

4.2. The Big Bang and the roots of inefficiencies. Steel in the fifties and sixties

The presumed importance of steel in the overall development of the economy is the factor that explains the great emphasis given to steel-plant construction, in the West European development plans of the immediate post-war period. Another factor behind this development was the hope of being able to supersede the Ruhr, when German steel production was placed under severe limitations.

We have already seen how the possibility of an imminent German comeback on the industrial stage had been one of the factors behind the formation of the ECSC. In 1950 the salvaging of as much wreckage as possible from the industrial plans of the immediate post-war period had become a matter of (presumed) utmost urgency (table 4.1)[2]. The mid 50s was an uncertain time-horizon, most probably to be dominated by steel over-capacities, when projects were bound to come on stream, at the same time as the Ruhr was reemerging from post-war limitations. There was, moreover, a real fear of possible shortages of energy (e.g. Ruhr coal) in this situation.

The continuing economic boom of the 50s -particularily intensive in steel intensive sectors such as transportation and construction- turned these prophesies on their heads, steel demand growing at unprecedented rates. The growth of demand was coupled to an exceptionally strong technological imperative, which it is necessary to discuss in some detail.

a) Oxygen steel making. Before the replacement of air by oxygen in the converter processes, the making of quality steel (heavy sections, plates etc.), had been undertaken almost singularily in OH furnaces, which had to an increasing extent, come to dominate the industry. The quality problems of the original Bessemer process had placed what would otherways have been an ideal method, due to its short processing time and enormous potential throughput, under severe limitations.

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[2]United Nations (1949), p 72.

Table 4.1. European steel plans 1948–1951. (In million tons.)

Country	Interwar peak	Actual 1947	Planned 1948	Planned 1949	Planned 1950	Planned 1951
Belgium	4,3	2,8	4,3	4,3	4,9	4,9
France	9,7	5,8	10,4	10,9	11,7	12,7
Italy	2,3	1,6	2,5	2,7	2,8	3,0
Luxembourg	2,7	1,8	3,0	3,0	3,0	3,0
Netherlands	0,1	0,2	0,3	0,4	0,5	0,5
Total	19,1	12,2	20,5	21,3	22,9	24,1
Germany+Saar	20,8	3,6	5,7	8,2	10,2	12,7
Total	39,9	15,8	26,2	29,5	33,1	36,8

Source: Adapted from Milward (1984) p 363.

Two innovations were crucial to the overcoming of these problems. Firstly, it was the development of the Linde-Frankl process (1928-29) which made it possible to produce large quantities of oxygen at economical prices. Secondly, it was the application of oxygen to steelmaking through the development of the Basic Oxygen Process (BOP) in Germany and Austria (late 30s-early 50s)[3].

The application of oxygen to steel-making faced producers with a multitude of choices, with implications primarily for the capital-intensity of production. The full range of these production functions are probably best appreciated when seen in the context of the continuing developments of the continuous wide-strip mills and the simultaneous upheaval in the pattern of supply of raw materials.

b) Wide-strip mills, first developed almost simultaneously by two US steel producers (Armco and Norton, patents merged in 1926[4]) were very late in arriving in West Europe, most probably because of the relative underdevelopment of the automotive industry[5]. The next developments of the sheet producing technologies includes electrolytical tinning of tin-plate (US Steel, 1937) and, after the war, the "second generation" of fully continuous strip mills.

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[3]Durrer R/Hellbrügge H/Richter-Brohm H (1965), p 1751-54; Durrer R/Hellbrügge H/Richter-Brohm H (1966), p 980-82; Roth R/Koller H (1966), p 851-52.
[4]Hogan W (1971), p 841-58.
[5]Svennilson I (1954), p 132-33.

The second generation of mills were, essentially, the answer to the continuingly accelerating demand for sheets. Earlier, semi-continuouos mills, were replaced by much bigger and wider mills, capacities rising from 1-1,5 mn t/y to 2,5-3,5 mn t/y[6]. As size increased, so did capital- and energy intensity, a line of evolution that was further strengthened by stepped up demands for quality, leading to additional construction of cold-reduction (CR), (finishing), facilities[7].

Essentially, this development solved the bottle-neck problem of one part of the steel industry. Earlier production of sheets had been small scale, labor-intensive and of uneven quality (hand-sheet mills)[8], and wasteful of a raw material in short supply (tinplate-tin)[9]. In this context the development of new rolling and finishing techniques was a necessary pre-requisite the steel industry's adaptation, in order to cater to the demands from two new and emergent industries -automobiles and food/drinks. The demand structure that had evolved during the early days of the industry, when railways and the construction sector had been most important[10], was rapidly giving way to new leading sectors. In fact, steel's adaptation to this new structure of mass demand is a very impressive and *continuing* phenomenon.

c) The changing structure of supply and demand for raw materials. We have already discussed the changing supply of coke, coking coal and petroleum after 1950. In the context of these developments, and their role for the changing geographic location of the steel industry, we have to consider the changing patterns for the supply of iron ore, as well.

As prices for internally produced coal increased during the 50s (relative to all products) and 60s (relative to petroleum), the importance of coal economy and the *origin* of coal increased disproportionally, especially in countries where internal production of coal continued to be protected.

This put the spotlight on the blast furnaces, where coal consumption in steel-making is concentrated. Increased energy efficiency in these was accomplished in a multitude of ways. Thus, new furnaces grew in size in a spectacular fashion, while also becoming more efficient (high-top pressure increasingly adopted), not least through the elimination of

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[6]Wladika H/Hüsken H-G (1981), p 883-90, Hogan (1971), p 1600-03.
[7]Schmitz H/Hörster W (1981), p 891-93, Hogan (1971), p 1590-91.
[8]Hogan (1971), p 429-30, 839-59, 1148 ff.
[9]Fox W (1974), p 105.
[10]See, for example, Fremdling R (1977), p 583-601; Temin P (1964).

smaller and wasteful furnaces[11]. Similarily, the iron content of the burden was increased, which reduced the size of the burden, thereby decreasing coke demands[12] (through the use of enrichened ores and/or more high grade ores). Making matter worse, oil was replacing coke to an important extent[13].

All these factors made for increased scale and a changed pattern of raw material supply.

West European ores (excepting the Lappish) were of low grade. Hence, they came under severe pressure to be replaced by imported high-grade ores, which led to a "Drang nach der Küste".

That we are dealing with a very intertwened development here is rather evident, as the insufficiency of coal supplies places an increased importance upon the insufficiency of ore supplies. Several innovations were undermining the old structure: new sources of raw materials[14], and the new developments in the ship-building industry (the construction of specialized tankers), that made the falling freigth rates possible[15].

It is the totality of these trends that needs to be underlined, when we return to the discussion of oxygen steel making, because the emerging features of the strip mills and the changing supply of raw materials were all part of the very same innovative complex. When investment decisions were to be taken, it was these factors which all made for increased scale (throughput), capital intensity and locational change, that had to be taken into account[16].

By the mid-60s, it was possible to produce 250 or 300 tons of steel per converter in some 40-45 minutes, if the new oxygen steel technology was fully utilized. This new technological possibility created a picture where new capacities could develop in line with the other (related) innovative

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[11]See, for example, Heal D W (1974), p 86-88 and Winzer G/Reichenstein E (1981), p 835-39; Peters K-H/Gerstenberg B (1986), p 946-52; Hogan (1971), p 1514-16.

[12]See, for example, Wübbenhorst H (1958), p 777-84.

[13]Replacing coke as the source of supply of heat in the furnaces, reducing the role of coke to its critical needs. See Heischkeil W (1971), p 250-56 and Glatzel G (1981), p 810-11. For an overview of blast furnace development during the last centuries, see Kreutzer H/Lüngen H/Meissner F (1986), p 933-45.

[14]Stroux W (1969), p 1414-21; Kaup K (1971), p 1428-37; Glatzel G (1981), p 807-17.

[15]Stroux W (1969), p 1417-18; Kaup K (1971), p 1433-34; Harders F (1971) p 242-44; Schenk H (1967), p 348-49.

[16]For some very enlightening examples: Meinshausen G (1970), p 153-160; Harders F (1971), p 241-49; van der Rijst A (1970), p 493-99; Mieth W-H/ Schenk H (1970), p 499-507. For a related discussion, see Plumpe G (1981), p 180-90.

trends. These new capacities were deemed necessary, in order to satisfy an ever-booming demand from new and buoyant markets.

The ideal size of steel plants had been 0,8-1,2 mn t/y during the early 50s[17]. By the early 60s optimal size had increased to 2,5 mn t/y[18]; by the mid 60s this scale had reached 5 mn t/y[19]. Crowning these trends, ideal size had reached 10-15 mn t/y by the early 70s[20]. On the other hand, the application of oxygen to the traditional OH furnaces increased the efficiency of existing facilities. The development of new capacities was taking place against a background of a still existing tail of less efficient facilities.

The relative merits of partial modernization and adaptation as compared to green-field construction should be borne in mind, as well. New facilities were much more effective in terms of energy, ores and labor demands, but they were extremely capital consuming as well. In times of slackening markets, the built-in inflexibility of costs that this implied made the new industrial structure vulnerable to competition from alternative suppliers, which were able to produce at other cost functions (i.e. with lower capital costs).

As tails of unrationalized plants developed, another source of vulnerability emerged. The full effects of the new technologies were not utilized, as relative overmanning continued within unrationalized firms. The possibility of developing the worst of two worlds is evident in this pattern.

4.3. The different strategies behind change

4.3.1. Steel in France in the period 1950-75

The French steel industry was, after the arrival of the Monnet plan, a remarkable picture of an anachronistic firm structure, on its way towards adapting to an innovative complex. The process of innovation and adaptation was to change the structure beyond recognition.

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[17]Burn D (1961 b), p 270-81.
[18]Michel A (1963), p 10-17.
[19]Schenk H (1967), p 341-52, esp. p 351-52.
[20]Trenkler H (1972), p 709-16; Schenk H (1968), p 1393-1400.

The firm structure was the result of developments in the period 1870-1920, when the Thomas process had arrived, which revealed the possibilities offered by the area's highly basic ores. As these had a low iron content (ca 30%), the alternative of moving them to existing steel making centers was inferior to the alternative of processing them, at least into pig iron, within the area[21].

So, during the last decades of the 19th century and the early decades of the 20th, a large number of existing German and Belgian firms (most of the area was under German administration after 1871) established blast furnaces and/or converters in the area, moving coking coal into Lorraine and semi-finished steel to rolling mills in the Ruhr or Saar/Vallonia.

The Saar firms -which were facing problems with its ores as well with regard to their supplies of coking coal[22]- moved in early, during the 1870s and 80s. Dillingen established blast furnaces in Hussigny and Rodange, Neunkirchen at Uckange, Röchling at Thionville. St Ingbert merged with firms in the Luxembourg area of the iron field (Rumelange and Differdange), creating HADIR[23], an important part of Stinnes Deutsch-Lux concern. Burbach, in turn, merged with other Belgian[24] controlled Luxembourg firms in Esch and Dudelange, creating ARBED[25].

Further important Belgian interests were the Ougree group that developed the Rodange works (in Luxembourg), just next door to Cockerill's Athus works[26]. Le Providence expanded into Rehon (Longwy, France)[27].

The big Ruhr firms were responding to the possibilities, as well. Thyssen built at Hagondage and in Caen (Normandy), Karl Später led in the creation of Rombas. Gelsenkirchen Bergwerks Verein expanded into Luxembourg and Klöckner into Knutange[28].

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[21]Pounds N (1968), p 110-11; Fritz M (1967), p 15; Burn D (1961 a), p 156-57, 222-23.

[22]Lenartz A (1981), p 827-31; Pounds N/Parker W (1962), p 201-02.

[23]Haut Fourneaux et Acieres de Differdange-St. Ingbert-Rumelange.

[24]Controlled by SG (Societe Generale).

[25]Acieres Reunies de Burbach-Eich-Dudelange. See Pounds N/Parker W (1962), p 201; Wille G (1986), p 979-80 (on the early development of the firm).

[26]Located in the small Belgian part of the iron field.

[27]Parker/Pounds (1962), p 193, 197-203; Hellwig F (1951), p 322, 324, 326.

[28]Burns D (1961 a), p 228, 409-13, 423 f.

After the first world war these German interests were taken over by the existing French steel producers, and in a series of moves this allowed the French and Belgian firms to gain control over their former rivals.

Schneider[29] gained control of Mondeville, as well as sharing control of Knutange with De Wendel and Pont a Mousson. Moreover, Pont a Mousson, Marine St Etienne, SG (Bel.), and Launoit (Bel), got control of HADIR, while ARBED came under the control of SG and Schneider. Finally, Pont a Mousson and Marine got control of Dillingen Hüttenwerk and Rombas[30]. UCPMI[31], which got Hagondage, was created out of steel consumers (most notably Renault). This process, termed "the richest pillage ever heard of" by a French parliamentary investigative committe, was followed by the partial modernization of facilities, when converters and rolling mills were constructed, in order to integrate the sites[32].

These developments are important, because they provide part of the explanation for the developments of the 1960s and 70s, when French, Belgian and Luxembourgian interests had to be disentangled from each other in order to rationalize the industry.

After the second world war, on the other hand, it was on this tradition of joint ventures and intra-firm cooperation, that the crucial two wide strip mills of the Monnet plan was constructed. The producers in Lorraine had, at first, been rather reluctant to undertake the project. Instead, Monnet turned to the (in the 50s) much less important producers of the *Nord* to implement his plans[33]. As these (Denain-Anzin and Forges

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[29]French, despite the name.

[30]Hellwig F (1951), p 323-25. Hellwig's study of the organization of French, Belgian and Luxembourg steel on the eve of the ECSC is interesting. A special point in it -the conception that "die luxemburgischen Montanunternehmungen das eigentliche Bindeglied in der französisch-luxemburgisch-belgisch-saarländischen Unternehmungsverflechtung waren..." is especially worth noticing. The role of ARBED was again to become critical during the late 70s and 80s, when it was deeply involved in the restructuring of Charleroi-Liege-Luxembourg, as well as leading the efforts to restructure the Saar, while simultaneously having been among the pioneers in the move towards the coast (Ghent). Somewhat later ARBED reknit their close relationsship with Lorraine (creating the joint ventures Europrofil and LME); while simultaneously being the company that was to fight hardest for the continuation of the EC coking coal subsidy scheme (being the owner of German coal mines in Aachen); after 1994 its ore mines will be the last producing units in France. To no small extent ARBED is the microcosm of West European steel - a glue between the present and tradition.

[31]Union des Consommateurs de Produits Metallurgiques et Industriels.

[32]Burn D (1961 a), p 423-26.

[33]Ehrmann H (1957), p 287-88.

de Nord-Est) joined to create USINOR[34], constructing a wide strip mill in Denain, the Lorraine producers had to jump the bandwagon, in order not to get bypassed by the state funds, and by their northern counterparts.

The Lorraine producers created Sollac in order to construct the wide strip mill on a joint venture basis between De Wendel (60%), Sidelor (17%) and Dillingerhütte (23%). Sidelor was itself, like Dillingerhütte, a company jointly owned by Pont a Mousson and Marine[35]. The wide strip mill was constructed at Seramange, adjacent to Wendel's existing steelworks at Hayange.

As these plants became fully operational (1952-54) the market situation was extraordinarily buoyant, demand for sheets from the emerging mass-consumption markets expanding in an unprecedented way. With production booming[36] (figure 5.3, SA fig 8), plans for a much larger mill soon materialized.

Concieved as far back as in 1956, the final ministerial OK to the Dunkirk plant materialized in 1959. The plant was operational by 1963-64, and was doubled in size in the early 70s (to 8 mn t/y). The plant was, of course, ideally located for the processing of foreign raw materials.

One rather significant detail should be recognized in this context, though. None of the French or Belgian (Dunkirk, Fos, Ghent) coastal plants that was constructed during the 60s and 70s produced any long products. It was implicit in this pattern of development that the "traditional" areas (Lorraine, Vallonia) should be allowed to modernize and specialize on this market segment.

Meanwhile, in Lorraine, the traditional steel producers were fully aware of the implications of these new innovative developments, and plans for expansion were running into high gear. These plans materialized despite the fact that the area was suffering from the existing innovative trends. It was not only that the comparative advantage of

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[34]Union Siderurgique du Nord et de l'Est de la France. USINOR was formed as a joint venture, but the mother companies became holding companies when they merged all their steel interests into USINOR in order to construct the Dunkirk plant. In this phase two smaller companies that operated in the Nord, cooperated as well; see Lister L (1960), p 134.

[35]As we have already seen the two companies had had common interests in Dillingerhütte and HADIR since the breakup of the German concerns. Having cooperated in these joint ventures since the 20s, the joint venture was again chosen to cooperate in a joint venture. See Burns D (1961 b), p 390-96.

[36]All figures on raw steeel production, employment and productivity are available in the Statistical Appendix.

Lorraine (the minette) was becoming a disadvantage, when Brazilian ores declined in price. Moreover, the comparatively high coke rates, which were the result of the use of the low-yielding minette, made the area highly sensitive to the negative price trends for West European coal. This was hitting a district that had always been very dependent upon outside markets, due to the lack of consuming industries within the area[37].

Although state involvement was normal to the French steel producers[38], this critical situation made state intervention pivotal, in order to finance the modernization of Lorraine. Thus, in order to carry out their modernization and rationalization plans, the traditional producers were planning for the the construction of a modern, 2,5 mn t/y, LD-AC[39] plant at Gandrange (a scale large enough to be able to provide the participating firms with steel as well as rolling facilities)[40].

Indeed, Gandrange was to be the archetypal adaptive investment project in the minette region. The basic problem behind its construction is easily understood -increasingly pressed by the arrival of oxygen steel making, the old Bessemer-based producers had to meet this challenge. The LD-AC

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[37]In contrast to the situation in the Ruhr. See, for example, Thompson I (1970), p 248-52.

[38]Investment was provided through group financing, individual firms investment plans being brought forward to the trade association (Chambre Syndicale de la Siderurgie Francaise-CSSF), and to the collective lending agency, the GIS (Groupement de l'Industrie Siderurgie), which, in turn, raised capital through the state controlled banks. The final decision on plans was then made between the CSSF- GIS (it was in this position; in charge of the trade association, thus in direct contact with the relevant politicians; that Jacques Ferry, the mastermind behind French steel during the 60s and 70s, made his carrer), and the Ministry of Finance and the Steel Directorate of the Ministry of Industry:

"This pyramiding of authorizations to borrow money opened the way for negotiations at each level - between company and industry association, association and directorate, and directorate and the Ministry of Finance. As a rule, the association dealt directly with the Ministry of Finance on financial issues, while following the full chain of command on broader economic problems, such as where and how the industry might develop new productive capacity."

Mc Arthur J /Scott B (1969), p 200 (citation), see p 197-202 for details; and Hayward J (1987), p 504-07.

On Ferry, see below note 20, sect 5.

[39]The original LD process required hematite ores. The LD-AC was developed during the late 50s/early 60s, in order to make the oxygen process available to the producers utilizing basic ores.

[40]There is a detailed lay-out of the original Gandrange concept available in MBM 9/1972 (a), p 9-10.

process provided the tools for this counterreaction, but for the strategy to be successful, the problem of coking coal prices had to be overcome, as well. The simultaneous arrival of new construction of inland LD-AC converters and the ECSC coke-subsidy scheme should be viewed in this context: they were part and parcel of an adaptation to possibilities offered by new innovations. In the medium- and long-run, though, it was to become apparent that the reconstruction of these areas was going to proceed on completely different lines (electric steelmaking).

It is this pattern of reconstruction that explains the "failure" (or even "madness") of the strategies pursued in the minette region (Lorraine, Saar, Luxembourg and Vallonia) between the mid 60s and late 70s. The visible side of change was oxygen steel making, coastal construction and problematic coke costs; hence, the obvious solution to the problem was to adapt -LD-AC and coke subsidies. *It was in areas where Bessemer converters had never been seen -Lombardy, Baden etc.- that the revolutionary mini-mills started a "mushrooming growth" in exactly this period.*

The Gandrange plant had, originally, been concieved as a joint venture (SACILOR[41]), between De Wendel and Sidelor[42], but with the firms in a precarious financial position; that is, in a critical need of state funding[43], the government was able to press for a more radical solution to the problem. On government insistence a thorough reorganization of the Lorraine industry was carried out, where the traditional steelproducers were fully consolidated.

SMS[44] was absorbed by Sidelor[45], whereafter the steel-making facilities of the two groups (including Sollac) were merged into De Wendel-

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[41]Soc. Acieres et Laminoirs de Lorraine.

[42]Again a joint venture in a joint venture, thus avoiding the complete merger of facilities, and being able to keep the separate identities of the companies.

[43]Mc Arthur J /Scott B (1969), p 370-72.

[44]Societe de Mosellane de Siderurgie -itself the outcome of a 1964 merger between Knutangen (Schneider), and UCPMI (Renault). It was in a disastrous financial position by 1966, a situation that was, of course, directly problematic to the government, as Renault had been nationalized in 1945. MB 630712 p 18; MB 631018 p 19; 631022 p 15.

[45]So that Sidelor and de Wendel should be equal partners in SACILOR. The 50-50 formula for the holding companies had been a major stumbling block on the road to the fusion. De Wendel as well as Pont a Mousson (the most important partner in Sidelor), were both insisting on 60-40. For details on the developments in Lorraine during 1964-67, Mc Arthur J /Scott B (1969), p 370-72; 431-34; and MB 640204 p 13; MB 650709 p

Sidelor (renamed SACILOR in 1973). De Wendel and Sidelor were turned into holding companies[46]. On the road to the merger another significant development had taken place. In order to raise cash, Pont a Mousson had sold off its holding in HADIR to ARBED. Luxembourg steelmaking was thereby consolidated into the converters of ARBED[47].

Lorraine-Escaut, a Longwy based plate and tube-making steel producer, was absorbed by USINOR during the same wave of mergers. This move was made in direct anticipation of the forthcoming expansion of both steel and rolling mill (plate) capacity at Dunkirk, in order to avoid duplication of investment, at Longwy and Dunkirk[48].

These early events, taking place within a very fragmented industrial structure, are rather fundamental, in order to grasp the evolution of policies during the period 1964-83:

First of all a situation emerged where different steel interests approached the state with demands for help in a, fundamentally, uncoordinated fashion. Secondly, the government, confronted with a situation outside of its regular agenda[49], had to formulate a strategy to deal with the situation, preferably in consistence with its overall policies. Thirdly, a negotiating process got under way, where the government, (ultimately) held all the strong cards, thus overcoming what remained of vested interests. In the next stage, what was deemed to be coherent policies was implemented[50].

15-17; MB 660125 p 13; MB 660218 p 15; MB 660802 p 8; MB 671215 p 17; MB 680102 p 11.

[46]Excepting SIDELOR's German daughter, Dillingerhütte.

[47]MB 651226 p 17.

[48]MB 660218 p 15.

[49]In the case of France: outside of the regular planning mechanism (see Mac Arthur/Scott (1969), note 38 sect 4 for a thorough discussion).

[50]Michel Bosquet's critical opinions on the deal were cited in Mc Arthur/Scott, these views should be compared to the criticism levelled towards the floating of the RAG (see sect 3.3.2.2., esp. note 83, sect 3): "What does the state ask in return ? A shareholding in the firm thus aided and subsidized? No... All that the state asks of the steel bosses is that they do their duty as employers. It pays them for that... It asks them to please modernize their factories; to please shut down obsolete enterprises; to please cooperate to construct installations of optimal size... Briefly it asks them to concentrate, cooperate and cartellize. It is precisely that which the heads of the ironworks... had decided to do fifteen months ago on condition that the state, that is, the public), would advance them some money. They had reached the decision because... they took the nationalization of their industry to be inevitable, and because to make it healthy (with state funds), was for them the best way to extract, when the day came, the highest price from that very same state..."

Fourthly: this expanding governmental interference would, sooner or later, require the evolution of new structural solutions. All over Western Europe (as we are to see) governments were increasing their role in the steel industry by the mid 60s, and at some point in time they would all have to accept the responsibilities that this implied. Increasingly becoming the purse of the industry, governments would, ultimately, have to formalize this relationship through de-facto nationalizations and by regularizing instruments aiming at direct intervention, (as acute needs arose for governments to be directly involved in the formulation and implementation of strategy). On the other hand, what was still happening in the mid 60s, was that centers independent from the governments[51], were able to pursue different strategies, *i.e. plans for expansion was undertaken by several different decisionmaking centers.*

In the instance of the 1964-67 problems of Lorraine, the strategy chosen by the French government was, apparently, one of effectivization. Modernizing the steel industry was in consonance with overall economic policies, which were heavily bent upon the goal of getting French industry competitive within the evolving EEC[52].

It was in the pursuit of this goal that the government stuck to its line, demanding amalgamation in exchange for state guaranteed funds. As the firms were unable to finance the investments themselves, this was something that had to be accepted in order to attain the desired construction. Declining competitiveness and eventual bankrupcy seemed to be the alternative. In the face of increased dependence upon the ministry of finance, the price of "real" amalgamation had to be paid.

In return, the state was to provide more than a quarter of the total financial needs of the industry during the period 1966-70[53] at subsidized interest rates, as well as taking measures to reduce the costs of coking coal to the Lorraine industry[54].

The strategy for these "spearhead industries" was clearly concieved. USINOR's Dunkirk plant was to be expanded to the neighborhood of 10 mn t/y. The Lorraine interests (De Wendel-Sidelor) were to be

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Bosquet M "Un Cadeau pour les Maitres de Forges", p 10, cited in Mc Arthur J /Scott B (1969), p 375.

[51]In a wide sense. In France the firms and -especially- the CSSF and the GIS remained important in strategy formulation.

[52]Mc Arthur J /Scott B (1969), p 52-55, 372-76.

[53]The needs were estimated at 10 bn FRF.

[54]On the imminence of the problem, see MB 650709 p 15-17.

concentrated to the development of Gandrange (long products) and Seramange-Hayange (flat). In addition De Wendel-Sidelor was to undertake major new investment at Fos (outside Marseilles) where a new steelplant, aiming at the south European market for flat products, was to be constructed[55].

The first stage of Fos -its construction was halted by the mid 70s, at a capacity of 4 mn t/y, although it had been concieved for much larger tonnages- got under way in 1969-70. The project, running into cost overdrafts as from the very beginning[56], was soon to become a financial millstone around the neck of De Wendel-Sidelor, as well as USINOR. The original state loan obtained by De Wendel-Sidelor (1850 mn FRF) had been consumed when the cash-flow of the Lorraine-based steelmaker dried up in the downswing of 1971[57]. As the project ran into a major crise before having really left the ground, the government had to persuade the potentially more profitable USINOR to enter Fos as a 50-50 partner, in the autumn of 1972[58].

So, in the early 70s French steel was undertaking several major investment projects (SA fig 9). What was in full swing was, of course, a process of adaptation, as the possibilities of the new innovations that had been introduced in the 1930s and 50s were exploited at more and more facilities.

This French pattern was in no way unique, as we are to uncover when we discuss its partner countries in the ECSC. On the contrary, we have to recognize the basic features of the French case, in order to fully comprehend the nature of the ensuing crisis (1973/4-1983/4). Summarily, an interrelated set of steel industry innovations -the wide strip mill,

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[55]A plant in the south had been discussed in the professional planning circles since the early 60s, and with the strengthening of steel demand in 1968, its location was finally decided. When the political decision to build thus was taken, the existence of the new De Wendel-Sidelor group meant that the government had a natural partner with which to discuss the financing of investments. Hayward J (1987), p 508-09; MB 630607 p 31; MB 630205 p 10: MB 631018 p 19

[56]MB 711029 p 33.

[57]MB 720303 p 28; MB 711102 p 26; MB 720317 p 29.

[58]USINOR was at this point in the process of enlarging its Dunkirk facilities, thus accumulating investment costs of its own. It was persuaded to join by the use of a huge new government loan, raising the state's stake to 3500 mn FRF. MB 721201 p 29. (Fos had been organized as a wholly owned daughter (SOLMER), of De Wendel-SIDELOR's. It was this daughter that USINOR entered as a 50-50 partner). See, as well, Lentes F et al (1972), p 368-71.

coastal locations, somewhat later oxygen steel making- had become central to Western European development plans as early as during the late 1940s[59]. As the imperative of demand grew during the 50s, these first plans had barely got on stream before new, even more radical, concepts were developed (in France: Dunkirk). As this second generation of plans matured by the mid 60s, the rationalization phase of the cycle was approaching. The traditional locations of industry were getting squeezed by increased competition[60], and by the revocation of their comparative advantages. Indigenous ores and coking coals were becoming burdens, when their costs increased relative to imported ones.

The situation was even worse than it seemed. The old producers of long products, already in a vulnerable position, were soon to be confronted with a formidable new competitor: the electrical steelmakers, whose production functions had passed through a metamorphosis with the advent of ultra-high power furnaces, continuous casting and the stabilization of scrap prices after 1958 (see sections 4.4.1-4.4.3, below).

4.3.2. Steel in Belgium-Luxembourg in the period 1950-75

4.3.2.1. Belgium

The Belgian steel industry of the 50s was concentrated to two basins in Vallonia, both of which had roots in the coal-based industrialism of the earlier parts of the 19th century.

The firms located to the vicinity of Liege were Cockerill, Ougree and Esperance. These located to the vicinity of Charleroi were Sambre et Moselle, Forges de Thy Marcinelle, Acieres et Minieres de la Sambre, Hainaut, Forges de Ruau, Boel and Forges de la Providence. Several of them (Cockerill, Providence, Ougree) had plants outside the area, a locational shift undertaken in the late 19th century, when the possibilities opened by the Lorraine-Luxembourg ores were exploited (sect. 4.3.1).

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[59]They had, in fact, been evident to decision makers in the 1930s as we shall see, when discussing the cases of the Netherlands and Italy.

[60]Even though Belgian and French coastal steelplants didn't produce any long products, this wasn't true for other nation's modern plants. That is: Even though home markets -and the ECSC market- were relatively protected, export markets were becoming progressively harder to defend, (sect 4.4.4).

In the Liege basin there was an initial merger in 1955, between Cockerill and Ougree. As the firms had adjoining facilities at Seraing (Ougree had a new wide strip mill, the first one in Belgium), the possibility of rationalizing investment in steel-making facilities, was clearly at hand[61].

Esperance-Longdoz, ARBED and Cockerill were next to commission wide strip mills in the early 60s. Cockerill and the Luxembourg based firm ARBED[62] went to the coast, jointly commissioning construction (the new firm being named SIDMAR[63]) at a greenfield site on the Ghent Ship Canal. Esperance-Longdoz started construction at its facilities at Chertal, outside Liege[64].

The reconstruction of the Belgian steel industry during this early period (before ca 1965) was, naturally, aided by the state. The dismal state of the country's coal industry, the percieved challenges of the membership in the EEC and the general need for a rehalibitation of the industrial structure, had prompted the passage of several investment laws after 1959. Through the use of these, the state could provide very substantial incentives to industrial reconstruction[65].

But, although aid was widespread, it still wasn't coordinated. The stage of preparatory coordination was reached by 1966. This must, in itself, be seen as a reflection of the worsened economic conditions that was apparent in a pronounced form in the downswing of 1966-67. A law providing for "exceptional assistance", mainly aiming at accelerated redevelopment in the run-down mining areas of Vallonia, was passed in the summer of 1966. By November the first "round table" talks between government, steel industrialists and unions were under way[66].

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[61]Burn (1961 b), p 450-51, MB 550218, p 23.

[62]SG controlled both groups (Cockerill-Ougree together with Launoit). Arbed was the majority holders (putting up 2 bn BEF, as compared to Cockerills 1 bn).

[63]Siderurgie Maritime SA. In Flemish: Maritieme Staalnijverheid NV.

[64]MB 680119 p 15. On Ghent, see MBM 7/1976 (d), p 14-17; on Esperance-Longdoz see note 70, sect 4.

[65]Interest rate reductions, employment subsidies, tax concessions, freight reductions for imported ores, canal infrastructure etc. Boddewyn J J (1975) p 48, Capron M (1987), p 702. See, as well, Katzenstein P (1985) p 68.

[66]A report by the Belgian Kredietbank (from January 1968), was cited in Metal Bulletin 680119:

"The financing charge of such investments /Oxygen process, Chertal, Sidmar/ had to be borne by the enterprises at a time when steel prices underwent a sharp fall at world level... with the result that they were severely effected in their earning capacity. This

The "round table", which was permanented with the inaugeration of the CCPS[67] aimed at the regrouping and rationalization of facilities. The CCPS became, thereafter, an instrument for communication between the firms and the state, its approval being necessary in order to get state funding for new investment[68].

Obviously, there was room for rationalization and mergers in Vallonia in 1966. The coming of oxygen steel made reconversion of existing plant necessary, at much higher tonnage levels than earlier (sect 4.2). The movement had started when Cockerill-Ougree had merged with Providence in June 1966[69], thereafter the coming of the CCPS speeded up the process, which continued with the autumn 1966 merger between Acieres et Minieres de la Sambre and the Forges de Thy Marcinelle, creating Thy Marcinelle Monceau (TMM).

Finally, in 1969-70, a logical merger followed, as Cockerill absorbed Esperance-Longdoz. The later firm was experiencing severe problems, due to the financial burdens incurred when Chertal was constructed. Closely following upon this move, Cockerill obtained control of additional finishing facilities, as the Phenix Works (galvanizing) was aquired[70]. The amalgamation, although certainly not the rationalization of existing facilities, of the firms in the Liege basin was thus complete, as Cockerill now had control of two medium-sized wide strip mills. Outside Liege, the firm owned steel plants in Charleroi, Athus, Rodange (Lux), Rehon and Hautmont (Fra). Moreover, it owned a third of SIDMAR.

The Charleroi basin presented an, essentially, depressing picture in the early 70s. TMM had converters at Marcinelle (Thomas) and Monceau, while Hainaut-Sambre had converters at Montignies and Chateaulineau.

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crisis... therefore led directly to an acceleration of the reforms in the organization of the Belgian steel sector which had been awaited for so long."

[67]Comite de Concertation de la Politique Siderurgie

[68]Hence a similar function as the French trade association had. See note 38, sect 4.

[69]This merger was, in fact, somewhat of a freak. Providence was located in the Charleroi basin and Cockerill in the Liege; the rationale behind it was that it collected SG's steel interests into one company; MB 660628 p 11.

[70]The CCPS was closely involved in these mergers; initiating and providing finance -in the case of Phenix preventing the Dutch firm Hoogovens from obtaining control. Keeping it in Belgian hands was said to be "in the national interest". Capron (1987), p 703-04.

On the developments in the Charleroi basin during the 60s and early 70s, there is an extraordianrily concise account in MBM 7/1976 (a), p 9-11; in which mergers, as well as plant construction are clearly outlined.

Right in the middle of this lay Cockerill's plant at Marchienne. All three firms had rolling programs heavily weighted towards long products, especially rebar and merchant bar. These were, of course, exactly the products that were coming under increasing pressure from the mini-mills in this period[71]. Three of these companies came under the control of one owner between 1973-76, as a holding company controlled by the industrialist A Frere[72] gained control over TMM, Hainaut-Sambre, and the important re-roller Ruau.

Frere's overall concept was to restructure the product mix of the basin, by modernizing its productive facilities. The most important objective of this plan was to construct a wide strip mill (Carlam) in the Charleroi basin, as well. The financing of this investment would, naturally, have to come from the state[73].

It is easy to see why choices had to be made in Belgian steel after 1976. Capacities were increasing everywhere, despite the general slackening of demand (figures 4.4, 5.4, SA fig 8), hence, production programs would certainly have to be radically rationalized. There was obviously a need for some kind of stronger coordinating mechanism in this process, as the CCPS had evolved into a rubber-stamp mechanism for the enlargement of the existing favcilities, with the use of state funds.

4.3.2.2. Luxembourg

Developments in Luxembourg up to ca 1975 are closely related to the Belgian picture. Perhaps surprisingly, they are less traumatic and more coherent, despite the obvious similarities between Luxembourg and Vallonia.

Investment in Luxembourg[74] was, generally, much more conservative than the patterns evident in Vallonia and Lorraine. Capacity expanded as LD-AC converters were installed, but there was no greenfield

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[71]For a detailed description of firm structure in the Charleroi basin, see MB 751007, p 38 (see, as well, MB 720620 p 28, on the problem of outside competition); and MBM 7/1976 (c), p 11-14.

[72]Cobepa, a financial holding company,which had sold Esperance to Cockerill some years earlier, provided financial assistance for these moves. Capron (1987), p 695, 696; MBM 7/1976 (c), p 12-13.

[73]See MB 751121 p 42; MB 760427 p 38; MBM 7/1981, p 51-55.

[74]Historical background, see sect 4.3.1.

developments. The one strip mill installed (in the 50s) was a small Steckel mill (in Dudelange). (figures 4.4, 5.5, SA fig 9).

ARBED's interest for greenfield development was, instead, turned towards Belgium, and, later, when Röchling had been absorbed (sect 4.3.4.1), towards Saar. On the other hand there existed a considerable scope for rationalization, as well. The HADIR deal (sect 4.3.1), had multiplied the number of ARBED's production facilities. This implied that rationalization of facilities, together with general problems of the Lorraine ore dependence, high coke rates and new, emerging, competition in the market for light sections, all were problems that would all have to be dealt with, if markets were to suffer any major downturn(s)[75].

4.3.3. Conventional Steel in Italy in the period 1950-75

The state had taken over the greatest part of the Italian steel industry during the crisis of the 30s, as the general effects of the depression was compounded by a policy of deflationary autarkism[76]. The policy led to the bankrupcy of much of Italian industry, and it was in this situation that the state started to intervene in private business in a serious way, and IRI[77] was instituted to collect the state's interest in ailing industrial firms. Then, as more and more firms collapsed, IRI had to systematize this growing and heterogenous portfolio of bankrupt companies. For the metallurgical sector this led to the creation of Finsider (1937) where the steelworks of Ilva[78] (Bagnoli, Piombino, Savona, Terni), Dalmine and the Acciarie de Cornigliano were amalgamated.

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[75]Messerlin P/Saunders S C (1983), p 72-74.

[76]A remarkable policy, where the goal of defending the lira ("to my last drop of blood", Mussolini, 1926), led to a situation of deflation, exchange controls, tariffs and clearing arrangements.

[77]Istituto per la Ricostruzione Industriale.

[78]Ilva had, in the period from 1905-31, amalgamated the conventional half of Italian steel production - that is the half that operated on Elba ores (Ilva means Elba in Italian), and imported coking coal. The early works that developed on this basis was Piombino and Bagnoli. The Breda concern had developed the inland works at Terni and had later taken over Savona.

It had been the construction of Bagnoli (1905) that led to the concentration movement among these producers, as the Consorzio Ilva was able to merge operations at Bagnoli, Savona and Piombino in 1911 and 1918. The tubemaking firm Dalmine had been established by Mannesmann before the first world war, then taken over by Italian

As Finsider was created in an ad-hoc manner, there emerged possibilities for new strategies. The Sinigaglia plan that was implemented in 1948-52 had, in fact, been drawn up in the late 30s. Oscar Sinigaglia had become the head of IRI's steel interests in 1933. In this position (becoming the first president of Finsider in 1937) he had drawn up the plans for a large shore-based steel-plant at Cornigliano (Genoa) by 1936. The construction of the plant was interrupted by the war[79], but after 1945 the thinking of Sinigaglia was again to become central, when strategies for the modernization of Italy were to be implemented:

> "Sinigaglia's plans for post-war reconstruction were avant-garde not only in the terms of steel making. Along with a small group of strategically placed and highly influential industrialists (including Vittorio Valleta of Fiat and Angelo Costa, the Chairman after 1945 of Confindustria...), Sinigaglia led an assault on the prevailing view that Italian industrial development should follow the Swiss model of production based on an organised, and protected, artisan class. For the new generation of Italian industrialists, in contrast, not only should Italian industry undergo extensive rationalisation and modernisation, but it should eventually be exposed to... international competition... For Sinigaglia, a large scale steel industry was vital for providing the foundation and infrastructure of a modern economy..."[80].

Important here are the similarities in outlook that we are confronted with, when we place these ideas beside the conceptions inherent in the French Monnet plan, that was a child of the same period. We are watching the state taking the strategic lead in the steel industry, in fundamental consonance with the interests of private capital. In France this was done through the existing steel firms in Lorraine and in the

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interests after the war. It was in the bankrupcy of these separate interests that created the conditions where a big state holding with interests in Bagnoli (Naples), Piombino, Terni, Triest, San Giovanni and Milan could emerge. Clough S (1964), p 81-89.

[79]What had been constructed was dismantled by the Germans after they had occupied Italy in 1943, and shipped off to Germany. After the war the concept was that Bagnoli shold be reconstructed, Piombino was to continue to operate on Elba ores, and Cornigliano was to operate on entirely imported raw materials. See Wormald A (1972), p 94 ff; and, for an overview of Italian steel in the 50s (layout, raw material economy etc), see Unnamed Author (1959 a), p 1228-30. (The poetry in this paper is worth citing: "Das unmittelbar am Mittelmeer gelegene Werk Cornigliano wird von Sachkenner der internationalen Eisen- und stahlindustrie als eines der schönsten Stahlwerke der welt bezeichnet..." (p 1229)). See, as well, Burn D (1961 b), p 460.

[80]Eisenhammer J /Rhodes M (1987), p 421. See, as well, Martinelli A (1979), p 67-87.

Nord, in Italy the existing situation -arrived at in an ad-hoc manner- made for large scale state involvement.

Then, as IRI and Finsider evolved, and the huge possibilities to exploit the existing innovative imperative were fully revealed, the potential advantages (regional patronage, creation of fiefs, *lottazione*) inherent in this pattern were exploited by a rapidly growing number of different political and economic decision makers. The decisions of 1951[81], 1956 (below), and 1962/63[82], created sprawling and ever-expanding institutions out of IRI, ENI and ENEL[83]. Indeed, by the early 70s the state holdings dominated Italian economic and political life to an incomparable (in a West European sense) extent.

In the case of steel this pattern of evolution is very evident. The Sinigaglia plan had created a modern plant at Cornigliano, based on the flat product concept, (plate mill in direct conjunction to the shipbuilding industry in Genoa, then, in rapid succession, the construction of a wide strip mill). The plants at Piombino and Bagnoli specialized on long products, and as Cornigliano came on stream, the massive demand from the expanding sheet-consuming industries made immediate enlargement necessary, while also creating the foundation for new capacity construction. By 1956 plans emerged from private industrialists for a new wide-strip mill, to be located somewhere in Liguria. The interests of the Christian Democrats, on the other hand, had turned toward the south, their foremost source of electoral strength[84].

The Vanoni plan of 1956 served, if nothing else, as a framework for the channelling of funds into the south of the country through the utilization of the Cassa per il Mezzogiornio (set up in 1950). Hence, it was in the general context of an accelerated political-economic emphasis on the south, that IRI started expanding into this part of the country. The

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[81]Bianchi (1987), p 275-79; Pasquino (1979), p 95-96.

[82]In 1962 the Socialists was included in the Christian Democratic led coalition. Electricity generation was immediately nationalized. See Martinelli A (1979), p 72-73.

[83]Ente Nazionale per l'Energia Elletrica.

[84]Wormald (1972), p 97-102; Holland S (1972), p 70-81; Lister L (1960), p 146. On the orientation of the Christian Democrats towards the south: Pasquino G (1979), p 79-109, esp p 79 ff.

creation of a giant shore-based steelwork at Taranto was, indeed, the crown-jewel of this strategy[85].

Construction at Taranto started in 1960. By 1964 the plant was on stream, by 1965 a relatively small extension was started, and in the late 60s a new phase, which ultimately carried capacity up to 11,5 mn t/y (1975) was implemented.

This strategy, based on expansion, worked very well as long as demand grew at extraordinary rates (figures 4.4, 5.7, SA fig 8), but serious problems emerged by the late 60s/early 70s. The nature of these problems was, in fact, normal to the whole state-owned sector in Italy. Managerial autonomy had been reduced, as more and more political committees entered the field of strategic policy making. Thus, a Ministry of State Shareholding had been instituted in 1956. As this had turned into a political fief of the "left-wing" of the Christian Democrats, it had degenerated into a center for factionalist infighting and political interest groups[86]. In 1967 one more political layer was added onto this economic-political structure when CIPE[87] (the Interministerial Committee for Economic Planning) was created for overall coordination and management of the state shareholdings[88].

Finsider's original strategy in the early 70s had been to increase production at Taranto, while building a new (fifth) integrated steel plant nearer the northern markets (in the medium- or long-run winding up the older plants). On the other hand, the strategy finally settled on by CIPE and Finsider, after intense political pressure[89], was one of all out

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[85]Law 634 (1957) required the state holdings to invest 40% of total investment in the South (60% in the case of newly established state enterprises). See Allen K (1972), p 173 ff.

[86]On the problems confronting state-owned Italian companies during the 60s and 70s, see Martinelli A (1981), Saraceno P (1977), Martinelli A (1979) p 75 ff.

[87]The Interministerial Committee for Economic Planning.

[88]Hence we are able to discern five different structural layers with responsibilities for the state holdings: Parliament, the Ministry of State Shareholdings (CIPE), the holding companies (IRI, ENI), and the operating companies (in this case Finsider). What was characteristic of the Italian state holdings by the 70s, was their extreme confusion, and their increasing dependence upon the political superstructure, see sect 5.2.3.

[89]The 70s saw the culmination of political decision-making in Italy. The resultant paralysis of economic-political process - as it had become, essentially, impossible to choose between alternatives- was one of the most dramatic examples of the breakdown of a political system that had become completely adapted to (and dependent upon), a continuation of economic growth. Hence, the crucial point to discern in the context of the (state owned) Italian steel industry is the illustration that it provides of how this system

expansion on every front. Cornigliano was modernized (OH's replaced with oxygen converters), Bagnoli got a wide-strip mill of its own, Taranto was to be expanded, and a new plant (at Goia Tauro) was to be built in the South[90].

So, wheras the French were entering the crisis with steelworks being built and modernized at Dunkirk and Fos, the Italians were entering it building and modernizing, essentially, all over the country. What we are describing is, essentially, a process where the development of new capacity is not accompanied by a logical process of rationalization. Thus, funds were channeled into Taranto, Dunkirk & Fos, as well as into Lorraine & Naples. (For the private Italian producers, see below, sect 4.4.)

4.3.4. Steel in Germany-Netherlands in the period 1950-75

4.3.4.1. Germany

The Ruhr industry had grown at high rates in the later half of the 19th century, as the exceptional comparative advantages of the area became evident. When the coal cartel was established in the 1890s, integration backwards was pursued, into coking coal. Simultaneously seeking horizontal consolidation, the steel producers started to cartellize, and although the pre-first world war cartel was often under stress, the success of the Ruhr companies with regard to technical excellence is little in doubt[91]. The vitality of the industry is, as well, clearly recognizable from

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worked. Thus, the existence of IRI provided the rationale for a state-led policy of intervention, the very success of intervention then creating fuzziness inside the structure, as more and more interests developed a relation to the organization. Accordingly, it should be no sensation that the organization started to overload and turn out steel-works all over the countryside in the 1970s; it was on the rationale of this very development that the political superstructure had evolved in the period up to 1972. What evolved out of this was an extraordinarily good example of a vicious circle, as analyzed by Crozier: A structure that is confronted with failures created by its own organizatorial shortcomings, responds to the failures by trying to cut itself off from its societal context (i.e. demanding autarchy, failure to accept reality etc.) This pattern is, indeed, central to our whole analysis. Italy in the 70s: See sect 5.2.3. and Salvati M (1979), p 31-48.

[90]Eisenhammer/Rhodes (1987), p 430-32.

[91]Webb S B (1980), p 309-29.

its activities in the ore-fields of Lorraine, Luxembourg and Normandy, (sect 4.3.1).

After the war there was a major move towards amalgamation, as the VS[92] was formed. The continuing -possibly strengthened- cartel tradition is evident in the activities between the VS and the remaining independent firms (Krupp, Klöckner, Mannesmann, Gutehoffnunghütte)[93]. Indeed, the conservatism of the traditional steelmakers seems to have been the prime mover behind the state's intervention into the industry, as it triggered the Nazi's decisions to construct the Hermann Göring Werke, based on the low-yielding Salzgitter ores (north of Hannover)[94], as well as the construction at Linz, Austria[95].

In the de-cartellization period after the war the break up of these concerns became a prime interest to the occupation powers and, indeed, a necessary pre-condition for German membership in the ECSC. VS would have dominated the Community in a remarkable way if it had been allowed to continue its existence[96]. So, in a somewhat ad-hoc manner the steel concerns were split up into 24 different companies.

The period 1951-60 saw the rebirth of the Ruhr producers. It was the lifting of limits on production, the coming of the ECSC, and the coming of the *Ruhrhilfe* and the accelerated depreciation program (sect 3.1) that served as a starting point for massive new investment, increased production, and the re-fusion of companies (figures 4.4, 5.8, SA fig 8, 9).

A logical point of departure for a description of German developments up to the mid 70s is Thyssen. The nucleus of the firm was back at its Duisburg site at Hamborn, where the construction of a wide strip mill was started in 1954 (fully modernized and expanded in 1972). The continued expansion during the 50s contained the absorption of Niederreinische Hütte and Deutsche Edelstahlwerke. The first half of the 60s was a period of ongoing expansion, as the companys second wide strip mill was constructed at Beeckerwerth (1964), next door to Hamborn. The cooperation agreement with Pheonix-Rheinrohr[97] reached

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[92]Vereingte Stahlwerke. On the rationalization of VS, see Chandler A (1990), p 550-59.
[93]Hexner S (1943), p 125-27.
[94]Pounds N (1968), p 169, 249.
[95]Durrer et al (1965), p 1751-52 for the origins of the Nazi plans in Linz ("Reichswerk Hermann Göring").
[96]Gillingham J (1988), p 422-36.
[97]Located at Ruhrort, Duisburg. The company stayed within the Thyssen orbit (family owned) after the breakup between the firms in 1950. See Lister L (1960), p 156-57.

its logical conclusion with the absorption of that firm in 1965[98]. By 1968 Thyssen's neighbor at Oberhausen (HOAG[99]) was absorbed[100]. In 1969 a rationalization agreement was concluded with Mannesmann. Mannesmann took over Thyssen's tube production, while Thyssen took over Mannesmann's rolling program outside tubes[101]. Then, in 1974, Thyssen absorbed the mechanical engineering firm Rheinstahl, a move mainly aiming at diversifaction, but also bringing control over the Edelstahlwerke Witten[102].

Mannesmann had reconstituted itself during the 50s, re-merging the three firms that it had been broken up into. Back at its pre-war site at Hattingen, it went through a program of -note the agreements with Thyssen- concentration on tube production and diversification into mechanical engineering. The cooperation with Demag in the innovative development work on continuous casting was followed by the absorption of Demag in 1974[103].

Krupp made a comeback at its riverfront location at Rheinshausen and in Bochum, where a wide strip mill was in construction by 1966. With heavy interests in mechanical engineering and plant construction, the firm became overextended in the downswing of 1966-67. This did, for the first time after the arrival of the *Ruhrhilfe*, make state intervention necessary

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[98]Stahl und Eisen, Heft 8/1963, p 480 ("Neuordnung der Thyssengruppe"); MB 640107 p 13, MB 640605 p 17, MB 650803 p 13, MB 651022 p 13.

[99]Hüttenwerk Oberhausen AG.

[100]MB 670915 p 14; Glückauf, Heft 8/1968, p 353; Stahl und Eisen 10/1968 p 530.

[101]A paper delivered by Egon Overbeck (MD at Mannemann at that time), was quoted in MB 690211, p 26-27 ("The German way of rationalisation"), which is interesting against the background of the developments in the Ruhr in this period. See, as well, Stahl und Eisen, Heft 4 1969 ("Röhren-Kooperation zwishen der Mannesmann Aktiengesellschaft, Düsseldorf, und der August Thyssen Hütte Aktiengesselschaft (ATH), Duisburg-Hamborn"), p 193; and MB 690819 p 23-25.

On the cooperation in the *Walzstahlkontore*, see Köhler H (1967), p 352-56. The four *Walzstahlkontore* (four central offices coordinating the selling of German Steel, where the German producers were grouped according to geographic location), which implied a return to the old German cartel tradition, were broken up by the EEC Commission in 1970. Their coming (1966) was clearly a direct reaction to the increased competitive pressures being felt all over Europe at this time. See Stegeman K (1977), p 34-35, 111 ff; Müller J/Loeber H-D/Dey G,bd 2 (1983), p 144-61; Schiller K (German finance minister at the time) (1967), p 877-882; and Sohl H-G (1967), p 882-89.

[102]MB 750909 p 39.

[103]See MB 690918 a a; Glückauf, Heft 14/1973 p 747 ("Mannesmann AG Stärkung des Mashinen und Anlagenbaus"); MB 730710 p 26. On the strategy of the firm over a longer period, see WiW 11/1987, "Anschluss gesucht", p 128-34; and sect 5.2.4.1.

into the German steel industry, as the state provided extensive credit guarantees, as well as being instrumental in moves centering upon the lowering of interest rates[104]. During the 70s the Iranian state bought a 1/4 share in Krupp[105], something which helped consolidation, as well as making new acquisition possible. Stahlwerke Südwestfahlen (special steel production) was taken over in 1974[106].

In Dortmund, there was amalgamation in 1966, as Hoesch merged with DHHU[107]. Whereas Hoesch had aquired a steckel mill as early as 1951 and a continuous wide strip mill in 1958, DHHU's production was tilted towards plate and sections. The merger did, thus, create the "complete" rolling program deemed preferable in the mid 60s. As several of the new company's melting shops were in need of replacement (the OH's) there was obviously room for rationalization in this process[108].

Besides, a strengthening of the old connection between DHHU and Hoogovens (sect 4.3.4.2.) implied scope for even greater synergies, as Hoesch relatively disadvantaged position in the eastern part of the Ruhr[109], could be mended through cooperation with a producer sited at an ideal position on the mouth of the Rhine. This led to the merger between Hoesch and Hoogovens (forming Estel in 1972). The possible "maximum" strategy for this new combine should have been to invest in a new oxygen steelplant in Dortmund, replacing the old OH-furnaces, as well as a new wide strip mill, rolling slabs from Ijmuinden[110].

Klöckner had moved its center out of Ruhr as early as in the mid 50s, when a new shore-based plant was constructed at Bremen, although their

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[104]Esser J /Fach W /Dyson K (1983), p 114; WiW 35/1982 "Krupp im Schmelztiegel", p 28-37, esp. p 36; Dyson K (1984), p 33-34.

[105]Apparently the Shah was interested in getting access to the know-how of Krupp's, in his attempts to "modernize" Iran. See WiW 35/1982 a a p 34-36.

[106]WiW 35/1982 a a; MB 750411 p 32.

[107]Dortmunder Hörde Hüttenwerk Union.

[108]MB 660104 p 11; Stahl und Eisen, Heft 2/1966, p 124-25 ("Zusammenarbeit zwischen Koninklijke Nederlandsche Hoogovens en Staalfabrieken N V Ijmuinden - Dortmund-Hörder Hüttenunion AG und Hoesch AG, Dortmund").

[109]As compared to the western part of the Ruhr, where Huckingen, Rheinshausen, Hamborn etc, were located. These Rhine-based sites had important advantages with respect to transport costs over the Ruhr-based Dortmund. See Warren K (1975), p 175-77.

[110]Gebhardt G (1966), p 330-31; Stahl und Eisen 10/1966 p 642; Stahl und Eisen 11/1966 p 698; MB 720121 p 29; and Schröter L (1986), p 372 ff. See, as well, sect 4.3.4.2.

old plant at Hagen-Haspe, in the interior of the Ruhr, was kept[111]. Bremen was thoroughly modernized and enlarged in 1972-74, including the construction of an entirely new wide strip mill (bringing capacity up to ca 6 mn t/y)[112]. The rest of Klöckner's product program was provided from Georgsmarienhütte and Troisdorf (special steel long products), and from Maxhütte[113] (heavy and light sections, CR facilities for sheets brought in from Bremen).

The old Hermann Göring Werke remained in the hands of the German state, now renamed as Salzgitter. A wide strip mill was built in 1963. Then, in 1970, it absorbed the neighbouring Stahlwerk Peine-Ilsede, as rationalization had become imminent in this area, due to the increasing pressures put upon sites based upon low-yielding ores. Hence, this was one potentially problematic German region[114]. Another potential problem was the Saar.

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[111]Hagen-Haspe, in its interior location, was obviously inferior to the Duisburg sites. Klöckner -early in his career an associate of Karl Späther- had, like Später, developed very strong interests in Lorraine. After Versaille, Klöckner lost more than half of its total capacity, and, unlike Thyssen, Krupp and Mannesmann, it was never able to undertake any large construction on a riverfront location in the western part of the Ruhr. Instead, Klöckner was, at a relatively early point in time -like Hoesch was somewhat later to be- confronted with the shortcomings of Ruhr locations outside the Duisburg area. Thus, the Bremen location should, to no small extent, be regarded as a reconstitution of a firm that had lost out in Lorraine, rather than a relocalization of a genuine Ruhr company (Klöckner kept Hagen-Haspe until 1982/83, it had, as well, important holdings in home ore districts, Lower Saxony, Bavaria). Pounds N (1968), p 196-97; Hellwig F (1951), p 323; Warren K (1975), p 178-79; WiW 3/1985 "Aus einem Haus", p 28-37; Burn D (b), 459-60; 657.

The prehistory to companies such as Klöckner and ARBED (note 30, sect 4), is, I think, essential to the understanding of the developments and alliances that developed after 1975. In a remarkable way, both of them were Lorraine ore companies; ARBED remaining within that orbit right to the end of mining, Klöckner turning to the coast, always remaining an outsider to the Ruhr (the merger talks 1982/83 and 1985 are discussed below). Then, after 1975, ARBED was entangled in almost any problematic area whatsoever - while Klöckner turned into a misery, both for its owners, as the dispersed facilities and heavy investment in the early 70s made it financially and industrially vulnerable, and to its German competitors, which were threatened by the potential effenciency of the Bremen facilities.

[112]Klöckner in the 70s, see WiW 5/1981, "Dem Bären entkommen", p 50-51. The origins of problems is also discussed in WiW 9/1983 "Unverdaulicher Brocken", p 114-15.

[113]Located in Bavaria, producing on Bavarian ores.

[114]Salzgitter's second problem was, of course, that it had lost much of its natural market, when the Eastern half of Germany passed under Soviet control. It is this strategic

Saar was in a position most comparable to Lorraine, Luxembourg or Vallonia. It was dependent upon the low-yielding French minette and its own coal[115], both of which were factors rapidly losing their comparative advantages after the late 50s. The rapidity of the conversion in Saar from French to Swedish ores during the 60s is, in itself, revealing evidence of the insufficiency of the minette: nearly unseen in the area in 1960, the high-yielding Kiruna ores[116] had replaced the Lorraine ores as the most important (ore content) in the Saar by 1968[117].

So, the Saar producers lived an existence rather off the main road up to the mid 70s. Some of the worst effects of the changing relative prices were mended by freigth subsidisation, ore substitution and the institution of the coke subsidy, but overall, their inferior position were clearly percieved. The traditionalistic profile of the region's production program -except for the French-owned Dillingerhütte, there was no major producer of flat products in the Saar- was a third factor that was to place the region under extreme stress after the mid 70s[118].

So, it was in these rather depressing circumstances that two of the main producers in the region -Röchling and the ARBED controlled plants- were merged in 1971. This merger created Röchling-Burbach. The company was, in our later period, to change name to Saarstahl.

4.3.4.2. The Netherlands

Developments in the Netherlands were deeply marked by the appearance of new innovations. Hoogovens's[119] plant (located at Ijmuinden) was an early coastal concept. Concieved in 1918, the first

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position in the *grenzgebiet* which explains its continued existence in state control up to the very recent years (its locational problems have -largely- been overcome by its canalfront location, making it possible to replace indigenous ores with imported). Warren (1975), p 177-78.

[115]Which was, anyway, of low quality, and had to be blended with coking coal from the Ruhr to reach coking qualities. On the problems of Saar, see Schluppkotten K (1961), p 761-67 and Schluppkotten K (1965), p 640-42.

[116]That were substitutable for the French ones in the LD-AC converters that were being installed in the Saar.

[117]Stroux a a p 1419-20; Lenartz A (1981), p 831-32.

[118]An analysis of the problems on the eve of breakdown is available in "Bericht über die Jahrestagung 1977 der Eisenhütte Südwest" (1977), p 950-53.

[119]Majority owned by the Dutch government and the city of Rotterdam, Lister L (1960), p 147.

blast furnace started producing in 1924. The depression delayed forward integration into steel, and then the Germans removed what had been installed during the 40s[120]. After the war the mill was reconstructed, with open-hearths and a plate mill first coming into production, a wide-strip mill following in 1952. Innovation was again evident in the 1956 extension, when Hoogovens was among the pioneers in the use of the new BOP-technique. By the mid 60s production had reached 4 mn t/y, capacity was raised to nearly 8 mn t/y by the late 70s. The one-facility solution, with its exceptionally good lay-out and high productivity, were all factors that made it the most profitable steel company in West Europe during the 60s[121].

The last stages of this continuing expansion was intimately bound up with Hoogovens's interests in the Ruhr industry. Its old shares in the Vereingte Stahlwerke had been converted into a controlling (43%) holding in the DHHU in the 50s, and after the merger between Hoesch and DHHU in 1966, this was transformed into a 15% holding in Hoesch. The vision of a giant new steelplant on the Dutch coast, producing slabs for a Ruhr based re-roller, was thereafter the rationale for the full merger between Hoesch and Hoogovens in 1972 (into Estel)[122] (figure 5.8; SA fig 8,9).

4.3.5. Steel in the United Kingdom in the period 1950-75

The UK steel industry reflected, basically, the same inhibiting forces that was evident on the continent, when the country aceeded to the EEC/ECSC in 1972. (figures 5.9, SA fig 8, 9)

The industry had evolved out of coalfield locations during the 19th century, moving towards the coast as the insufficiencies of the original locations became apparent. By 1945 several distinct geographic districts were clearly recognizable.

In the interior of Scotland (Lanarkshire) the steel industry, centering upon Colvilles, had specialized in plate production for the shipbulding industry. In the North-eastern part of the country (Teeside) plate

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[120]The similarities with developments at Cornigliano are worth noticing.

[121]Profitability in the West Eurpean steel industry is, for example, discussed in Manners G (1971), p 121-22. On the background to the plant, its development, its layout, see MBM 7/1976 (b), p 18-19; MB 700630, p 20-26.

[122]The economics behind, v d Rijst (1970), p 493-99 and sect's 4.2. and 5.2.4.

production for shipbulding was also important, together with production of steel for the construction sector (sections). In this region there was a multitude of firms, amalgamation being inhibited by conservatism and industrial parochialism[123]. The most important of the existing firms were Dorman Long, Consett (inland location) and South Durham.

Appleby-Frodingham (Scunthorpe), near the Humber, was the location for United Steel's integrated steelplant. It was based on local ores, its structure of production was similar to Teeside's. Inland from the Humber was Sheffield, the traditional center for production of special steels.

South Wales had become the center for sheet and tinplate production, after the migration of this industry from its inland sites in the West Midlands (the Black Country). The chief reasons for this locational shift was the availability of coal and better harbor facilities, which was necessary for the importation of ores and the export of tinplate. Then, as we have seen, there was a strong shift in demand for sheets during the 20s and 30s, as the car industry developed. It was during this period the first two strip mills in the UK were constructed. One was built at Ebbw Vale (inland location, South Wales)[124], the other one at Shotton (North Wales, to the south of Liverpool).

Finally, there were important developments taking place in Corby during the 30s. The low-yielding, highly phosporous ores of Northamptonshire were the rationale for a new (Bessemer process) steelplant, constructed by the tube producer Stewart & Lloyds[125].

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[123]Tolliday S (1987), p 345-49.

[124]The history of the construction of West Europe's first strip mill, at Ebbw Vale (Richard Thomas, 1935), is an epic history of resistance to innovation. With the instigation of protection for the British steel producers (1932) a branch organization (BISF; British Iron and Steel Federation) had been set up to oversee the rationalization of production. As internal production quotas were introduced, and BISF got the final say in any new investment, the undertaking of new developments became a rather traumatic experience. Richard Thomas main competitors -Lysaght, Baldwins- fought the new construction, organized labor pressed for concessions etc. The final decision on location was taken after intervention from the prime minister, as fears of the effect on the traditional producers had reached unprecedented heights. It was in these circumstances that Ebbw Vale was chosen for construction. It was a site with reminiscences from the 1840s, (the period when Welsh ores had been the world's most important). See Warren K (1970), p 172-200; Tolliday S (1987), p 124-55; 249-58.
The new construction projects at Corby encountered somewhat similar problems, but were helped by the fact that Stewart & Lloyds were the only tube producers of any importance in the UK. Tolliday S (1987), p 228-35.

[125]Tolliday S, note 124 sect 4; Burn D (1961a), p 437; 1961 (b), p 283-84.

It was on these main locational lines that the industry developed up to 1975. Institutionally there was a protracted conservatism, as well. The Iron and Steel Board, set up by the labour government after the war, and revived by the conservatives after denationalization (1953) had a decisive influence over new investments and closures of works. The brief period of the industry's first nationalization (1951-53) saw no break with the traditional patterns. The old firm structure was retained, there were no moves towards large-scale rationalization.

The wish for consensus is evident in the industry's pattern of expansion up to 1965. In this period, new investment centered upon the wide strip mills in South Wales. First of all, Port Talbot was constructed directly after the war as a joint venture (SCOW[126]) between Guest Keen and Nettlefolds and the amalgamated firms of Richard Thomas and Baldwins (RTB). CR (finishing) facilities were located at Trostre and Velindre. The rationale for this location in Southwest Wales -with finishing facilities dispersed at relatively distant, inland locations- was that the traditional location of the tinplate industry was to be retained to the highest possible degree, and Ebbw Vale had tipped the balance to the east of Wales[127].

The next phase of wide strip mill expansion arrived in the late 50s. The preferred option for RTB's expansion this time was Newport (Southeast Wales), but after intervention from the ministerial level a "solomonic decision" (MacMillans expression) was arrived at. It was decided that two somewhat smaller strip mills were to be built -one at Newport, and one in Scotland. Although Scotland hadn't ever had much of a tinplate industry, it did have a stagnant plate industry and it was judged that a new strip mill at Ravenscraig[128] would help revive the Scottish steel industry[129].

In the rest of the industry there was, mainly, incremental investments. By 1965-66, when the nationalization debate resumed, it was evident that the industry was in need of thorough modernization and relocation. Several units were exceedingly small, some were located in regions that had lost their comparative advantages. The LD process was still awaiting

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[126]The Steel Company of Wales. See Warren K (1970), p 219-44; Burn D (1961b), p 80-82.

[127]Warren K (1970), note 126 sect 4.

[128]Inland location, although the area had to import both ores and coking coal, CR facilities located at a distance, at Gartcosh. Construction undertaken by Colville's.

[129]Government credits etc Payne P (1979), p 368-83, 393-405; Burn D (1961b), p 644-46, 652, 655, 657, Warren K (1970), p 277-81.

a broad introduction, and the financial position of the industry was steadily deteriorating[130].

Even though nationalization was carried out -mainly, it was argued, on economic (rational) grounds, as the industry had to be saved from its own lethargy[131]- it is interesting to note the great similarities between the plans of the industrialists in the mid 60s, and the "Heritage Plan" eventually carried out by British Steel. By 1965 a real merger was, at last, in the making, as S & L had to react to the new trends in ore prices, thus moving towards the seaboard. Hence, S & L was in the process of being merged with Dorman Long and South Durham, a merger that would have concentrated new construction activity to the Redcar-Lackenby site on the Teeside[132].

Similarily, there was extensive development planned at Scunthorpe, by 1966. This location, close to the coast, was to become the point of departure for new expansion plans, which were to utilize imported ores via an expanded harbor at Immingham. At SCOW (Port Talbot) there was plans for investment in oxygen converters, as well[133].

These plans, indicate the strength of the "adaptive oxygen wave" by the mid 60s. In the context of this wave, the launching of British Steel (BS) makes extraordinary sense, it being part and parcel of a general process towards increased amalgamation and state intervention. It was, indeed, a process that was in evidence in the whole West European steel industry between 1965-70. After nationalization was carried out[134], investment had

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[130]Bryer R/Brignall T/Maunders A (1982), p 26-33.

[131]Ovenden K (1978), p 16-23, 82-85.

[132]Where extensive new investment was planned in 1965: Heal D (1974), p 112 ff; 135-38.

[133]Heal D (1974), p 118-19.

[134]Nationalization encompassing the 14 biggest steel companies, leaving GKN (mechanical engineering), smaller plants and re-rollers independent. Great emphasis have sometimes been placed upon the evident "mistake" of not nationalizing all steel plant, as well as consuming industries (where GKN would have played a crucial role), the government thus failing to develop an overall industrial policy, encompassing all steel production and most steel consumption. In reality, I think, this was not the crucial mistake of nationalization. The technological changes during the 70s, and the accession to the EEC/ECSC structure would, anyway, have made a private reentering of the sector, and an increased import penetration, unavoidable. The "total nationalization argument" implies, in reality, that some kind of prohibition on imports, new industry entrants and substitution would have needed to be made, as well; this would have implied a change in the whole market economic set-up, that the UK was a part of.

to follow the abovementioned patterns and, consequently, British integrated steel production was pushed towards the coast in a fairly radical fashion[135]. In the end this couldn't but increase the problems of the British coal industry, even though the motive behind coastal concentration was always expressed as the need to gain access to high-yielding imported ores.

The coastal strategy of the BS was still more clearly spelled out in its Development Plan of 1971. This plan -which in the end was going to prove itself a suicide by degree to the BS, as well as spelling the end to much of British inland steelmaking- foresaw a BS production of 43 mn t in 1980[136]. It outlined greenfield construction, as well as a radical restructuring of the five "heritage plants" (Port Talbot, Newport, Scunthorpe, Redcar-Lackenby and Ravenscraig)[137].

As things turned out, the plan of the management had to be modified in stages, when the gigantic miscalculation of the original BS plans became evident.

Firstly, the company's banker and owner (the government) had arrived in office the year before, elected on a program of a general roll-back of the state. Hence, in order to regain control over a company (in reality) totally dependent on the state for the financing of its investment program, outside expertise was called in[138], and a compromise capacity was decided

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But, the argument is interesting, in that it crystallizes the alternatives open to the UK (and indeed, to the other discussed countries, as well). It is significant that the changes around 1965-70 were interventions taking place in market economic settings - basically intended to strengthen the adaptive wave in the setting of a dynamic market place (only *helping* the working of the market mechanism, by overcoming the "rigidities" and "short-time horizons" of the private investor). With the maturing of the adaptive wave (by 1975-80) the catastrophic results of much of the strategies carried out over the last decade was evident - the changing production functions that grew increasingly visible in the depressive phase nearly nullifying the potential value of much of the adaptive investments undertaken. In this situation two options existed -systematized intervention (increased protectionism, technological bans) or retrenchment of intervention (radical restructuring and eventual "privatization").

[135]Bryer et al (1982), p 74 ff.

[136]In the 80s UK production of steel has stabilized at 15-18 mn t/y, BS supplying ca 12-14 mn t.

[137]Bryer et al (1982), p 77-88; Heal D (1974), p 162 ff; 174 ff; Richardson J J/Dudley G F (1987), p 317-24.

[138]McKinsey was commisioned to produce an analysis of BS capacity needs in 1980. Mc Kinsey's conclusion -demand at 23 mn t- was then conciliated with BS projection of 43

by the Joint Steering Group (JSG), that the government had placed between itself and the BS management in 1971[139].

Secondly, after the approval of the better part of the BS investment program in 1972[140], important investments in the primary stages of steel making was carried out, in a situation where demand was levelling off. Moreover, private sector companies[141] had reentered the sector, starting

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mn t. The JSG (see above) set the 1980 target at 28-36 mn t. BS, of course, went for 36. (Ovenden K (1978), p 176-80, Richardson/Dudley (1987), p 323).

[139]The BS management did, of course, hate the JSG and the commisioning of McKinsey, which threatened their autonomy to formulate development plans and demand monies. To the government, on the other hand, the JSG was a way of getting control over a management that it had, essentially, lost control over. See the interesting comments cited in Young S /Lowe A V (1974), p 145-46.

The problems that nationalized steel industries presented to the British and Italian government by the early 70s are highly interesting to reflect upon. In Italy as well as the UK there were managerial demands for greenfield development and a strategy of coastal concentration, while the political "managers" were totally unable to break out of the structural logjam created by politization and capacity construction; politicians tending to support coastal expansion as well as avoiding inland rationalization. The construction of new committees such as CIPE and JSG are evidence of the increased need for management rationalization and the centralization of decisionmaking, but, before the late 70s, attempts such as these were tentative and groping; it was the deterioration of conditions after ca 1975-80 that forced governments to grasp the nettle of restructuring. However, it should be recognized that the forces in evidence in France and Belgium by the late 60s/early 70s were structurally similar to events in the UK and Italy. Intervention was increasing, new structures were evolving between governments and (formally) private firms. Thereafter, it was the crysallization of events after ca 1975 that forced these actors to define their roles and act in accordance with them.

To sum up, nationalization or corporativist solutions was not the real issue by 1965-70; rather, it was the ability to handle the adaptive phase of the innovative wave. In country after country this led to increased politization and blurred responsibilities. Then, the grandiose manner in which the adaptive wave was carried out, directly contributed to the increased severity of the depressive phase of the wave. Not only had the old and clearly inferior capacities to be shut down; what made matter worse was that newly constructed plants had to be closed and written off, as well (as we have already touched upon, and will discuss at greater length in sect 5).

An intereseting summary of the early history of the BS is given in MB 741115, p 40-42.

[140]Ovenden (1978), p 178-82; Bryer et al (1982), p 108 ff, Richardson J J/Dudley G (1987), p 317 ff.

[141]GKN, Sheerness, Alphasteel, Manchester Steel etc. On the growth of the private producers in the UK after 1971: See MBM 4/1973 (b), p 31-37; MBM 3/1977, p 11-13; MBM 3/1978, p 9-13; MBM 12/1981 (Special Supplement: Mini-mill Monographs); (a), p 12-14"; (b), p 17; (c), p 21 and Messerlin/Saunders (1983), p 77-78.

construction of mini-mills on a broad front during the early/mid 70s[142]. Lastly, the accession to the EEC/ECSC structure had opened up the country to increased competition from abroad. In this situation BS market shares started falling in a declining market[143].

Thus, by the mid 70s, plans had to be radically restructured, as the failure of the BS strategy had left it open to attack from a multitude of fronts. The private long product sector was expanding and so was imports. Even worse, the massive investment plans undertaken during the 70s had left the company with a debt burden of uncontrollable size. As we shall see in sect 5.2.5, this made it necessary to reach a raprochement with private sector companies, along with a general downsizing of remaining investment projects. Moreover, a radical restructuring of the tail of old plants that the company had inherited was to become necessary.

4.3.6. A concluding summary of the tendencies evident in the period up to the mid-70s

By 1975 the West European steel industry was on the verge of a crisis of truly staggering proportions. It was foreseen by few, yet today, using the benefit of hindsight, we are able to identify all of the weaknesses that were to break it into pieces in the years that followed.

1. The traditional locational pattern of the steel industry was already greatly upset. The coming of high-yielding Latin American and African ores sent indigenous ore producers into crisis by the early/mid 60s (fig 5.1, and SA fig 10).

2. The advantages of high-yielding ores were unevenly distributed, benefitting the coastal locations, and to some extent the Ruhr producers, as these were the ones most able to make use of the new technical trends evident in large-scale shipping.

3. The evolution of energy prices in Western Europe after 1950 (fig 3.1 and 3.2) strengthened these trends. Low yielding ores implied high coke rates, and coal field locations meant dependence on expensive indigenous coking coal. The ECSC coke subsidy regulations of 1966-67 must have been pivotal to the continuing survival of the old inland steel

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[142]See sect 4.4, on the importance of the minis.
[143]Bryer et al (1982), p 142-56.

locations, at least if they were, as well, to be prevented from using imported coking coal.

4. The slow-moving decline of the old centers, and the push to the coast, was interfoliated by another process: the large-scale breakthrough of the wide-strip mill. As the imperative of demand and national strategies of "modernization" compelled ever increasing investment in primarily flat product production, this new investment was concentrated to some new coastal locations. A tremendous wave of new seafront development commenced by the early 60s (ca 1960-65).

5. As this momentum gained force, the problems of the older centers increased, prompting intervention to remedy these. Investment tended to be undertaken everywhere, in order to modernize and adapt (green-field developments, continuing expansion of the new seafront centers), while simultaneously trying to prop up the older structures. Thus, another investment boom was in evidence by ca. 1970-75.

6. This feverish investment boom of the early 70s, was compounded by the mixtures of social-regional and economic considerations that were taken. Alas, the boom seems, in retrospect, dominated by an almost total disregard of normal cautiousness, on the part of the investors (see SA fig 9).

7. As the industry was undertaking this strategy of all-out growth, its internal structure was, in several countries, anything but clear. Relations between the governments, trade associations and industrial firms had been important to the development of the industry all through the post-war period, but after the stepped up merger wave of the period (ca.) 1965-68, the relation had become increasingly blurred and unclear.

The point is that the merger wave was signalling an escalated state intervention into the industry, mostly because it was increasingly evident that private capital was -with respect to important parts of the "traditional" structure- becoming less interested in a continuation of operations. But, importantly, if the state was increasing its stake in the industry, this implied that the structural relationsship between governments and industrialists was necessary to overhaul and redefine. A situation where several centers could articulate plans etc. was, in the long run, to prove itself counter-productive.

8. The governments were an important factor in the reorganization of the industry in most countries discussed. Formal nationalization was brought about in the UK, but not in Belgium or France. Our point is that this difference didn't really matter. Rather, it is important to see that these governments had some kind of conception of what they wanted the industry to be like -dynamic, effective, modernizing, socially just- and

they were trying to mould the structure on this overall strategy. This moulding necessitated changes along some pre-concieved lines: mergers were seen as desirable, new large-scale developments were equally desirable etc. At an early stage it was understood that this new situation required the development of new lines of communication between the government and the companies, as well. Hence, there were round table agreements, special plans and reports by outside consultants (which made it possible for governments to present their own information, in order to strengthen their hands against the industry interests in bothersome situations)[144].

9. Our point is that this momentarily unclear situation was, in itself, a major obstacle to change, in the period after 1975. The situation -a structure where the governments provided cash and industrial plans, and the firms sent christmas lists to governments, trade associations or round tables- might have been sufficient in a situation of ever increasing growth rates, but it was problematic to sustain when the imperative of demand slackened.

10. Germany and the Netherlands deviated substantially from this overall picture. Although the early post-war history of the industries had been moulded by state policies here, as well (in Germany the *Ruhrhilfe*, in the Netherlands Hoogovens was controlled by the state), the wave of fusions here was carried out with very little interference from the governments. The better preconditions that their respective main steelproducers had, contributed significantly to this tendency. Ijmuinden was the ideal solution to steel in the age of intra-continental transportation and the Ruhr had been supplied with ores from the outside since the 1880s. The efficiency of the barges on the Rhine is striking. Duisburg works had costs comparable with Klöckner's Bremen site in the early 70s (although, of course, higher than Ijmuinden)[145].

That the Germans were no strangers to political helping hands were evident in the case of the Krupp crisis, in the Saar, and at Salzgitter, and, as we have seen, in the case of coal). The limitations of the low intervention profile were for everyone to see, when the more awkward

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[144]As we have seen the situation was, essentially, similar in Italy, although Finsider had been state owned since 1933. Between the level of the firm and the level of the government there had evolved a series of institutional layers, which were all in the business of formulating strategies and concepts about the future. (Sect 4.3.3).

[145]Warren K (1975), p 175-76.

positions of the Dortmund and Saar sites were fully revealed, during the later 70s.

11. Then another round of technical change started encroaching upon this -essentially- nationalistic and traditionalistic industrial structure. The West European context was still only realized in a very limited sense, (sect 4.4.4 and figures 4.6. b and 4.7. b).

12. Technical change -electrical furnaces suited to the production of plain carbon steels (sections 4.4.1-4.4.3)- was pivotal because it hit the structure at its weakest point: the older areas, that were still heavily involved in the production of long products (the worst problems were to be encountered by these long products producers that had specialized on light sections).

The other side of the crisis was connected with two interrelated sets of factors. The investment boom of the early 70s in sheet production could only make sense if older centers were rationalized. This rationalization would, as it turned out, have to be undertaken against a background of low growth or stagnation. The enormous innovative wave of the 50s, that had been dominated by the commercial breakthrough of Mid-east oil, the mass produced car for West European customers, the development of mass shipping, the coming of coastal steel and the wide strip mill etc., had spent its force by the early 70s, as is evident from the decreasing rates of economic growth and increasing rates of inflation (fig 1.1-1.2).

Following Schumpeter, we conclude, that we are approaching a situation where adaptation is going on all through the economies, i.e. investments along the lines of "more of the same". The -apparently- contradictory phenomena that signals the intensification of recession and coming of depression -greatly increased production and production capacities- are encountered, capacities increasing until the very arrival of depression. It is in this acute phase of the cycle, that the least efficient production functions at long last will have to be disposed off.

13. In the case study of coal we drew the conclusion that this depressive phase had been entered sometime by the late 50s/mid 60s. The Juglar recession of 1957-58 had brougth a disproportionate gloom upon the sector, and by the next Juglar recession of 1966-67 it was in very dire straits.

In the case of steel the picture is much more complicated, as a clear distinction has to be made between products as well as between districts. Generally, though, it seems as some of the traditional locations were coming under increased pressure as from the later 50s, when indigenous ore production started to fall (fig 5.1; SA fig 10), and by 1966-67, there is a general intensification of crisis measures in several countries, as the

older centers had been unable to adapt to the new innovative imperative. Fusions increased in numbers and piecemal measures were abandoned as investment subsidies were becoming concerted. Ultimately, these measures all aimed at making the existing structures more able to adapt to the new innovative imperative.

14. So the timing between coal and steel crises may be closer than generally percieved, if we see coal in the perspective of general energy developments, and steel in the context of the developments of high yielding ore-coking coal requirements, oxygen steel making and the wide strip mill.

In that case the crisis of traditional coal mining areas becomes a crisis of adaptation to a new energy paradigm. By 1965-6 the initial struggle is, for all practical purposes over, and large-scale intervention is the one remedial measure to be resorted to. After that structures had to be developed that were able to withstand the competitive pressures and, as we saw very clearly in the case of the UK coal industry, equally sophisticated strategies may have to be developed to alter this structure of intervention, when it had turned into a "vicious circle" (Crozier, sect 1.4.2).

In the case of steel, the crisis of the traditional areas can be viewed as a crisis of adaptation to a new steel production paradigm. By 1965-6 the problems had intensified in the areas least able to adopt, so much that intensified intervention had to be resorted to. As intervention evolved, a structure suitable to a state administered industrial crisis had to be developed, and then, if necessary, dismantled.

4.4. The emergence of a new production function. The coming of the mini-mill. The localization of the minis and the changing nature of the concept. The evolution of the markets

4.4.1. The appearance of the mini-mill, and the basis for the growth of the concept

The large-scale policies of expansion described in section 4.3. is a necessary background to the chaotic situation evident in the period 1965-85. In themselves, though, they explain very little. The missing link which can identify the *localization* of the crisis is to be found somewhere else. In this connection we have to identify the appearance of a radically different production function.

Electrical steel making goes back to the earliest decades of the 20th century. For several decades it was to remain a rather peculiar process. Due to the low efficiency of electric arcs and the excessive prices of electricity it was suitable only to the production of special, high-priced steels. Thereafter, the real breakthrough for the technology, the development of the ultra-high power furnaces, was a gradual process. When it became technologically possible to apply higher amounts of power to the furnace (through the transformer), the time required for steelmaking declined dramatically, making for radically increased throughputs in existing equipment[146] (while the electricity consumed was more efficiently used). These developments are illustrated in table 4.2.

What has been termed the first "mini-mill" -Northwestern Steel and Wire- was instrumental in the early development of ultra-high power furnaces during the 50s[147]. Given the incredible advantages accruing to existing electric arc furnace operators from this technique[148], the importance of this pioneering mini in the innovating stages of the new technique seems rather logical. The incentives to innovation was enormous, especially as the costs for installing "conventional" technological solutions was increasing (sect 4.2).

The advantages gained by electric operators by the development of the ultra-high power furnaces and the injection of oxygen are easily recognized. Ultra-high power furnaces offered a capital saving road to the massproduction of plain carbon steel in existing arcs, provided that scrap prices were attractive. The stabilization and decline of scrap prices, at exactly this point in time, tended to reinforce the technological pull towards the electric arcs.

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[146]Relatively more time is needed for the production of special steels than for plain carbon steels. On the ultra-high power transformers, and their effect upon (existing) electric furnaces: Hogan (1971), p 1527-37; Goldstein P/Dziggel K (1968), p 1189-92; Ottmar et al (1969), p 466-71; Lüth F (1972), p 364-68.

[147]Barnett D & Schorsch L (1983), p 86.

[148]Goldstein P/Dziggel K (1968), p 1189-92.

Table 4.2. Efficiency of Electric Furnaces, 1918-68.

Year	1918	1925	1955	1968
Size of converter (tons)	6	36	180	160
Length of heat (hrs)	8,0	10,0	8,75	3,75
Prod/hr (tons)	0,8	3,6	21,0	42,7
Rating of transf. (kv.-a)*	2,5	10,0	25,0	50,0
Energy cons. (kw-hr ton)	675	570	475	275**
Production/Year (tons)***	6,4	28,8	168	340

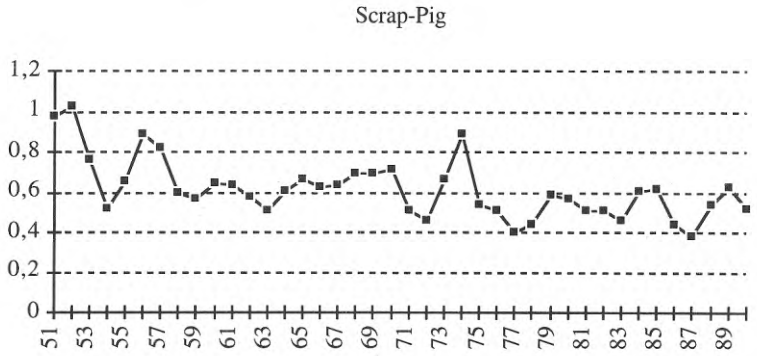
Note 1: * In Thousands of kv-a.

Note 2: ** With injection of oxygen.

Note 3: *** In Thousands of tons.

Sources: 1918, 1925, 1955: Mineral fact and problems, 1960 ed, p 777; 1968: Hogan W (1971) p 1537.

Figure 4.1. Scrap price as proportion of pig iron price, 1951-90.



Note: **Scrap price**: Italy, import price; **Pig iron price**: Oberhausen hematite.

Sources: **Scrap price**: Derived from Commodity Trade Statistics, United Nations, Statistical Papers, Series D, (New York). **Pig Iron Price**: Statistisches Jahrbuch für die Bundesrepublik Deutschland, (Wiesbaden).

What had happened? One obvious - and the most often cited- reason for the decline in scrap prices after 1957/58 is the introduction of the Basic Oxygen Process in conventional steelmaking. As the BOP, with its low

acceptance of scrap, replaced the traditional OH's, there was obviously huge amounts of scrap available for the mini-mills. Strengthening these developments were, possibly, the industrialization of scrap processing, when the breakthrough of power shredders increased productivity in the scrap business[149]. A third reason cited has been the decrase in the average period of circulation for steel products (cars, machinery etc).

Another factor that strengthened the position of alternative steel producers after the mid 60s, was the relative rise in investment costs experienced by the integrated mills. This development has to be seen in connection to the investments undertaken after ca 1965 in the integrated sector of the industry. The disastrous implications of these projects, increasing corporate debt at a point in time where the cash-flow was drying up, due to the stagnation in demand, is discussed below (sect 5.2.1.1).

What the mini-mills offered were, in short, a capital effective route to steel making, in a period when most other actors were moving head on into traditional technological solutions[150].

The different strategic conceptions that mini-mill operators had, as compared to traditional steel-industry strategists, were crystallized after 1965, when continuous casting of billets became a commercial possibility. As discussed at length in the section 4.3, traditional centers opted for integrated technical solutions at exactly this point in time, while mini-mill operators started investing in continuous casters at a very early point in time[151].

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[149]The Steel Market in 1966, p 90-91.

[150]Cartwright W F (1972), p 221-28.

[151]Barnett D/Schorsch L (1983), p 90 ff, 122, 154. In Western Europe we are (see below), primarily dealing with Italian (Lombardian) and Spanish (Basque) operators. As compared to their traditional integrated rivals these "alternative" operators were, by 1975, advantaged (compared to producers in Saar, Lorraine, Luxembourg and Vallonia), with regard to yields, capital costs, energy demand and labor requirements.

4.4.2. The implications of continuous casting, and the moves into new production areas. The implications for the light section market

Continuous Casting (CC) was an enormous breakthrough. It had been conceived by Bessemer in the 1880s, but its commercial breakthrough wasn't to occur before the period 1965-80. CC's logical continuation, Thin Slab Casting (TSC) reached commercial application by 1990. The consummation of the technique, Direct Strip Casting (DSC), seems destined for its commercial breakthrough within the next decades.

To understand the full implications of these innovations it is necessary to discuss the old rolling techniques.

When steel was tapped it was formed to ingots, which had to be treated in blooming mills and soaking pits, before being cast into blooms, billets (long products) or slabs (flat products). The process was wasteful, both with consideration to metal (high wastage), energy (reheating), labor (to man primary mills), and capital (requiring a primary set of rolling mills). Hence, as CC was able to bypass these first steps, by casting slabs and billets directly, its radical advantages with respect to yields[152], manning levels and capital requirements are readily percieved.

The innovation was earliest felt among producers of long products (rolled from billets and blooms). CC was a complicated process to develop, its first decades of existence were full of false starts and shattered hopes, when problems over quality and process control were encountered. It was because of these problems that CC was first introduced commercially by producers of blooms and billets, as quality demands (on surface appearance etc.) were lower for tubes and light sections, than for the slab based materials (sheets)[153].

So, by the mid/late 60s, conventional wisdom about steelmaking was being upset in one product area. It was by now possible to produce light sections (most uncomplicated rolling technique of all: rebars) with very

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[152]Finished steel production increasing from ca 70-75% of raw steel production, up to often 90-92%.

[153]Hogan (1971), p 1571-73. The history of continuous casting: Petersen U/Spieth K G/Bungeroth A (1966), p 333-53; von Ende H/ Horst R (1972), p 329-37 and Schreue H et al (1988), p 427-36.

little capital and labor employed. A relatively small electric furnace, with a CC and a relatively uncomplicated rolling mill was all that was needed.

The segment of the market under threat from mini-mills spred from rebar to merchant bars, and to an initially smaller extent, to wire rods. Heavy sections, requiring more accurate quality control, was out of sight for the scrap based producers up to the mid 80s, when penetration started there, as well[154].

Producers of flat products were protected from the mini-mills, even after the coming of CC for slabs (ca 1970-75). It was the immense capital requirements of wide strip mills (sect 4.2) that put these out of the reach of the smaller producers: reducing slabs from 200 mm down to 1-2 mm still required roughing mills as well as 6-8 finishing stands.

It was only with the coming of TSC[155] (first applications at SMS-Siemens at Nucor Corp, USA 1990, Mannesmann-Demag at Arvedi, Italy 1991) that it became possible to cast slabs down to ca 50 mm, which have upset the existing rolling-mill technique in a radical way. In the new technical context the intermediary stage between the slab stage and the finishing mill (slab conditioning, reheating furnace and roughing mills), as well as several stands in the finishing train, are possible to eliminate. Obviously, this will cut capital, electricity and labor costs significantly. Moreover, production losses will, again, decrease by a third (this could bring yields up to 95%). The significant thing about TSC/DSC is that these techniques will benefit the existing large-scale producers, as well as much smaller mills. Cost will decrease, competition increase. Judging from the effects of CC on the market for light sections there will be major upheavals in the marketplace[156].

This conception of electric arcs and the innovative stage of CC is important to our discussion of the upheavals of the 1970s and 80s, because it explains why the most severe competitive pressures were felt in certain segments of the markets. The mini-mills were able to penetrate through the simplest products (with respect to rolling techniques, and quality specifications). Thereafter the rebar market led to merchant bars.

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[154]See, for example, Iron Age 1/92 p 22-24; MBM 911007 p 45; MB 910404 p 19.

[155]Iversen F K/Busse K (1991), p 37-45; Rohde W/Wladka H (1991), p 47-61; Wiesinger H/Döring K (1990), and Eberle et al (1990), p 81-88; as well: VDI Nachrichten 920424 "Von der Schmelze schnell zum Blech", p 1, 6 and "Dünne Bänder auf dem kürzesten weg", p 8; Iron Age 7/1991, p 20-23, and MBM 6/1988 (a), p 58-59; (b), p 59-65.

[156]See, for example, MBM 6/1988 (b), p 61-65 for a discussion.

Producers of wire rods, heavy sections, plates and sheets were protected (in a somewhat longer term), due to higher demands on quality and/or capital.

For the largest producers the main emphasis became concentration of production. It was the old multi-product firm concept that was going, although it took a long time to recognize. Hence, the really large producers tended to cut back plate capacities in a rather dramatic fashion (depressed after the shipbuilding industry had, virtually, collapsed after 1975), increasingly concentrating their capacities upon the one expansive market segment that still existed: sheets, a product where quality (finishing facilities) rather than quantity increased in importance as the 80s progressed.

For the relatively small, integrated, producers there was left three possible routes for retreat: to concentrate on heavy sections or plates or go electric themselves.

One last point should be underlined here: the limited relevance of the normally cited figures -raw steel production- as compared to figures that show production on a product basis (that are used in fig 5.3-5.9).

The effect of CC clearly demonstrates the need for carefulness, if we are to use aggregate figures. CC's effect on raw steel production was quite dramatic. 100 mn t raw steel in 1970 implied 73-75 mn t of products. Today ca 85 mn t of raw steel corresponds to the same amount of products, i.e. a decrease of some 15% in raw steel production, does not correspond to any decline in *finished* steel production at all.

Thus, and importantly: If we should describe steel production as being in a "severe crisis" etc., because raw steel production had declined by 15% after ca 1975, we would be guilty of a rather misleading mistake. A decline of this magnitude was really no decline at all, only the effect of more efficient productive facilities.

4.4.3. The mini-phenomena revisited

The development of the "mini-mills", as they were traditionally defined -producing 10.000-500.000 tons of steel in one specialized, low value-added product line, dependent upon abundant local scrap markets[157], and

[157]This point shouldn't be overemphasized in the case of Italy, though (below). Clearly, in this case, the existence of important local scrap markets was important, but one should recognize that Italian scrap imports hovered around 4-7 mn t/y between 1960-90. One of

serving primarily nearby construction markets- proceeded along these lines because the innovation had to penetrate the traditional industrial structure through its weakest links. Ultra-high power furnaces offered unintegrated producers an opportunity to produce 0,1-0,5 mn t of steel in existing furnaces. From this position there was no possibility whatsoever of reaching the flat section of the market.

Instead, it was the low-quality and low-breakeven segment of the market[158], that was within striking distance for the new operators. The weaknesses of the traditional long product producers -being located at raw materials rather than markets, experiencing high and increasing costs for capital equipment, and demonstrating a considerable amount of technological/entrepeneurial inflexibility- were the strong points of the emerging producers.

This is exactly what should be expected from an innovatory line of production: to emerge in a rather invisible way, through the simplest product lines, i.e. these that were least readily adaptable to the new oxygen-based technologies.

Turning to the minis location in the ECSC, we note their remarkable concentration to northern Italy (Lombardy) especially to the immediate neighbourhood of Brescia (hence the nickname "the Bresciani")[159].

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the entrepeneurial possibilities exploited by the Bresciani was, evidently, the possibility of importing scrap from the whole of the ECSC-area.

[158]Sections, Tubing. See Barnett D/Schorsch L (1983), p 160 f, 164 ff.

[159]There was, of course, mini-mill construction all over Western Europe during the 60s and 70s, as the entrepeneurial possibilities opened up by modernized electric arcs and CC was recognized. The most important mini-mills outside Italy was the German Korf group -which was, in fact, a pioneering attempt to construct a concern of mini-mills, a concept that was realized by the Italian producers as the 80s progressed. ARBED and Usinor had joined this trend by the early 90s; Nucor had pioneered the concept in the USA.

Led by the arch-type entrepeneur Willy Korf, this group constructed mini-mills in Germany, (Baadische (1966) Hamburg (1970)) in the USA, in France, and in the Mid-east. Korf developed, as well, interests in a DRI (Directly Reduced Iron) project at Emden, in cooperation with a Norwegian state-owned gas producer, as DRI is an extremelly energy consuming technique), to avoid total dependence on scrap as a raw material, as he was worried over the power of the integrated producers in the scrap market. During the 60s the big German companies had, apparently, operated in such a manner as to decrease open market scrap availabilities, when Korf had disturbed the technologic equlibrium.

The problem that the Korf group encountered during the recession was twofold. Its hasty expansion loaded the group with debt and made it vulnerable to downswings in the market, and the move into DRI was ill-timed (premature). When Emden was nearing completion scrap prices was lower than ever and natural gas prices had tripled.

f

Steel production was of long standing in the district, going back to charcoal furnaces, which were succeeded by the early steelworks of the north Italian industrial revolution. Then, after the second world war, the region was the center of a remarkable entrepeneurial revolution based upon abundant hydro-electric power, available manpower familiar with steel production and a nearness to booming construction markets (Milan, Bergamo etc). Similarily, the existence of these markets implied a good scrap availability. In fact, many of the minis made their appearance through forward integration, when scrap dealers moved into steelmaking[160].

The boom in Italian construction markets up to the mid 70s deserves mentioning, together with the strategy of Finsider: concentrating investment into the South and into the flat product concept, the state firm left much of the Northern building markets to the Bresciani.

The adaptability of these producers in the period up to 1975 is, indeed, impressive. Continuous casting had been introduced in the mid 60s, and by 1972 all 23 producers listed in Stahl und Eisen had adapted the technique[161]. Moreover, it is evident from this list that all producers

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In 1975-76 the Kuwaiti government had saved the company, taking a 30% share in the group, a move that should be compared to the Iranian move into Krupp a year earlier, but in 1982-83 the company's overextension forced Korf into*Vergleich* (bankrupcy) proceedings. The plants survived under new owners, but Korf was eliminated from the scene. On Korf, see: WiW 34/1980 "Akquisiter eigener Ideen", p 56-60; WiW 1-2/1983 "Appell an den Kanzler", p 84; WiV 3/1983 "Am Ende doch besiegt", p 34-37, and Goldberg (1986), p 23-24, 132-34; MB 830118 p 23.

Apart from the Bresciani and Korf there was, naturally, more construction in other parts of the ECSC. In France four mini-mills were built up to 1975 (including Korf's) on French mini-mill construction: MBM 3/1975, p 23-24; MBM 12/1975, p 32-33. Thyssen controlled the Dutch mini-mill Nedstaal and in the UK there was a boom of electric capacity construction during the 70s, as private capital was reentering the sector (most importantly GKN, Sheerness, Alphasteel etc.), at the point most vulnerable to the integrated producer (The UK: See note 141, sect 4).

Overall, though, EC electric capacity was remarkably concentrated to the private Italian producers, and, as the 70s and 80s progressed, it was these entrepeneurs that was to become pivotal in reforming the West European steel structure, at least after the fall of Willy Korf. Therefore our discussion is heavily concentrated upon this striking development.

[160]Fumigalli M (1978), p 9-11, 23-25. In the case of Korf, and in the US, the reverse case was evident, steel fabricators integrating backwards. Barnett D/Schorsch L (1983), p 87-88.

[161]Lüth F (1972), p 366. The capacity figures occasionally published in, for example, the MBM between 1975 and 85 is more telling by what they do not reveal, than by what

listed had adapted to the ultra-high power furnace technique. The enormous difference betwen the Italian producers and their Lorraine-based competitors, is readily seen from graphs 5.2 a-f, below.

In fact, the coming of the mini-mills deserves, in a wider context, to serve as a textbook case of the breakthrough of a new production function, and of the different entrepeneurial perception needed in a situation such as this. The adaptive wave underway in Lorraine, Saar and Vallonia after ca 1965 was, to no small extent, a classic lemming migration, all the classical producers following each other into the same technical solutions, despite their very limited possibilities to utilize them. The Lombardian producers and Willy Korf had left this "technological paradigm" altogether:

> "Many analysts tried to discover the 'weak points' of the Bresciani, who were critisised for using electric furnaces in the production of rebars and for wasting a very precious raw material - scrap. One of the 'weak points' was believed to be the fact that the industry was often set up in an improvised way by scrap merchants, or... the old artisan industries like small forges producing agricultural tools, who availed themselves of the opportunity offered by the technical simplicity with which rebars could be produced.../they/ used old and obsolete installations, and this was considered another indication of the supposedly transient nature of their industry... in fact, what appeared to be 'weak points' turned out to be the strong points. Electric furnaces are increasingly used... for the production of low-carbon steel.../and/ by avoiding the necessity of high depreciation

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they reveal. Most Lombardian firms did not publish capacity figures, "Arc furnace size and capacity: Answer-Yes"), in the face of increased outside threat (EC Commission, integrated producers etc.). On the secrecy of the Bresciani Fumigalli M (1978), p 35, on the outside critiscism of them, Fumigalli M (1978), p 9, 27-35.

Riva -founded by a scrap merchant in the 50s- was rated at a capacity of 0,1 mn t /y in 1971. By 1991, after the acquisition of the former GDR mills Brandenburg and Henningsdorf, Riva's capacity had grown to in excess of 5 mn t/y, more than the capacity of, for example Krupp or Hoesch, before their merger in 1992.

This point is important to make, beacause it demonstrates that the "steel crisis" was not a crisis of "de-industrialization", or any "general decline of basic industry". The crisis was a crisis of an old industrial paradigm having to adapt to the introduction of a radically different mode of production; the rethoric being the result of the much greater possibilities of the older mode of production to influence its sociopolitical environment. In fact, this environment was, to no small extent, a direct outflow of "the basic industries" of the 19th century.

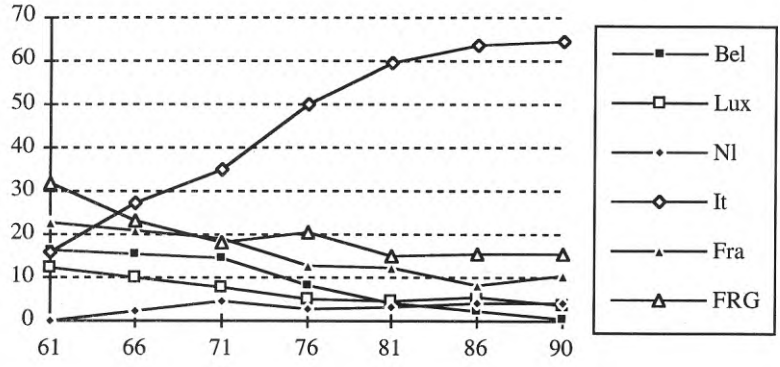
In the US Nucor has experienced similar rates og groewth; from 0,3 mn t (1970) to a capacity of some 6 mn t when its new projects are coming on stream. Riva's (and Beltrami's, Feralpi's, Pittini's and Lucchini's) growth are deeply ingrained with its West European context, whereas Nucor's pattern of growth are distinctively American.

> and heavy financial burdens, they could achieve a remarkable cash-flow which eventually enabled them... to renew their installations using up-to-date and sometimes revolutionary concepts"[162].

This time had, as we have touched upon, arrived by the mid 60s, when the Bresciani were among the pioneers in the utilization of CC. By the mid 70s a considerable wave of investment in electric arcs was underway, as well (fig 5.2 d).

Thus, it was well equipped producers that entered the export market at an accelerating rate after 1974, when the Italian building market stagnated. Similarily, there was a marked movement into merchant bars and wire rods, during the later 70s[163]. The close to incredible Italian penetration of the markets for rebars, merchant bars and wire rods is readily seen from graphs 4.2 a-c. The resultant decline in prices is seen from fig 4.3.

Figure 4.2. a. Proportion of Rebar production among the original EEC members, 1961-90, (in %).



[162]Fumigalli M (1978), p 33.
[163]Fumigalli M (1978), p 11, 33-35; MB 870113 p 21.

Figure 4.2. b. Proportion of Merchant Bar production among the original EEC members, 1961-90, (in %).

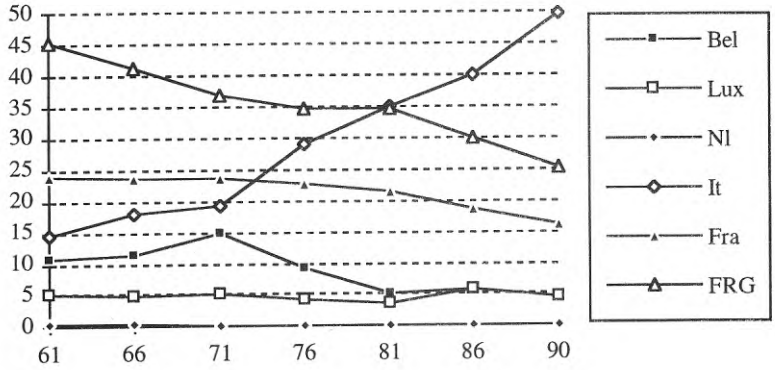
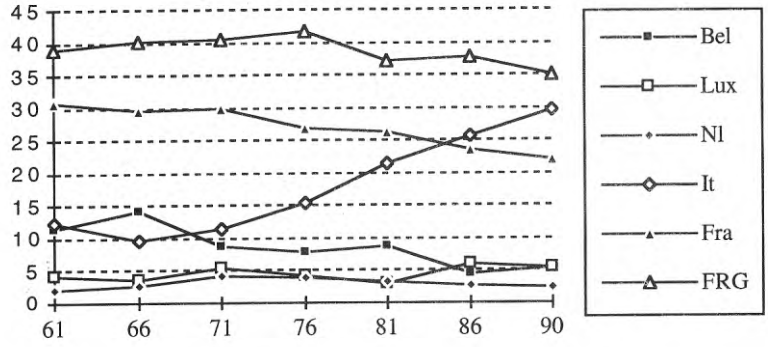


Figure 4.2 c. Proportion of Wire Rod production among the original EEC members, 1961-90, (in %).



Source: Eurostat. Siderurgie, Annuaire (Luxembourg).

After the adaptation to the ultra-high power furnace/continuous casting complex, the next hall-marks of the emerging producers are rather logical. During the 80s and early 90s, they were instrumental not only in

the remodelling of the entire Italian steel complex. Moreover, by the later 80s they were becoming an important force in the remodelling of the West European[164] steel complex. The pursuit of continental strategies was logical, in a situation where the utility of the earlier strategies (as described by the figures 4.2 a-c) was reaching its limits.

Serving the whole of Western Europe from Italian electric arcs is simply not feasible. The alternative to continental strategies -to build much larger DC-furnaces in Lombardy- would have exposed the expanding Italian operators[165] to the same weaknesses as traditional intergrated operators experienced after ca 1965/70[166].

Concludingly, it was the innovatory behavior of the mini operators and the persistent investment patterns of the traditional producers that tended to reinforce the strengths of the new producers: If the 60s had seen an important increase in the numbers of minis, the 70s and 80s saw the collapse of the traditional integrated light section producers. Then, the late 80s and early 90s witnessed a confounding trend, when minis started expanding in size, and turned towards completely new markets. By the early 90s mini-concerns[167] with capacities between 2-5 mn t had made their appearance (below). In 1991 it was suggested that Nucor might become the largest US steel producer within some decades[168].

The reason why this gradual process deserves to be recognized as an archetypal example of the Schumpeterian concept of innovation is obvious: *the outstanding fact about the minis have been their quite fascinating ability to adapt to changing circumstances in order to remodel their competitive position.* The introduction of ultra-high power furnaces, the innovatory behavior during the introduction of continuous casting, the move to take advantage of the collapse of the majors (which made it possible for the minis to acquire facilities abandoned by integrated producers) and finally, the moves towards building concerns of minis, were all examples of constantly changing -yet logical- innovatory strategies.

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[164]See the case studies in section 5.2. For the importance of minis in other parts of the world (Japan, USA, South-east Asia), see sect 5.3.

[165]E.g. Riva, Lucchini,Feralpi, Arvedi etc.

[166]Inflexibility, high capital charges, increased transportation costs.

[167]Mentioning just some examples: USA: Nucor, Nothwestern Steel and Wire, Florida Steel. Japan: Tokyo Steel. Western Europe: Riva, Beltrami, Lucchini.

[168]See the AUS study cited in Iron Age 5/1991, p 5.

By the late 70s and 80s, the "majors" had to react and adapt to the emerging production function[169]. To a large extent this was done by the shedding of underutilized integrated capacities, in other cases the majors accepted the mini concept themselves. In Germany we are able to see how Thyssen converted Oberhausen (and Nedstaal), and then sold off Oberhausen to Beltrami. Other German producers tended to leave light section capacity altogether. In the UK private interests remade the sector in close accord with BS. In France there was widespread conversion after 1977/78 (a process that was still continuing during the early 90s) when Usinor-Sacilor reconverted their Lorraine mills to the electric route. In Belgium-Luxembourg there was close coordination between ARBED and Cockerill, as the Luxembourg centers were concentrated towards heavy section production.

4.4.4. The effect of collapsing prices and the situation in the markets

The need for the "traditional" -integrated- producers to react, is evidenced by price developments.

Thus, prices for rebars and merchant bars collapsed desperately during the mid 70s, demonstrating the influence of producers able to supply the market from wholly new production functions. This illustrates, in itself, the consequent impossibility of producing these products at integrated plants at, essentially, the same costs as that of other products, which were possible to price 20-30% above light sections[170].

Let us once more emphasize the very different implications that this had in the markets for light sections, as compared to the markets for heavy sections and flat products. In the light section segment of the market Belgian, German and French producers were losing markets shares to the mini-mills in a radical way (figures 4.2, 4.5 b). In other markets room for maneuvre still existed.

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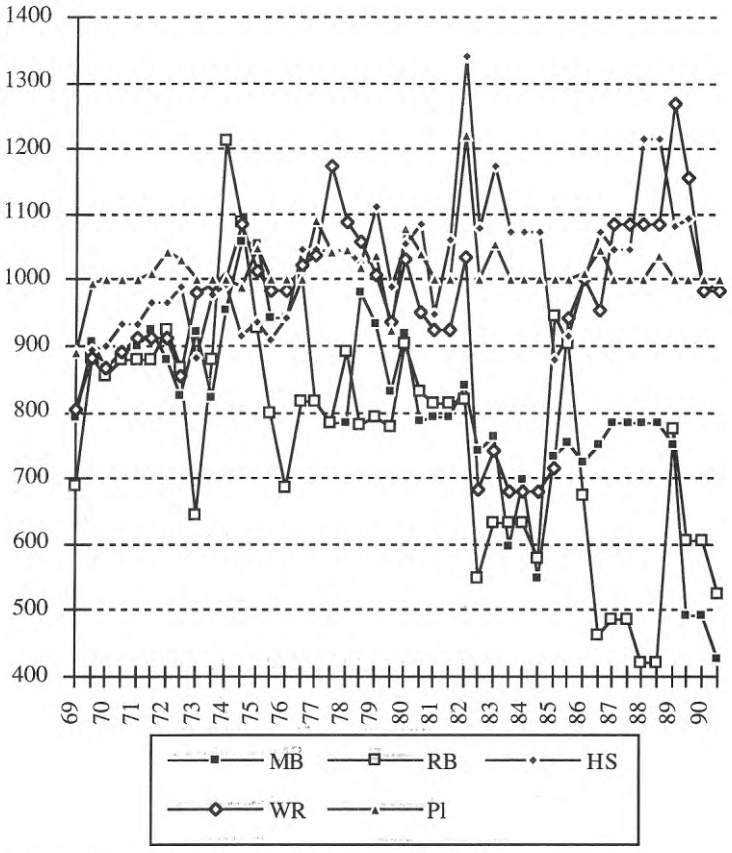
[169]What follows is a short outline. The cases are fully discussed in sect. 5.

[170]It should be noted that wire rods (which gains in price strength after the early 80s), have a price (basing point: Brescia) ca 30% below the one quoted here, (Piombino). The only reason that WR prices hasn't fully collapsed along with MB and RB prices, is that Bresciani capacity has been strongest in these two products (Italian exports of WR are, for example, rather insignificant, as compared to exports of bars). This is, of course, the main reason for the opposition towards Italian plant expansion North of the Alps (sect 5.2): there is still a market to guard.

Figure 4.3. **Price evolution for different steel products in Italy, 1969-90.** Prices relative to Sheet prices: Rebars, (RB), Merchant Bars, (MB), Heavy Sections, (HS), Wire Rods, (WR), Plates, (Pl).

Sheet prices each period = 1000.



Note 1: Prices in January and July each year.

Note 2: Italy is used as an example of price trends in the ECSC because of the early advent of the minis in this country. The relevance of Italian prices, and the need for other producers to react to the Italian price trends (at least in the medium- and long-term) is evident from the actual developments in the ECSC steel industry after 1975.

Sources: 1969-75: Eurostat, Siderurgie; 1976-81 Metal Bulletin, 1982-86 Metal Bulletin Handbook, (Worcester Park); 1987-90 Metal Bulletin Prices and Data Book, (Worcester Park).

Thus, sections of the sheet market was still expanding (in some instances (coated sheets) at quite significant rates), and the heavy section market offered possibilties to niche producers (as discussed in sect 5.2). As seen from the figures below (4.5 a; 4.7) the ability of traditional producers to supply flat products was never wholly undermined. With regard to sections, the picture was very different, as exports declined in a rather dramatic fashion after 1973.

These are events that need to be seen in a Community-wide context, because they implied very different things to different producers. To the mini-mills there was room for expansion; for the real large producers such as Thyssen, with large sheet capacities, the crisis was to become a crisis of rationalization and modernization. It was for the smaller -traditional and still integrated- long product producers, that the crisis was to become a matter of survival.

As a whole, these developments has to be seen against the background of what had happened in the period after ca 1960. At this point in time several producers had, with quite important implications for the future, started to become increasingly export dependent. The trend towards an escalating export dependence was a direct reaction to the coming of the BOP (which had provoked an unprecedented expansion in capacity). It was, as well, a direct reaction to the Community's internal pricing structure, where prices were, generally, about 10% higher, as compared to world markets, in the period preceding 1975[171], (below).

As is evident from figures 4.4 the new capacities were only mirrored in a limited expansion of home markets - in Germany, for example, steel consumption declined five years out of seven, between 1961 and 1967.

Thus, there were very few really buoyant steel years during the 60s, consumption growth being dynamic only for a few years during the late 60s and ca. 1972-74. The boom in capacity construction in the late 60s/early 70s was, even in the best of circumstances, a very risky undertaking. Its possibilities for success would, ultimately, depend upon the continuous ability to expand exports.

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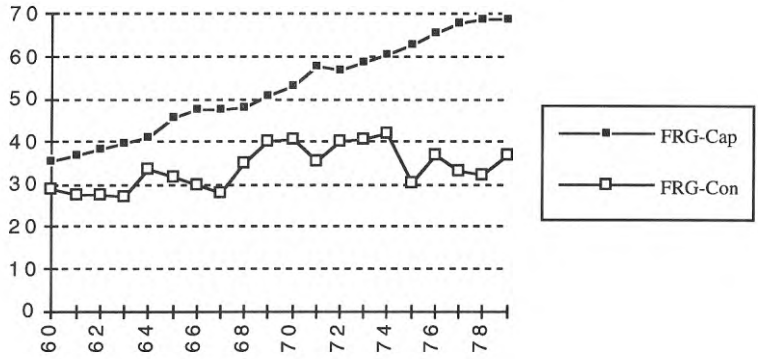
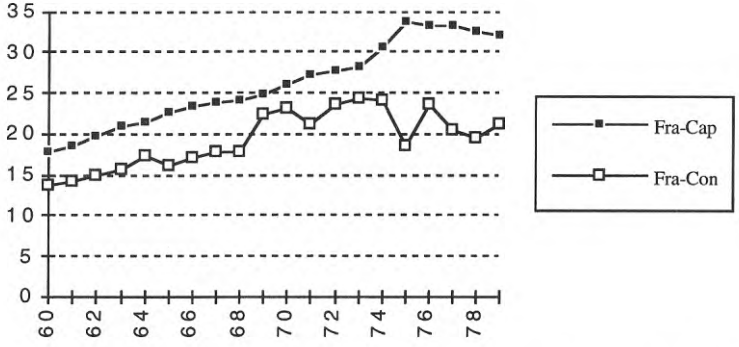
[171]Friden L (1972), p 34, 116-24; Messerlin P (1987), p 124-26.

Figure 4.4 a-d. Capacity and Home Consumption of steel in Germany, France, Belgium-Luxembourg and Italy 1960-79. (In million tons).

4.4. a. Germany.

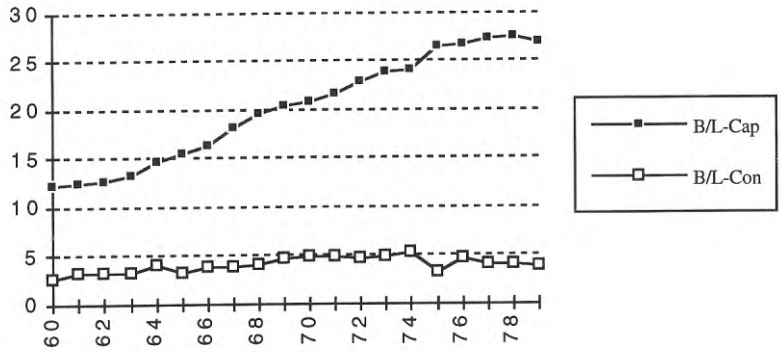


4.4. b. France.

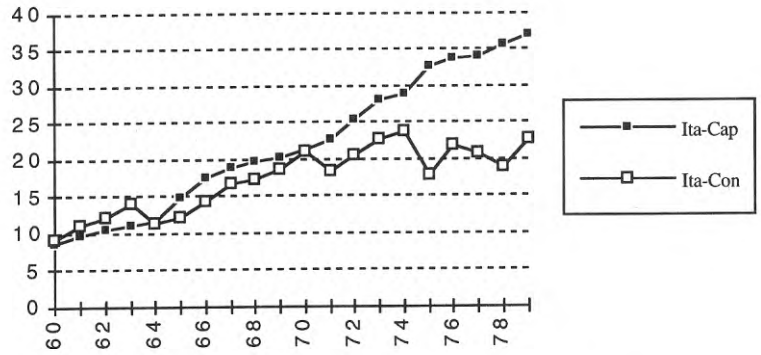


Sources: for 4.4a–d: **Consumption**: The Steel Market, (New York). **Capacity**: Die Investitionen in den Kohle- und Stahlindustrien der Gemeinschaft, Zusammenfassender Bericht über die Erhebungen 1956-65; 1964-73; 1974-80, (Luxembourg 1966,1974,1980).

4.4. c. Belgium-Luxembourg.



4.4. d. Italy.



Then, the different things that *this* implied in different markets has to be recognized. Intra-community markets had, up to 1975, been interpenetrated in a careful way[172]. Some large producers had, instead, turned towards Extra-community exports; i.e. exports which paid less, but didn't threaten the existing internal price structure (SA fig 12)[173].

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[172]Stegeman K (1977), p 195 ff.

[173]By meeting all price competition in the ECSC market, the large German producers would have threatened their home market price structure (a home market that was to 80%

Truly aggressive behavior, with respect to Intra-community sales, had been confined to a few small, primarily Belgian producers[174]. These producers aim was to decrease third country sales, in preference for sales on the EEC market[175]. Thus, a rather interesting picture had developed, where some small, *but integrated*, Belgian producers had been allowed to increase their market shares, whilst the shares of the French and German producers had stabilized in the Community market. Instead, the German producers, refraining from Intra-community expansion, pushed Extra-community sales, as a direct response to capacity increases that arrived in train with a stagnating home market, (fig. 4.4).

The problem that this pattern presented after 1975 is clear. During the 60s, it had been possible for the Germans and French to accomodate these relatively less important Belgian producers but after the mid 70s, they would have to compete with a completely different production function. The problem that the mini-mills represented to the traditional big German producers, had been in evidence as early as in 1968-69[176]. After 1975 the problem was only to become much more pronounced.

As markets started to shrink, rather than stagnate, after the mid-70s, informal accomodation became impossible. Expanding sales in Extra-community markets grew progressively harder, when trade restrictions and general problems of growth limited these possibilities in an even more severe way[177].

The basic problem was multi-faceted: Capacities were increasing at alarming rates, while consumption was falling, and the possible way out of this problem -increased third country exports- was effectively blocked. As new problems emerged, the destabilization of the threatened

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supplied from themselves). In the perspective of the possible destabilization of the whole of the ECSC market, if competition was met to the full extent, it was preferable to use third country exports as a vent for the surplus production.

[174]Boel, Clabueqe, Thy-Marcinelle.

[175]Stegeman K (1977), p 92 f. The share of Belgo-Luxembourgian long product exports that went into the EEC 12 market had increased from 50,6% in 1963/4 to 55,6% in 73/4. By 1981 this ratio had reached 65%. It is rather significant that this pattern wasn't in evidence with regard to exports of flat products. In this case the share of Belgo-Luxembourgian exports that went into the EEC 12 states declined from 76,8% in 63/4 to 73,7% in 73/4. By 1981 the ratio was down to 66,5%. The aggressive producers which increased their shares of the EEC market during the 60s were some small/medium sized, integrated, producers of long products.

[176]Stegeman K (1977), p 113-16.

[177]See, for example, Messerlin P (1987), p 128-30.

equlibrium was for everyone to see. The Italian mini-mills were arriving on Community markets in a significant way, while -to meet needs in the other end of the market- major new coastal flat-producing capacities were constructed. The Intra-community market threatened to become much more competitive, as "outsiders" to the old system started arriving on the markets.

As already underlined, the producers which were hardest hit by these developments, were the traditional and integrated producers, as these were disproportionally dependent on the Community market for light long products (i.e. the Vallonia, Lorraine and Saar based ones). In fact, the aggregated figures used for the drawing of fig 4.5 b *underestimate* the collapse in export sales from some of the traditional steelmakers, in the segments most under threat from the emergent mini-mills. Belgo-Luxembourgian exports of rebars and merchant bars declined from 3,6 mn t to 1,5 mn t between 1973-77, whereas during the same period Italian exports of these products increased from 1,3 mn t to 2,3 mn t. *The Italians were expanding in a shrinking market.* That is, the increased Community dependence that had been pushed by the Belgians after 1960 was no longer a guarantee for survival. On the contrary: the hour of redemption was arriving.

We are by now able to see why the inaugeration of the ECSC quota schemes had to become a rather drawn out process, as steelmakers were no homogenous group. The large Dutch-German producers were heavily dependent on the world market, and any open schemes of market sharing would clearly threaten these (the most effective) producers with retaliation from third countries, while also limiting any possibility to expand in the Intra-community market.

On the other end of the spectrum there were the almost bankrupt steelproducers of inner Europe. From these quarters the most persistent calls for the application of paragraph 58 were sure to come.

Between these two poles there existed something of an unstable twilight zone. In the downswing of 1975 it was evident that some producers -primarily the nationalized Italian and British steel industries[178]- tried to expand their sales of flat products at cut-down prices. That is, the old rules of informal market sharing mechanisms were falling apart, as the newly constructed capacities along the West European shore-lines were coming on stream. Similarily, in the downswing of 1980 it was Klöckner

[178]Stegeman K (1977), p 282-83; Tsoukalis L/Strauss T (1987), p 198 ff.

and Finsider, both of which having new coastal plants, that demonstrated aggressive behavior.

Another aspect of the problem of homogenity needs to be discussed, as well. Putting trade figures in perspective, we are able to see how little developments were directly influenced by Japanese competition in the ECSC home market, with regard to the really critical product lines. Japanese exports of rebar and merchant bar into the Community was 0,1 mn t in 1977; that is, before "voluntary" trade agreements were drawn up between the EEC and Japan. As is evident from the disaggregated figures in SA fig 12, the "Japanese problem" was mostly felt as West European losses of market shares in disputed areas[179].

In the case of flat products the situation was somewhat different. Japanese exports of sheets and plates into Western Europe grew from 1,3 to 1,8 mn t between 1973 and 1977, to decline in a quite dramatic fashion after the instituting of "voluntary" trade agreements. By 1981 these exports were down to 0,2 mn t, at which level they stabilized.

Clearly, the Japanese imports were never a very significant factor on the EEC steel market, *but* the increase in their market share in the flat segment of the market after 1975 was an unwelcome event in itself, to producers already hard hit by stagnating markets and increasing overcapacities. In order to gain control over the market, this disturbing trend had to be arrested, as a precondition for the successful inauguration of cartelized solutions. By itself a VRA with Japan could solve absolutely no problems: what it could do was to eliminate one potential outsider from the market. (The extent of export losses are demonstrated in figs. 4.5 a-b and SA fig 12.).

Falling internal consumption (fig 4.4) was compounded by stagnant, or falling exports of steel. Of prime importance was, again, the virtual impossibility of export expansion, which was especially true for long products, where a decline of quite unprecedented proportions set in for some of the traditional exporters. Hence, there was to be no "easy outlet" for the expansionary projects of the early 70s.

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[179] Total steel imports from Japan into the EEC 12 area were 1,8 mn t in 1973; 2,1 mn t in 1977; 0,3 mn t in 1981 and 0,4 mn t in 1985. When Japanese exports to the ECSC culminated in 1977, the areas total consumption was 111 mn t.
In the US, the situation was very different, in this country Japanese steel imports ran at ca 10 mn t/y during the 70s. In a way this influenced the ECSC steel companies as the Japanese were displacing European suppliers on the US steel market.

Figure 4.5. a. Exports of Flat products (Plate, Sheets, Strip) 1963/4-85.

In thousands of tons

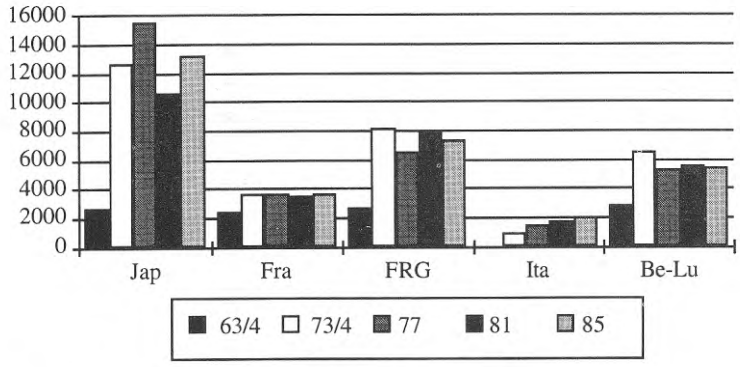
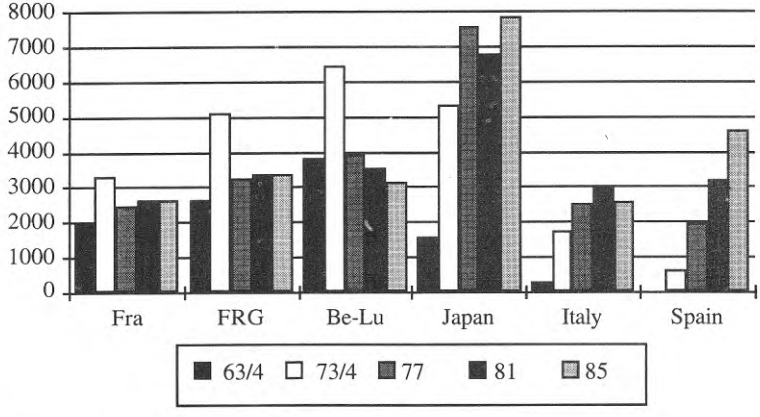


Figure 4.5. b. Exports of Long products (Heavy and Light sections, Wire Rods) 1963/4-85.



Note: Figures for 1963/4 and 1973/4 are averages for these years.

Sources: 1963-64: Commodity Trade Statistics. United Nations Statistical Papers Series D, New York). 1973-85: Statistics of World Trade in Steel, New York).

Figures 4.6 a-b and 4.7 a-b demonstrate these changes in the home markets of some important producers/exporters. Here, we are able to trace the early importance of the ECSC. Import penetration ratios (for

flat as well as long products), rose from 2-4% in the early 50s, up to ca 20% in the early 60s. Thereafter, the trend slowed down, interpenetration ratios edging up to ca 30%, by the mid 70s[180].

What happens after this point in time is, on the other hand, something rather dramatic: Import penetration ratios take off with regard to long products, reaching 50-70% by the 80s., while self-sufficiency ratios starts declining in an abrupt way. Traditional producers of long products[181] were losing their ability to export, while their home markets were coming under very severe pressure, as well. This hadn't, as we can see, been the case before the mid 70s, when exports increased in line with imports.

Italian developments needs attention, as well. In this country the self-sufficiency ratio reaches its maximum by the late 70s, and there is no significant increase in the import penetration ratio, either. On the contrary, import penetration of the Italian long product market had culminated in the period directly following the freeing of the Italian steel market, in 1958-59. Judging from Italian import penetration and self-sufficiency ratios, it seems that the competitivity of Italian producers increased significantly after ca 1963. In this connection the figures 5.2 a-f, is highly interesting, as well.

With regard to flat products, the picture is a radically different one. Export surpluses continued on high levels after 1975, market penetration rose slowly until the mid-70s.*Thereafter it stabilized, at exactly the same point in time that the long product market was collapsing,* (confirming the trends readily seen in fig 4.5).

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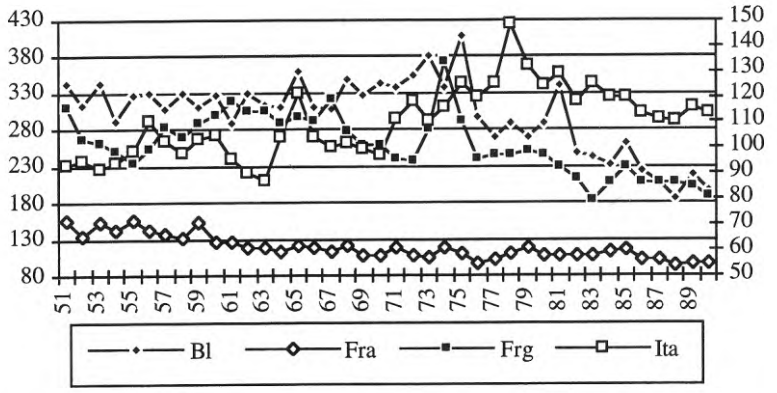
[180]The ECSC must, essentially, have normalized trade flows in Western Europe after 1952. The autarky of the early 50s, a picture virtually unchanged, as compared to the 1936-38 period), seems bizarre: A country must, normally, even if it has an important export surplus), import more than 2-4% of its production, at least because some areas will be nearer to foreign plant than to the indigenous ones etc.
From figures 4.7 a and 4.8 a we are, as well, able to see the importance of steel exports to Belgium-Luxembourg and France during the 50s and 60s (Lorraine overcapacities, as compared to French needs) in long products; the Monnet strip mills implying overcapacities in flat products, as well.
As import penetration into these countries increased up to 1975, there were few signs of exports drying up, either. Instead ECSC interpenetration increased, and dependence on third country exports decreased in importance, *which could only mean trouble, if any ECSC partner was to be able to supply the market from radically altered production functions.*

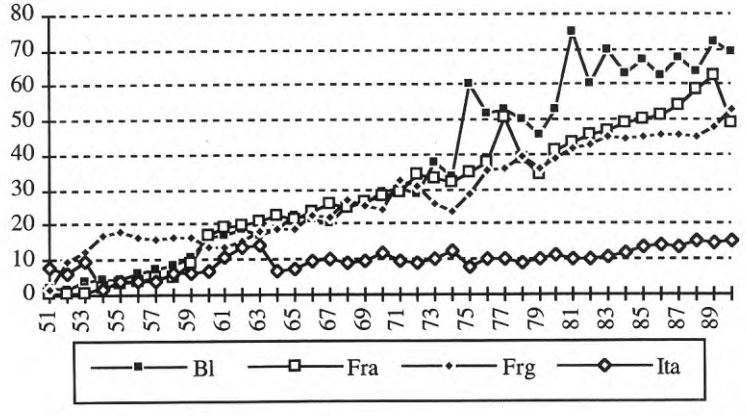
[181]In Belgium-Luxembourg, France and Germany.

Figure 4.6. a. Self sufficiency ratios. Heavy and Light sections, 1951-90 (in %).



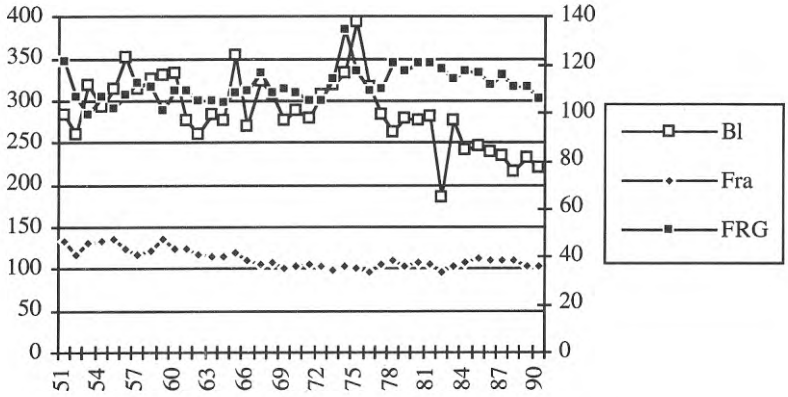
Note: **Left hand scale**: Belgium-Luxembourg and France. **Right hand scale**: Italy and Germany.

Figure 4.6.b. Import penetration ratios, Heavy and Light sections, 1951-90. (Belgium, France, Germany, Italy)(in %).



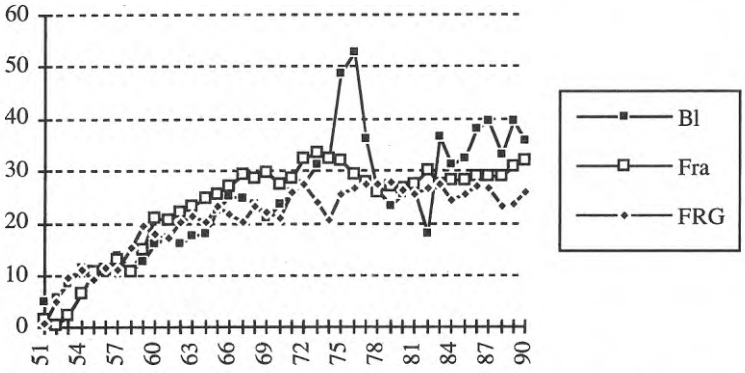
Sources to figures 4.6: See fig 4.7 b.

Figure 4.7.a. Self sufficiency ratios. Flat products, 1951-90.(in %).



Note: **Left hand scale**: Germany and France. **Right hand scale**:Belgium-Luxembourg.

Figure 4.7.b. Import penetration ratios, Flat products, 1951-90, (Belgium, France, Germany)(in %).



Sources: (4.6 and 4.7): 1951-63: Quarterly Bulletin of Steel statistics for Europe; 1964-87: Commodity Trade Statistics, United Nations Statistical Papers Series D. 1988-90: Eurostat. Siderurgie, Luxembourg).

Summing up: The "steel crisis" of the 1970s and 80s was to a considerable extent a crisis with different features in different sectors. The traditional producers of sections were losing market shares to the electrical producers[182], production of plates were retreating as well. Production of sheets was, on the other hand, expanding all through the period, although lower growth and the coming of CC for slabs made extensive rationalization necessary in this sector, as well.

NOTES REFERING TO FIGURES 4.6–4.7.

Note 1: to figures 4.6 and 4.7: Saar is included with France up to July 1, 1959.

Note 2: to figures 4.6 b and 4.7 b: Import Penetration Ratio defined as

$$\frac{\text{Imports}}{\text{Consumption (defined as production - exports + imports)}}$$

Note 3: to figure 4.6a: Production of heavy and light sections as proportion of consumption (defined as production-exports+imports).

Note 4: to figure 4.7 a: Production of strip, sheet and plate as a proportion of consumption (defined as production-exports+imports)

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[182]It should be noted that this intensified competition arrived on top of the problems that had already beset these traditional, often inland, producers: the insufficiencies of their traditional strengths - ores, coals etc.

5. Steel and the end of consensus

5.1. Moment of truth. Steelmaking in the age of the crisis

The story of West European steel in the period after 1975 is a remarkable one.

First of all, it can only be understood as a continuation of trends visible since the early 1960s. That these trends were clearly percieved by the mid 60s, is evidenced by the direction of investment plans in the period 1965-75 (sect. 4.3).

Indeed, we treated the period 1950-75 as an entity - in spite of the fact that we date the early traces of the "crisis" at least from the mid 60s- in order to cover the expansion plans drawn up in the period (ca.) 1965-75, in direct connection to the problems that appeared after ca 1960. *It should be recognized that these plans were, to a great extent, direct reactions to the shortcomings of the earlier structure* (i.e. the need for general rationalization measures, and the need to react to the coming of oxygen steel).

And then, after the wave of investments in the period around 1970-75, feathers were coming home to roost. The expansion of capacities (fig 4.4) was a reflection of the adaptive wave. The hollowness of this expansion was clearly unveiled by the mid 70s, but there was to be a long and consequent series of delaying tactics from governments, as private capital prefered to bow out of certain parts of the imploding sector.

The role of the governments was to reach its maximum during the intensified crisis. It was now that nationalizations and systematic intervention were turning into strategic policy tools, developed in order to get on top of a socioeconomic crisis of veritable proportions.

We have seen how a pattern of dual control had been developed by politicians and private capital in the period leading up to the 1970s. Political actors were nurturing interests in an industry that was ready to implement their overriding strategies (modernization, the development of competitive national industries, the avoidance of regional conflict), in exchange for the inflow of subsidies and the ability to get access to subidized sources of credit.

Of course, the structure that evolved was intimately connected with economic growth. One level offered access to funds, the other level was offering modernization, expansion and social peace. For obvious reasons, the interests involved could feed upon each other, in order to continue

developing everincreasing strategies for expansion. Then, more and more political levels tried to jump the expansionist perpetum mobile, as it created new possibilities for patronage and for the execution of regional policies etc.

The drawbacks of this development are evident. The structure becomes intimately bound up with expansion, and clear lines of decision making and strategy communication ceases to exist, being suffocated under new and evolving layers of influence peddling and political interference. "Managerial autonomy" in systems such as the English or the French was, even before ca 1965, to a certain extent an autonomy of formulating demands, to be communicated to the trade associations, that is, their collective tool of communication with the government(s). In this situation, which was only much more pronounced after 1975, it became necessary for the governments to try to streamline industrial decision making, in order to get control over the use of state funds and national strategies.

This process is evident in countries with privately controlled steel industries, as well as in countries where the state was in "control" from the very beginning (Italy). In this perspective the nationalization of industries becomes policies of utmost necessity, rather than policies of "radicalism". Governments had always been involved in the steel industry, and after the late 1940s they had, to an increasing extent, turned into the bankers and strategists of the sector. By the 70s -in order to salvage anything from the wreckage of "industrial patriotism"[1]- it was necessary to straighten up the organizational chaos created by decades of strategy confusion. The luxury of a privately owned industry, when governments had the real financial control, was only possible to pay in a period of expansion.

Again, the similarities between the privately and publicly held industries should be stressed from the very beginning. When the Belgians and the French were going through the motions of gradual nationalizations, the Italians and British were struggling to get a firm grip on nationalized industries beset with political and managerial confusions. By this point even the Germans, with banks and politicians working in unison, were moving towards a pattern of intervention aiming at the rationalization of industrial decision making.

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[1]Jack Hayward's phrase.

This rationalization created similar effects everywhere. One effect was that industries turned even more nationalistic -as national governments had to prop up their respective "national champion", subsidizing neighbors wasn't politically feasible. Alas, the industries had to become ever more national, cutting themselves off from foreign connections (ARBED-Saarstahl, Cockerill), or being, in essence, cut off from them (Hoogovens). Moreover, the number of steel producers were greatly narrowed in each country, as it was another luxury to deal with more than one ailing company. Having to deal with different demands from different managements may be possible and/or feasible when capacities are *intended* for dupli- or triplication. On the other hand: in a period when choices have to be made, and the weeding out process is in full swing, *control gets imperative.*

It may seem to be a paradox that the role of the EC Commission was greatly strengthened during this nationalistic phase of the cycle. In reality, though, the decisions to invoke paragraph 58 (manifest crisis-quota measures) of the ECSC charter, during the autumn 1980/spring 1981, were the logical continuation of the crisis. If the seperate states wanted to remain inside the EEC-ECSC structure, than it was only through the use of paragraph 58 that this could be done, as it contained the keys to an ordered withdrawal from the cornered situation of the 1970s.

During the later 70s the supra-national ECSC-attempts to get "control" over the situation had been hesitant (in view of the different interests among the different member states and different steel producers, see sect. 4.4.4). Thus, it was at this point in time that attempts to get control over the markets were made through the use of the producer associations (DENELUX and EUROFER), but after 1980 these "voluntaristic" attempts had collapsed along with the intensified depression and systematic cheating[2].

These problems -the widely differing interests, and the intensified depression- were reflected in the 1980-81 invocation of paragraph 58. As

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[2]The first Davignon-plan (1977) provided for the introduction of voluntary production quotas in order to raise prices, typically enough, singling out rebars for a mandatory system of minimum prices. As it was, this scheme of voluntary production cuts coincided with the eased market conditions of 1978-79; when depression hit again in 1980 the scheme collapsed immediately. These developments should be compared to the destiny that befell the ISC in 1930, see sect 2.2.1.1. See, as well, Tsoukalis L/Strauss R (1987), p 198-203 and Müller J/Loeber H-D/Dey G bd 1 (1983), p 188 ff.

the Germans, which were having the most efficient steel industry, were least interested in "58", they were able to press for a strengthened role for the Commission in the negotiating process. It was in the course of this negotiating process that the Commission was granted effective control over national subsidy policies[3].

The invocation of paragraph 58 was, however, no isolated measure. Ever since the 50s, more or less open designs intended to deal with "unrestrained competition" had been part and parcel of the continuing development of the ECSC. The basing point system, the right to align, the nationalized or nationally controlled firms, the *Walzstahlkontore*, the DENELUX and the EUROFER, the joint ventures- all of these were measures that, one way or another, were intended to foster coordination between the main producers. It was the virtual collapse in the markets after 1975, and the almost contemperaneous arrival of a number of different "outsiders" to the old system, that made the old informal ways of dealing with these problems relatively harder to implement and police. In short: industrial heterogenousity and the incentives to cheat had increased after 1975.

After 1980/81, though, the powers wielded to the Commission in exchange for the quotas -a real supranational control upon subsidy policies[4]- became a tool to regularize the exit option. Of crucial importance in this connection is the fact that, as chaos and costs were mounting, this had become the preferred choice of separate governments, anyway. Budget constraints and the demands of the Commission, propped up by the member governments with the most competitive steel industries, combined to force measures of structural adjustments. In themselves these measures may not have been too hard to identify. It was just that they were complicated, in a socioeconomic sense, to carry out[5].

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[3]See Grunert T (1987), p 278 ff and Helin W (1986), p 21-22; Müller J/Loeber H-D/Dey G bd 1 (1983), p 194 ff.

[4]The fundamental diffence as compared to coal policies should be evident here. Thus, in coal no-one was pressing for a return to "market conditions". In steel there were several actors pressing for exactly this: the German and the Dutch government and steel producers. After the restructuring of their indigenous steel industry, the British pressed for a discontinuation of the scheme, as well. In 1980 the British government had -despite its market oriented reputation- been amongst the proponents of the invocation of article 58.

[5]What the quotas really meant in the sense of "delayed restructuring", we will never know. As it was, the restructuring measures undertaken after the late 70s did, in fact, in many ways conform to what would have been done under a more "market-oriented"

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So, the invocation of paragraph 58 made it possible to carry this change through in an orderly fashion, and during the period 1983-87 the position of the respective steel industries changed in a formidable way. The Commission has continued to hold extraordinary powers over subsidies even after the phaseout of quotas (1985-88[6]), assuring a return to something that may be called competitive conditions. These emerging competitive conditions were, by the recession of the early 90s, compounded by the dramatic political changes to the East of the Community. Thus, this recession saw the continuation of rationalization measures, as outlined in the period 1983-87. By 1987 the West European steel industry was beginning to rationalize in an international setting. The recession of the early 90s seems to have speeded up this process (as should be expected).

To sum up we will focus on three distinct sub-periods during the period 1975-93:

1975-81: A period of crisis identification, when losses reached unheard of heights, triggering off the beginning of the restructuring phase, during

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regime, anyway. It was equally clear that these restructuring measures were undertaken because of utmost budgetary necessities (rather than being done in order to conform with Commission demands).

A special feature of any quota scheme needs to be underlined in this connection. The existence of quotas may, in itself further cooperation and restructuring, through exchanges of quotas (as happened, for example, in Luxembourg-Belgium), or the buying of quotas (as happened, for example, in the UK), but they may, equally well inhibit restructuring *for exactly this reason:* Even if some production may be unprofitable, the decision to stop it may be delayed, because the quotas are, themselves, valuable.

[6]In 1985 rebars and coated sheets were freed from the quota system, wire rods and merchant bars were freed at the end of 1987; heavy sections, plates and sheets went off quota six months later.

As it was, the discontinuation of the scheme was a somewhat drawn out process, where it was the most efficient producers that wanted to retain the scheme (not least because the conditional ban on subsidies had given the Commission real powers over the Italian and French industries). What was feared by 1987/88 by German, British and Dutch governments was that a discontinuation of quotas would lead to renewed subsidation in (primarily) Italy. In the end, it seems to have been the unwillingness of governments to continue to take responsibility for the industry, that settled the question in favor of a liberalization, that was coupled to a continued ban on subsidies (i.e. a continued, important, role for the EC Commission). On the later developments of the quota scheme, see MB 850719 p 19; MB 851101 p 23; MB 861024 p 23; MB 861121 p 23;MB 870317 p 23; MB 870605 p 35-37; MB 870727 p 19; MB 871123 p 23; MB 871210 p 29; MB 871214 p 19; MB 871231 p 3; MB 880118 p 23; MB 870509 p 33; MB 880606 p 27; MB880620 p 23; MB 880630 p 23.

which a streamlined industrial command structure started to evolve. (Strategy: the orderly retreat from chaos. Structure: increased governmental control over a declining number of national steel producers).

1982-87: A period when the industries were returned to a state of conventional profitability, through the intensification of crisis measures. Survival strategies grew clearer and the structural coherence of industries was greatly increased. These measures were a continuation of trends apparent by the late 70s, but they were much more logically ordered, and accepted, by ca. 1984-85.

1988-93: A period when national structures had been rationalized and thus had increased in competitive strength. This made positive strategies, rather than strategies of coherent retreat, possible to pursue. These strategies turned, to an increasing extent, international in scope, and by 1993 much of the nationalistic structures that had evolved between 1950 and 1985 were shaken to their foundations. Thus, by 1992/93 when problems once again returned, especially in Germany and Italy, transnational solutions appeared pivotal if problems were to be solved.

A rather interesting (seeming) contradiction in the early 90s was the widely differing tendencies evident between mini-mill operators, as compared to traditional "big steel". Whereas the integrated German/Italian companies (Ilva, Thyssen, Klöckner, Krupp-Hoesch) were in the midst of a deep crisis, the innovative mini-operators of the 60s and 70s expanded rather vigorously (e.g. Arvedi, Riva, Lucchini, Celmag).

Before entering upon the national examples, we note the correspondence between the Community's energy and steel markets. Up to the 70s an interrelated set of factors (crisis in basic industries - need for socioeconomically acceptable strategies), led to increasingly national industries. Trade expansion and interpenetration was hampered by these problems, as well. By the late 70s this economic paradigm was in a crisis of escalating dimensions, and by the 80s a real internationalization emerged, as the impasse of the period (ca.) 1975-80 had become impossible to uphold in the face of stagflation, budget pressures and tensions inside the Community. The period after 1985 seems to represent a very important break with the past. The innovative forces of the preceding decades (the coming of an integrated world fuel market, mini mills, continuous casting etc.), seems to be on their way of penetrating the old structures, finally laying traditional coal and steel to rest.

To finalize our point: in a long-term perspective, the means to regularize competition and structural change seemed to escalate up to ca. 1980/81; thereafter the virtual impossibility (because of escalating direct

costs, and general problems of economic stagnation due to the vicious circles) of containing the imploding structure forced a gradual turnaround, towards something that may be termed "market-oriented mechanisms".

1. A first phase may be distinguished up to ca. 1975. It was marked by a) greatly increased steel-making capacities and b) greatly increased national coordination (through fusions, *Walzstahlkontore,* state intervention etc).

Moreover, home markets were, to a considerable extent, protected by the basing point system and the right to align, which limited aggressive behavior in Community markets. Large producers tended, instead, to become more dependent upon third-country exports.

2. The second phase, was marked by the coming of the Simonet- and Davignon-plans. The breakdown of these industry-administered plans led, directly, to the paragraph 58 years. By 1975 -as increased third country exports was turning into a barred possibility, and home markets declined in an unprecedented manner- Community-wide and open coordination had become necessary. When the wolves turned inwards, after the mid 70s, losses escalated at tremendous rates, turning national subsidies and coordination into expensive and lost causes.

So, in the context of the Community, it was necessary to move from informal to formal ways, in order to police the market-place. Despite this, costs (economic and political) continued to soar.

3. It was this continuing escalation of costs that forced the attempts to liberalize the stagnant sector. At first, these attempts were rather tentative and reluctant, but after the early 80s, a visible movement towards market-oriented solutions was clearly percievable, as outlined above.

5.2. National experiences

5.2.1. France

5.2.1.1. The French connection. The general problem of the minette-region (with special reference to Lorraine), in the light of the Mini-mills

The French steel producers entered the post-1975 era in a parlous state. The round of expansion started by the mid 60s -Gandrange, Fos, the expansion of Dunkirk- was coming on stream when the deepened phase of the depressive wave was entered. Consequently, the financial state of the producers was alarming[7], and major rounds of rationalization were necessary, in order to concentrate production to the most productive plants. A thoroughgoing adjustment of productive capacity was necessary after this unparallelled round of new construction.

It was, of course, in Lorraine and in the coal-field locations of the *Nord* that the roots of the problem lay. The expansion at Dunkirk implied thorough reorganization in Longwy (the former home of Lorraine-Escaut), and at Denain, where the old strip mill of the Monnet plans was located. In Lorraine proper, the expansion at Gandrange had provoked major restructuring measures as early as in 1969 and 1971[8]. As production continued to fall at an accelerated pace after 1975, when the impact of Italian competition was being increasingly felt (fig 4.2-4.3), continued rationalization and restructuring proved necessary.

The localization of the crisis is evident from figure 5.1. The problems of the low-yielding Lorraine ores, had been in evidence in all recessions during the 60s, it is highly significant that the expansion after 1969 largely bypassed the area. After 1973, though, stagnation was followed by a decline of unprecedented proportions (SA fig 11).

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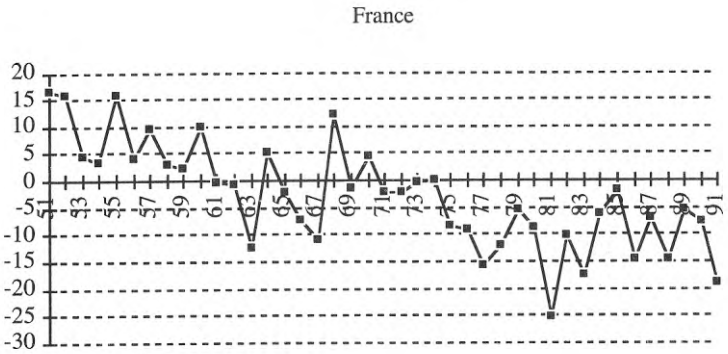
[7]McArthur J/Scott B (1969), p 370-73; MB 650709 p 15.

[8]Among the Bessemer based facilities. There is a concise description of French steel, from the mergers around 1965 up to 1975, available in MBM 6/1976, p 7-14.

Figure 5.1. France, Production of Iron Ore, 1951-91 (yearly change in %).



Source: 1951-87 Statistical Yearbook (United Nations, New York), 1988-91 Monthly Bulletin of Statistics, (UN, New York).

What had happened has already been discussed. The relative decline in prices of (primarily) Brazilian high-yielding ores, had underscored the drawbacks of Lorraine ores after 1960 -provoking the "Drang nach der Küste"- when the potential advantages of high-yielding Extra-european ores were utilized: Coke rates were halved and oxygen converters utilizing (Brazilian) hematite ores were 10-15% more effective, as compared to the LD-AC converters.

By 1965-66 the additional drawback of dependence on inland supplies of coking coal[9], had been instrumental to the instituting of the ECSC coke-subsidy system[10], simultaneously large scale modernization was started in Lorraine (and Vallonia).

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[9]Increasing in cost, as compared to imported coal, figure 3.2.

[10]The pressures for structural change was, as we have seen, growing in strength by 1963-66: Ore imports into all member countries in the Community were increasing at unprecedented rates and the prices for imported energy in direct competition with coal was decreasing. The structural forces making for large scale reorganization during the Kondratieff recession, were all tending to increase the pressure felt in the old steel-making districts, as these were, less well placed to handle the technological imperative, as compared to the new coastal locations.

In Lorraine, it was the Gandrange project served as a cathalyst for the achievement of large scale organizatorial reorganization. These developments were mirrored all over

The shoring-up effect of coke-subsidies and large-scale modernization of older production centers is obvious. Furthermore, in spite of the fact that the LD-AC process made oxygen steelmaking possible in the minette districts, the structural implications of the new paradigm were impossible to avoid, anyway: The low-yielding ores were uneconomic to use, which implied, in the medium-term, that the minette was replaced by imported ores. As LD-AC converters had been installed (requring basic ores), this made for an increased importance of Lappish -rather than Brazilian- ores in the district[11].

The problem with this trend is evident. If the minette was replaced within its own district all comparative advantages had vanished, as the costs for transporting ore and (given the eventual disappearance of the coke subsidy) coal into the traditional districts were higher than the costs for transporting them to coastal locations[12].

The modernization of the traditional districts upon the lines of the existing technological paradigm could, in the medium- to long-run, only constitute an intermediary solution to locational problems. The greatest drawback to the strategy was, thus,

a) its sensitivity to energy costs and

b) its capital costs were comparatively high. The drawback of energy cost made necessary the construction of sintering plants, modern efficient blast furnaces and converters. As is evident from the figures below (figure 5.2 a-5.2 f), investment in France-Est (representing Lorraine) was much higher than investment in the non-coastal regions of Italy

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Western Europe at exactly this time. In the UK BS was founded, in Belgium support systems was reorganized to support the fusion of firms, in the Ruhr there were several fusions (centering on Thyssen and Hoogovens), centering on the importance of the new oxygen processes. The reemergence of the German cartels (the *Walzstahlkontore*) is, as well, evidence of the increased pressures felt by steel producers by 1965-67.
Moreover, the coal industry was in dire straits. In the Ruhr the collapse of the concept of the *Rationalisierungsverbande* was followed by the formation of the *Einheitsgesellschaft* (1968), the same thing had happened in Campine the year before. In the UK the Plan for Coal (1965), was a concept for the thorough rationalization (shrinking), of the industry. The same forces were behind the radical shrinking concepts that appeared in France and the Netherlands between 1965-69. In coal consumption figures, the break in the series around 1963-65 is evident. It was the end-result of the structural changes discussed above, this made the coke subsidy scheme importabt; not only to coal-mining districts, but to inland steel producers, as well.

[11]In Saar, the Minette was, virtually, replaced by Lappish ores during the sixties (sect 4.3.4.1).

[12]Warren K (1975), p 158-62, 182-89; v d Ruijst A (1970), p 493 ff.

(taken to represent Lombardy) each year up to 1972, but the direction of investments were disparate. Thus, in Lorraine 30-50% of investment went into ore preparation, blast furnaces and traditional steel making. This proportion never exceeded 10% in Lombardy, where investment into electric steelmaking and continuous casting was much more important (figures 5.2 c-5.2 e).

The result of these divergent investment strategies was that the producers in Lombardy managed to increase their capacities much more economically, as compared to the French (figure 5.2 a and 5.2 f)[13]:

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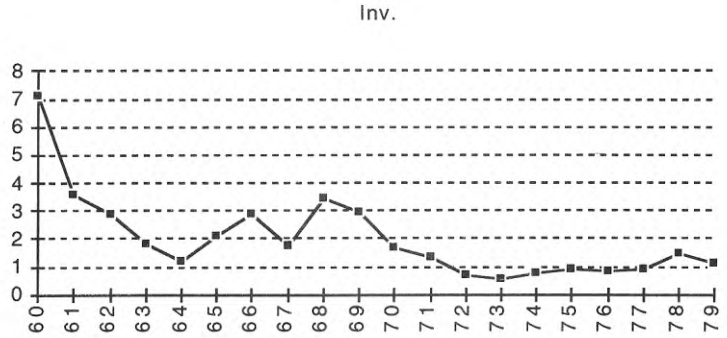
[13]In absolute quantities: between 1960-79, the capacity increase was 1,8 mn t (steelmaking) and 1,3 mn t (long products) in France-Est. In Italy, inland, the increase was, respectively, 14,8 and 12,5 mn t.
During this period the French had invested (at 1960 USD), a total of 2581 mn USD and the Italians 1751 mn USD. These figures indicate a cost per incremental ton in Lorraine at USD 1433, in Lombardy at USD 119.
Even when the greater replacement need in France-Est (a total of 8,4 mn t of capacity shed between 1960-79, compared to 1,6 mn t of capacity shed in Italy, inland), the cost differentials are still very substantial: In this case we arrive at a French capacity construction of 10,2 mn t, an Italian of 16,4 mn t. The resultant cost per ton for new investment becomes USD 253 in Lorraine, and USD 106 in Lombardy.
Another aspect of the Lombardian pattern of investment is important, as well: The early advent into continuous casting in Italy implied two advantages: Lower specific energy needs and higher yields on products. In 1979 CC capacity in Lorraine-Est was 0,4 mn t; in Italy, inland, it was 11,1 mn t.
This implies that the Lorraine capacity should have been able to produce ca 9,7 mn t of finished products in 1979 (8,6 mn t 1960), while finished capacity should have been ca 15,4 mn t in Lombardy (3,9 mn t in 1960)*.
Again considering shedded capacity (same as above, at a 75% ratio this becomes 6,3 mn t in Lorraine, 1,2 mn t in Lombardy) we arrive at incremental production capacities of 7,4 mn t in Lorraine and 12,4 mn t in Lombardy. In these circumstances investment costs "per ton of newly installed finished steel capacity" becomes USD 349 in Lorraine and USD 137 in Lombardy.
Clearly, the very greatest advantage that the Lombardian producers had was their efficient investment strategies. The investment into France-Est between ca 1965-75, must, on the other hand, be considered as monies spent without a cause. Between 1978-93, most of the investments that had been made between 1965-77 into the "adaptive-modernization concept" was closed down -the new oxygen furnaces at Gandrange, Neuves Maison, Longwy-Rehon etc.- and replaced by electric furnaces, fully equipped with continuous casters.
*Given a yield of 75% from conventional production techniques, 92% from CC.
All figures are taken from: Die Investitionen in den Kohle- und Stahlindustrien der Gemeinschaft, Zusammenfassender Bericht über die Erhebungen 1956-65; 1964-73; 1974-80. (Luxembourg, 1966, 1974,1980)

Figure 5.2.a. Investment in Steelmaking in France-Est, as a proportion of investment in Italy, inland, 1960-79.



Note: Italian non-coastal regions each year=1.

Figure 5.2.b. Proportion of investment in preparatory stages and blast furnaces, France-Est and Italy, inland, 1960-79 (in %).

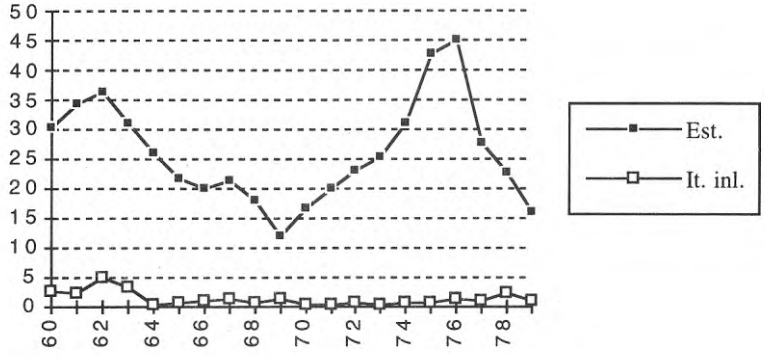
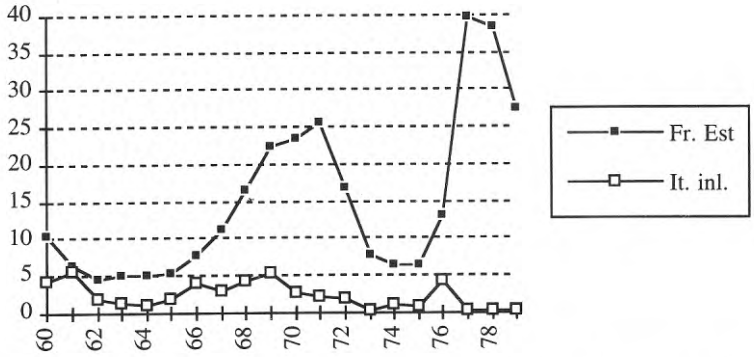


Figure 5.2.c. Proportion of investment in traditional or integrated steelmaking. France-Est and Italy, inland, 1960-79(in %).



Note: Traditional or integrated steel= OH's, Bessemer process, Oxygen processes.

Figure 5.2.d. Proportion of investment in Electric steelmaking, France-Est and Italy, inland, 1960-79 (in %).

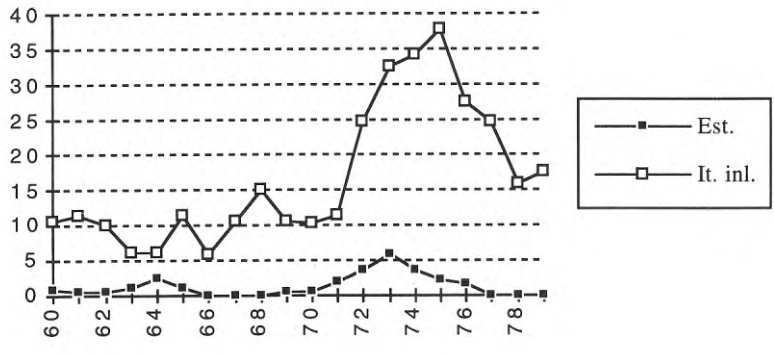


Figure 5.2.e. Proportion of investment in Continuous Casting, France-Est and Italy, inland, 1960-79 (in %).

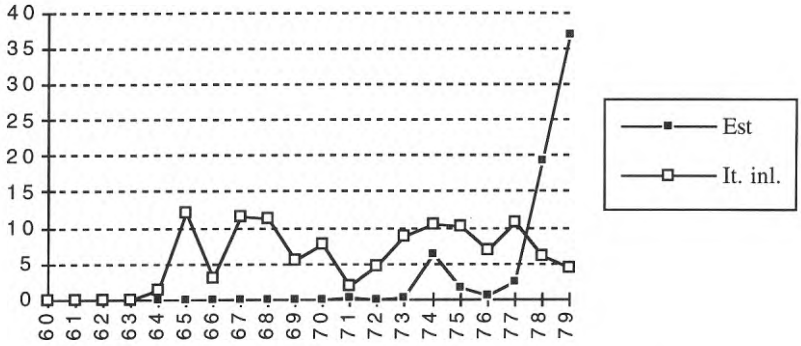
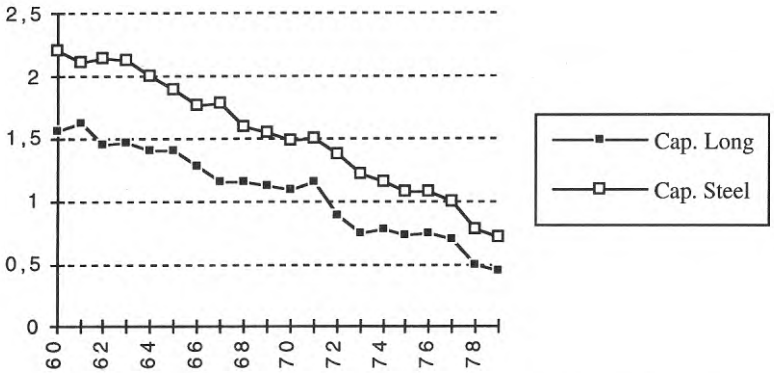


Figure 5.2.f. Steel making capacity in France-Est as a proportion of capacity in Italy, inland, 1960-79.



Note: (5.2 f) Capacity Italy inland each year=1. **Black dots:** Capacity Long Products; **White dots:** Total steelmaking capacity.

Sources: (5.2 a-f): Die Investitionen in den Kohle- und Stahlindustrien der Gemeinschaft, Zusammenfassender Bericht über die Erhebungen 1956-65; 1964-73; 1974-80.(Luxembourg, 1966, 1974,1980)

Thus: transport costs, ore costs, energy costs, the pattern of investment, all of these factors had for more than a decade worked to the disadvantage of the minette-region. Indeed, the preferred pattern of investment tended to make problems *worse,* by placing staggering debt-burdens upon producers.

5.2.1.2. French rationalization and its outcome

In a falling market the compounded impact of escalating energy prices, excessive debt burdens and increased international competition[14] made problems critical. As over-capacities opened up everywhere, the threat of bankrupcies and mass redundancies soon proved explosive, and the Barre government was called upon to intervene. The 1977 programme called for major restructuring measures, and the shedding of 16.000 jobs, but it was still concieved in an atmosphere of overall optimism, and the judgment of the CSSF was still trusted. That is, it was accepted that demand was to recover in a relatively short term. Thus, the modernization of existing facilities could safely to be entrusted to the main companies and the CSSF, in exchange for financial assistance (1,3 bn FRF) from the state[15].

Thionville was the first integrated production center to be turned into a mini-mill[16], but overall the plans of 1977 were still centering upon modernization along the lines of the 60s. There were plans for thorough, oxygen-based, reorganization and expansion at Hayange, Neuves Maison, Denain and Longwy[17]. This point is worth stressing, as it demonstrates the fundamental difference between the plan of 1977 and the plans of 1978/1984. *The plan of 1977 was still drawn up in a context where the crisis was seen as cyclical rather than structural. Thus, the full*

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[14]Increasing the problem of "over-capacity". The concept "over-capacity" should be understood in a dynamic context, though. All through any depression there will be new investment ongoing in an industry such as energy or steel - but these investments will be undertaken into new production functions (technologies, products, regions). "Overcapacity" is a relative concept: Some production functions -e.g. Lorraine-based integrated steelmaking- will be much more affected by it than others.

[15]On the views of the CSSF, see MB 770311 p 39-42; the government MB 770422 p 36; as well MB 770812 p 32; Hayward J (1987), p 521.

[16]See Fumigalli M (1978), p 33; MB 770408 p 37.

[17]MB 770429 p 32; MB 770712 p 33.

implications of the move to the coast and the emergence of the minis were still to be accepted.

The continuation of enormous losses during the remainder of 1977, when demand for steel refused to take off, made new rounds of state funds pivotal, as USINOR and SACILOR were dragging down some major banks into the abyss, with themselves[18]. By 1978, when the situation had become really critical, de facto nationalization was resorted to, in order to get effective control over real decision making.

State debts to the tune of 9 bn FRF were converted into voting debentures in the firms, placing effective control in the hands of the state. The thorough debt consolidation undertaken at this point in time[19], and the rapid rationalization measures, made it possible for USINOR and SACILOR to stay in business, until the arrival of the Mitterand government.

The old system, where trade association, firms and the finance ministry made up plans of their own, had led to disorganization and confusion: "Only too often no one quite knew where and by whom industrial decisions were taken"[20]. When urgent measurs had to be adopted in 1978 -a stop to the investment plans of 1977; the closedown of operations in Denain and Longwy in phases[21] (22.000 redundancies over 18 months)-

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[18]USINOR and SACILOR lost 5,3 bn FRF in 1977, and 3,5 bn FRF in 1978. The medium- and long-term debt of the firms had reached 38 bn FRF by early 1978. Hudson R/Sadler D (1989), p 83-85. See, as well, MB 770520 p 37; MB 771108 p 39; MB 780210 p 33; MB 780331 p 35; MB 780422 p 37; MB 780623 p 33; MB 780919 p 37; MB 780922 p 36.

[19]Müller J/Loeber H-D/Dey G bd 1 (1983), p 221-23; for further details, see MB 780919, p 36. The state took, in effect, over responsibility for most of the outstanding debts of the companies.

[20]Stoffaes C (1980); and MB 790213 p 36, on the highly significant end of Jaques Ferry, who had been the deciding force in French steel for more than a decade. Ferry had, as head of the branch organization, been able to use his position between producers (the firms), and creditors (the government and the government controlled banks), in such a manner as to deeply influence developments. (See Hayward J (1987), p 506-07). With the government taking effective control over the industry, there was no longer any place for a go-between, heavily associated with the mistakes of yesterday.

[21]Semis supplied from Dunkirk, and, during a transitional stage, from Neuves Maison and Rehon (Longwy - ex Cockerill). The strategic importance of the 1978 moves, as compared to those taken in 1977 are important. 1977 saw, in spite of the extensive job cuts undertaken, a continuation of the moves taken after the mid 60s. The reconstruction of Neuves Maison, Longwy and Denain, using new highly productive techniques (BOP) was, in fact, development along the lines undertaken at Gandrange around 1965. What we are seeing is, essentially, attempts to redevelop older locations -whose chief

effective control had to be instituted to implement rationalization measures in a truly forceful manner[22].

It was in line with these developments that Chiers-Chatillon-Neuves Maison, as well as Cockerill's Rehon plant, was absorbed by USINOR. The absorption of the remaining capacity in norther Lorraine into USINOR implied, together with the 1966 absorption of Lorraine-Escaut[23], that the move towards the coast (Dunkirk) was accepted. True to this point, integrated steelmaking at Longwy and Neuves Maison was phased out in stages after 1978[24].

The major features of the restructuring process is seen from figure 5.3. Cutbacks are concentrated to the light section sector of the market, combined to a simultaneous conversion into electric steelmaking. In the flat section sector there is stagnation (especially with regard to plates) at exactly the time when major new investment was coming on stream. The developments should be seen in the context of continued, and forceful, expansion with regard to coated (galvanized) sheets and the much more severe fall in raw steel production and employment (SA fig 7, 8).

This demonstrates the very anatomy of the "West European steel crisis". To no small extent it was a crisis very much localized to certain segments of the steel market, while other market segments showed strength all through the setback.

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comparative advantages had disappeared after ca 1960- using state-of-the-art technical solutions.

The decision to phase out traditional steelmaking at Longwy (Bessemer, and Bessemer (LWS) converted to oxygen), and Denain (open hearths, LD's), was very significant. The "innovatory" character of these changes was that the old melt shops weren't replaced by new LD-vessels. Either they weren't replaced at all, the new alternative being to replace them with electric arcs.

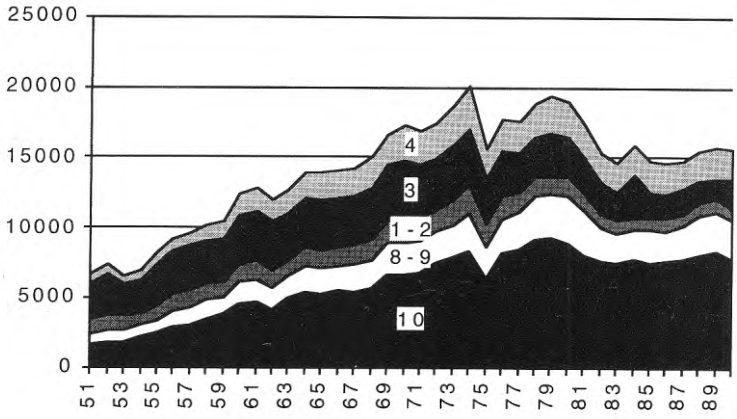
[22]See Stoffaes (1980) .

[23]Longwy based, see sect 4.3.1.

[24]MB 780721 p 31; MB 781215 p 36; MB 781219 p 37; MB 790130 p 32-33; MB 790316 p 36; MB 790727 p 32; MB 791102 p 38. There are excellent accounts of the structure of these plants before rationalization measures were instituted in MBM 6/1976, p 11-14 and MBM 9/1972 (b), p 10-13.

Figure 5.3. Production of steel by products, France, 1951-90.

In thousands of tons



Note: 1-2: Heavy Sections, Rails; 3-Light Sections (Rebar, Merchant Bar); 4-Wire Rod; 8-9 Plates; 10-Strip and Sheet.

Sources: 1951: Quarterly Bulletin of Steel Statistics for Europe (Geneva); 1952-90: Siderurgie, Statistique Annuelle, 1962-91 (Luxembourg).

The important structural developments taking place in the light section end of the sector was compounded by the very grandeur of the investment boom of the early 70s: major new flat product capacities were coming on stream when that segment of the market, (automotive, shipbuilding), started to stagnate. The structural implications of continuous casting, raising capacities by ca 15% in existing facilities, only served to make retrenchment even more inevitable.

The different implications of the crisis at different ends of the market should be noted. In the long product centers -concentrated to Saar Vallonia, Luxembourg and Lorraine- we are dealing with a crisis of reconversion, a slow movement into electric steelmaking. In the flat section of the market -the new coastal locations, Western Ruhr- it was a crisis of rationalization. The sheet and strip mills of the 50s and early 60s had to be closed down, as rationalization was needed at the less advantageous locations.

The Mitterand government arrived in office (1981) burdened by the promise of new steelworks in Lorraine. This was a dangerous

predicament, but like the plans for a coal production of 30 mn t/y by 1990, these promises were to be relinquished.

First of all the industry was nationalized once more, when 14 bn FRF of debt was converted into shares in the two companies. Thereafter a new steel plan was launched (1982) assuming a French steel production of 24 mn t/y by 1986[25]. This plan, although still calling for a continued retrenchment at Longwy and Denain (where the wide strip mill was next in line for closedown), did include some expansion in Lorraine (new rolling mills at the Gandrange complex)[26].

But by 1983 USINOR's and SACILOR's losses reached new record heights (more than 10 bn FRF) as steel production continued to fall, and the EC commission was demanding capacity cuts, as well.

So, alike the fate of coal policies, steel policies had to be sacrificed at the altar of budget constraints. The new steel plan unveiled by Mitterand in early April 1984, had a great symbolic, as well as practical value. The expansion plans for Gandrange was dropped, while electric steelmaking was proposed for Neuves-Maison and Longwy. These were all measures that symbolized the continuing move away from Lorraine ores[27]. The instigation of a greater cooperation between the two steel firms, at exactly this time, pointed in the same direction. It was no longer feasible to have two state concerns pressing for different sets of policies, when one strategy -to get out of traditional steelmaking- had been settled for[28].

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[25]MB 820713 p 27; Hayward J (1987), p 527 ff; MBM 9/1985, p 19-23; MBM 1/1985, p 37-42; ST 1/1983 "Revised French predictions", p 8. (Real level 1984: 19 mn t).

[26]MB 821001 p 29; MB 830701 p 21.

[27]Details in Le Usine Nouvelle (UN) 840405, "Siderurgie: Des choix sans concession", p 34-35; see, as well ST 8403 "French government rejects financing request", p 90.

[28]The ultimate merger between USINOR and Sacilor was important in the same sense that the absorptions of Lorraine-Escaut and Chatillon-Chiers and Neuves Maison (C-C-N-M) into USINOR had been significant. Merging these activities meant that the least effective units had to go; which had to imply the continued phaseout of integrated steelmaking in Lorraine. As we have seen the effects of the merger between Lorraine-Escaut and USINOR were slow in coming, but the merger between C-C-N-M and USINOR had been followed by immediate, and sweeping, reorganizations.
The same is true of the moves to merge parts of USINOR and Sacilor after 1984. The formations of Unimetal and Ascometal was followed by forceful rationalization; by 1987 the political superstructure had accepted the idea that Lorraine ores was doomed and the full merger was the rational solution to the continuing rationalization measures. On the continuing mergers and rationalization measures: MB 840417 p 29; MB 841002 p 25; MB 850115 p 25; MB 850118 p 23; MB 850802 p 20; Stahl und Eisen 21/85 p 11, Stahl und Eisen 22/85 p 11; MB 860905 p 23; Stahl und Eisen 2/87 p 14; MB 870206 p 19;

During the remainder of 1984, USINOR's and SACILOR's most problematic divisions were merged. For special steel long products Ascometal was formed and for carbon steel long products, Unimetal was instigated. During the next years -the full merger occured in 1987- coordination was increased on the lines laid out in 1984. Hence, major rationalizations were announced, as integrated steelmaking in the inner part of France was phased out in stages during the period up to 1988, converters being replaced by new electric furnaces.

By the spring of 1988, as the most urgent rounds of streamlining was over, and the rationalization of light section production turned international in scope. Rebar production was sold off to the Italian Riva group[29], while cooperation with Belgium's Cockerill was increased in LME[30], coordinating long product rolling programmes in France and Vallonia. Then, ARBED's inclusion into LME signalled an increased coordination of rolling programs between that company and USINOR[31]. By 1991 the expanded coordination between ARBED and USINOR led to the formation of Europrofil, a joint venture encompassing parts of Unimetal's and ARBED's long products programmes, aiming at a total coordination of the two companies rolling mills. By late 1991 the outcome of this new round of streamlining was announced, as there were closedowns of rolling mills on both sides of the border, when specialization increased (ARBED side: heavy sections; USINOR -which had installed several electric arcs after 1984- specializing on light sections and wire rods). At this point in time Gandrange was up for a conversion

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MB 870508 p 23; MB 870706 p 23; UN 870917 "Retards dans la fusion", p 39-40. See, as well: Genevaz P (1987), p 169-72; MB 880602 p 20.

[29]Riva had acquired one of the original French mini-mills (Iton-Seine), in 1976; the firm was thus well positioned to take advantage of the restructuring of USINOR and Cockerill (sect 5.2.2.1), when this time finally came. Then, during the late 80s, the firm was able to purchase mini-mills and rolling mills, on both sides of the French-Belgian border, to start expanding from this newly acquired position,

[30]Lamine Marchands Europeans (sect 5.2.2.1). MB 880523 p 39.

[31]ARBED and USINOR took over Cockerill's long products mills completely in 1989-90 (sect 5.2.2.1). Continuing rationalization in France: MB 880602 p 20; MB 880609 p 23; MB 880919 p 21, MB 900122 p 21; MB 900201 p 21. Coordination between ARBED and USINOR, and the eventual start up of Europrofil: MB850712 p 23; MB 871210 p 27; MB 910404 p 21; MB 910620 p 21; Stahl und Eisen 6/1991 p 22; MBM 9/1991 (c), p 49; MB 911007 p 45; MB 920210 p 27; MB 920430 p 20; MB 921210 p 22. See, as well, sect 5.2.2.2.

to electric steelmaking, a final confirmation of the move out of the minette[32]; [33].

Thus solving the two most problematic complexes -the dependence on low-yielding ores and the miserable situation in the market for light sections- by the phased withdrawal from integrated steelmaking in Lorraine, USINOR was able to adopt a somewhat different strategy towards the flat product sector. Here a strategy of expansion -through concentration, product development and downstream integration- was followed.

With Denain and Longwy out of the picture, Dunkirk became the unrivalled center for sheet and plate (tubes[34]) production. Hayange-

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[32]It was also decided to finish off integrated steelmaking in Normandy (Mondeville, the old Thyssen venture from 1911). At this location local ores had been the rationale for production of long products. When ore production was phased out, ore was imported to an awkward position (inland) in a situation where electrical mills were more cost efficient. Losses were, consequently, substantial and by 1984 propositions for conversion into electrical steelmaking was made, but stopped due to local resistance. The final decision to close it down in 1991, was thus an unavoidable step in the streamlining of USINOR. MB 911121 p 15; MB 921214 p 25.

When the decision to convert Gandrange to the electric route was made, another decision of some symbolic importance had to be made, as well: to phase out what remained of Lorraine ore production. Thus, the last of USINOR's three remaining mines will be closed by 1994. Thereafter, what remains of Lorraine ore production will be controlled by ARBED, which is, as well, substituting electric arcs for oxygen converters. MB 920723 p 19. On the state of Unimetal and Ascometal on the eve of this round of rationalization, see ST 8/1991 (e), p 432; (f), p 434; and MBM 9/1991 (d), p 51-55.

[33]One somewhat problematic acquisition that USINOR has done in the last years was the take-over of Saarstahl in 1989. The company has, during the last decades, only brought headaches to its owners (ARBED, the Saar government), and it seems as though there was considerable hesitation on the part of USINOR on this move before it was finally taken. The logics behind the operation should be Saarstahl's close cooperation with USINOR's Dillingerhütte, and the acquisition of old, tax deductible, losses. In order to make full sense of this merger, though, Saarstahl needs to be integrated into Europrofil, simultaneously as the converters at Dillingen and Hayange need to be fully coordinated. Moreover, the Saar works will meet a new competitive situation in a few years time, when existing mini expansion plans are realized. As the Saar government has a blocking minority in the company, there seems to exist plenty of room for problems here in a few years time. (See sect 5.2.2.2 and sect 5.2.4.1).

[34]The market for welded large-diameter tubes have been problematic for more than a decade. The duplication of facilities between the big integrated tube producers was the rationale for the joint venture with the German producer Mannesmann in 1991, which merged their welded tube capacities, creating Europipe. ST 8/1991 (a), p 430; MB 900305 p 23; MB 910211 p 21.

Seremange (of Monnet plan fame), has been kept and thoroughly modernized with new annealing lines. Fos stands at a capacity of 4 mn t/y[35]. Coating and galvanizing capacity has been increased, and a strategy of acquisition of stockholders as well as coil coaters have been pursued[36].

It is, of course, this Community-wide downstream expansion -similar to the strategies followed by BS, and on a somewhat smaller scale, by Cockerill, Ilva and ARBED- which accelerated after 1987, that had to provoke reactions among German as well as Italian producers. Their home markets were turning into battlegrounds for the acqusition of downstream activities and steel service centers, which threatened to increase competition. This process has tended to accelerate European restructuring and concentration, as the potential advantages of scale that large producers had were (at long last) realized: large product flows, possibilities to coordinate between efficient production facilities and enormous cash-flows. When USINOR, British Steel and Ilva[37] were allowed to rationalize, they had obvious possibilities to become competitive: coastal locations and modern facilities.

To sum up, we discern several distinct phases in the rationalization of USINOR-Sacilor. Up to the late 70s there was considerable confusion around decision making processes and a concomitant development of over-capacities, as it seemed easier to expand than cut back. By 1978 the financial disaster forced a decision from the government, and the impopular process of retrenchment was greatly speeded up. A short period of optimism reigned between mid 1981 and early 1984. Thereafter budget constraints made phased -but determined- restructuring necessary, once again.

As traditional steel-making in Lorraine was phased out, profitability returned, and a policy of expansion was accelerated, provoking counter-reactions in Germany as well as Italy. The problems of the policy -its

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[35]On the state of Dunkirk, Fos and Florange (Hayange), see ST 8/91 (d), p 424-26; ST 8/1991 (b), p 426-28; ST 8/91 (c), p 428-30; MBM 9/1991 (b), p 40-43.

[36]MBM 9/91 (a), p 36-39; MBM 9/91 (b), p 40-43. On the changing role of (and the acquisition of), West European stockholders during the 80s, see: MBM 4/1973 (a), p 39-47; ; MB 850416 p 25-27; MB 880630 p 24; MBM 6/1989, p 35-37; MBM 4/1990, p 31; MBM 5/1991, p 54-57; MBM 6/1992, p 26-29.
(Some examples on the reasons for the increased importance of galvanizing is available in MBM 6/1988 (c), p 24-25 and MBM 6/1988 (d), p 27.)

[37]Although there are still important problems at this company, see sect 5.2.3. (Finsider was renamed Ilva in 1988).

extreme costliness- was evident in the recession of the early 90s when profits receded[38]. Rationalization was again hastened, and in a debatable move[39] USINOR was allowed by the government to issue new stock, that was taken up by a state controlled bank[40] (getting control of 20% of the company).

It is important to point to the underlying logic of this development. In principle this demonstrates how the imperative of innovative change penetrates economic structures. Acting on the possibility of sheet production and coastal locations, the French producers responded -on government urging- to this challenge. The response was followed by an excessively long period of rationalization, when the companies also had to respond to the coming of the mini-mills, in another segment of the market.

With rationalization finally gripped, an aggressive strategy of expansion was started, leading to responses in other parts of the system. During this phase an increased internationalization of the industrial had got started.

5.2.2. Belgium-Luxembourg

5.2.2.1. Belgium

Belgian restructuring up to 1975 concentrated, as we have seen, upon the reconstitution of steelmaking around three geographically distinct centres: Charleroi (the Frere group), Liege (Cockerill), and Ghent (ARBED). In Charleroi reconstruction centered upon the Carlam facilities. In Liege there existed two strip mills and a new wire rod mill (Valfil) was under construction. In Ghent, Sidmar was up and running since 1967.

The potential strong points evident in this pattern -the existence of modern wide strip mills- opened a way to coordinate Belgian and

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[38]Thus provoking the severe rationalization measures that had to be taken towards the long products producers in Lorraine and Normandy in 1991. MB 920203 p 19; MBM 9/91 (c), p 48-49; Stahl und Eisen 2/1992 p 26.

[39]In the light of the ban on state subsidies to the steel industry in the EC. The sale was cleared by the EC Commission, as being made on market conditions.

[40]Credit Lyonaisse, 70% state controlled, bought half of this stock for 2,5 bn FRF. MB 911202 p 21.

Luxembourg restructuring. In the later country, ARBED's production profile was heavily concentrated upon the production of sections, except for the small and ageing strip mill at Dudelange. As early as 1978 this laid out an obvious track for a possible coordination between producers in the two countries.

The chronology of these events is rather similar to the French, and the outcome of the process bears strong resemblances to the French experience, as well.

By 1975-76 the crisis had, as everywhere, intensified and reached unprecedented proportions, and by January 1977 massive infusions of help was sought from the state by the firms[41].

The character of the emerging problems has already been touched upon (sect 4.3.2.1).

In the Charleroi-basin, there was an excessive dependence on long products, and the strategy for moving out of the traditional production pattern, i.e. the construction of Carlam (wide strip mill) and Carfroid (adjacent coating facilities), required a cash-flow of very considerable proportions in a situation where losses were mounting.

In the Liege-basin, Cockerill was suffering from its multitude of production sites (Chertal, Seraing, Rodange, Athus, Rehon, Marchienne, Hautmont, a minority interest in SIDMAR). Cockerill had grown out of a series of mergers. Thereafter expansion had continued at a multitude of sites in France and Belgium, when state subsidized loans (in both countries) were utilized. Hence, there was an enormous need for rationalization when markets declined after 1975 (especially as most sites were minette-dependent). The major development project in the pipeline by the mid 70s was not very promising, either: the construction of the 0,9 mn t/y wire rod mill at Liege (Valfil), which was majority owned by Cockerill (minority shares were held by Hoogovens and Klöckner).

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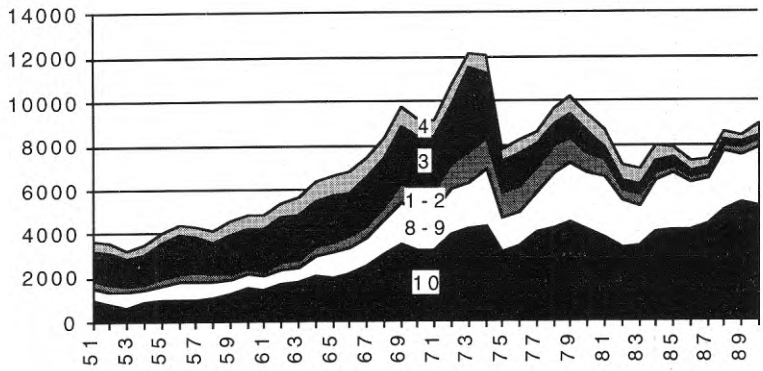
[41]MB 770107 p 37; MB 770211 p 38; MB 770225 p 37; MB 770304 p 32; MB 770308 37; MB 780704 p 32; MB 781212 p 34.

Figure 5.4. Production of steel by products, Belgium, 1951-90.

In thousands of tons



Note: 1-2: Heavy Sections, Rails; 3-Light Sections (Rebar, Merchant Bar); 4-Wire Rod; 8-9 Plates; 10-Strip and Sheet.

Sources: 1951: Quarterly Bulletin of Steel Statistics for Europe (Geneva); 1952-90: Siderurgie, Statistique Annuelle, 1962-91 (Luxembourg).

To be fully aware of the strengths and weaknesses of the different centers, it is once more interesting to look at a segmented picture of steel production. From figure 5.4, we are again able to see the localized character of the "steel crisis" (this is especially true for Belgium). The virtual collapse in production of long products is evident, together with the continued expansion in the market for flat products. Given the strengths and weaknesses discussed above and in sect. 4.4.4, the severity of the crisis in certain production centers is easily understood.

The truly critical situation that the Valloon steel companies was encountering by 1977 called for state help on an unprecedented scale. This help had to cater to the needs of extensive new investment projects, as well the day-to-day running of firms. Thus, the model of intensified state help that evolved in Belgium over the period 1977-84 had to accomodate both of these needs. While releasing emergency funds several times, the government also had to try to formulate a comprehensive strategy of modernization. The new structure that finally evolved had, moreover, to be able to implement this strategy in a national context.

The national context was central, because Belgian steel was a critical political question during these five-six years[42]. Steel was one of the central questions upon which the very existence of the bilingual nation-state hung. The balancing of the relatively healthy Flemish steel industry (ARBED-SIDMAR) against the faltering Valloon giants was a *national* consideration.

Recapitulating: during 1977 and 1978 emergency credits were released[43], while a new long-term strategy, able to find some sustainable solutions to the problems of this ailing industry had to be developed. ARBED, being an integral part of Belgian steel, was involved in this process as from the very beginning.

The first Claes plan (1978) foresaw the creation of a permanent institution for cordination between the industry and the government. The CNPC[44], was an essentially corporativist institution. It was to be in charge of the distribution of funds from the newly created SFS[45], which was to be set up with a capital of 44 bn BEF (half to be provided by the private sector, half by the government).

There were major problems associated with these policies. The rationalization and product sharing agreements concluded up to 1979/80 all seemed to favor the Charleroi basin. Primarily, the coming on stream of Carlam opened up obvious avenues of cooperation between ARBED and Charleroi, as ARBED's flat product interests lay, foremostly, at SIDMAR, while the Frere group was aiming at a strategy of dissociation from long product production. Thus, the logics of the "Banana solution"[46] (Ghent-Charleroi-Luxembourg) was already in evidence with the conclusion of the Hazinelle Accord in May 1978[47]. In this, ARBED

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[42]Maughan A (1982), p 298-304; Rudd C (1986), p 282-88; and MB 780512 p 38 MB 810922 p 29.

[43]MB 770405 p 39; MB 770429 p 33; MB 770916 p 37; MB 771011 p 37; MB771018 p 37; MB 780222 p 39.

[44]Comite Nationale de Planification et de Controle.

[45]Societe Financiere de Siderurgie. For an overview of subsidies see, as well, Müller J/Loeber H-D/Dey G bd 1 (1983), p 219-20.

[46]MB 780512 p 39 (Cockerill's options); MB 780526 p 36; MB 780704 p 32; MB 810213 p 29; MB 820205 p 23.

[47]The basic idea of the Banana solution was (and is) that ARBED specializes on heavy section production and finishing of sheets in Luxembourg and sheet production at Ghent. Charleroi specializes on sheet production. This opens up the possibility of integrating the finishing facilities in Luxembourg with the wide strip mill in Charleroi (Carlam). The

agreed to stop its plans for expansion of flat products facilities at Dudelange[48], in exchange for the takeover of heavy section capacity from Charleroi. Over the years that followed the "Banana solution" was always alive, although sometimes being a *too* logical industrial solution to problems that were primarily political.

The immediate problem was, in short, that if the phasing out of the strip mill at Dudelange held the keys to the problems at Charleroi[49], this implied that Liege risked being left out in the cold.

The Liege-based Cockerill had sold out its stake in SIDMAR in 1975-76 in order to raise cash[50]. The most modern melt shop in the Charleroi-basin (Marchienne) was ceded to the Frere-group in 1979[51]. Then Rehon was left to USINOR, and the facilities at Rodange-Athus had been turned into an ARBED-dominated subsidiary in 1977[52]. But while the weakest[53] points in the Cockerill structure were being weeded out, the strong points were few in numbers. The strip mill at Seraing was old and small, and the major new ongoing investment project was aiming at the long product market (Valfil).

These underlying differences and problems were evidenced by the fate that befell the investment plans put forward to the CNPC during 1979-80. The plans of both Hainaut-TMM and Cockerill were overoptimistic, aiming at the reconstruction and modernization of almost all existing

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modern Charleroi facilities can, moreover, be utilized in conjunction with ARBED's Ghent facilities (avoiding duplication of investment into CR facilities etc.)
Then, the pursuit of the Banana solution implied that heavy section production in Charleroi should be given up, to the benefit of ARBED's Luxembourg sites. In Luxembourg, ARBED's strip mill at Dudelange should be given up, to the benefit of Charleroi (Carlam). The advantages to Ghent was that investment could be avoided, while an increased coordination with the Charleroi facilities was possible.

[48]ARBED agreeing to use 450.000 tpy of hot coil brought in from Charleroi at its Dudelange facilities.

[49]Coordinating Carlam and ARBED-SIDMAR, running the ARBED-Luxembourg CR and galvanizing facilities entirely on coil brought in from Belgium; concentrating integrated production of heavy and medium sections to ARBED's rolling mills in Luxembourg, see MBM 7/1981, p 55.

[50]MB 751223 p 41; MBM 7/1976 a a p 15.

[51]As part of the first Claes plan. Carlam was thus equipped with modern steel making facilities. See MB 781107 p 37.

[52]The integrated facilities was closed down, the rolling mills being supplied from Esch-Belval. MB 770909 p 38; MB 770913 p 38; MB 780303 p 33.

[53]Most minette-dependent.

steelmaking facilities that still existed in the region[54]. When they were approved -almost in their entirety- by the CNPC, this spelled the end to the whole CNPC-SFS formula. It was foremostly to Cockerill (Liege) that this breakdown had disastrous implications.

The breakdown was inherent in the very construction of the first Claes plan. Even though the SFS had been set up in order to avoid "the socialization of losses" that the state had undertaken during the restructuring of the coalmining industry[55] -thus the 50-50 formula for the provision of funds, and the limited conversion of debts into state held stock[56]- the government was unable to *force* the holding companies to put up the 22 bn BEF of loan capital. When the private owners of the steel companies stalled, arguing that they had only agreed to provide a very limited sum of capital for the inaugeration of SFS[57], the scheme drifted into oblivion, and by early 1981 the crisis was more unresolved than ever.

The overall problem was that the true extent of the crisis still hadn't been fully accepted and comprehended. The plans provided by the companies to the CNPC, were much too optimistic to conform with the existing level of demand, whilst the CNPC was impotent if the SFS didn't come into being. If some kind of coherence was to be infused into this very uncoordinated and diffused structure, a leading force had to emerge among the partners involved in the drama of Belgian steel[58].

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[54]MB 790504 p 37 (Cockerill); MB 790925 (Hainaut-TMM-Ruau); MB 800122 p 39; MB 800201 p 37.

[55]MB 781124 p 37MB 781128 p 36; MB 790105 p 31.

[56]It was through the limited reconversion of debts that the Claes plan provided for a state minority shareholding in the steel firms in Charleroi and Liege. (30,9% of Hainaut-Sambre, 42,3% of TMM and 28,9% of Cockerill). *It was, thus, the government that wanted to minimize state ownership at this point in time.*

[57]MB 800411 p 37; ; MB 800701 p 38; MB 800711 p 36; MB 800815 p 33; MB 800912 p 39; MB 80919 p 38, MB 810116 p 27.

[58]Losses were mounting once again by late 1980 (MB 801021 p 37; MB 801212 p 39) and there was no money in the SFS-concept. The concept of the first Claes plan -the shared responsiblity between the state and private capital, and the avoidance of the socialization of losses- was clearly utopian. The similarities between what happened in Belgian steel in 1980-81, and what had happened to the German *Rationalisierungs-verband* in 1964-66 (sect 3.3.2.2) are striking.

In both cases the original plan was that the state and the private owners should share the costs of the adjustment and investment. In both cases the schemes broke down when the structural character of the crisis was recognized. In both cases this led to the withdrawal of private capital, which was very interested in state funding, but little interested in

This fact is of crucial importance. It is one of the central arguments of this study that the governments had to accept that they were left with sole responsibility for the sector around 1980, thereafter implementing forceful strategies of overall rationalization. In this process the governments had to be confronted with increasing social unrest, industrial pressure groups, and demands for more "just" policies. These pressures and counterpressures became, in the final analysis, the razor's edge upon which all plans ultimately balanced.

It must have been that the coalitions and interest groups that had been driving forces in the period of expansion were, by the late 70s, either in the process of fragmentization or tending to loose relatively in strength. In Belgium, for example, we are able to see how the private partners leave the politicians to themselves. Moreover, these politicians had to take the interests of the new Flemish steel industry into consideration. The question of steel couldn't be decided by the traditional corporativistic measures- the state was alone. Moreover, the question couldn't be decided by all-out expansion in both Charleroi and Liege: there were no markets, costs were truly prohibitive, and the Flemish would have counterreacted by pushing for an extension at Ghent.

The point is that the governments had to pass through this purge, to fully redefine their strategies. A balance had to be struck between the costs of trying to keep up the status quo[59], and the costs of redefining strategies. Then, when this purge was passed, strategies had to aim at the massive cutback of section production, and concentration of production to the most modern wide strip mills. Continued expansion had, thereafter, to be based upon a strategy of moving up through the market, through investment into finishing facilities, downstream activities and acquisition of stockholders.

Accomodation was impossible when coalitions fragmentized and costs increased. When this was fully percieved, turn-arounds happened everywhere. In France they happened in 1978 and 1984, in Italy between 1981 and 1983, in the UK between 1978 and 1981, in Luxembourg and Belgium in 1982/83. A seeming paradox is that the German producers

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providing funds for investment. In both cases the state was left with sole responsibility for a collapsing industry.

[59]At the (increasing) costs of budget deficits, problems within the EEC, social unrest despite continuing plans, turmoil within governments etc.

entered a phase of hesitancy between 1983 and 1987, at exactly the point in time when the other producers were redefining their strategies.

In this way the Belgian steel crisis limped on in well-known footsteps. The private owners of the steel industry had an interest in state financing, but were little interested in providing funds themselves. That problems concerning the financing of investment developed during 1980 is thus no surprise. As relations between the two owners deteriorated, so did relations with the EC Commission, which demanded increased cuts in capacity[60].

The fusion of the companies in the Charleroi and Liege basins occured in this context of utmost confusion, (Jan. 1981). Cockerill-Sambre (C-S) was created in spite of the very limited synergies that existed between the two basins. Instead, we are witnessing a situation where certain actors are pressing for their very own industrial solutions.

> "It appears that J. Charlier /managing director of Cockerill/ had taken the initiative in convincing A Frere of the usefulness of a merger... Charlier was afraid that if Charleroi was salvaged by integration with Arbed-Sidmar, Cockerill would bear the brunt of the costs of this operation, and the prospects /for Cockerill/ of cooperation with Hoogovens or Klöckner seemed slim. On the other hand, it was unlikely that the government would risk the collapse of a giant Valloon steel industry by refusing the public funds it demanded. A Cools, the President of the PS /Socialist Party/ -the major political party in Vallonia... a native of Liege, was informed and saw an oppurtunity, by becoming the champion of the /merger/, both for strengthening his position within the PS and for boosting the popularity of his party... The trio of Charler, Frere and Cools then informed W Claes..."[61].

The Cockerill solution preferred by Charlier was a remarkable one: the closedown of the new oxygen converters at Marchienne, in order to solve the problems in Liege[62]. Although this cramped solution to Liege's problems was soon discarded[63], it points to the very modest coordination gains that could be reached between Cockerill and Hainaut-Sambre/TMM.

Clearly, the fusion was pushed through by industrialists and regional politician's in unison, in order to press the federal political level to shoulder full responsibilities for the ailing steel facilities ("Hainaut-

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[60]MB 810109 p 31; MB 810116 p 27.
[61]Capron M (1987), p 716.
[62]In order to supply Carlam with steel from Liege (!) MB 810123 p 27-29; MB 810130 p 29.
[63]MB 810403 p 29.

Sambre and Cockerill only escaped bankrupcy through merging"[64]). The alternative would have been the "filialization" of the companies and the quest of finding outside partners for these different parts[65]. Thus, it was only when the federal Belgian political level accepted these costly facts of life, that some kind of structural level with overall responsibilities for the whole industry could evolve[66].

In short, the state was forced to nationalize (e.g. the continued reconversion of old debts into stock[67]), in the process winding up the doomed SFS and CNPC. Instead SNS[68] was formed, this time with state guarantees for the loans provided from the private sector.

And then, there was a rapid succession of new corporate plans to restore some order into C-S. The original Charlier concept was discarded, and a new plan was developed[69]. The realization of this new plan was dependent upon the abovementioned debt-conversion and new state funding. Thus, 22 bn BEF was released, in order to cover needs up to the end of 1984.

But, as C-S was turning into a black hole in the continued downswing of 1981-82, it was the need for new funds by the spring of 1982 that eventually set off a new round of very severe cutbacks[70]. This time there had to be real selections made between the four major locations; the

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[64]Michel Vandestrick (see note 71 sect 5), cited in MB 821026 p 26

[65]See MB 821026 p 26. In this situation, as stated over and again, Charleroi would have been in a better position than Liege.

[66]The similarities between what happened in Belgian steel in 1980-81, and what had happened to the German *Rationalisierungsverband* (in the coal industry) between 1964-66 (sect 3.3.2.2) are striking.

In both cases the original plan was that the state and the private owners should form "partnerships", in order to share the costs of the adjustment and investment. In both cases the schemes broke down when the structural character of the crisis was recognized. In both cases private capital, which was very interested in state funding, but little interested in providing funds for investment, bowed out of the schemes. In both cases the state was left with sole responsibility for a collapsing industry.

[67]MB 810410 p 33; MB 810416 p 27; MB 810626 p 29.

[68]Ste Nationale de Participation et de Financement de la Siderurgie.

[69]This was the "second Claes Plan" (outside consultants Nippon Steel). This plan aimed (like the Charlier concept) at a capacity of 8 mn t/y, but in the Claes plan all four melt shops were kept in operation (cutbacks shared between Marchienne and Montignies), as well as all of the major rolling mills: Carlam, Seraing, Chertal and Valfil.

[70]The cash released in order to tie the firm over until 1985 had been spent in a year, in order to raise capacity at Carlam, as well as to cover the enormous losses. MB 810922 p 29; MB 820330 p 23; MB 820910 p 26.

process was greatly accelerated during 1982-83, when a critical situation turned into a desperate one.

The Vandestrick plan (May 1982)[71], aimed at a C-S capacity of 6 mn t/y. The closedown of the Seraing strip mill was only partially compensated for, by increased deliveries from the Seraing converters to Valfil, which was still intended for completion.

Although clearly coming round to some kind of reality, the Vandestrick plan was discarded by late 1982. By now the unprecedented character of the crisis (as evidenced during the later half of that year) was provoking measures hinting at the "filialization" strategy, to no small extent through the realization of the "Banana option". As both ARBED and C-S was approaching the point of no return, this created the pre-conditions for a road towards coordination, in direct continuation of the strategy laid out in the Hazinelle accord[72].

The strategy worked out by Jean Gandois[73] during the winter and spring of 1982/83 (in his position as an outside consultant both to the Luxembourgian and Belgian steel industry), provided for an overall solution to the problem of Belgo-Luxembourgian steel, by coordinating the production facilities between the two companies. C-S closed down Seraing, Valfil and all production of heavy sections. This made it possible to concentrate all production to Chertal and Marchienne, while the oxygen converters at Seraing (Liege) and Montaignes (Charleroi) were closed in their entirety. In exchange, ARBED closed down the the oxygen converters and the strip mill at Dudelange (Luxembourg). What remained of that mill (CR, galvanizing) was integrated with Carlam[74].

The radical industrial surgery accepted at this time only serves to underline our main point. The crisis couldn't be solved before the political superstructure had accepted the structural character of the crisis. In our view this is the only reasonable interpetration of the wave of "neo-liberalism" that swept over Western Europe after ca 1980.

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[71]Michel Vandestrick had taken over as MD in March 1982. The plan: MB 820528 p 27; MB 820604 p 29.

[72]MB 821026 p 26; MB 821214 p 23; MB 821231 p 21.

[73]A Frenchman, who had earlier been MD for Sacilor. Gandois was later one of the men behind the French restructuring in the mid 80s; he then went on to become MD at C-S. For a summary of Belgian steel up to 1983, see "Belgium grasps the nettle of restructuring", MBM 9/83, p 15-19.

[74]MB 830517 p 23; MB 830520 p 27; MB 830527 p 33; MB 830705 p 21; MB 840120 p 23.

Neo-liberalism and industrial retrenchment became associated with each other, because the intensification of the policies of the preceding decades (intervention and corporativist solutions) had reached the point where it had to be accepted that further subsidies would be counterproductive. In most instances, the expansion of capacity at one location only served to underline the drawbacks at other locations. *Neo-liberalism, i.e. the increased preference for "market solutions", was only one way of expressing that kingdom come had hit the compromise of the 60s and 70s.* In Belgium the compromise in the steel industry was threatening the survival of the country (increasing tensions between Valloons and Flemings). In a somewhat longer perspective, it surely threatened the further development of the EEC: The Germans considered countervailing duties on subsidizing member states, the schemes for EEC exchange rate coordination that had been inaugerated in the early 70s had broken down under pressures from increased budget deficits and inflation rates in states such as Italy, Belgium and France[75].

These conditions did, in the end, force the coming of some kind of "neo-liberal" balance, a balance that had to be struck between restructuring and subsidizing: how long is it worth keeping an uncompetitive industry for the sake of social peace, if subsidation threatens other important political goals? In my view, it is the fragmentization of the old interest-groups that must be seen as central, in order to understand this economic and political search-process. At certain points in time we seem to arrive at breaking points, when the coalitions of 60s and 70s starts to disintegrate.

Thus, if the road to wholesale adaptive modernization was effectively blocked, retrenchment had to be sought. For C-S part, the one remaining alternative coordination with ARBED, would have been some kind of tie-up with Klöckner or Hoogovens. In this case the outside producer could have supplied Valfil with billets, but the potential for synergies that existed between Carlam and ARBED was lacking, the outsiders both being very strong in the flat section of the market, having over-capacities of coil of their own[76]. The choice between ARBED or Klöckner was a choice between Charleroi and Liege. The Charleroi solution always had to be the logical one, if the "new" C-S was to be able to modernize and

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[75]Hodges M (1981), chs 1 and 11.

[76]In Hoogovens case this was especially true after the forced divorce between Hoesch and Hoogovens in 1981 (see sect's 5.2.4.1 and 5.2.4.2).

concentrate its production upon the most effective plant. It was, as well, important that the ARBED solution had the potential to bring in the interests of the Flemish community into the deal (any large-scale expansion in Vallonia always implied a threat for compensatory investment at Ghent).

In this context the remains of steelmaking in Vallonia were concentrated to Chertal and Marchienne. Rolling programs were increasingly concentrated upon the two adjacent wide strip mills (Chertal, Carlam). What remained of light sections production was left to ARBED and USINOR by the agreements concluded in the later 80s[77], except for a merchant bar mill in Charleroi, which was sold off to the enterprising Riva concern in 1989[78].

This was, of course, a rather controversial decision, as it further opened up the continental markets to this concern[79]. One of the few remaining smaller Belgian independent producers (Boel) protested the sale in vain -in consonance with Hoogovens and the German majors- as they were fearing an obvious threat to their own markets for wire rods in the somewhat longer term. Riva operated, initially, on billets supplied from Cockerill, but as the plant was expanded, a new electric furnace (0,7 mn t/y) was commissioned, provoking similar commissioning at the integrated Boel plant. As we are able to see in our different case studies, it was becoming increasingly impossible to avoid to accept the mini-mill innovation by the late 80s/early 90s.

Moving out of long products, C-S concentrated upon the two wide strip mills and production of coated sheets. It modernized its CR facilities and acqured the rest of the 51% owned galvanizer Phenix. In the same vein of flat-product consolidation, C-S bought other independent Belgian galvanizers and consolidated the ties with ARBED (with regard to Ghent and the Dudelange (Galvalange), facilities, both of which make use of Carlam). In a further direct parallell to other large West European steel

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[77]See sect 5.2.1.2.

[78]MB 890406 p 19; MB 890413 p 25; On Cockerill and LME: MB 890907 p 23; MB 890911 p 27.

[79]Riva was, as we have seen, already expanding in France, (see sect 5.2.1.2).

companies, C-S moved into stockholding on a continent-wide scale[80]. By 1989 the company had been returned to profitability[81].

The coordination with ARBED culminated in late 1990, as the logics of the "Banana solution" was once more evidenced. The joint commissioning of a galvanizing line, operating in Differdange, to be fed with coil from Carlam, was followed in August 1990 by the announcement of an intended flat product merger between the two groups. The project was stopped by political pressures inside Belgium (fear of "Flemish production falling into the hands of the Vallonian government"[82], and simultaneous Vallonian fears over the future of the least efficient wide strip mill in Chertal). The breakdown of this merger demonstrates that there still exists a very political dimension to the remarkable complex of Belgian steel[83].

5.2.2.2. Luxembourg

As we have seen, Luxembourgian steel was heavily involved with developments within Belgium, ARBED's problems having to be solved in an interplay between the two countries.

Within the Grand Duchy the crisis had provoked extraordinary political measures by 1977, as it was percieved that the major problems faced by ARBED, required the construction of some kind of comprehensive sociopolitical framework, in a country which was monolithically dependent upon steel. In Luxembourg, the sector was responsible for 50% of industrial production, 60% of exports, 15% of GDP and 12% of active employment during the mid 70s.

Tripartism had long been an accepted form of consensus-building in Luxemburg, and the Tripartite Committee that was set up in 1977 was

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[80]Steel Times (Annual Review of Steelmaking) (STARES), 9/1988 p 470-71; STARES 8/1989 p 420-21; STARES 8/1990 p 423-24; STARES 9/1991 p 498-500; MB 880118 p 23.

[81] MB 880303 p 23.

[82]After the partial privatization (20%) of Cockerill in early 1990, the Vallonian government still holds ca 78% of Cockerill. On the cooperation, problems of Liege and possible merger: MB 890928 p 27; 900830 p 19; 901231 p 15.

[83]Not surprisingly, it was instead reported by early 1991, that Cockerill was interested in converting one of their plants to the electric route, using a thin-slab continuous caster, a move which seems rather logical, given the obvious drawbacks of inland sites such as Chertal. MB 910131 p 23 .

merely a strengthening of an existing system. This new Committee was given powers over the invocation of crisis measures to deal with unemployment, if certain pre-set treshholds were reached. In effect, the government was ceding some of its traditional political powers to a corporativist body made up of representatives of the government, the unions and ARBED[84].

So, this was the organ in charge of solving the Luxembourgian steel-crisis, providing the institutional setting in which ARBED's investment plans could be presented to representatives of the unions and the government, in exchange for financial help. ARBED, on its part, financed part of DAC (the anti-crisis division), where laid off steelworkers were occupied in different kinds of relief works, while keeping their old salaries[85].

ARBED, moving along with these constraints, proceeded with rationalization in 1978-79 and again in 1983-84 on the classical lines of the 70s. Pig iron production was concentrated to new -larger and centrally located- blast furnaces at Esch-Belval and Differdange[86]. Steel production was concentrated to Esch-Belval, Differdange and Esch-Schifflange. Rolling capacities were cut back in the light section range, as heavy section production grew in relative importance[87].

ARBED's takeover of Saarstahl in 1977-78 should be seen in this context, together with the virtually simultaneous moves to take over Rodange-Athus, and some section capacity from Charleroi (the Hazinelle accord). All these steps pointed to an increased role for ARBED in the restructuring process in the traditional minette dependent steel districts. But, as these takeovers were consummated, the inherent conservatism of ARBED's strategy subjected the company to important set-backs. Basically, the strategy was aiming at the modernization of existing facilities -the construction of new, much larger blast furnaces at a few central locations (Esch-Belval, Dillingen, Differdange), in order to feed converters at other locations, or alternatively, to supply billets to locations turned into re-rollers.

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[84]Hirsch M (1986), p 55-56. Trade unions and employers were granted veto powers over regulatory decisions made by the government.

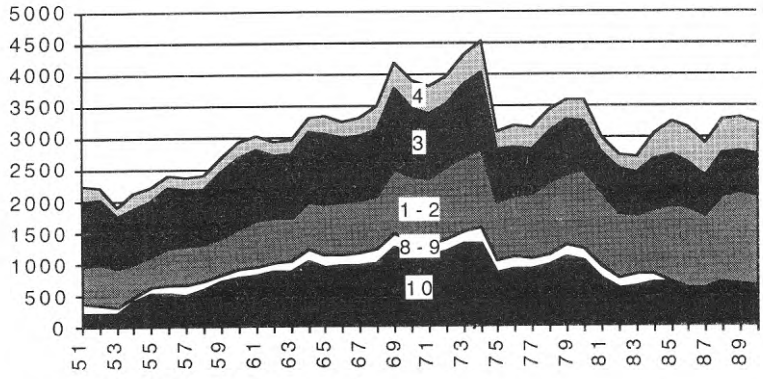
[85]Hirsch M (1986), p 59-60.

[86]MB 770318 p 35; MB 790306 p 33. The projected blast furnace at Differdange was never built, though.

[87]MB 780512 p 37.

Figure 5.5. Production of steel by products, Luxembourg, 1951-90.

In thousands of tons



Note: 1-2: Heavy Sections, Rails; 3-Light Sections (Rebar, Merchant Bar); 4-Wire Rod; 8-9 Plates; 10-Strip and Sheet.

Sources: 1951: Quarterly Bulletin of Steel Statistics for Europe (Geneva); 1952-90: Siderurgie, Statistique Annuelle, 1962-91 (Luxembourg).

This implied that ARBED was to remain an integrated producer of long products, which always subjected the company to a competitive disadvantage in the ranges where it was competing with the mini-mills.

Thus, although general cutbacks and an overall rationalization of the heterogenous facilities taken over from HADIR (1965), and by 1977/78, from Cockerill[88], had been initiated by the late 70s[89], it was only with the actions of 1983 that a very streamlined strategy of ARBED emerged. Flat products were left to Sidmar (strip capacity in Luxemburg being exchanged for Belgian heavy section capacity), while Luxembourg was turned into a center for galvanizing and heavy section production[90].

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[88]Athus-Rodange. See sect 5.2.2.1 for further details.

[89]See MB 770809 p 31; MB 780207 p 38 (Rodange - sect 5.2.2.1., Arbed Saarstahl - sect 5.2.4.1.)

[90]The heart of Luxembourgian rolling mills being the 1 mn t/y beam mill at Differdange. This is supplemented with heavy section capacity at Esch-Belval (0,6 mn t/y), while medium sections sections and rebars (cap. 0,4 mn t/y) are produced at the same location

The incidence of the crisis in Luxembourg is readily seen from figure 5.5.

The radical steps taken in 1983-84 - the move out of Saar, and the important cutback in Luxembourg capacities- was, partly, a recognition of the ineffectiveness of consensus-building in effecting genuine industrial change, something that had been recognized by both ARBED[91] and the government[92] by 1982. Tripartism had led to tax increases and delayed restructuring, and the subsidies paid to the steel sector were getting increasingly unpopular among the majority of the electorate, which was becoming concerned over rising taxes.

On the other hand, the turnaround was, just as much, evidence of the limitations of ARBED's strategy up to 1983. The company had, in a systematic fashion, used subsidies from the Germans and Belgians, to make up for the inability of the Luxembourgian government to match their much bigger neighbors in the subsidizing game. These subsidies were used for adaptive investment in the Saar and in Luxembourg, and it was when the long-term impotence of this strategy was recognized by 1982-84, that ARBED had to make a choice between Luxembourg-Belgium and the Saar. Equally important, governments were starting to question the effect of subsidies, as well.

Thus, it was the last round of public subsidies that hit the company, when the Luxembourgian state infused funds through an increase in ARBED's capital, taking a 30% share in the company; a move made conditional upon the firm's withdrawal from the Saar[93]. Clearly, the

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and at Rodange. At Rodange, there is, as well, facilities for rail production; Esch-Schifflange produces wire rod (cap 0,5 mn t/y), merchant bars (0,4 mn t/y) and sheet piling. As noted above, all pig iron production is concentrated to Belval, steelmaking (oxygen based) are located at Belval, Schifflange and Differdange. CR and galvanizing facilities (fed with coil from Carlam), are located at Dudelange and Differdange. MBM 6/1991, p 27-28.

[91]Hirsch M (1986), p 60 ff, see, as well, WiW 32/1982 "Tesch spielt auf Staatskassen", p 95. ARBED's strategy is clearly outlined in WiW 27/1986 "Verkappte Subvention", p 116-22.

[92]Hirsch M (1986), p 62-64.

[93]Sect 5.2.4.1.

ARBED's management had been seeking increased direct state participation in the company since the summer of 1982 (see the sources cited in note 91, sect 5). As the company had steelmaking facilities in Belgium, Luxembourg and Germany, and mines in France (ore), and Germany (coal), state participation was sought in all four of these countries. The Belgians did increase its share in SIDMAR, but the Germans were little interested in taking a major stake in an ailing Luxembourgian steel company, WiW no

prospect of Luxemburgian tax money ending up in Germany was intolerable[94].

What is important here is that both the government and ARBED had positioned themselves for the radical strategic moves taken in 1983. ARBED had settled down with a Belgo-Luxembourgian state sponsored strategy, in a close relationship to Cockerill-Sambre. As the Germans weren't prepared to enter the company as partners, Saar was abandoned.

To the Luxembourg government, the radical departure from the step-by-step approach of the late 70s was evident in the partnership solution. By 1983 the crisis had been ongoing long enough for the limits of the corporativist system to be revealed. Indeed, the comments made by the parliamentary committee set up in 1981 in order to evaluate the Tripartiate system is highly revealing:

> "The Luxemburg model was seen as a useful instrument to fight economic and social reprecussions of the crisis up to the moment it really had to put into practice... The committee is of the opinion that everybody involved in this should wake up from their sweet somnolence. In economic matters, saving time has never arranged things; temporisation is worsening the situation, and with 'acquired rights' social progress has never been financed anywhere"[95].

The moves after 1983-84 was followed by increased coordination with the French long products producer Unimetal (sect 5.2.1.2) as the continuing concentration upon heavy sections was confirmed[96]. By 1991-92 this cooperation approached the merger stage, with Europrofil inaugurated as a joint venture between Unimetal and the long products division of ARBED (coordinating sales and production flows between the companies productive facilities).

With regard to future strategies the moves to cooperate with Unimetal, as well as the plans to install a 1 mn t/y electric arc furnace at Schifflange, ultimately suggests a strategy of moving ARBED-Luxembourg out of integrated steelmaking[97]. The company's takeover of

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32/1982 a a and 51/1983 "Kuhhandel mit Quoten", p 90-92. The solution to ARBED Saarstahls problems was, instead, to drag on for several more years (sect 5.2.4.1).

[94]MB 820803 p 23-25; MB 830215 p 23; 830319 p 21; MB 830322 p 25; MB 830412 p 29; MB 830422 p 23; ; MB 830426 p 25; MB 840501 p 29.

[95]Cited in Hirsch M (1986), p 61. (See, as well, Hirsch M (1985), p 116-18.

[96]See France above, and Stahl und Eisen 6/1991 p 22; MBM 7/1985 p 37-41.

[97]MBM 6/1991 p 27-28; MB 910404 p 21, MB 921210 p 21.

the old GDR heavy section producer Maxhütte[98] in early 1992, where a new electric furnace is under construction, confirms this conclusion, as well. By the early 90s some producers were able to follow European strategies, based upon a clear conception of the best available technologies[99]. The contrast between this move and what had been done a decade earlier in Luxembourg and the Saar is striking, and very telling (sect 5.2.4.1). In the late 70s, investment aimed at the construction of larger, more effective, centrally located blast furnaces and the conversion of Bessemer (or OH's) melt shops to the BOP. In contrast, by the early 90s producers were aiming at strategies based upon the electric arc technology. European strategies required the construction of several arcs, minimizing transportation costs for a product with a low value-added, while simultaneously not foregoing economies of scale.

5.2.3. Italy

The Italian steel industry was in a curious shape by the mid 70s. On one hand there were the private electric producers, well positioned to take advantage of the new trends. On the other hand, there was the Finsider complex, on its way towards some kind of major shake-up.

After proceeding with new investments at Cornigliano, Bagnoli and Taranto in the mid and late 70s, Finsider was left with a capacity with little relation to its potential market. The plans for Gioia Tauro were modified in several stages (1975, 1977 and 1979)[100], as the hot end stages of operations were dropped. Rerolling facilities were instead proposed for the location. Otherways, though, the Steel Plan of 1979, drawn up against the backgound of increased losses and a stagnating demand[101], was still a highly optimistic document, foreseeing a buoyant demand in the

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[98]There is one Maxhütte in the GDR, thus taken over by ARBED, and one Maxhütte in the old area of Germany: Maxhütte of Bavaria. The continuing story of this Bavarian producer is discussed below, in the section of Germany. On ARBED -Maxhütte Unterwellenborn, see MB 920323 p 18; MB 920720 p 23; Stahl und Eisen 2/1993 p 18.

[99]The moves by US electric producers into heavy section construction (Nucor-Yamato and Chaparall MB 920305 p 17) and increased competition from Eastern Europe, will undoubtedly hasten this move towards electric steelmaking.

[100]MB 770624 p 39; MB 770705 p 37; MB 790327 p 37

[101]Eisenhammer J /Rhodes M (1987), p 436 f.

nearest future, thus discerning no reason for a basic change in the prevailing attitude towards expansion in the steel industry[102].

With the benfeit of hindsight (see figure 5.6), we are able to identify the major weaknesses of this strategy of expansion.

By the mid 70s the period of rapid expansion of the flat product market in Italy was over, which made the simultaneous modernization and expansion at several sites (Taranto, Bagnoli, Cornigliano), superfluous and costly. Continued expansion was, in Italy, to come from the light section sector of the market, a direct reflection of the strength of the emergent electric steelmakers.

So change had to come: Finsider began running losses on a massive scale by the late 70s and, with a continuing sales crises up to 1983 (in spite of the predictions in the 1979 plan) the situation went from bad to worse. By early 1981 the company was in an acute liquidity crisis. In this situation calls for help from the government were victimized by intra-governmental strife (below), and the company found itself in an ever worsening position, as recourse had to be made to the open credit market for bridging facilities[103].

Indeed, by 1981 a split had opened up within the government, over the way to handle the whole IRI complex. Parts of the Christian Democrats (DC) were beginning to question the usefulness of keeping the complex, in the face of its formidable costs. The split was evident during the intra-ministerial feud in early 1981, when Andreatta (treasury minister) and La Malfa (budget minister, both DC), refused to release the funds that De Michelis (state shareholding minister, Socialist), had granted to the IRI.

In the longer run, though, the new DC orientation towards reform (starting after the death of de Moro) was a laborious search-process: the PSI and important parts of the DC were continuing to favor the older system[104]. The early stages of this search-process was marked by the appearance of De Mita (1979) and the following, gradual, reorientation of the DC:

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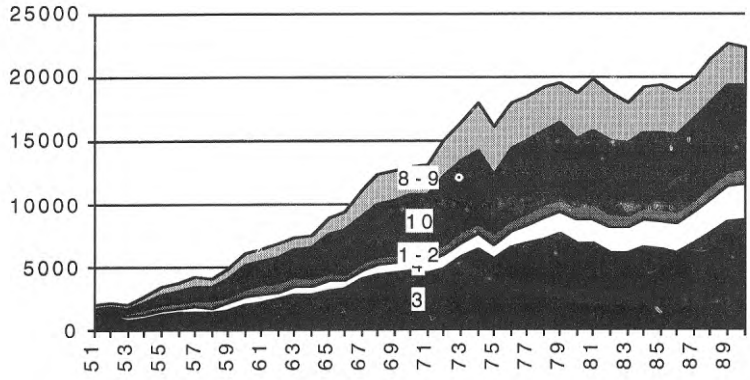
[102]MB 790327 p 37; MB 790406 p 38; MB 790427 p 37.

[103]Müller J/Loeber H-D/Dey G bd 1 (1983), p 225-26; Eisenhammer J /Rhodes M (1987), p 447-50; MB 810904 p 33; MB 811103 p 27.

[104]Bianchi P/ Cassese S/d Sala V (1988), p 90-95.

Figure 5.6. Production of steel by products, Italy, 1951-90.

In thousands of tons



Note: 1-2: Heavy Sections, Rails; 3-Light Sections (Rebar, Merchant Bar); 4-Wire Rod; 8-9 Plates; 10-Strip and Sheet.

Sources: 1951: Quarterly Bulletin of Steel Statistics for Europe (Geneva); 1952-90: Siderurgie, Statistique Annuaire, 1962-91 (Luxembourg).

> "...his political ideas resemble the late De Gaspieri vision: opposition to the Communist Party and a response to the "social anxiety" of emerging groups in society, through a "modernization" of the country"[105].

It is evident that it was the very scale of the public sector crisis that was forcing a redefinition of strategies, calling primarily for a redefinition of roles between politicians and managers. This required the formulation of a new overall strategy, in order to deal with the state holdings.

Finsider had been able to pioneer the new steelmaking paradigm during the 1950s, ENI had, as well, during the days of Matei, been extraordinarily innovative and entrepeneurial. The main problem that emerged during the 60s and 70s was that this original drive (the clear conceptions and strategies) was vanishing. By the 70s all clear strategies were buried under layers of decisionmaking confusion and aimless

[105]Bianchi P (1987), p 282.

intervention into lame ducks[106]. The 1981 Annual Report of the Ministry of State Shareholding, summed up the problem, simultaneously hinting at a possible exit option:

> "The crisis of the largest Italian firms shows its deepest intensity in the public-owned firms... /it/ has become terribly costly in terms of collective resources absorbed, while the results are worsening day by day... The most striking point about /their/ collapse is in the nature of the shareholders, because the public shareholder obliges public enterprise to sustain behaviour which is contrary to free market behaviour in pursuing goals that completely diverges from profit-making. The state obliges public firms to sustain improper burdens... The decline in self-financing has, therefore, caused an unanticipated circular process which, through the growing influence of the public shareholders explicit guidance and the interference of the hidden political shareholder, has further reduced any autonomous behavoiour... If there is a clear will to reshape the Public Shareholding system a better managerial skill is necessarily associated with a government behaviour which must be more respectful towards the promises made when the public enterprise system was asked to play a precise role"[107].

So the policies of the 70s -wholesale intervention into lame ducks- had to be modified, and a new strategy for IRI-ENI had to be defined, in amongst the traditional disarray of Italian factionalist politicking. The assignment of the "neo-liberal" Romano Prodi as the new head of IRI in late 1982, was one sign of reorientation. Thus, IRI was immediately being downsized, as smaller companies were sold off, in order to orientate the company towards something that could be termed "core" activities. As we are able to see in the case of steel, what were "core" activities and what was the overall strategy of the reorientation process was never wholly clear. The process of reorientation was always a gradual one, where the room for maneuvre had to be set in the interaction between the EC Commission, political factions and the percieved goals of the IRI-Finsider management.

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[106]IRI during the 60s and 70s, see Prodi R (1974), p 45-63; (Prodi became head of the IRI a few years later, and was instrumental in the turn-around of the 80s). See, as well, Kreile M (1983); Holland S (1972a), p 70-91.

[107]Bianchi terms this report as an example of the schizophrenia of the Italian political system "which, on the one hand, acted to destroy a public shareholding system as the extreme way to to stop the leaks of the Italian economic system, yet on the other hand called for free market behaviour of public firms against political pressure...", Bianchi P (1987), p 281-82. See, as well, Kreile M (1983), p 205 ff.

The beginning of the process came with temporary closedown of Bagnoli in the summer of 1982[108]. It was the basic truth of the steel crisis that was dawning on the politicians and industrialists responsible for the industry: sheet production had been expanded too rapidly with the contemperaneous extensions of Bagnoli, Cornigliano and Taranto[109]. As Bagnoli was closed down, it was evident that other plants would have to be shut, if this modernized plant was evermore to be reopened. The takeover of the ailing Fiat steelmaking subsidiary (Teksid, 1982) was one way of reaching this goal, as it increased Finsider's shares of the Italian quotas[110]. Another way out of the dilemma was the reconversion of Cornigliano into a producer of billets for the electrical steelmakers (below).

In line with this, the 1983 Steel Plan recognized the need for concentration of production[111]. As we have already hinted at, cooperation with the private sector opened a way to phase these measures, as a scheme for the distribution of production cuts between Finsider and the private electric steelmakers was put into effect. Cutbacks in the private sector became eligable for government support[112], and a scheme for Cornigliano was developed (over a drawn out period between 1983-87), in accord with the biggest mini-mills. This public-private accord cut back Cornigliano to a one blast furnace operation, producing 1 mn t/y of billets for inland producers temporarily affected by rising scrap prices during the mid 80s[113]. The private consortium led by Riva, that had taken control over the plant, converted it back into a slab producer, when scrap prices once again receded, and it became more economic to run the electric furnaces on scrap[114].

The public operator was thus concentrating sheet production to Taranto and Bagnoli, while COGEA was organized to run the Genoese plant, Finsider keeping only a limited number of flat product activities at the

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[108]MB 821008 p 29; MB 821029 p 25.

[109]A summary of Finsider expansion and plans for expansion can be found in Cooke H (1983), p 25-29.

[110]MB 810714 p 29; MB 820312 p 27; Eisenhammer J /Rhodes M (1987), p 453-54.

[111]MB 830208 p 23; MB 830415 p 25; MB 830712 p 19; MB 830930 p 23.

[112] Eisenhammer J /Rhodes M (1987), p 460-61.

[113]MB 831021 p 25; MB 840327 p 25; MB 840626 p 27; ST 5/1984 p 353; MB 851224 p 23; ST 4/1986, p 178; MB 860701 p 19; MB 870612 p 25; MB 880107 p 20; MB 880613 p 21.

[114]MB 891023 p 43; MB 910527 p 43; Stahl und Eisen 5/1992 p 32.

site (the plate mill and sheet CR facilities). Bagnoli continued to be handicapped by low utilization rates, especially as the attempts to reach an accord with the private sector operators Arvedi and Falck fell through (this would have involved the transfer of coil production from the private sector companies to Bagnoli)[115]. To make matters worse, Finsider continued to carry a long tail of other plants, fuzzily defined within the -emerging- strategy of concentration upon flat products. The combined burden of Bagnoli, unstructured productive facilities and a truly staggering debt burden[116] (incurred as a result of the overload of the 70s) continued to hamper Finsider, making new restructuring measures inevitable.

So, by 1987 there was a need for a new corporate plan, with its concomitant infusion of new state funds. The plan first put forward from the IRI was, as always, modified under political pressure, despite its basic soundness. The strategy of the managemant was to sell off all long product[117] activities (now reorganized in Deltasider), to the private sector, and to concentrate sheet production to Taranto. Bagnoli was to be closed down once and for all[118]. As always a compromise had to be settled for: Bagnoli and Piombino were kept, while otherways production was reorganized along the plans put forward.

Thus, Finsider was liquidated in early 1988. The core operations were reorganized in the new company Ilva, while Finsider kept those assets that were destined to be closed or sold off[119].

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[115]Finsider/Ilva's main problem has been twofold: political interference have continued to cloud decisionmaking and the private producers have been -relative to the ailing state concern- in a rather good shape (technically and economically). Thus, producer's such as Arvedi, Lucchini and Falck have always had the option of going alone, or start cooperating with foreign producers. On the continuing attempts to reorganize the Italian tube market, see MB 830506 p 23; MB 830809 p 19; MB 850723 p 25; MB 851025 p 25; MB 851125 p 25; MB 851213 p 31; MB 860211 p 21; MB 870310 p 21; MB 870810 p 20; Fumigalli M (1986), p 36-37. See, as well, text below.

[116]The basic problems are oulined in Eisenhammer J/RhodesM (1987), p 439-49 and Wille G (1987), p 1079-80; Vondran R (1988), p 1223; Unnamed author (1989), p 66; Le Usine Nouvelle "Course l' obstacles pour Finsider", 20/1987 p 43; WiW "IRI: Der Professor räumt auf", 35/1987 p 44.

[117]These had, in line with our experience from the other countries, been organized into a seperate company (Deltasider), after 1985. See Peters H-J (1986), p 43-44.

[118]MB 861230 p 21; MB 870310 p 21; MB 870416 p 31; MB 870508 p 25.

[119]MB 870612 p 23; MB 870921 p 19; MB 871029 p 39; MB 871221 p 20; MB 880215 p 23; MB 880222 p 20; MB 880303 p 25; MB 880509 p 33; MB 880901 p 23; MB 890417 p 25.

As a considerable portion of the tail of works was hived off, new possibilities were opened for the private producers (many of these had got capital injections through the state aids to cutbacks in the mid 80s). Ilva's facilities was, meanwhile, subject to further restructuring along the lines arrived at by early 1988. Terni was kept but its production was concentrated to stainless steel, the CR facilities at Novi Ligure were extended and there was a movement into downstream activities (coating, tubing), while the plate mill at Genoa was closed down[120].

The fate of the unfortunate works at Bagnoli was the subject of an inflamed struggle with the EC Commission, which had to approve the infusion of state funds that was associated with the new plan. In the end it was closed down in August 1990, after massive pressures from the rest of the EC. There is, in fact, very little reason to believe that Ilva wanted to retain the uneconomic plant, which had no real *raison d' être* . Rather, the Commision (and the Germans), became useable scapegoats, on which to blame an unavoidable closure[121].

So, by 1989-90, Ilva was entering the same strategy as USINOR, making aquisitions in downstream activities and stockholding. The efforts to reach an agreement with the private tubemakers on coil deliveries were again stepped up, but ran into new problems by 1990-91. The continuing weakness of the still heterogenous Ilva group, the relative strength of the private producers, and the arrival of USINOR on a large scale on the Italian arena, were further complicating the restructuring efforts centering upon Ilva-Dalmine-Falck-Arvedi-Marcegaglia[122]. In particular, Arvedi decided to go its own way, pioneering TSC in a West European

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[120]MB 871105 p 25; MB 910211 p 21; Stahl und Eisen 2/1991 p 30; MB 911205 p 18

[121]MB 880414 p 25; MB 880509 p 33; MB 880602 p 20; MB 881013 p 29; MB 881024 p 41; MB 881027 p 22; MB 881128 p 23; MB 881212 p 23; MB 881215 p 27; MB 881219 p 21; MB 881230 p 23; MB 890306 p 25; MB 890309 p 23; MB 890511 p 29; MB 891002 p 44; MB 891116 p 27; MB 900719 p 21.

[122]The aim was to tie up the private tube producers (which uses flat products for tube-making) with Ilva's flat product production facilities. Lucchini, which has important sheet coating facilities in direct conjunction to Piombino, was also involved in these discussions. As USINOR interferred in these negotiations, the price for the possible solutions increased. On the interaction between USINOR-Lucchini-Arvedi-Ilva-Falck in the late 80s/early 90s: MB 890717 p 23; MB 890724 p 21; MB 890907 p 23; MB 890918 p 33; MB 900628 p 21; MB 900712 p 19; Stahl und Eisen 8/1991 p 44-45. The state of the private sector: MBM 3/1992 p 24-27.

context[123], by the summer of 1992 this firm was rumored to plan the construction of four new steelplants[124].

The point is that the strenght of the private producers and the appearance of USINOR were factors that made the new Ilva strategy very expensive. Consequently, by late 1991 Ilva was back in the red again, having had to handle old debts as well as new acquisitions. Once more a policy of radical restructuring had to be worked out, in a situation where the whole Italian system of state holdings was on the brink of collapse. All Italian privatizations up to mid-1992 had been made as majority or minority sell offs of daughters by the big holdings, a way of phased privatization originally intended for Ilva, as well[125]. The renewed losses in 1991 (500 bn LIT; 380 mn USD), made changes necessary in this outline, as new injections of state funds were needed. In fact, Italian political conditions had, by this point in time, been cathalyzed by the April 1992 elections and the increasing need for Italian convergence (in a wide sense) with the rest of the EEC.

In this situation the IRI-Ilva concept seemed to be dissolving, as the filialization and privatization[126] of Ilva (as well as the rest of IRI[127])

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[123]Commisioning from Mannesmann Demag, spring 1989; Stahl und Eisen 11/1989 p 14. On Arvedi, see MBM 12/1981 (d), p 11.

[124]Two to be located in Italy, two outside. MB 920706 p 21. The remarkable plans for expansion undertaken by the TSP pioneers (Nucor, Arvedi), right in the middle of the recession of the early 90s is, in itself, a major sign of the profitability of the process. On the economies, see Iversen K (1991), VDI Nachrichten 920424 a a p 8; MB 920716 p 17.

On the future of mini-mills in the flat segment of the market the chairman of Birmingham Steel (one of the largest US mini-mills), was cited in MB 920618, p 17: "Studying these expansions and not moving ahead would 'mean we are willing to sit on our hands and let this business go by us. There is just too much opportunity and too much room to move against the majors' (integrated mills)". This was said in a situation where most of the majors (both in the US and in Western Europe) were losing money, and the general economic outlook was, mostly, considered to be extremely gloomy.

[125]Italian stock market rules requires a three year profit record before the floating of a new company. After Ilva's reconstitution in 1988, it had been profitable in 1989 and 1990.

[126]The stock market rules being circumscribed by letting the already quoted daughter Dalmine make a bid for Ilva; then selling off the newly issued Dalmine shares on the stock exchange instead. MB 920618 p 17; MB 920716 p 18, MB 930215 p 21.

[127]The big holdings -IRI, ENI and ENEL- were converted into joint stock corporations in early august 1992. FT 920713 p 1, 8,10; FT 920716 p 12; FT 920724 p 1; FT 920730 p 1-2; FT 920807 p 14; FT 920808-09 p 2; FT 920810 p 3; HB 920707 p 11; HB 920810 p 1, VDI 920821 p 7.

seemed imminent. In this vein, the original 1991/92 restructuring measures centered on the sell off of remaining long product activities, together with other non-core activities[128]. These measures will, after being carried out, define Ilva in a rather clear way[129]. Piombino was finally sold off in late September 1992, when it was included in a new company, 60% owned by Lucchini.[130]

In early 1993, the need for quick restructuring measures was further sharpened, because of the remarkable extent of Ilva's losses during 1992 (LIT bn 2.000; USD bn 1,36). In January the whole of the old leadership of the company was dismissed, paving the way for the first Japanese MD of a West European state owned company. Hayao Nakamura[131], an outsider to the Italian party-system, was made head of the company, in order to restructure and privatize it[132].

Italian state owned companies had been on this road since the early 80s (as is readily seen from our case study on steel). Hence, we are again encountering the seeming inevitability of the move away from the strategies and structures of the after-war period. Ultimately, we are confronted with a couple of interrelated questions: Why was it all coming down? Why did a modernization strategy that had been innovative and successful in its formative phase deteriorate and cave in?

In the case of steel[133] (and, as we saw in the case of ENI) the early innovative phase was based on the very essence of "the innovative

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[128]Holdings in the transport sector and shipbuilding, remnants of the days when Finsider produced shipplates, was involved in shipbuilding and operated shipping lines. See Holland S (1972 b), p 118 ff. 1991/92 restructuring: MB 911114 p 19; MB911205 p 18; MB 920305 p 15; MB 920312 p 19.

[129]As what remained of Ilva owned facilities at the Cornigliano site (1988-91), had, or was to be, closed down, the new Ilva would consist of: Steelmaking, wide strip mills, plate production (Taranto), CR and coating facilities (Novi Ligure and Turin), stainless steel (Terni) and tubes (Dalmine). Cogne's place within Ilva seems unsure. See, for example Stahl und Eisen 2/1992 p 29 and MB 930215 p 21, (on the attempts to sell Cogne).

[130]Only weeks earlier Lucchini had finalized its takeover of Huta Warszawa, Poland. When these acquisitions are finalized Lucchini will approach Riva's capacity.

[131]Formerly of Nippon Steel.

[132]HB 930122-23 p 18; HB 930125 p 17; FT 930122 p 14; MB 930128 p 21; Stahl und Eisen 2/1993 p 20.

[133]Our discussion is only directly appliable to steel. To know why the whole IRI-ENI-ENEL-EGAM structure collapsed, we would have to discuss branch after branch, to identify the strengths of the original concepts, and identify what weaknesses emerged during the 70s and 80s.What we can do, though, is to discuss why structural changes (as

paradigm of the 40s and 50s". Coastal steelworks, imported raw materials and sheet and plate production[134], was an innovative block which readily lent itself to rapid expansion. The problem seems to have been that the original strategy was in a profound state of disarray by the 60s and 70s, diluted by decisionmaking confusion, and a total inability to define the goals of the organization, in the sense that it was turning into a perpetum mobile for capacity construction and a fire brigade devoted to the rescuing of ailing steelplants. The marginal benefits of the construction of one more steelplant were decreasing rapidly.

An organization designed for expansion seemed unable to restructure in a recession, that is, in *a situation where this inability only could lead to further deterioration.* Expansion was leading to increased debt rather than sales, and then this very expansion -in a situation of stagnating markets- created an even greater need to choose between the existing facilities.

And then we are where Finsider was in 1981-83. A new technological and organizational imperative have been better mastered by someone else, and every while restructuring was postponed, the position of the company continued to deteriorate, when competitors made inroads into its established strongholds. The move to sell off Cornigliano, intended as a way to share out cutbacks between private and state producers strengthened the position of Riva, that converted the plant into a slab produce. The restructured USINOR-group had entered into a partnership with Lucchini (coil coating) and Alessio Tubi, creating a competitive situation which made Ilva's 1988-91 downstream integration strategy increasingly expensive. Last, but not least, Arvedi was demonstrating a possible way for the private producers to enter the flat market. In France, Belgium-Luxembourg and the United Kingdom the redefined (state) steel corporations divested themselves from, or restructured, long product production, but kept production of flat products under control. In Italy the divesting of long product mills was a bothersome process, while the flat market got more and more uncoordinated.

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articulated in moves towards largescale rationalization, product redefinition and/or privatization), was gaining in force during the 80s and 90s in our two lines of production, and why these structural changes -at branch levels- should be able to influence the political superstructure (this possibility will be closely tied to the importance of the branch in the immediately preceding period).

[134]Directly leading to shipbulding, motor vehicle production, motorway construction, gasoline distribution etc.

Finsider/Ilva had missed the arrival of a new concept. In 1983 and 1987 strategies were one step late in arriving (or were modified by the organizational superstructure to that effect) when the *raison d' être* that once had created the organization -unhampered expansion of the concept of the 50s- had long since gone. The process started in the early 80s must have reached a critical point when the owner (the state), was forced to accept the effects of the restructuring of the organization, without being able to realize any of the benefits that it had brought up to the 70s. This dynamic search-process seems to have created an outcome where the costs of keeping the structure outran the continuing advantages of keeping it.

So, we are again confronted with a situation where rationalization and privatization isn't pushed for its own sake or for ideological reasons, we are, rather, dealing with the logical outcome of the breakdown of the technical-political imperative of the preceding period. When it had passed through its innovative and formative phase, it entered an adaptive phase. As this culminated in the period of overload and vicious circles (i.e. steelplant construction all along the shoreline), the structure became too expensive to uphold, in the context of industry fragmentization, budget deficits, EC demands, increased competition and escalating Finsider losses and overcapacities. It was in this situation that there emerged a need for adjustment, rationalization and the ultimate arrival of a new structural context.

5.2.4. Germany and the Netherlands

5.2.4.1. Germany

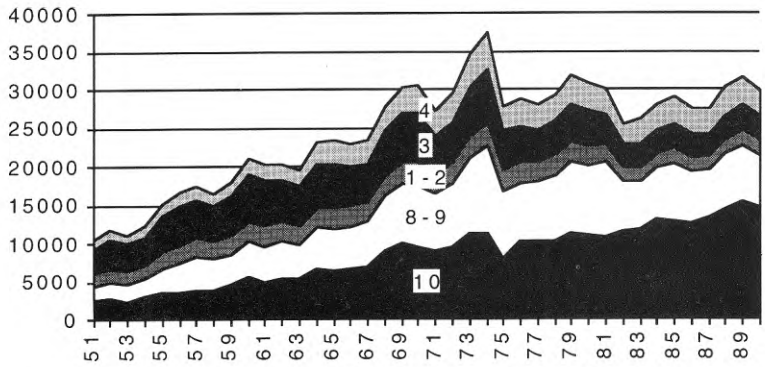
The German development is a heterogenous experience. The distance between Thyssen and Saarstahl is astronomic, and there are very important differences even between the most important companies, as some tended to be snared in the structural *sackgasse* of the 70s. Several firms tended to avoid making the adjustments that should have been necessary to undertake, in view of the existing innovative forces. This was the result of both firm parochialism and interference from different political levels.

Overall, the same basic forces that were at work in other parts of the Community were at work in the Federal republic, as well. Long product production was falling and in the flat section of the market there was

continued expansion with regard to sheets. Plate production was sinking, along with the shipbuilding industry (figure 5.7).

Figure 5.7. Production of steel by products Germany, 1951-90.

In thousands of tons



Note: 1-2: Heavy Sections, Rails; 3-Light Sections (Rebar, Merchant Bar); 4-Wire Rod; 8-9 Plates; 10-Strip and Sheet.

Sources: 1951: Quarterly Bulletin of Steel Statistics for Europe (Geneva); 1952-90: Siderurgie, Statistique Annuelle, 1962-91 (Luxembourg).

The period had to be dominated by an industrial adjustment to these basic underlying forces. The big producers had to concentrate on their wide strip mills and heavy section capacities. The companies most vulnerable to the increasingly unfavourable price trends for energy (the ones originally based upon inland ores), and these most involved in the production of long products, were most vulnerable to the crisis, being forced to undertake the most radical restructuring measures.

During the first years of the crisis this made Hoesch and the Saar industry most vulnerable. Klöckner turned out to be a special case, as the construction undertaken at Bremen on the very eve of the crisis loaded the company with an unusually heavy debt-burden. Peine-Salzgitter's location made it vulnerable, while Thyssen, Mannesmann and Krupp were benefitting from their west Rhine sites. Hoogovens, the most important Dutch producer, had a site on the mouth of the Rhine, something that made this location ideal for the production of slabs or coil, which could be re-rolled/finished at other locations.

Hoesch's merger with Hoogovens was disolved in 1981, as it had become clear that Estel's strategy had to favor Ijmuinden. The dissolution was the logical outcome of the acute era of the steel crisis, when problems became rampant, due to the collapse of several market segments. With regard to the Dortmund sites, it was evident that demand for several products was declining beyond any hope of redemption. In this situation, Hoesch was in need of substantial state support, if it wasn't going to be reduced to a reroller of Dutch slabs. Hence, as state subsidies for the modernization of the Westfalenhütte site were necessary, there was room for increased political interaction with the Hoesch board, in order to dissolve the company from its Dutch partner[135].

The dissolution of Estel and "rebirth" of Hoesch was, thereafter, to usher in a drawn out period where fusions was thwarted, due to political pressures and intrafirm rivalries. Simultaneously, other producers in the Community were in a process of increased mergerization, and, even more importantly, in the process of rationalizing these merged entities.

There are several reasons for this seeming German paradox. First of all, there was a very strong political will not to nationalize[136]. (It was evident when the RAG was formed that German politicians were ready to go to extreme steps in order not to nationalize.) Secondly, the firms were, with some noteable exceptions, in a healthy enough position to make *Alleingang*-strategies possible. As we saw in France and Belgium nationalizations emerged primarily out of the need to relieve the firms from debt, and in order to get control over fundamentally confused situations. Hence, in both these countries there emerged a point when nationalization occured out of utmost necessity. In Germany, on the other hand, things had never deteriorated anywhere near these depressing depths. This implied that overall nationalization out of utmost necessity could be ruled out (except in Saar).

Thirdly, this implied that politicians and bankers had to influence the firms in a more subtle way when overall plans were discussed. This problem was complicated by the fact that political preferences differed between national and local levels.

The regional governments had a very important influence on the overall course of restructuring, as the *Länder* provided part of the subsidies granted between 1981-85. Thus, the companies dependence upon

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[135]See sect 5.2.4.2.

[136]Dyson (1981), p 24-46; Dyson (1984), p 35-55; Katzenstein P (1989), p 13-17.

different politicians during this period did, ultimately, place them, and restructuring plans, in an rather awkward position. Strategy formulation could come from several quarters -and, indeed, be agreed by most of these quarters to be desirable- only to be thwarted by some other player, holding enough funds and/or influence in his hands[137].

Returning to Hoesch, we can trace the evolution of these influence. By 1981 it had been agreed that German steel producers should recieve a major round of closely controlled subsidies. All German firms were to benefit from these funds, which were to be distributed within an agreed industrial framework.

In this situation Hoesch started merger talks with Krupp, but in the somewhat longer run, the strategies of the two companies weren't easily reconciled. In the short run Dortmund could well be supplied with slabs from Rheinshausen, but in the medium or long run the aim of the Hoesch management was to construct a new steelplant in Dortmund (Pheonnix II, at Westfahlenhütte)[138]. The logical solution to the industrial problem was to concentrate steelmaking at the most favorably located location (Rheinshausen) and turn Westfahlenhütte into a center for sheet production, annealing and coating. On the other hand this was a sensitive solution, both in a political sense, and as a question to be resolved between the two companies. To Hoesch the Rheinshausen solution was, to no small extent, like putting out fire with gasoline. To Krupp a strategy aiming at a new steelplant in Dortmund left Rheinshausen hanging in the air[139].

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[137]Müller J/Loeber H-D/Dey G bd 1 (1983), p 227-30; Bünnig J (1983c), p 124-29.

[138]On the state of Hoesch see: Müller J/Loeber H-D/Dey G bd 2 (1983), p 259-64. WiW "Eine miserable Planung", 49/1980 p 77; WiW "Lockruf an leere Kassen", 32/81 p 68-69; WiW "Zum Abschuss frei", WiW 41/81 p 103-04; MB 810515 p 23; MB 810814 p 23; MB 811009 p 29; MB 811020 p 29; MB 811027 p 29; MB 811208 p 33; MB 820924 p 25.

[139]Whatever industrial concept that both Hoesch, Krupp, and Klöckner got into during these years was ultimately to reach Moment 22 situations: Krupp had extended a favorable Western Ruhr site in the 70s, and was, thus, locked with an overcapacity problem. Klöckner had a modernized and effective mill at a favorable location. Hoesch had an inferior site (and an added problem with dispersed facilities), at Dortmund. Concepts which aimed at the more rational use of Bremen and Rheinshausen were - always- a menace to Dortmund; but *Alleingang* on the part of Hoesch -if it was coupled to state subsidies for Pheonix- implied, if logically extended, that Hoesch would seek new subsidies to rebuild their ageing wide strip mill, as well. Thus a concept where other companies were teamed up with Hoesch meant that the Dortmund site would be in for heavy rationalization (which was sensitive in a political sense), while concepts which left

The breakdown of merger talks between the two companies (after about a year of discussions) was, thus, rather natural; Krupp gradually leaving Hoesch for the preferred company of Thyssen. This, later aborted, merger concentrated, initially, on the two firms' special steel units[140], between which there were possibilities for the rationalization of duplicated, underutilized, facilities (Thyssen: Witten, Krefeld. Krupp: Südwestfalenhütte)[141].

A state commisioned and bank supported moderator's group -led by Alfred Herrhausen of the Deutsche Bank- saw another possible solution. In this scenario, Hoesch was to be merged with Klöckner and Peine-Salzgitter. This was a scenario that would have made sense if one of the wide strip mills in Dortmund or Salzgitter was closed down, in order to relieve the situation at Bremen[142]. Hence, this solution was not to be forced upon neither of the local governments in Nordrhein-Westphalia (Hoesch) or Lower Saxony (Salzgitter)[143].

Instead Hoesch had to go it alone and implement the action that was both necessary and possible in a desperate situation. In the period between 1982 and 1984, the plate and light section capacities were closed down, while the old OH's were phased out and an impressive modernization of Westfalenhütte was undertaken. Although there was no possibility of

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Hoesch on its own threatened to create increased overcapacities, new social problems and, ultimately, increased needs for subsidies.
Schröter L (1986), p 374 ff; WiW "Eine Krise des Systemes", 16/1983 p 23-28; WiW "Kein Billard am Abend" 43/1981, p 18-19; WiW 48/1981; "Ein erstes Säuseln", p 128-29; WiW 24/1982 "Zum Erfolg Verdammt", p 108-10.

[140]By early 1983 the concept had been changed, so that all steel activities of the two companies were intended to be merged, see below. WiW 36/1982 "Stahlharte Zeiten an der Ruhr", p 90; MB 820824 p 21; MB 820903 p 29.

[141]The duplication of work inside the Thyssen groups (Stahl-Edelstahl), led to a fusion between these in 1992 (see below), that pointed to the possibilities that could have been offered by the Thyssen-Krupp deal of 1982/83, had it come true: centralization of steelmaking, rolling etc. When Thyssen merged their groups, it was obvious that it was the Duisburg site (Ruhrort) that was gaining at the expense of Krefeld-Witten (see below, Thyssen).

[142]WiW 49/1982 "Dortmunder Werben", p 138-39; WiW 8/1983 "Nichts dazugelernt", p 88-92; MB 830128 p 23. There's a very interesting analysis of the moderators report, and the problems facing German steel in the early 80s, Graham G (1983), p 9-15.

[143]WiW 12/1983 "Kampf der Länder", p 30; WiW 46/1983 "Tödliche Spiele", p 24-26. MB 830201 p 31; MB 830222 p 25; MB 830318 p 23.

financing the hoped for converters at Westfalenhütte[144], the Phoenix I site was modernized. By 1986 a 100% continuous casting ratio was reached, and investment was heavily weighed towards the development of new capacities for coated sheets[145]. By the late 80s the company was in an impressive situation, as compared with what it had been a decade earlier. The problems that existed were tied to failed attempts at diversification (electronics, machine-building etc.[146]).

In the end it was these problems, and the dispersed stock, that made the company suspectible to takeover attempts. By 1991 Krupp moved in[147], and with the LB West[148] firmly behind its back, Krupp was able to steamroll the opposition encountered from local interests and Hoesch directors alike. The differences and similarities between the early 80s and the early 90s needs to be discussed in this connection. In 1981 strategies were, to a certain extent, arrived at by majority decision (all firms were to have subsidies, and veto powers were had by firms, local governments, national government, banks etc). By 1991 subsidies had to a certain extent left the industry, which should have increased managerial autonomy, if it had left outside forces with fewer effective tools to influence firms. But, what was to show itself evident in the Krupp-Hoesch merger was that the relative situation of the managements had deteriorated, as well. What we are dealing with by 1992/93 is a situation where very strong non-German firms with multi-national strategies have arrived onto the German scene (USINOR, British Steel)[149], while East European exporters increased the competitive situation.

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[144]MB 830628 p 21. On the state of Hoesch at the time of the dissolution from Hoogovens: MBM 9/1979, p 55-59.

[145]Consemüller K (1985), p 33-36; MB 811124 p 29; Stahl und Eisen 1/1983 p 12; MB 830624 p 21; MB 841211 p 25; Stahl und Eisen 2/1984 p 9; Stahl und Eisen 7/1985 p 18; ST 4/1985 (b), p 160; Stahl und Eisen 3/1987 p 13; MBM 7/1988, p 17-18. MBM 10/1990, p 68-69.

[146]Der Spiegel 38/1991 "Fata Morgana", p 139-42; Der Spiegel 42/1991 "Eine feindliche Übernahme", p 156-58.

[147]WiW 43/1981 "Der Coup und die Folgen", p 170-74; Financial Times 920421 p 33; HB 920507 "Krupp hat keinen schlechten Fang gemacht", p 17; MB 911014 p 19; MB 911111 p 17; MB 920220 p 21. In October 1992 the merger had been approved by the sharholders of both company's. Final registration occured in December 1992. MB 921210 p 22.

[148]Landesbank Westfalen. On the uniquely aggressive strategies of this bank: WiW 30/1991 "Mut zum Risiko", p 80-85.

[149]Sect's 5.2.1.2 and 5.2.5. See, as well, the interviews with Krupp MD Gerhard Cromme in Der Spigel 44/1991 p 156-62 and FT 920421 p 33.

Thus, we are facing a situation where the mid-sized German producers faced a strong need to react[150]. As has been evidenced in this situation, *Alleingang*-strategies is no longer possible. Majority-decisions are clearly no longer being made[151], but the scale of the problems that the companies are confronted with, and the continued existence of the *Hüttenvertrag* has again served to make managements more dependent upon political pressures. German steel is today confronted with major problems. The industrial cleaning-up process that was only hesitantly followed during the 80s, will have to be speeded up.

Moving on to Krupp, we can see the coming of today's situation. The company had spent the years up to 1980-81 digesting the companies that it was made up of. Integrated oxygen steelmaking had been concentrated to the most favorable site, Rheinshausen. Bochum and Siegen-Geisweid were converted into electrical producers (turning Niederschelden/Hagen into a reroller)[152].

The strengths of the company were obvious, but there were major drawbacks as well, when the merger shuffle started in 1981. The expanded Rheinshausen plant was to large for the company's needs and it was an important producer of sections. Moreover, the diversified activities (parts of the engineering interests, the shipbulding interests) were in a problematic state[153].

While the company was impossible to accomodate with Hoesch, it proved itself too weak for Thyssen in the merger talks following the moderators report. Thyssen was demanding, and not getting, increased subsidies to take on Krupp's debts[154]. As well, there must have been a clear conception on the part of the Thyssen management that there was more to be gained from internal rationalization than from taking over Rheinshausen - Thyssen did, already, have excellent sites and capacities at Duisburg.

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[150]As we are to discuss in the following text Klöckner went into Vergleich in December 1992 and Krupp-Hoesch is implementing a program of forceful rationalization.

[151]Hoesch was absorbed by Krupp, Rheinshausen will be closed, Bremen is drastically cut back. Siegen, Georgsmarienhütte and Maxhütte are being closed or turned into mini-mills. Choices between major facilities are clearly being made. The question is if they are the right ones.

[152]Graf H/Meinshusen G (1985), p 43-46; Schröter L (1986), p 404-05.

[153]WiW 35/1982 "Krupp im Schmelztiegel", p 28-37.

[154]WiW 36/1983 "Ein böses Omen für Fusionen", p 122; WiW 43/1983 "Das war absolut irrational", p 18-20; MB 830415 p 25; Bünnig J (1983c), p 124-29.

Instead Krupp entered into negotiations with Klöckner by late 1984. This time the talks collapsed because of political resistance in Bavaria (Maxhütte), Lower Saxony (this time Georgsmarienhütte), and Nordrhein-Westfahlen (Leverkusen[155]). The idea behind the fusion was to be able to load the two wide strip mills[156] more fully through the closedown of Leverkusen, and to close down the oxygen steelworks and some of the section capacities at Georgsmarienhütte and Maxhütte, running the plants on semis from Bremen and Rheinshausen[157].

As this merger fell through on political obstacles, Krupp had to turn inward to find a solution. By late 1987 the seemingly unstoppable deterioration in the company's situation made a very radical move necessary: Krupp announced that it was to close Rheinshausen, transferring some of production section capacity to Thyssen[158], and tying up with Mannesmann in a joint venture at Huckingen. Huckingen was to be owned 50-50 by the two companies, supplying Krupp-Bochum as well as Mannesmann, which had been hard hit by the problematic tube market[159].

In spite of political resistance on an unprecedented scale, as this was one of the *major* steelworks in the Ruhr that was going to be shut, the plans were pushed through, anyway. Consequently, all section capacity at Rheinshausen was closed down and one of the two blast furnaces, as well. As the time for the last blast furnace was approaching (mid 1990), it was only destiny that could intervene to save Rheinshausen as a one blast furnace operation. The collapse of the GDR opened up possibilities for Krupp to supply EKO-Stahl (Frankfurt a.d. Oder) with coil[160].

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[155]The relatively small hot strip mill at Leverkusen had been taken over by Krupp in 1984, it had earlier been run as an independent rerolling operation (Wupperman), running on slabs from Rheinshausen.

[156]Bochum, Bremen.

[157]WiW 44/1984 "Rettung durch Dreibund", p 158-60; WiW 13/1985 "Der Ofen ist bald aus", p 46-64; MB 841023 p 27; MB 841102 p 23; MB 841116 p 26; MB 850604 p 27; MB 850618 p 21; MB 850712 p 23-25; MB 850719 p 21.

[158]Closing down what remained of long product rolling mills at Rheinshausen.

[159]WiW 50/1987 "Bann gebrochen", p 156-59; WiW 52-53/1987 "Schmerzgrenze erreicht", p 14-17. MB 870529 p 25; MB 871130 p 23; MB 871203 p 23; MB 880222 p 20; MB 880512 p 29; Eckert V (1988), p 7-9. See, as well, the interview with Krupp MD Gerhard Cromme in Der Spigel 39/1988 p 117-19 and Esser J/Fach W (1989), p 231-34.

[160]MB 900412 p 21; MB 900628 p 23; Stahl und Eisen 7/1990 p 22.

So, it was a Krupp in better shape that moved in on Hoesch in 1991. Its heterogenous non-steel activities had been overhauled after 1985[161] and the steelmaking operations had been cut back[162]. The takeover of Hoesch implied that production was to be centered upon the two wide strip mills, and the further processing of sheets. The merger itself is making thorough rationalization necessary, as the company needs to be able to generate a cash-flow able to finance the debts incurred in the process[163]. Steel-making facilities, after the merger dispersed at five different sites, has to be concentrated, while long product programmes will see more closedowns[164]. By February/March 1993, it was already obvious that Siegen-Hagen was destined for drastic cutbacks, while Rheinshausen was going to be shut, in order to cut overheads and rationalize production flows[165].

The decision to close down Rheinshausen rather than Dortmund had been influenced by the strong local political interest groups in the later

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[161]WiW 22/1987 "Probleme in Profil", p 142-51; WiW 49/1987 "Wieder im Schmelztiegel", p 146-51; MB 880313 p 43.

[162]Graf H/Meinshusen G (1985). Hagen and Siegen-Giesweid was rationalized in the same operation, cutting back on long products, closing down smaller one of the electric arcs. As was evident in 1992/93, this wasn't enough. Stahl und Eisen 19/1989 p 16; Stahl und Eisen 8/1991 p 23; MB 920629 p 18; MBM 12/1990 p 73.

[163]WiW 26/1992 "Schwere Hypothek", p 128-29, MB 920305 p 17; Stahl und Eisen 3/1992 p 22; MBM 6/1992 (b), p 80-83; FT 920421 p 33.

The problem here centers upon the other German steel firms' -most notably Thyssen's- opposition to this. There's a certain double-sidedness in this opposition, though: a concern over the impact of German subsidies on other EC partners, is combined to element of industrial Malthusianism. Thyssen's role in the restructuring of the former GDR steel-complex has been heavily tilted towards very conservative plans (see below on the restructuring of Brandenburg-Henningsdorf).

The point is that, if the dominant German firms had been succesful in implementing conservative strategies in the former GDR, keeping future steel production in the neighborhood of 2-3 mn t/y, they would have escaped the threat that a modernized East German steel industry constitutes to them - exactly because the GDR collapsed just in time to be able to take full benefit of the innovatory changes readily apparent by the early 90s.

As it is, the strategy of Malthusianism doesn't seem to be working, and the former GDR mills have been taken over by what may be termed aggresive and expanding steel-producers. In this authors mind, it seems that 1996-97 East German capacity will be around 5-6 mn t, all emanating out of new electric arcs (it may well be more, if East German construction markets starts booming after 1993, provoking additional construction).

[164]FAZ 930311 p 3; Die Zeit 930312 p 24; MB 930222 p 18; MB 930311 p 19.

[165]HB 930128 p 21; HB 930211 p 16; VDI 930212 p 6.

town, which forced RAG to subsidize coal sales to Krupp's Dortmund site. This implies that the problem of the Eastern Ruhr site has not been solved; and in a few years it seems very likely indeed that the Dortmund problem will return[166]. In the long-run, Rheinshausen would have been the preferable solution, but the price concessions made by the RAG gives Dortmund an edge in the nearest future. As *Die Zeit* put it:

> "Krupp braucht das Geld jetzt und nicht erst im nächsten Jahrtausend."[167]

That the company had problems had been evident as early as during the autumn of 1992, when the take-over of EKO-Stahl (which originally had been concluded in early 1992, on the expressed intention of making the operation a 1 mn t/y mini-mill, using TSC to produce sheets) had been aborted[168]. The problems consists of debts, steel-making overcapacities and continuing losses in the long product range.

Thyssen had an easier ride through the steel crisis. As everywhere the long product and the plate markets were causing problems, leading to falling capacity utilization and an incremental phaseout of rolling mills.

The essential strength of an ideal location with two adjacent wide strip mills made these problems possible to handle, and after the aborted merger talks with Krupp in 1983, the company had no problems in implementing an autonomous strategy[169]. The so-called "concept 900" cut raw steel capacity from 16 to 11 mn t/y, the lions share of cutbacks befalling plates and light sections[170].

The late 70s had seen the reconversion of Oberhausen (plates, light sections, wire rod) into a mini-mill. The 80s saw a disproportionate investment into sheet finishing facilities (coating etc.) and, as the hopelessness of revival became evident, the total closedown of Thyssen's operations at Hattingen (plates)[171]. At Oberhausen there was new

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[166]FAZ 930311 p 3; MB 930215 p 19; MB 930318 p 21.

[167]Die Zeit 930312 p 24.

[168]Instead the Treuhandsanstalt, in cooperation with Nucor, continued working on plans on similar lines.

[169]On the financial strength of Thyssen, see Müller J/Loeber H-D/Dey G bd 2 (1983), p 250-58.

[170]Zimmermann K A (1985), p 57-64; MB 840515 p 37; ST 4/1985 (c), p 176-93; MB 861219 p 23; Stahl und Eisen 1/1987 p 8; Stahl und Eisen 14-15/1987 p 14.

[171]The oxygen steelwork -supplied with pig iron from Ruhrort after the 1986 closedown of the blast furnaces- was taken over by the Vereingte Schmiedewerke, a company into which Krupp, Klöckner and Thyssen merged their loss-making forging activities,

cutbacks, eventually the plant was sold off to the Italian market leader in merchant bar production, Beltrami. This firm had, for some time, tried to acquire a foothold in Northern Europe (sect 5.2.5)[172].

So, by the early 90s Thyssen still had two wide strip mills and their production of plate was concentrated to Heinrichshütte (Duisburg-Süd). Their production of long products is increasingly being weighted towards rails, which had been untouched by the minis so far. The recent construction of a 15-meter blast furnace (the largest constructed in western Europe since the early 70s), is further testimony of the still existing advantages of the Duisburg sites, and their possibilities of rationalization[173].

The merger between Thyssen Stahl and Thyssen Edelstahl (1992) was the logical continuation of concentration to the Duisburg-Ruhrort complex. By the merging of the Krefeld-Witten (Edelstahl) activities with Duisburg, there will be extensive scope for the elimination of intra-firm movements of products[174], as well as a thorough rationalization of long product capacities in general[175].

Mannesmann, the third producer in the Western Ruhr area, followed a strategy of rationalization and diversification out of steel. Acquiring and consolidating DEMAG, Rexroth, AEG/Telefunkens mobile phone operations[176] as well as several other mechanical engineering firms, it

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concentrating these to Hattingen. Stahl und Eisen 14-15/1988 p 12. Ver. Schmiedewerke decided to close down the oxygen furnaces by the recession of 1992/93, see Stahl und Eisen 3/1993 p 22.

[172]HB 911122 "Grünes Licht für Stahl Werke Oberhausen", p 18; MB 910711 p 15; Stahl und Eisen 8/91 p 22-23. On the conversion of Oberhausen in the 70s: MBM 5/1980, p 71-73.

[173]Lovatt M (1989), p 20-23; MBM 12/1990 p 63. It is not had to foresee a situation where Thyssen might absorb Krupp-Hoesch during the later 90s, supplying all the wide strip mills in the area from the modernized facilities in the Duisburg area. As has been discussed above, Dortmund steel-making faces obvious problems in the medium-run.

[174]MB 920113 p 15; MB 920123 p 18; MB 920618 p 18; HB 930130 p 15.

[175]There was a revealing interwiev with Thyssen-Stahl MD Ekkehard Schulz on Thyssen's rationalization goals in the short- and medium-term in VDI Nachrichten (920731 p 6): "Bei einigen Langprodukten haben wir Strukturschwächen nicht rechtzeitig erkannt..."; "Im metallurgische Bereich einschliesslich Warmwalzstufe müssen wir mittelfristig zu einer produktivitet von 1000 t pro Mann und Jahr kommen." On Thyssens' position in the early 90s, see Stahl und Eisen 2/1993, p 104-08.

[176]Taken over during the big AEG crisis of the early 80s. See EsserJ /FachW /Dyson K (1983), p 118-21; Dyson (1984), p 40-43.

was, by the early 1990s, again what it had been a century before - an engineering firm.

It had been the existence of the coal- and steel cartels that forced the seamless tube producer to become an integrated steelmaker. During the 60s the basic structural changes that we have described (the death of Ruhr coal, the coming of oxygen steel making and continuous casting), made very deep imprints on Mannesmann's strategy. The coming of RAG relieved it from its coal interests, its innovative work on continuous casting led to the cooperation with DEMAG, and then, the product sharing agreement with Thyssen took the company out of all products but tubes[177], a really critical decision[178].

During the 80s the weak state of the market for (primarily) welded tubes contributed to this continuing movement out of steel. Concentration on seamless tubes led to product rationalization, as well as a movement into joint ventures, as weak markets and product specialization led to a constant underutilization of facilities at Huckingen[179]. Krupp moved in at that location, and a joint venture with USINOR[180] was created to rationalize production of large diameter welded tubes.

At Peine-Salzgitter there were thorough rounds of rationalization, as well. All light sections facilities were closed, the blast furnaces at Peine was abandoned and all pig iron production was concentrated to Salzgitter. Imported ores replaced indigenous.

Heavy section production was kept and modernized, and in sheet production investments were concentrated to the development of coating facilities. The reorientation of the raw material basis, the strength of the new production mix (heavy sections, coated sheets) and the rationalization of production facilities thus allowed the company to stay profitable during the better part of the crisis[181]. By the late 80s the company was

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[177]The alternative, in the 60s, would have been to construct a wide strip mill at Huckingen. In that case Mannesmann would, once and for all, have become (most probably, as it would have been heavily indebted by 1974-75) a crisis ridden steel company among the other.

[178]WiW 33/1985 "Nahtloser Übergang", p 80-84; WiW 11/1987 "Anschluss gesucht", p 128-34.

[179]Pfeiffer G (1985), p 47-52; MB 860520 p 25.

[180]Bringing together the facilities of Mannesmann and the USINOR daughter Dillingerhütte. Stahl und Eisen 3/1991 p 30; MB 920629 p 18.

[181]WiW 30/1983 "Unglaubliche Form", p 99-100; WiW 6/1984 "Noch etwas zweihaft", p 114-15; Stähler K (1985), p 53-56.

privatized (sold off to Preussag)[182], immediately thereafter the political changes in the former GDR turned the company's offroad location into a central one. The takeover of the Ilsenburg (GDR) plate mill in the immediate neighborhood (to be supplied with slabs from Salzgitter), the recent commisioning of a new 14-meter blast furnace (replacing three old ones) and the decision to turn the long product center (Peine) into an electric producer, are logical moves if this position is to be fully utilized[183].

Klöckner was extremely pressed by the crisis. The construction at Bremen right around 1973 loaded the company with debt, and the instituting of quotas, in Klöckner's case calculated on the deliveries of the old, much smaller strip mill, implied that the company was unable to expand even if it had been possible[184].

With the most modern facility having problem, the state of the rest of the company's facilities was crucial. One possible solution to many of these problems -the merger with Krupp- fell through, to be followed (1987) by the collapse of the 51%-owned daughter Maxhütte. In these troubled circumstances reorganization was pivotal to the very survival of Klöckner. First of all a strategy for the abandonment of, at least, the long products interests had to be implemented.

Maxhütte was reorganized (below) under the auspices of Thyssen, Mannesmann, Krupp and Klöckner, while Troisdorf was sold off to British Steel[185]. What remained of Klöckner's interest in long products - Georgsmarienhütte- was slimmed down[186] and turned into a subsidiary (Klöckner Edelstahl)[187]. The divestitures of Hagen-Haspe (1982), Maxhütte (1987), Troisdorf (1990) and the cut-backs at Georgsmarienhütte (1988-90), are in themselves examples of the same

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[182]MB 890905 p 25; MB 890930 p 27.

[183]In the somewhat longer term cooperation with Krupp may be possible. The West LB is the most important shareholder in Preussag.
Ultimately, this will be dependent upon if Thyssen and Krupp finds some way of cooperating (see note 173 sect 5). The possible synergies between Dortmund and Salzgitter seems more limited. In Germany, you can never know, though. Penson S (1991), p 89-91; MB 920625 p 17.

[184]The financial problems of Klöckner: Müller J/Loeber H-D/Dey G bd 2 (1983), p 265-70.

[185]MB 900621 p 19; MBM 12/1990, p 73.

[186]v Bogdany L/Korth H (1985), p 37-42; MB 820716 p 25; MB 830624 p 25; MB 880725 p 19.

[187]Stahl und Eisen 5/1992 p 139-40.

forces as these that were at work in other parts of the steel industry during the period. That is, the reorganization of the long products sectors and the concentration on the flat section of the market. On the other hand: the problem in finding a partner to the Bremen operations, and the long delays in converting the inland sites -Maxhütte and Georgsmarienhütte- to the electrical route (or the failure to close them down) exemplifies the hesitance shown by the Germans when they were confronted with industrial change on a massive scale.

In the case of Bremen there has been a natural interest in finding partners for this troubled operation, especially when steel receded in importance to the Klöckner-group (diversification into mechanical engineering)[188].

For the steel division, the solutions to two problems have been central -indigenous coal and heavy debts. The forced dependence upon indigenous coal (the *Hüttenvertrag*) denied Bremen much of the potential advantages of its harborfront location[189]. Thus, cooperation with an external supplier of either pig iron or slabs/coil seemed logical. The main problem in this quest of finding an outside partner, which was greatly accelerated during the recession of the early 90s[190], was the heavy debt-burden. It had been problematic to find partners willing to shoulder the old debts. Instead, in December 1992 *Vergleich* proceedings were started, with a 40% write-off of debt proposed. At the end of this road, a very thorough rationalization of the Bremen activities, and some kind of cooperation with Hoogovens seems probable. A strategy of cooperation and the cut-back of Bremen to a one blast furnace operation had been settled for by the spring of 1993[191]. Georgmarienshütte is to be divested, the new owner finally converting the operation into a mini-mill[192].

Returning to Maxhütte's collapse, this is, in itself a rather interesting phenomena, as it was one of the last manifestations of the closed character

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[188]WiW 21/1987 "Krise macht hart", p 157-66.

[189]Henke M (1989), p 196-97.

[190]During 1992 tensions increased, and the attempts to sell Klöckner Stahl to outside interests accelerated. First of all a German consensus-solution (Thyssen, Preussag, Krupp/Hoesch) failed and the USINOR withdrew from negotiation. BS seemed, for a moment to be the probable buyer, thereafter Hoogovens' appeared on the scene. See Der Spiegel 40/1992 p 149.

[191]Die Zeit 921218 p 21; MB 921214 p 25; MB 921217 p 21; MB 930121 p 19; HB 921214 p 20; HB 930211 p 17; HB 930128 p 21; VDI 930212 p 6, stahl und Eisen 3/1993 p 22.

[192]MB 930215 p 21; MB 930322 p 21.

of the German steel industry. Simultaneously, it was the logical outcome of the EC's regulative system.

Maxhütte (cap 1 mn t/y) had been producing light and heavy sections utilizing Bavarian ores, while also having CR facilities for the processing of sheets brought in from Bremen[193]. The situation had been deeply problematic for more than a decade and by 1987 bankrupcy was impossible to avoid.

The rest of the German producers were worried over the situation for two reasons. First of all there was a pronounced risk that aid to Maxhütte, from the Bavarian or the federal government, might destroy their case against Finsider. Secondly, there was another risk inherent in the possibility that Maxhütte might be taken over by either Austrian or Italian interests, thereby gaining an inside foothold on the German market. In the somewhat longer term this might once again have threatened the Saar-works -this time from inside Germany- a situation that may well have made for even greater outbursts of state subsidies. Implicitly, this would have undermined the position of the Ruhr-based concerns when complaining about subsidies in the rest of Europe[194].

Hence, it became necessary to guard the soft underbelly of the German steel market once more. Thus, Thyssen, Mannesmann, Klöckner, Krupp and Saarstahl (11% each), and the Bavarian state (45%), reorganized the Bavarian producer in unison, cutting operations in less than half. The industrial conservatism of the concept was clear: Maxhütte was still an integrated, one blast furnace operation. In the process the last ore-mining operations in Bavaria were stopped[195].

By early 1992 Maxhütte was back in the limelights, as the big concerns decided to leave the area. The operations were deeply in the red, and the breakdown of Eastern Europe had opened up the German market to the Italians once and for all. The Treuhandsanstalt had sold off two GDR-mills to Riva (aiming at a capacity up to 2,4 mn t/y of long products at these sites)[196]. Moreover, Lucchini was on its way to acquire Huta

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[193]ST 4/1985 (a), p 173.

[194]WiW 37/1986 "Bayrisches Stahlopfer", p 127-33; WiW 19/1987 "Franz-Joseph Hütte", p 14-16;

[195]WiW 24/1987 "Gienows Grubenzauber", p 14-17; WiW 27/1987 "Millionen für Ruinen", p 22-23; WiW 47/1987 "Maxhütte: Doppelter Bankrott", p 9; MB 870424 p 23; 871105 p 25; MB 880201 p 21; MB 870921 p 21; MB 871005 p 19.

[196]The case of the sell off of Henningsdorff and Brandenburg to Riva in late 1991 is, in itself, a revealing story on the character of German steel industry opposition to

Warszawa (Poland), Feralpi had taken over at Riesa (GDR) and ARBED had bought Maxhütte Unterwellenborn (GDR). All these projects are, or will be turned into, mini-mills producing long products. In this scenario the further subsidizing of an integrated Bavarian mill was a lost cause.

> "Im übrigen will man, bei Lage der Dinge, Geld in ein Fass ohne Boden werfen. Hätte diese Erkenntnis den Stahl-Managern von der Ruhr nicht schon früher dämmern können?"[197].

The fate of Maxhütte seems tied to the ability to attract some investors interested in converting the plant into a mini, just like several other long products producers that had been reorganized along these lines in the decade leading up to 1992/93. There may well be a hint of the future destiny of Saarstahl in this pattern, too.

The Saar needs a paragraph of its own, as the problems here have been much more intensive then in the rest of Germany. Indeed, for every practical reason, the fate of Saar has been more related to the fates of the neighboring areas -Lorraine, Luxembourg and Vallonia- then to the relatively easier development paths experienced in the Ruhr.

By the mid 70s the need for a thorough reorganization of the Saar was clearly recognized, as well as the need for massive injections of state

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competition from the inside. A German consortium, built upon consensus (Thyssen, Baadische, Saarstahl), was beaten by the Italian buyers. The Germans, not wanting to destroy their own markets, aimed at a capacity of 1,5 mn t/y. In the aftermath of the privatization verdict, the MD of Baadische led the protests and strikes in Henningsdorf:
"Der Mann am Eingang verschränkt die Arme von der Brust. Er hat es ihr schon einmal gesagt, und er sagt es ein zweites mal: 'Das Werk ist besetzt, da kommt keiner rein'...Horst Weitzmann durfte das Tor passieren. Der Chef der Badischen Stahlwerke führt sein Kampf auf dem Fabriksgelände. In einem überheitzen Büro redet er auf die Henningsdorfer Betriebsräte ein 'Ich dürft nicht nachlassen'. Der Manager im grauen Zweireiher ist ganz begeistert vom Protest der Stahlarbeiter, er passt bestens in sein Konzept..."
The really absurd situation of a manager of a West German steel producer occupying East German plants, and delivering words of wisdom like "In der Treuhand gibt es eine Spaghetti-Connection.../Riva/ verdienen im eigenen Land nichts, und mit Schwarzgeld aus der Schweiz kaufen sie Firmen auf", (cited in Der Spiegel 46/1991, p 132, 133), is a remarkable evidence of the still closed character of the German steel market after 40 years of the ECSC: Der Spiegel again: " 'Wenn der Italiener kommt' sagt Weitzmann, 'dann ist der Krieg programmiert'. /Der Spiegel:/ Man könnte es auch Wettbewerb nennen. Aber das ist für den Deutschen Stahlmanager offenbar ein ganz schrecklisches Ereignis", ibid p 134. See, as well: MB 911128 p 19.

[197]Handelsblatt 920515/16 p 18. See, as well, HB 920731-0801 p 11 and HB 930210 p 19.

funds into the project. As the years 1975-77 inaugurated a crisis of unprecedented proportions[198], ARBED -the potentially strongest partner in the Saar- was called upon to lead this reorganization: At this point ARBED absorbed the 50% stake in Röchling-Burbach, that it didn't already own, after the 1971 merger.

The strategy for Saar reorganization that evolved was similar to the concepts that ARBED developed for Luxembourg during the same period, as well as the concepts evident in the French steel plan of 1977: Saar iron making was to be thoroughly reorganized by the construction of new large blast furnaces at a central location (Dillingen). These were to feed the plants of both the new ARBED Saarstahl and the French-controlled Dillingerhütte[199]. Steel production was, likewise, to be concentrated to Dillingen (Dillingerhütte), and Völklingen (ARBED Saarstahl), turning Burbach and Neunkirchen into unintegrated rolling mills[200].

Once more, the inherent conservatism of the plans implemented around 1977-79 is obvious: The crisis was still concieved of as a cyclical one, and the old technological concepts were only to be reorganized into more effective (increased scale) units. We should be aware of the fundamental differences between these strategies and the strategies pursued by USINOR and ARBED during the 80s and 90s. What evolved then, were variations on the Italian theme, as electric furnaces was built or planned, allowing a totally different measure of flexibility of operations. When ARBED and USINOR reorganized in 1991-92 the whole concept was built upon this new technical paradigm, ARBED planning to construct electric arcs at geographically distant locations, in Luxembourg and Germany, while USINOR was converting Gandrange. This strategy was, in fact, the exact opposite of the strategies of the late 70s.

Thus, in the late 70s the concentration upon few sites was emphasized, while in the 90s production was located to a multitude of sites, in order to increase flexibility, cut overheads, and decrease transport costs. In the late 70s the integrated route was still the order of the day for investment

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[198]Stahl und Eisen 18/1977 a a ; MB 771209 p 37; MB 771213 p 36; MB 780221 p 31; Stahl und Eisen 20/1978 p 1065-66.

[199]Creating the 50-50 owned Rogesa (Roheisen-Planungsgesellschaft Saar mbH. On the general state of the Saar industry during the period 1975-82, see Bünnig J (1983b), p 93-101.

[200]Rosenstock H G "Die ARBED Saarstahl GmbH", Stahl und Eisen 1/1985 p 29-32; MB 780207 p 38;MB 780224 p 36; MB 791228 p 33.

decisions, by the 90s it is safe to predict that another integrated plant for the long product segment of the steel-market will never be constructed.

On the other hand, it must be emphasized that this new pattern does not appear to break down the old rules of company size. The logics of Unimetal and Europrofil (sections 5.2.1.2 and 5.2.2.2) and the rise of the Italian and American concerns[201] is evidence of the *reverse* case: a concern of "mini-mills" (the concept seems exceptionally outdated) is able to steer production flows to the most efficient mills, to rationalize production between mills, to avoid excessive capital charges at any one site, and to minimize transportation costs. In fact, if the normally argued biggest advantages of minis -their flexibilty and low overheads- are to be kept, there is a *need* for multi-site production. Hence, there exists plenty of room for economies of both scale (speed) and scope (moving into heavy sections or flats) for the electrical producers.

In the Saar, construction according to the older strategy was started in the early 80s, heavily subsidized with credits from both the Saar and the Federal government. By 1982 the operations were in deep crisis, as new credit charges were loaded on top of the low capacity utilization rates of the older facilities. By late 1982, there seemed to be risk for a real bankrupcy and by early 1983 ARBED was opting out of the project (note the incidence with the reorganization of production in Luxembourg and Vallonia). At this time a new concept for the whole project had to be found[202].

The role of the German federal government, being very reluctant to approve of any scheme extending state ownership or state involvement in further schemes aimed at the "socialization of losses", was instrumental in the continuing developments in the Saar. ARBED was relieved of responsibilities by the end of 1983, but further grants of aid from the federal government were made conditional upon cooperation from the trade unions and deep cutbacks in the labor force. By early 1986, ARBED's shares were transferred to a trustee for the government, where they remained until USINOR was willing to take over control of the company (April 1989)[203].

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[201]Riva, Lucchini, Arvedi, Beltrami, Feralpi. In the US Nucor, Birmingham Steel etc.

[202]WiW 12/1981 "Einen meter vorm Lokus", p 66-68; WiW 10/1982 "Hilfe in Eiltempo", p 126-27; WiW 26/1982 "Das Ende zweier Namen", p 102-03; WiW 45/1982 "Das Herz Europas blutet aus", p 32-33; MB 821203 p 23; MB 830726 p 19.

[203]WiW "Fass ohne Boden", p 155-57; WiW 18/1985 "Unverhoffte Entspannung", p 144-50; WiW 30/1985 "Gefährlicher Ballon", p 100-01; WiW 40/1985 "Kurz vor

USINOR was, of course, the logical partner to Saarstahl, as it controlled Dillingerhütte, thus being part owners of the central plants for pig iron production (ROGESA), and the central coking plant (ZKS). The reluctance on the part of USINOR to merge with Saarstahl is easily explained, though. The company was, itself, in the process of ridding itself of uneconomic long product plants in Lorraine, and Saarstahl had been no rosegarden to foreign investors before the late 80s.

Thus, it was only after the completion of the ROGESA and ZKS projects, the massive cutbacks, and the write off of governmental debts, that USINOR proved willing to take on Saarstahl. The possibility of gaining huge tax write offs through the use of Saarstahl's earlier losses was another important element in this merger[204].

In the somewhat longer term the coordination between ARBED and USINOR (Unimetal) will imply changes in Saar, especially when the new electric capacities in Belgium, Lorraine, Luxembourg and the former GDR come on stream. The changes apparent during 1991-92 heralded the coming of a situation where Saarstahl might become the last inland West European integrated producer of light sections and wire rods. This is a scenario clearly implying further deep changes. At the moment Saar operations are in the process of being rationalized, when integration with Unimetal has prompted cutbacks in the long product range[205]. On the other hand, the closedown of integrated operations at Gandrange has improved the situation for Völklingen, as the hot end[206] of Dillingen activities is being integrated with USINOR's flat product activities at Hayange-Seramange.

5.2.4.2. The Netherlands

As we have already seen, Dutch steel was intimately bound up with developments in Germany in the earlier part of this period. By the 90s it

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Toresschluss", p 196-97; WiW 15/1986 "Auf dem Amboss", p 156-62; WiW 41/1986 "Tendenz gegen Null", p 137-42; MB 831014 p 29; MB 831111 p 25; MB 831220 p 25; Mb 841012 p 31; MB 850521 p 41; MB 860103 p 21; MB 860117 p 21.

[204]MB 860311 p 31; MB 860418 p 25; MB 860919 p 25; MB 861111 p 20; MB 880512 p 31; MB 881006 p 33; Eckert V "Saarstahl makes ready for merger", MBM 7/1988 p 11-13; MB 881031 p 21; MB 881219 p 21; MB 890403 p 25; MB 890424 p 23-25. The *land* of Saar keeping a minority (veto controlling) stake in the company.

[205]FAZ 930311 p 3.

[206]Dillingen is to supply the Lorraine center with raw steel.

again seemed as though Hoogovens was to be able to tie up with a German company.

First of all, the maximum strategy of the Dutch-German Estel combine -to build a new plant at Dortmund, as well as new finishing facilities for Dutch supplied slabs and coil- was out of the question with the onset of the "steel crisis". Instead the emphasis turned towards closing down facilities at Dortmund, increasingly supplying what remained from Ijmuinden[207]. In a political sense these plans were impossible, and German pressures forced a dissolution of the partnership with Hoesch by 1981[208].

Left with more overcapacity than ever, Hoogovens was left out of the Belgo-Luxembourgian settlements of 1983/84, as well. The firm was, in short, too strong to be a partner in the reshuffling game at this point in time.

Hoogovens modernized the rolling facilities at Ijmuinden during the 80s. In line with the strategies of other major producer, production was becoming more and more centered towards the most modern wide strip mill and the further processing of sheets[209]. Investment was made into coating lines, and a by now familiar pursuit of downstream integration was followed, when independent coaters and tinplate producers was aquired[210]. The increased importance of the sheet segment of the market to Hoogovens can be seen from figure 5.8.

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[207]MB 801104 p 37; MB 801111 p 38; MB 810210 p 29; WiW 18/1981 "Kein ewiger Bund", p 18.

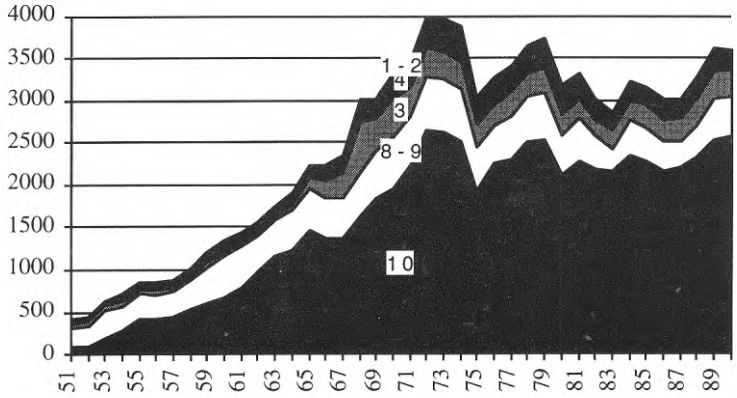
[208]Schröter (1986), p 372-79; WiW 32/1981 "Lockruf an Leere Kassen", p 68-69; WiW 43/1981 "Kein Billard am Abend", p 18-19. See, sect 5.2.4.1.

[209]The most modern wide strip mill was upgraded, the oldest closed down, the billet lines being equipped with continuous casting facilities.

[210]Hoogovens in the 80s (primarily strengthening its sheet production facilities, coating facilities and moving into downstream (tinplate producing), activities), see: WiW 46/1982 "Der Ofen ist nicht aus", p 148; WiW 41/1985 "Künftig aus eigener Kraft", p 160-62; STARES 8/1984 p 366; STARES 8/1985 p 374; STARES 8/1987 p 386-90; STARES 9/1989 p 482; STARES 8/1989 p 430; STARES 8/1990 p 437; STARES 9/1991 p 512; MB 920716 p 17.

Figure 5.8. Production of steel by products, Netherlands, 1951-90.

In thousands of tons



Note: 1-2: Heavy Sections, Rails; 3-Light Sections (Rebar, Merchant Bar); 4-Wire Rod; 8-9 Plates; 10-Strip and Sheet.

Sources: 1951: Quarterly Bulletin of Steel Statistics for Europe 1954 (Geneva); 1952-90: Siderurgie, Statistique Annuelle, 1962-91 (Luxembourg).

Hoogovens's international connections seems to have been strengthened by the pressures evident during the recession of the early 90s. At first, the decision to close down the aged plate mill was taken in direct

connection with USINOR[211]. Somewhat later in 1992, the tentative moves to leave long product production (where it was sensible to mini-mill- and East European-competition) seems tied to a coming cooperation with Bremen[212]. Indeed, the new coordination between Ijmuinden-Bremen may well be the second coming of the old Dutch-German concept, that had failed in the political harmageddon of the early 80s.

5.2.5. The United Kingdom

In the UK there had emerged a need for really thorough reorganization of steel-making capacities after the modernization of Port Talbot, Newport, Scunthorpe and Redcar-Lackenby. As steelmaking capacities were increased at these sites, a mop up of older centres was urgently called for, as utilization rates declined in accord with the development of new capacities and the continuing weakness in the market place In the United Kingdom, production reached its top as early as in 1970 (fig 5.9).

That there was a need for such a rationalization had been recognized by the early 70s, when the modernization plans got under way, but during the next decade the question was put on hold, as a political gamble over the future of British steel got under way.

The Beswick review (1974-75) delayed the closure of several plants for some years, the new Labour-government being anxious not to provoke any outbursts of industrial unrest[213].

The governmental policy was one of delayed retreat, in the vain hope- as it turned out to be- of a steel revival[214].The costs of the strategy increased when BS losses grew in line with the arrival of new capacity[215].

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[211]Hoogovens agreeing to supply the Dutch plate market from USINOR, the French producer instead taking ca 150.000 t p y of HR coil from Hoogovens. MB 920423 p 21.

[212]MB 1214 p 25; Die Zeit 921218 p 21.

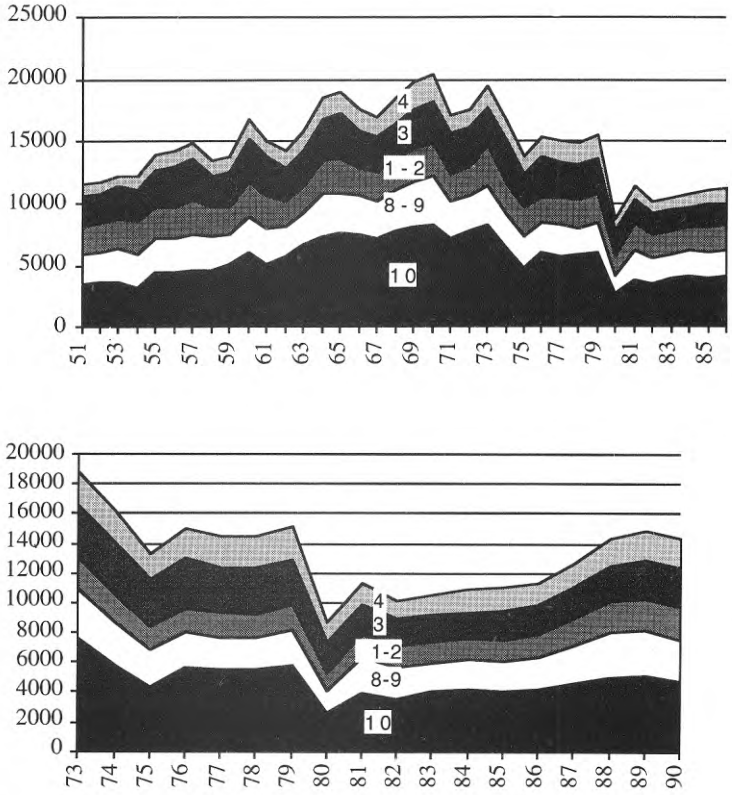
[213]MB 741115 p 40-42; MB 750509 p 31; MB 791009 p 41-42; Richardson J/Dudley G (1987), p 334-35.

[214]"By the end of 1975 BSC production was down to 17 mn t/y, but mr Varley /the industry minister/ still estimated that by the 1980s BSC would require a capacity of 37 mn t/y" Richardson J/Dudley G (1987), p 336; Messerlin P/Saunders S, p 76-77.

[215]Losses were: 1975/76 GBP 255 m; 1976/77 GBP 95 m; 1977/78 GBP 444 m; 1978/79 GBP 309 m; 1979/80 GBP 545 m, see MB 790206 p 33 on the urgent need for rationalization.

Figure 5.9. Production of steel by products, The United Kingdom, 1951-90.

In thousands of tons



Note 1: 1-2: Heavy Sections, Rails; 3-Light Sections (Rebar, Merchant Bar); 4-Wire Rod; 8-9 Plates; 10-Strip and Sheet.

Note 2: **The upper figure**: UN figures. **The lower figure**: ECSC figures (available after accession to the ECSC).

Sources: **Upper Figure**: 1951-72: Quarterly Bulletin of Steel Statistics for Europe. 1973-86: Annual Bulletin of Steel Statistics for Europe. **Lower figure**: 1973-90: Siderurgie, Statistique Annuelle (Luxembourg).

By 1978 a modified line of action had to be implemented, signalled by the arrival of a new White Paper on BS[216]. This change of strategy was followed by the negotiated closure of the last open-hearth plants in the UK. Even in the medium-run this new line of action could only be an intermediary solution, though. What was needed was, by now, a very thoroughgoing restructuring of all existing British steel facilities.

The basic logic of the situation implied that sheet production had to be concentrated to the best equipped plants, i.e. Port Talbot and Newport, where massive overmanning had to be reduced, as well[217]. This required the consequent closedown of steelmaking at Ebbw Vale, Shotton, and, ultimately, Ravenscraig.

Similarily, the modernization at Redcar-Lackenby implied that the long intended coastal drift from Corby was possible to fulfill, while also requiring the reorganization of production along the entire North-Eastern coast (Hartlepool, Cargo Fleet, Consett etc.). Moreover, the expansion at Scunthorpe, and the growing competition encountered from the expanding private (electric) steelmakers, required reorganization of light section and billet capacities. In the case of engineering (special) steels, there were massive overcapacities. BS had plants and so had GKN, Hadfields, and a multitude of other special steel producers[218].

Considering the remarkable state of the British steel industry in 1979-80 it is no wonder that developments during these years turned out to become rather traumatic. Thus, it was not more than three months after the lightning of the new Redcar furnace (Oct. 1979)[219], that a new corporate plan outlined the future of the company. The planned concentration to the five major works implied, in the *short* run, a cut in

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[216]"BSC-The road to viability". The report outlined cutbacks in new capacity construction, and a new line was also taken with regard to closures, in order to get capacity utilization back to satisfactory levels. The coincidence with the French plans, that was being drawn up at exactly this point in time, is worth being remarked on. In both cases the new strategies arrived at during the spring of 1978 implied that a state supported policy of all-out expansion was cut off, thereafter accelerating measures of rationalization were implemented.

[217]MB 791009 p 43.

[218]An overview of the situation in Sheffield is available in MBM 6/1974, p 9-21 and MBM 2/1987, p 29-37.

[219]On the potential importance of Redcar-Lackenby, see: MB 751115 p 37; MB 790916 p 41; and Hudson R/Sadler D (1989), p 66-73. Bryer et al (1982) is, in fact, a book almost totally dedicated to this subject, see, esp. p 177, 187 ff, 199 ff., 207 ff.

the workforce by 52.000 men[220]. It was at this point in time that the big steel strike developed (in the end solved by an arbitration committee, granting wage increases of 9%)[221].

The strike couldn't influence the general direction of events, though. In fact, it is almost impossible to understand how anything could have stopped this rationalization. During the preceeding century steelplants had been located at different locations all over the UK, according to their different (changing over time) comparative advantages. The weaknesses inherent in this pattern had been felt by the 1930s, when it had provoked an early advent into protectionism and corporativism.

The further developments of the industry continued to be deeply influenced by the traditional locations. Above all, the construction of new capacity had only rarely been followed by the rationalization of old capacities. British steel was, by the 70s, a multi-layered structure, where new mini-mills and coastal giant blast furnaces were mixed with Open Hearth's, old coal-field locations (Consett's) and old ore-field locations (Ebbw Vale's). So, through the years 1980-83 a string of major plants had to be closed, either totally, or in part, as they were turned into unintegrated rerollers. In the same vein, the company was being reorganized along product lines (compare this to the development of Unimetal and Ascometal in 1984). It was these strategic-structural changes in the company's set-up that, ultimately, made privatization feasible.

Indeed, there are several distinct phases in the transformation of the BS from one of the worst performers known to the civilized world, into a major force on the European steel-making scene. These phases have to be tied to the developments just oulined.

During the late 70s and early 80s major capacity cuts had to be made in order to cut overhead costs and get the new capacity off the ground. This "heroic" phase was followed by a less spectacular phase, when a strategy for the future of the company had to be implemented -defining its place

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[220]Just as with regard to coal (sect 3.4.2.4) it was the stringent cash limits set by the ingoing tory-government on the nationalized companies that provoked the acute situation of 1979/80 (Bryer et al p 174-76). In reality, though, it woldn't have mattered how much money the company would have been granted. There were problems of genuine overcapacity and an acute need to make choices between facilities (rationalization) MB 791207 p 36; MB 791211 p 40; MB 791214 p 36; Richardson J/Dudley G (1987), p 342 ff; Müller J/Loeber H-D/Dey G bd 1 (1983), p 223-24.

[221]Richardson J/Dudley G (1987), p 343-44.

in amongst the structure of British private steel producers, as well as inside the general European stage. Going back to our earlier cases, we may recall the emergence of these strategies and structures, in order to place the British experience within these general developments.

In France the whole of the industry was, in stages, merged into USINOR. After finding a national strategy -the retreat from home ores, the acceptance of the move towards the coast and the conversion of Lorraine to electric steelmaking- a feasible structure could be allowed to evolve, i.e. the unitary company with product divisions. Then, increased scale, and a continuing need for rationalization, led to the implementation of a European strategy: acquisition of stockholders and rerollers, coordination with Cockerill and ARBED.

In Belgium and Luxembourg there were initial confusion, but after the early 80s a strategy of product specializalization was arrived at. A still tentative structure has emerged, where the Vallonian producer has been able to cooperate with USINOR and ARBED to a certain extent, although the move towards a merger of flat products activities between Ghent and Vallonia was evidently too early concieved. Arriving at national -really regional- strategies of specialization, the international concept was coordination and movement into stockholding and fabrication (Cockerill), while ARBED seemed to be entering upon a stage of internationalization of production by the early 90s. The company's earlier attempt at this have been successes (Ghent), and spectacular failures (Saarstahl), but the fundamental differences of the strategy of the late 70s and that of the early 90s have been noted.

In Germany and the Netherlands, there was an initial retreat into national strategies and company solutions. Finding company strategies -primarily aiming at the concentration of production upon heavy sections and flat products- were, in the end, not enough. As competition increased with the reorganization of other steel industries, mergers have increased in importance, and strategies to accomodate to an increased international presence inside Germany will have to be developed. The strategy adopted towards the GDR/Treuhand complex ("modified Malthusianism"), broke down, and the traumatic process of rationalizing troubled areas inside an increasingly internationalized market, will have to be dealt with. By 1992/93 the nationalistic strategy adopted at Maxhütte had failed, Klöckner and Hoogovens were in the process of increasing cooperation, and in Saar the industry was in the process of being integrated with its French mother company.

In Italy (state industry) strategies evolved as reactions to recurring breakdowns. By 1981 there had opened up a split over the future role of

IRI as well as Finsider inside the government. Steps towards a solution of the strategic as well as structural logjam evident in Italian state held enterprises had to be taken. For Finsider, the period up to 1992/93 was, after this, a continuing adjustment to this situation. By 1983 there was a recognition of the basic problem: finding some ways to get capacity utilization back to acceptable levels. The obvious solution to the problem (concentration to Taranto) was avoided for as long as possible, though. By 1987 a strategy of concentration upon the flat segment of the market was at last arrived at, it was to take another crisis to decide to get rid off Piombino. By the early 90s Ilva is destined for a much slimmer costume, as a feasible structure, both with regard to the private Italian producers and within Europe, will have to be found during the next few years.

For the private Italian producers the strategy was one of moving up within the segments of the steel market, and after the freeing of the market in the years 1985-88, and the arrival of concieved strategies in Belgium, France and within Italy, new possibilities for expansion opened up for the acquisition of facilities within the Community. By the late 80s and early 90s the tentative expansion of the Italian producers had gathered force into a rather significant innovative wave, as multi-plant expansion was sought (Riva, Beltrami, Lucchini, Feralpi) and thin-slab casting was pionereed (Arvedi).

In the United Kingdom the strategy chosen by BS was a variation of these major themes. Large scale reorganization was followed by the spin-off of product groups. In this context, the problem with light section and wire rod was solved through the formation of Allied Steel and Wire (ASW, 1981), and United Merchant Bar (UMB, 1984). ASW merged the wire rod and rebar mills of GKN and BS, concentrating production to GKN's Tremorfa-Cardiff operations and to a rod mill at BS's Scunthorpe complex[222]. UMB created a privately controlled company that operated a

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[222]MB 810703 p 27-29. In no small sense the formation of ASW was the second coming of GKN's old set up (before nationalization), when the firm had had an integrated mill at Cardiff (East Moors) and one at Normanby (adjacent to Scunthorpe). After nationalization GKN had reconstructed their position in South Wales, through its construction of a mini-mill in Cardiff (Tremorfa, 1974-76), in order to supply their bar and rod mills from this new facility. This led, in itself, to the closedown of the old integrated mill at East Moors (MBM 3/1977, p 11-13; MBM 1/1980, p 47). In Scunthorpe the BS rod and section mill included in this new company was entirely fed with billets from BS Scunthorpe plant. At its inception in 1981 ASW was owned 50-50 by GKN and BS. MBM 1/1982, p 43-45; on ASW in the later 80s, after the management buy-out and stock exchange introduction of 1987-88, see ST 7/1989 (a), p 374-78.

rebuilt merchant bar mill at Scunthorpe (closing down less efficiently placed ones in the process)[223]. After this deal the Scunthorpe mill supplied two nearby rod and bar mills (ASW, UMB), which minimized transport costs, while simultaneously making a higher capacity utilization of steelmaking facilities possible.

This "public-private interface" in the production of light sections and wire rods (BS supplying billets, the adjacent ASW and UMB rolling rod and bar) goes some way to explaining the negative reaction that the Italian producer Beltrame faced when it announced (1988) that it wanted to set up a plant just next door to Scunthorpe (at Boston). In the end this scheme was stopped on environmental grounds, much to the benefit of the existing UK firms that had been very upset by the possibilty of gaining an Italian competitor on their very doorstep[224].

The Sheffield area's problem was solved through the formation of Sheffield Forgemaster[225] (SF, 1982), and, in the first place, through the foundation of United Engineering Steels, which merged BS special steel long products activities with GKN's special steel facilities[226].

The formation of BBB[227], ST and CDT[228] were examples of the same tendency. The troubled areas (light sections, special steel-long products,

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[223]UMB took care of the rest of BS light section problem. Closing down two distantly located (and aged), bar mills (Jarrow, Monks Hall), BS centralized Scunthorpe's billet supply to the available, adjacent, rolling mills. The new company was able to utilize an existing -modern but disused- rolling mill at Scunthorpe. UMB is owned by Caparo-BS 75-25. See MBM 2/1986, p 48-51.

[224]MB 880926 p 23; MB 891106 p 25; MB 900419 p 35. Beltrame did instead move into the Oberhausen venture with Thyssen, see sect 5.2.4.1.

[225]Concentrating the forging divisions of BS and Johnson & Firth to the formerly BS-owned River Don plant (Sheffield). Jointly owned by BSC and Johnson and Firth (50-50) (1982). See MBM 2/1983 (b), p 41-43. On the general problems of the SF and UES mergers, see MBM 2/1982, p 35-37.

[226]Effectively merging BS Sheffield/Rotherham long products special steel facilities (Templeborough, Aldewarke, Stocksbridge) with GKN's Brymbo-Wolverhampton facilities. In the run-up to the merger BS had closed down Round Oak, Tinsley Park and Hadfields. After the merger the installation of a new continuous caster at Aldewarke was immediately followed by Brymbo's closure. The bar mill at Wolverhampton went down in 1992. UES was, effectively, a 50-50 joint venture between GKN and BS. See MB 2/1987, p 29-37; MB 900517 p 23; Stahl und Eisen 9/1985 p 12; MBM 2/1983 (a), p 45-47; MB 821119 p 25.

[227]British Bright Bar, concentrating bright bar production to BS's former Tipton plant (owned by BSC-GKN-Brynill 40-40-20) (1983). MBM 2/1983, p 37; Stahl und Eisen 3/1983 p 7; Stahl und Eisen 9/1984 p 14.

tubes), were merged with their respective private partner, each of these new company spin-offs being followed by extensive rationalization, both through the closure of capacity within the new groups, as well as through the acquisition and closedown of competitors[229].

Simultaneously, a continuing rationalization and development of the five major sites was undertaken. Heavy section and plate production were concentrated to Scunthorpe and Redcar-Lackenby, as the traditional sites were closed down in rapid succession[230]. In South Wales production was concentrated to the best sites -Port Talbot and Newport- followed by the conversion of Shotton and Ebbw Vale into CR facilities. Moreover, Shotton was chosen for extensive investment into coil coating - in itself a choice that spelled the beginning of the end to Ravenscraig. By 1986 the Scottish CR facility (Gartcosh) was closed down, Scottish coil instead shipped to Shotton for further processing[231].

With the company slimmed down and profitable, privatization was possible (1988) but the change in ownership implied little change in strategy. The flat section of the market was further reorganized with the closure of the CR facilities at Velindre (1989) and, more significantly, at Ravenscraig (1990-92)[232]. New investment went, in line with general

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[228]Fusing BS and TI's (Tube Investors) interests in Seamless Tubes (ST) (Corby-Wednesfield), and Cold Drawn Tubes (CDT) (Corby-Aston) (the two companies owned by BSC 75% and 25% respectively, TI 25% and 75% respectively). (1984).

[229]ASW, BS and Sheerness cooperated in the takeovers, and closedowns, of several mini-mills and bar rerollers (MBM 2/1985 p 39; MBM 2/1986 p 48). It was a question of buying quotas, by closing down competitors.
In the flat section of the market BS acquired Alphasteel in order to close it down. This move, which was directly coupled to the closedown of Gartcosh's CR facilities, did, naturally, improve the utilization of BS Welsh mills. See Stahl und Eisen 7/1984 p 12-13; 16/1985 p 14; 18/1985 p 14. On the Welsh works (Port Talbot (integr.), Newport (integr.), Shotton (finish.), Ebbw Vale (finish.), see: MBM 8/1986, p 95-99; ST 7/1989 (c), p 364-72; MBM 8/1990, p 54-56; MBM 8/1978, p 59-63.

[230]An outline of the company on the eve of privatization is available in MBM 9/1988 "Will BSC's financial armour keep its shine", p 8-21.

[231]On financial reconstruction and internal rationalization see, for example, Cockerill A (1986), p 153-6; 160-61.

[232]Ravenscraig -an extremely sensitive political issue- was closed down in stages during the period. CR facilities had gone in 1986, the closure of the wide strip mill was annonced in the autumn of 1990, turning the plant into a producer of slabs for the operations in South Wales. Then, one blast furnace went in Jan. 1991, the supply of slabs to the Dalzell plate mill went by that summer (to the benefit of Redcar), than in January 1992, the closure of what remained of the plant was announced. Stahl und Eisen

industry experience, into coating and laminating facilities, along with the acquisition of stockholders on an international scale[233]. The heavy sections and billet production capacities (Scunthorpe, Redcar) required international links. BS showed an interest in taking a significant share in the Spanish heavy section producers Aristrain, in 1990 it acquired Troisdorf from Klöckner.

Taking a comparative view of these developments we are again struck by the similarities with other national experiences. The restructuring of the industry is no simple closedown of facilities. Primarily, it required that the coastal push was accepted; thereafter a consistent strategy dealing with the relationsship between the state steel company and the smaller private producers had to be arrived at. Hence, the "easy" part of reorganization becomes the massive closedown phase (Denain-Shotton), the much more elaborate phase being the implementration of a strategy aiming at revival, not least because strategies of reorganization and revival requires certain structural solutions: the creation of different production departments (profit centers) where rationalization can be carried out, the creation of effective sales organizations (the move into stockholding). Lastly, an increasing need for cross-border mergers or coordination is felt, as large production capacities implies a concomitant need for large production flows, that can be planned and steered to the most effective units. A totally different question is how effective these new big units (BS, USINOR, possibly Ilva) will prove themselves to be. The outcome of that question will be entirely dependent upon their respective abilities to adjust to technological change and the continuing need to rationalize their productive facilities.

5.3. A short summary of West European steel-making trends in the period 1945-93, with a brief comparision to Japan, South-East Asia and the United States

When summarizing what happened in Western Europe during the period 1945-93 we are, first of all, struck by the strength of the "Drang nach der Küste". It was a tremendously forceful wave of construction of new steel capacities along the West European shore-line, and it was to

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2/1992 p 26. On BS after privatization, see ST 7/1989 "British Steel after privatisation", p 360-62.

[233]MBM 9/1988 a a p 16-19.

make thorough reorganization necessary. Thereafter, the equally traumatic implications of the coming of the mini-mills, made a related wave of rationalization necessary. Strengthening these trends, continuous casting made rationalization even more necessary, by raising yields ca. 15%.

There is, of course, some interest in discussing the similarities in the West European pattern, as compared to the developments undertaken in other market economies during the same period. Western Europe didn't exist in a vacuum. On the contrary, as discussed at some length in sect 4.4.4, international competition was increasing all through the period. It was especially the Japanese steel industry, that was becoming a formidable competitive force in the period leading up to ca 1975. A discussion of the global setting of the coastal wave, and the increasing role of electric steel-making is of some general interest.

The first expressions of these trends in Western Europe after 1945 were the related wave of construction at Port Talbot, Cornigliano and Ijmuinden, all of which intended for forthcoming expansion into the flat product segment of the market.

Early French, German and Belgo-Luxembourgian constructions were, on the other hand, still connected to the old locations: The earliest strip mills (the Monnet plan) were constructed in Lorraine and at Denain (coal field location). In Germany early strip mill construction was undertaken in Duisburg and Dortmund. In Belgium-Luxembourg Chertal (Liege) and Dudelange was chosen for early construction of strip mill capacity.

During the later half of the 50s there was a considerable strengthening of the coastal pull, as imported ores and coking coals became fully competitive with indigenous sources of raw materials. By the early 60s the strength of imported raw materials had increased to the point of being fully competitive even within the old raw material districts.

This trend, together with the coming of oxygen based steel processes -allowing unprecedented levels of throughput in the newly constructed steelplants- turned the earlier trend into a whirlwind.

In Germany, Klöckner moved out of Ruhr, into Bremen. Ijmuinden underwent an important expansion based upon the introduction of the BOP, while the French decided to build at Dunkirk in 1960. The Italian decision to construct at Taranto was virtually simultaneous. The Belgo-Luxembourgian steel industry reacted by construction on the Ghent Ship Canal. In the United Kingdom Llanwern (Newport) was constructed. The decision to share out the capacity of this mill between Wales and Scotland (Ravenscraig), was, on the other hand, an ill-fated example of industrial consensus-building.

Then, the continuing strength of demand from the emergent, sheet-consuming, industries called for another round of expansion at these plants, as the 60s progressed. By the late 60s/early 70s the intended scales of Taranto, Dunkirk and Ijmuinden were approaching 8-12 mn t/y. Fos, which was to become the last of the big greenfield developments, was originally concieved for a capacity in excess of 10 mn t/y. In Germany, meanwhile, Klöckner was -essentially- reconstructing its Bremen plant.

Other German firms moved towards the Netherlands. Hoesch merged with Hoogovens, the new firm harboring plans to construct one more Ijmuinden, at Maasvlakte. Thyssen's take over of Nedstaal was, obviously, done with the intention to expand the plant in a very substantial way. In Italy, all older centers were modernized, while simultaneously new construction was contemplated at Goia Tauro. In the UK the plans of the early 70s called for truly heroic construction, as existing plants in South Wales, in Scunthorpe and on the North-eastern coast was intended for expansion, in the case of the Tee-side approaching 10-15 mn t.

The 70s and 80s saw, in no way, any general revocation of this trend. It was only that the scale enviseaged by, say, 1973, was never really realized. Although the projects were scaled back on their way towards implementation, and a reorganization of the less feasible strip mills (Denain, Ravenscraig, Ebbw Vale, Leverkusen, Chertal etc.) had to be undertaken, the coastal concept for wide strip mills is still alive.

It was, instead, the traditional long product producers that had to undertake the most thorough reorganization. This development has to be seen towards the background of the breakthrough of the mini-mill, i.e. a concept introduced during the 50s and 60s. The full potential of this innovation was only to be felt in a much more severe way in the context of stagnating (or declining) markets.

The severity of this crisis was directly related to one basic fact: the oxygen concept didn't lend itself to inland -adaptive- investment, as readily as it lent itself to coastal construction. In short: *Inland centers were losing their comparative advantages, in the era of trans-continental raw material integration,* in a situation where they were facing a new formidable competitor. Thus, the newly constructed inland integrated centers (in Saar, Luxembourg, Vallonia, Lorraine etc.) turned into white elephants, only loading the traditional industry with debt-burdens of suffocating proportions. The coming of the minis forced a traumatic rationalization in this part of the West European steel industry.

We returned to this point over and over during our recapitulation of the trends apparent in the West European steel industry after ca 1965. Up to -the date differs in different countries- ca 1978-82, much of investment

undertaken was tied to an older investment "paradigm". That is, although technical change was accepted and sought, the direction it took was very often conservative. Oxygen steelmaking and bigger, more effective, blast furnaces, became a panacea, used in order to avoid real structural changes (an unavoidable side-effect of this reconversion was that capacities increased at uncontrollable rates, as the new technique was much more potent than the old).

The most important phases in the reconstitution of the "traditional" steel industry were, thus:

In the first phase a very great number of facilities were reconversed to the new technological imperative (oxygen steel).

The structural character of the crisis was increasingly accepted in the second phase. That is, it was accepted that the new techniques and new sources of raw materials couldn't be used as patent medicine's to do away with any structural illness whatsoever. During this phase integrated steel-making was phased out at several of the old west European centers[234], as old plants were turned into minis or were run as re-rollers (using billets or slabs brought in from a limited number of integrated steel-making centers).

In the last phase, the center's that had been reconverted (equipped with oxygen converters) during the first phase (ca 1965-1980) were closed down as well. In France, Neuves Maison and Pompey was converted to electric steelmaking by 1987, Gandrange was in for the kill by 1991. This sequencing is seen over the whole of Western Europe. In Italy we see Bagnoli and Cornigliano being thoroughly modernized between 1975-1980; only to be cut back and phased out by 1985-90. In Belgium the plans developed for large scale reconstruction of four (or five) melt shops in the Valloon area, were drastically cut back by 1981-84, as only the two most effective ones were kept.

In Germany, we can see these same developments, as well. Moving from a phase where new oxygen converters were seen as an industrial panacea, there followed a period of selection and weeding out, as Klöckner concentrated on Bremen, Hoesch on Westfalenhütte, Krupp abandoned Rheinshausen, and Thyssen opted for the Duisburg solution.

These developments were paralleled in other market economies. Indeed, during the 50s and 60s, the Japanese had been distancing the West

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[234]Using France as an example, we could mention Thionville, Hagondage, Denain and Longwy.

Europeans, by constructing the world's most efficient steel industry out of, virtually, thin air.

In the traditional sense of steelmaking, it seems hard to imagine a less suitable candidate for the free world's no 1 steelmaking spot than Japan. Lacking any significant sources of ores and coal, the country was absolutely unable to develop a large-scale steel industry before the coming of coastal steel.

The old, pre-second world war Japanese steel industry, had largely, been based upon Manchurian raw materials. When this source dried up after 1945, the country seemed destined for relative obscurity in the case of steel-making[235].

For the first decade after the war this held true. Although production grew at rather fast rates during the early 50s, there were no signs of any truly innovatory behavior. The Japanese were, seemingly, adapting to their limited comparative advantages, within the framework of the existing technological paradigm. As the industry had to be very scrap dependent, in view of the lack of indigenous raw materials, it was almost wholly dominated by OH's and electric arcs.

After ca 1957 this picture started changing in an astonishing way. As it was, there was a remarkable convergence of Japanese and American interests, which opened up a road of innovation and upheaval in the context of steel.

When Japanese scrap-based steel production expanded during the 50s, the country had become the world's largest importer of American scrap, which exacerbated tensions in the US scrap market. When scrap-prices hit an all time high in 1956, this made both the Japanese and the Americans acutely aware of the need for a modernized and integrated Japanese steel industry. To one of the parts, it was the question of pursuing a road towards a very rapid industrialization that called for cheap steel. This goal seemed to rule out an excessive dependence upon a, presumably, unstable scrap market. To the other part it was a question of assisting an important ally in the era of the cold war. As this allied country was upsetting American scrap-dependent steel producers, it seemed logical to assist it in the aim of developing an integrated steel industry[236]. In order

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[235]During the mid 50s OHs supplied ca 80% of Japanese steel, electric arcs ca 15%, Bessemers 5%. Pig iron production was less than 60% of crude steel production. Integrated plants were, foremostly, supplied from Malaysia and the Philippines.

[236] Tiffany P (1984), p 172-76.

to illustrate the innovative strategies pursued in Japan, and the US views on these developments, it is worth quoting a report filed by an US Commerce Department official:

> "In general, all persons contacted gave the impression of being most anxious to present a clear picture of the problems confronting the steel industry in Japan. They stated that they had suspected that the supply of scrap from the US to Japan might be curtailed, either by US regulation or by price. Consequently, they have been working on plans for producing steel, issuing a minimum of scrap. In general, this involved the construction of additional blast furnaces and the installation of top blown oxygen converters. It is their plan, in the future, to use /the BOP/. This method of steel production will not require more than 10% of the total scrap requirements... when compared to the conventional open hearths... Four of these /BOF's/ will be installed in August or September 1957... In 1958, four more... will be added...
>
> /The Japanese further descibes their plans of adding an increasing number of BOF's/...They realize that if this is achieved it will be necessary for them to greatly increase their blast furnace capacity in the future. They stated that this move was entirely motivated by their realization that scrap would be in short supply and high in price in the future. From the above it could be added that Japan is planning its future steel production in accordance with the desires of the USA, meaning they are planning in the future to greatly reduce the steel scrap required from the /USA/"[237].

What happened thereafter has already been thouched upon. By 1962 the BOP accounted for 30% of Japanese steel. In 1965 the share had reached 55%, it reached 80% by 1970. This installation of BOP-capacity resulted in an unparalleled increase in the production of steel. It had risen from 4,8 to 12,6 mn t between 1950 and 1957. With the introduction of the BOP production virtually exploded. By 1962 it was 27,5 mn t, it reached 93 mn t by 1970. The peak year was 1973, when production was 119 mn t[238].

This new construction was entirely coastal, expansion being concentrated to "the Inland Sea" (Osaka area), the Tokyo Bay and Nagoya. *What was being pushed was the extreme case of the coastal-oxygen wave.* In line with this, all of the big steelmakers were, by the

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[237] "Report to Mr. H B McCoy, Administrator, BDSA, Department of Commerce," from H W Neblett, 12 July 1957, cited in Tiffany P (1984), p 174.

[238] For the quite extraordinary importance of the Japanese steel industry in the innovative stages of the introduction of oxygen steel, see Unnamed author (1962), p 1572-75.

early 60s, a) expanding existing coastal sites and b) pursuing new greenfield construction.

Yawata was pushing greenfield construction at Sakai (Osaka), and at Kimitsu on reclaimed land in the Tokyo Bay area. Its oldest plant configuration, Yawata-Tobata (Kyushu), was expanded, as well. Both Kimitsu and Yawata-Tobata had capacities far beyond 10 mn t by the mid 70s. Fuji developed greenfield, coastal plants at Nagoya and Oita (Kyushu); while enlarging already existing facilities at Hirohata (Osaka), Kamaishi (North-Eastern coast) and Muroran (Hokkaido). In 1969 Fuji merged with Yawata, creating the world's largest steel producer -Nippon Steel.

NKK (Nippon Kokan) was exceptionally strong in the Tokyo area (Kawasaki-Mizue-Tsurumi). In the 70s greenfield (landfill) developments were undertaken in order to rationalize production in the area, resulting in the Keishin project. Earlier, the company had undertaken greenfield development in the Osaka area, as well (Fukuyama).

Kawasaki Steel emerged out of Kobe, developing an interest in the Tokyo Bay area by the early 50s (Chiba). During the 60s that plant had been thoroughly modernized, while the firm was pushing greenfield construction at Mizushima.

Sumitomo had plants in the Osaka area (Amagasaki and Wakayama), during the 60s massive greenfield expansion was started at Kashima, in the Tokyo area.

Rounding off our very short summary of Japanese coastal integrated development with Kobe Steel, we find developments rather similar here. Its Kobe site was integrated by the mid 50s, thereafter it was thoroughly expanded; simultaneously greenfield construction was pursued at Kakogawa (Kobe area)[239].

Clearly, the Japanese steel industry entered the 70s on an extremely expansionary wave. As expansion continued all through that decade, despite stagnating demand, these developments were to expose the industry to problems of overcapitalization and overcapacity[240], especially after the minis made their breakthrough in Japan, as well, during the later 70s. Between 1977-91 the share of Japanese steel production emanating from electrical arcs increased from 19% to 32%. The share of steel produced in BOFs decreased accordingly, in a market that had stopped

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[239]For an overview, see Warren K (1975), p 98-132.
[240]Hogan W (1983), p 64-67, 82-86.

growing. The mistake that had been done by the big integrated producers during the 70s was to expand BOP capacity by dozens of million of tonnes, while production emanating from the process had started to stagnate and decline[241].

By the mid 80s, there was blood in the market, as aggressive mini-expansion (Tokyo Steel) provoked competitive pricing policies ("the H-beam war"), forcing the integrated companies to move out of long product market. Instead, the big integrated companies often ceded production to directly affiliated mini-mills[242].

Uncontrolled expansion, declining exports, currency appreciation and mini-mill competition, combined to force a large-scale rationalization of the Japanese steel industry, especially after 1985. In line with the West European and American experiences, this was done through the (massive) closedown of the least efficient capacities[243].

The two South-East Asian tigers -Taiwan and South Korea- seem to have been able to avoid many of the Japanese mistakes. The two state-owned steel giants China Steel and Posco was both inaugurated in 1968. Their continued expansion was thereafter directly timed to the growth of internal markets. Going for the coastal-oxygen concept by the late 60s/early 70s, the Taiwanese pushed creation of the first phase of Kaohsioung in 1974, while the Koreans started constructing Pohang in 1970. Both plants were expanded in carefully phased stages thereafter -right through the recession of the 70s and early 80s- and by late 1981, Posco started constructing its second coastal plant, Kwangyang.

While expanding vigourously, Korean and Taiwanese integrated steel has still been able to avoid the "Japanese mistake" (indeed, the West European's had did it, as well) of the 70s: the tendency to construct capacity in anticipation of future -never materializing- markets. While the Japanese had reached 1 ton/capita of steel capacity by 1970, and continued to expand, its smaller neighbors have been aware of this mistake. This very awareness goes a long way towards explaining the careful phasing of the three major projects. Moreover, the mini-mill sectors in the two countries are very vigorous, controlling the markets for sections in both

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[241]Barnett D/Schorsch L (1983), p 116-22, 208-14.
[242]ST 11/1990 p 6; MBM 4/1985 p 17-19; MBM 3/1988 (a), p 24-29; MBM 3/1988 (b), p 35-37; MBM 6/1985 p 43-46.
[243]ST 9/1989 p 24; MBM 12/1986 (c), p 8-13; MBM 5/1990 p 88-91; MBM 12/1986 (b), p 20-23; MBM 12/1986 (a), p 16-19.

countries. Thus, in Korea and Taiwan the integrated, state-owned[244], steel industry has avoided overdependency upon export markets and left the segments of the markets, where scale is less important, to the minis[245].

In the USA the coastal wave has to be placed much earlier in time than in the rest of the world. Indeed, many of the problems of the 70s/80s emanated out of this early relocalization.

In the formative stages of growth, the industry had become deeply entrenched in some inland areas (The Ohio Valley), and coal field locations (Pittsburgh-Connelsville). The early westward movement spurred harborfront construction in Chicago (South Works). Thereafter, the merger between Pittsburgh and Chicago interests into US Steel (USS) (1901), was followed by increased USS harborfront construction in the area (Gary).

In the US, harborfront location on the Great Lakes was, to some extent, the equivalent to the coastal wave that was to hit Western Europe and Eastern Asia some fifty years later. These new harborfront locations in Chicago[246], were all evidence of the push towards the (Western) markets. The limitations of raw material locations is evident in the dismal fate of USS Duluth plant. Located -because of political pressures- on the Northern ore-fields, this plant never acquired any significance, except as a lossmaker.

Moreover, other Great Lake locations gained in strength during the period between 1920 and 1960. Bethlehem acquired plant at Lackawanna (outside Buffalo), and National -a firm that merged traditional inland centers with emergent Great Lakes ones- built at Ecorse, Detroit (McLouth did the same during the 50s). Republic Steel and Jones & Laughlin (J&L) both diversified out of traditional (Ohio Valley, Pittsburgh), sitings during the 20s and 30s, constructing new flat product capacities at Cleveland.

Hogan summed up this movement (although refering to Youngstown Sheet & Tube (YS&T) the generality of the pattern described is clear):

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[244]Posco was partly privatized (in stages) during the late 80s and early 90s.

[245]Hogan (1983), p 165-66; MBM 10/1988 (b), p 24-26; MBM 10/1988 (a), p 29-31; MBM 10/1988 (c), p 33; MBM 5/1987 (b), p 47-52; MBM 5/1987 (c), p 53-58; MBM 9/1992, p 56-59; MBM 5/1987 (a), p 60-62; MBM 12/1985 p 60-65.

[246]Gary, South Works-USS; Indian Harbor-Youngstown Sheet & Tube; Indiana Harbor-Inland Steel; Burns Harbor-Bethlehem Steel (this was the last US integrated plant constructed, 1962-65).

> "The pattern of /YS&T's/ evolution during this period shares some characteristics with other steel firms. The number of firms established around the turn of the century which survived as major steel organizations is significant... these units began to restructure their activities with regard to production, marketing and technology. Youngstown's shift out of iron products, its purchase of ore and blast furnace facilities, its diversification into sheet products as well as tubing, show /its/ adherence to the /general/ pattern of evolution. By the end of the second decade it had a large production capability"[247].

On the Eastern seaboard Bethlehem was, for a long time, the sole producer in a coastal location (Sparrows Point, Chilean/Cuban ores). By the early 50s USS responded by constructing the Fairless Works, not far from Sparrows Point.

It was on the Western coast that the strategies of the majors left a gaping hole in the US steel market. The one major plant constructed (Kaiser's Fontana Plant, wartime construction), had -very unfortunate indeed- been located inland, a location which always placed the plant under a considerable competitive disadvantage, as compared to its (after 1960) Japanese competitors. Other Western construction, apart from Fontana, had been undertaken at Houston, Tx. (Armco) and at Geneva, Ut. (USS). With due consideration to these developments, it still has to be recognized that Sparrows Point was California's most important steel supplier, before the Japanese started shipping steel on a large scale, after 1960.

As it was, American steel came under intense pressure after the mid 60s, when stagnating demand, together with Japanese and mini-mill competition provoked a real industrial showdown. Firstly, the old locations (tails), that all companies had kept, had to be shed (closedowns were heavily concentrated to the Pittsburgh and Ohio Valley areas). Secondly, the Great Lakes harborfront locations had to be rationalized and downsized[248], and, thirdly, major portions of the old integrated plants had to be adandoned, as well: First went bar capacities, to be followed by wire rod capacities (in spite of considerable investment). In the last stage

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[247]Hogan W (1971), p 643. See Hogan W (1971), p 982-90 for further details on YS&T.

[248]USS has, for all practical purposes closed down the South works; Bethlehem closed down Lackawanna. The enforced merger of YS & T, J & L and Republic (1978, 1983) into LTV was followed by massive closedowns in Cleveland (as well as in Pittsburgh and the Ohio Valley).

(to this date) the majors shed their heavy section capacities. This phase had been reached by the late 80s/early 90s

Although all the major market economic steelproducing nations passed through more or less the same phases, the manner in which they passed through them varied in an impressive way, depending upon the varying trends apparent in the markets, on the available technologies and on the specific hereditary situation into which the new (or radically modernized) coastal industry had been inaugerated.

6. Conclusions

6.1. Innovative change in the coal and steel industries after 1945

Our study has adressed itself to the problem of structural change in the context of a "long wave". We have -in that context- discussed the impact of innovation upon older lines of productions and societal organization.

When considering the evolution of prices for oil, coal, iron ore, scrap and international freigth rates, we were confronted with quite dramatic changes after the late 50s, when prices for Extra-european commodities declined, relative to prices for comparable West European raw materials. In the case of scrap and freigth rates the outstanding feature was the stabilization of prices after this date.

These developments took place in an environment where the technological frontiers were anything but stable. Indeed, they were closely coordinated, in time, with the (West European) breakthrough of a technological and socioeconomic imperative of tremendous proportions: the coming of the sheet-consuming industries -household appliances, mass-motorization- and their necessary pre-requisite, the wide strip mill. In its West European context this innovation of the 20s was introduced alongside an entirely new concept: oxygen steel.

Changing raw material prices, stabilized freigth rates, oxygen steel and the progressive enlargement of wide strip mills, were by the late 50s/early 60s in the process of strengthening an already existing tendency -coastal steel. Concepts of scale became evermoving targets, as the new coastal possibility was exploited and expanded, in the light of everbooming sheet markets.

But innovation had another side, as well. The old coal-ore-steel locations needed to react to change. Indigenous coal- and ore- districts were subject to everincreasing competitive pressures after the downswing of 1957-58, as the old comparative advantages of the traditional heavy industry centers were evaporating. The innovative complex of the 50s made for the coming of a tremendous adaptive wave after the mid-60s.

Adaptation centered upon two objectives, as solutions had to be found to the coal problem and to the traditional steelmakers problem:

Indigenous coal had only a decade earlier been of paramount importance, with regard to energy needs as well as political plans. By the early/mid 60s, the inferiority of indigenous coal had to be admitted. It

was in this situation that some markets had to be secured to a commodity otherways doomed to rapid extinction. Hence, two markets were reserved, in electricity generation and in the steel industry.

Traditional steel-producers -located on raw materials and primarily producing long products- were, in these circumstances, experiencing escalating problems. The answer to these problems seemed to lie in the subsidation of indigenous coal, to be combined with a forceful wave of investment into the oxygen concept.

By the mid 70s these interrelated tendencies were producing remarkable results. Oxygen steelmaking capacities were expanded in every corner of the continent, the adaptive wave reaching its maxima somewhere in between ca 1972 and 1978. With regard to raw materials there was a violent showdown after the 1971-73 events in the petroleum market. In the two most important coal-producing nations this was followed by increased coal protectionism[1].

By that time we were facing escalating situations of overload inside the political-economic system, something that led to the appearance and strengthening of "iron triangles" and "vicious circles", as the inferiority of steelmaking locations bred the inferiority of the emergent energy solutions. Moreover, the construction of capacity at any one location bred the countervailing construction of capacity at some other location[2]. It was in this situation that the "steel crisis" became rampant, together with the exploding "energy crisis". For a few years after the outbreak of these panic situations (the period between 1974/5 and 1977/8), the emergency atmosphere of the situation tended to reinforce the trend towards something that we might term a "controlled adaptive mercantilism".

Highly significant was the fact that the traditional industry had got involved in a rearguard adaptive battle during the recessive phase of the cycle (mid 60s up to mid/late 70s). This battle was undertaken on the conditions set by the innovative paradigm of the 50s, while in the real

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[1]The effects of the "first" oil crisis upon energy policies should be noted: in neither Germany, the United Kingdom nor the United States did "energy policy" make any sense at all; in France the 1981-82 events, when coalminers were once again hired, offered another attempt to enter the future crawling backwards.

[2]Italian construction at Taranto was instrumental in the French decision to build at Fos, in Belgium any expansion in Vallonia threatened countervailing Flemish expansion; simultaneously the coal crisis strengthened these expansionary forces. The solution to the coal-mining industry's problems in areas such as Saar or Vallonia were thought to be tied up with the expansion of the integrated steel industry.

world these producers would have to stand up to competition from yet another innovation. When the traditional producers loaded their industries with capital-intensive equipment, the coming of the minis -benefitting from stabilized scrap prices, ultra-high power furnaces and continuous casting- heralded the coming of a radically different production function.

Similarily, the rising energy costs after 1973 might, in the short run, increase coal protectionism. In the medium run, though, the situation resulted in a) innovation centering upon decreased energy intensity and b) the development of new energy sources. New nuclear power stations and oil- and gas-fields came on stream by the early 80s, while countries that weren't burdened with the maintenance of indigenous coal industries, started to import increasing quantities of steam coal.

The depressive and recovery phases of the wave were dominated by these developments. By the late 70s we saw how the adaptive phase started to weaken -policies towards steel were reversed in France and the UK in 1978/9. By the early 80s the weakened adaptive momentum was threatening chaos all over Western Europe. What was under threat was not only the suitability of integrated inland steelmaking. In fact, it was the whole concept of the "controlled adaptive mercantilistic mechanism" that had to be overhauled.

What was being demonstrated was the ability of innovative change to explode old institutional solutions. Traditional strategies of accomodation had been pursued for several decades, but tensions among the group members had long been on the rise. The basic problem was that paradigmatic innovation(s) were fragmentizing old socioeconomic coalitions, as the possibilities to reap the advantages of the new production functions were unevenly distributed. When the interests of coalition members grew increasingly divergent, this implied that the existing structural solutions were no longer functional[3].

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[3]As these structural solutions were a direct reflection of the co-ordination between interest groups that were, by the late 70s/early 80s, in the process of fragmentization.
One example may illustrate our point. If governments and private capital work in unison, the use of industry-wide trade associations, in order to relay communication between the two agents, becomes highly functional. Then, the financial needs of the industry can be met by, for example, state-controlled banks. But, if private capital starts leaving the industry, the pattern will no longer be satisfactory. In that case, the trade association would deteriorate into a body which the government used to communicate with itself.

6.2. Innovation and the need for institutional adaptation

Approaching the fundamentals of the situation, we are able to see how the late 70s/early 80s saw the fragmentization and final dissolution of two cartel-like situations, which had long been controlled by governments and private capital in unison. The cartels had their roots in very old West European solutions, and they had increased been reinforced during the inter-war period.

What the inter-war period had demonstrated was that the forces of innovative change were escalating. New sources of energy were being introduced, while the emergence of new industries forced innovative change upon older industries (the wide strip mill). It was these forces that the emerging/strengthened coalitions (of the 20s and 30s) sought to accomodate or control.

Technically homogenous producers had strong incentives to organize[4], while governments, with an overriding interest in social peace in the face of innovative upheaval, had to be susceptible to the demands of these highly organized and articulated groups. Thus, a pattern grew increasingly visible where coal and steel producers were closely organized nationally, while governments policed the markets controlled by these national industrial groups. In steel, the international context was organized by the ISC; the international coal market was dominated by extreme "beggar-thy neighbor" tactics. In both of these cases the close co-operation between national industries and governments was a pre-requiste to success in international negotiations and for the implementation and survival of the international "solutions".

6.2.1. The institutional solutions in the coal industry after 1945

After 1945 the weaknesses of the coal solutions were in evidence, as both the French and British coal industries were nationalized, in order to counter their structural shortcomings. Even these early nationalizations were less of "radical" solutions, rather it was solutions introduced in

[4]It is of interest to note the problems encountered with the Belgian re-rollers during the 20s and 30s.

order to counter the long-term decline of coal industries harassed by the problem of increased international competition, although that problem was dressed up in terms such as "shortfalls in investment" and "the limited time-horizon of the private investor". Our point is that it didn't really matter how much investment that was poured down the mine-shafts of the *Nord*, Vallonia or South Wales: they were basically unable to compete with the new low-cost production functions, anyway.

Instead, the West European coal market continued to deteriorate during, essentially, the entire post-war period. The private partners left the industry at an accelerating pace after ca 1958-59, leaving the governments with sole responsibility for the continued solution of "the coal problem". The governments were, during this dissolution phase, forced to step up their attempts to "rescue" the industry through new structural solutions, and through the finding of new partners (that were needed in order to be able to implement these new measures). In this context, the ailing coal industries were tied up with electricity generators and steel industries, through government induced contractual agreements.

The process of coalition fragmentization is evident here. First of all private capital leaves the sector, thereafter the new solutions produces tensions between the new partners.

The importance of the international context is, as well, clear. The coal producers had been unable to create an international cartel along the lines of the ISC during the inter-war period, and the chances that the heterogenous energy interests[5] should have been able to produce a coherent international solution after 1945 were even slimmer. Instead the ECSC became, to the West European coal interests, a mechanism for the shoring up of national solutions. The very great problems inherent in an integration of even the West European coal mines had been evident during the inauguration of the ECSC: the Germans and the Dutch being forced to subsidize the Vallonian mines, while price competition between the different coal regions was limited.

It might seem that the events of the late 50s (when petroleum and American coal threatened wholesale destruction to all West European mines whatsoever) could have served to strengthen this European solution, as *all* European coal producers lost their interests in free markets[6]. In reality, though, "the coordinated West European energy

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[5]Producing along wholly different cost curves.

[6]I.e. they became more homogenous.

market" so hotly desired by the coal interests during the 60s, was to prove a mirage. Important members of the ECSC had an interest in an expansion of the oil industry, and the national coal solutions had to be accomodated within the veritable flood of oil imports that flowed through Western Europe in the period up to 1973.

It was because of this international context that the national solutions introduced by the respective governments had to center upon the two new partners discussed above. Electricity generators and steel producers were large and homogenous national consumers of coal. If international competitivity was threatened, subsidation was possible.

The oil chocks were a short-time blessing to the coal interests, as they increased the price of international energies to West European levels, while providing a justification for neo-mercantilist policies aiming at "energy security". "Security" was, in this context, synonymous with dependence upon one source of energy: indigenous coal.

But the blessings were to be rather short-lived to the coal interests. When demand for energy declined, and cost-effective coal producers were allowed to enter the market-place, prices started weakening. By 1982 coal prices were in a downward spin, by 1986 oil prices had to be adjusted downwards.

These events provoked the final fragmentization of the national coal solutions. First of all, the "security" inherent in a dependence upon indigenous coal had been deeply questioned by the British events of 1972 and 1974, when miners forced the government to negotiate in candle light. Secondly, when an international coal market materialized after the late 70s, and prices declined, this increased the cost of the existing solutions. All three partners -governments, generators, steel producers- had to reevaluate their positions towards the coal industry, in order to avoid the costs that were associated with the declining international energy prices.

After the early 80s this reevaluation forced the breakdown of the old structural solutions. The technical fragmentization of the steel industry (i.e. the acceptance of coastal steel and the increased importance of electric arcs) made this industry an unreliable customer when coke demand declined, while declining international energy prices made national electricity solutions increasingly expensive in a situation where international competition was escalating. In the UK, the government itself was bent upon change, in view of the experiences of the early 1970s.

After 1982/83, it all fell apart. Innovation and the fragmentization of coalitions that it provoked, were everywhere the driving forces in this process of readjustment.

These years spelled the beginning of the end to the traditional coal structure. The moves provoked by primarily the "second oil-chock" (energy efficient techniques, and the increased importance of imported steam coal) were moves that the traditional structure was fundamentally unable to counter. As we know, indigenous -*increasingly* high-priced- coal could only substitute for other fuels through strenghtened *Zwangsmekanismen*, but these mechanisms were, by now, accelerating in cost.

Stocks and costs rose in consonance, while there was a real risk for stagnation in the electricity generation industry[7], and for every country that reversed its strategies when confronted with this *Sackgasse* (the French government deciding to move ahead with the nuclear program, the British government opting for a depoliticized electricity market), the pressures upon the laggard (the Germans) tended to increase.

6.2.2. The institutional solutions in the steel industry after 1945

The situation in the steel industry was somewhat different after 1945. During the 50s most West European producers were both competitive and technologically homogenous, both of which being factors that tended to strengthen the role of organized private interest. Hence, the state wasn't left with an industrial carcass, at this early point in time.

The situation started changing somewhere after 1960-65. After this point in time industrial heterogenosity started increasing. Coastal steel increased in importance, while it was evident that traditional steel-making areas were suffering from the existing innovative trends. When the adaptive wave increased in force after 1965 (the Gandrange concept), it was evident that the role of governments was on the rise. Just like in the coal industry, private capital had started to leave important parts of the traditional industrial structure.

We have stated over and again that we regard the institutional changes undertaken between 1965-75 as crucial, in order to understand what was to happen later. The state induced/enforced mergers in the Belgian and French steel industries, the coming of BS, the *Walzstahlkontore*, the

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[7]See Suding (1989) p 218-19 on the problems confronting the German generators by the mid 80s.

general confusion reigning in state-owned Italian steel - these were related events, all of which signalling a need to handle the new production functions, the impact of new competition and the concomitant need for a rationalization of the industrial structure.

After 1975, the forces making for a heterogenization of the industry increased in force. New, or enlarged, coastal plants were coming on stream, while the mini-mills were making their break-through on an ever-widening front. The nationally organized interest groups had, rather instantly, to start searching for a corresponding Community-wide structure for intervention. Early, voluntaristic attempts broke down, and the final instituting of paragaph 58 in 1980 has to be seen as a compromise between the relatively efficient producers (the coastal, Western Ruhr) and the ones ultimately doomed to extinction (Lorraine, Saar, Vallonia etc).

The interests of the respective national governments seems to have been a function of a) the relative inefficiency of the industry and b) the costs associated with an upholding of the status quo. Even in the short run, governments were confronted with one basic problem: Private capital, which had been reluctant to undertake investment in the traditional steel districts ever since the 60s was, by 1980, in full flight out of the *traditional* steel industry.

Without private partners, governments found themselves burdened with yet another industrial complex that could only bring headaches, because no matter how much monies were thrown ("invested") into the converters of Lorraine, Vallonia or Scotland, the old areas could never be competitive again, if they were to use traditional technology. The really staggering amounts of subsidies granted to these steel industries after 1965 didn't really matter anymore. On the contrary, it could be argued that the continued pursuit of an old investment paradigm, only on a more grandiose scale, made matters worse. In a way, this stubborn persistance in trying to enter the future through the backdoor of yesterday, increased the competitive edge of the new and innovative producers (in this case the minis), as these were allowed to compete with debt-ridden traditional producers.

Just like in the case of the coal industry, it was a case of an industrial structure increasingly plagued by the effects of innovation. For a period, these problems had, again, been dressed up in terms such as "shortfalls in investment" and "the limited time-horizon of the private investor", but by the early 80s the ultimate fate of these industrial structures were increasingly recognized. By now governments were left to themselves in their defence of the traditional structures. Indeed, at this point in time

governments were being harassed by interest groups representing competitive industries[8], dissatisfaction from the general electorate, and complaints from the EC Commission and from neighboring governments. In this situation governments had to decide upon new strategic concepts for the old steel areas. New structural solutions evolved that were able to implement these strategies.

Just like the evolution of a Community-wide "coordinated energy policy" had been an impossible goal, the evolution of a "coordinated steel policy", was just as impossible in the face of increased industrial (and interest group) fragmentization. Thus, the crisis cartel became an instrument that could only be conditionally utilized. There were always important groups pressing for freer conditions, and when governments allowed their steel industries to pass through different shrinking concepts, their interest in free markets increased, as well.

6.3. The end

Returning to our conception of the two industries as two industry-government controlled cartels, we sum up their developments along lines such as these: the cartels had been increasingly ineffective with regard to pricing since the late 50s[9], and the two agents in control of the industries had, more often than not, been at odds with each other during the 60s[10]. During the later 60s and 70s the attempts to control the "cartels" grew increasingly visible, because of these tensions. This was the true significance of nationalizations, enforced mergers and price controls; these were the logical last efforts of the, by now, abandoned governments to regularize structural change through the "controlled adaptive mercantilistic mechanism".

By the depressive phase of the wave these cartels were long since ineffective, with regard to pricing, output controls, development targets

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[8]Dissatisfied with the effects of budget deficits, inflation etc.

[9]Oil penetration opened up a virtual Pandora's Box with regard to coal-mining after 1958; with regard to West European steel prices these continued to be both higher than world market prices, and conspisciously stable, during the 60s, see Friden L (1972). The first tendency towards weakened rebar prices are detectable by the mid 60s, though.

[10]Over the price of energy, over the future of the coal districts, over coking coal prices, over the financing of investment into the traditional districts, over the price of steel.

and productive techniques[11]; and, in that case (travesting Adelman), what happened in steel (or coal) had nothing to do with overcapacities or Arabs, *per se*; it was purely sectoral phenomena of joint government-management monopolies, long since approaching the point of maximum (political and economic) returns. Once having attained this, the ceiling was reached, and no further increases were possible[12]. Because the two parties were in a posture of both co-operation and conflict in sharing the fruits[13], communication between them was necessary but difficult, and broke down somewhere between the mid 60s and late 70s[14].

This was the true significance of the changes apparent during the 80s. What had broken down was not the simple possibility of constructing oxygen steel plants all over the countrysides and shorelines, or the possibility to compel electricity generators to burn ever-increasing amounts of coal, what had broken down, in a wider context, was the possibility of steering one specific innovative-adaptive wave towards a number of pre-set goals (e.g. full employment, regional development etc). Hence, when the appearance of an increasing number of vicious circles and the introduction of new innovations started to impinge on the possibilities for effective adaptation[15], governments found themselves without tools to handle the fundamentally altered situation.

This was truly a traumatic experience, because what had evolved after the second world war in Western Europe was not only an innovative technological block, what had evolved was, equally well, a socioeconomic paradigm of regularized structural change, the lifeblood of which was the "adaptive merchantilistic mechanism" touched upon above. The mechanism for regularization had been -whatever it had been called

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[11]On the subject of cartels, or cartel-like situations, we emphasize the process of "creative destruction" - that is, the movement into entirely new production functions, outside the control of the hegemonic interests; a process that will, ultimately destroy the most stable of "socioeconomic" equilibriums. For two case studys of "creative destruction" and the breakdown of cartle-like situations (both of which having deeply influenced the author), see Sweezy P (1938); and Adelman M A (1961), p 16-40.

[12]Due to the dangers of substitution, increased competition, declining international competitiveness, countervailing capacity construction etc.

[13]And avoiding the costs.

[14]The original quotation is available in Adelman (1961), p 34-35. The timetables for breakdowns varied, as we have seen, greatly between different countries.

[15]What we are dealing with is, clearly, a case of decrasing marginal utility (by the late 70s returns were, without any doubt negative), of a continuing investment into conventional production functions.

konzertierte aktion, Butskellism, *économie concerteé* tripartism or planning- the same one: The possibility of steering innovation, and adaptation towards the ultimate goal of introducing into the system the exact amount of change necessary for "modernization", while not endangering the basic socioeconomic "equilibrium".

It was in this context of the existing mechanisms for socioeconomic adaptation that reorientation had to occur. As these existing structures were designed to control change, they were correspondingly unsuitable to the introduction of the emergent production functions. Because of this, the old structural solutions had to be taken apart, and the process of reorientation had to be experienced as a rather traumatic one: it was familiar and traditional concepts that were going. When rationalization and the move into new production functions was pursued (towards the very strongholds of corporativism) it required, in its immediate extension, a new *raison d' être* for the logics of collective action (hence the rise of "neo-liberalism"), as well as the evolution of new structural solutions to solve the problems of vicious circles (hence "deregulation" and "privatization").

What we were able to trace, after the late 70s, was the hesitant coming and the acceleration of this fundamental reorientation. In a very real way, every step towards reorientation (for example the construction of one more mini-mill in Lorraine), tended to increase the pace of the process -the new production functions introduced only placing the inefficiency of the older ones in sharper relief.

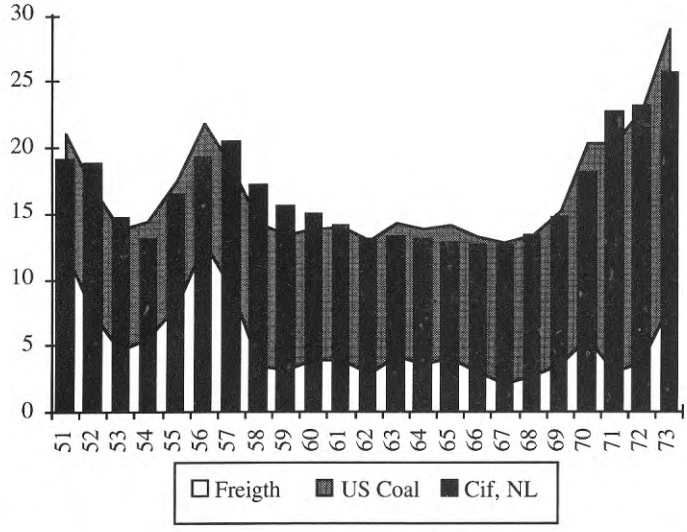
By the late 80s/early 90s the old structures were collapsing. The traditional steel industry (nationalistic, integrated) was in a process of accelerated dissolution. Scores of mini-mills were under construction, or in advanced stages of planning, in Vallonia, Lorraine, Luxembourg, the former GDR and in Lower Saxony. Thin-slab casting was on its way of dealing another blow (probably during the course of the next two Juglars) to the old concept of the "steel-giants"[16]. Hit by the rise of an

[16]I am in no way forecasting the end to Western Ruhr sites or Dunkirk, Ghent etc.; what I am hinting at is a period of radically increased competition for the traditional flat-product producers, where major changes -with regard to firm structures, site selections etc.- will become increasingly apparent.

international market for steam coal, the traditional West European coal industry seemed, as well, to be dissolving.

Statistical Appendix

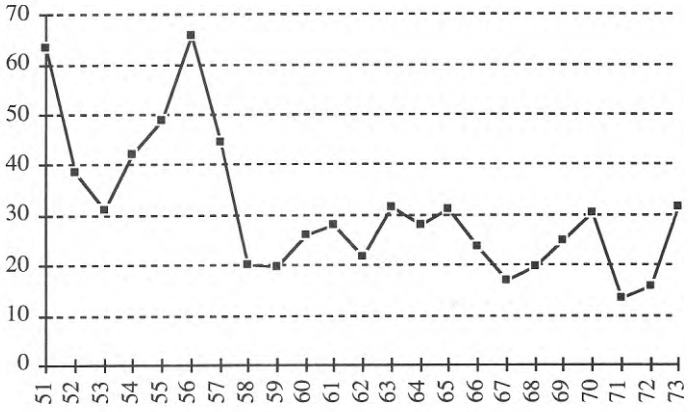
Figure SA 1a. Coal Prices, 1951-73.



Note 1: **Freigth Prices**: Hampton Roads- Continental Ports. **US Coal Prices**: FoB at Hampton Roads. **Dutch Coal Prices**: Cif, computed from trade returns. All prices are in current US dollars.

Note 2: The highest and lowest freigth rates given for each year has been used in order to calculate an arithmetic average. In order to check that these values haven't been to strongly influenced by extreme values, the Dutch Cif prices are shown, as well.

Figure SA 1b. Freigth rate as proportion of total price for US coal in West European markets (in percent).



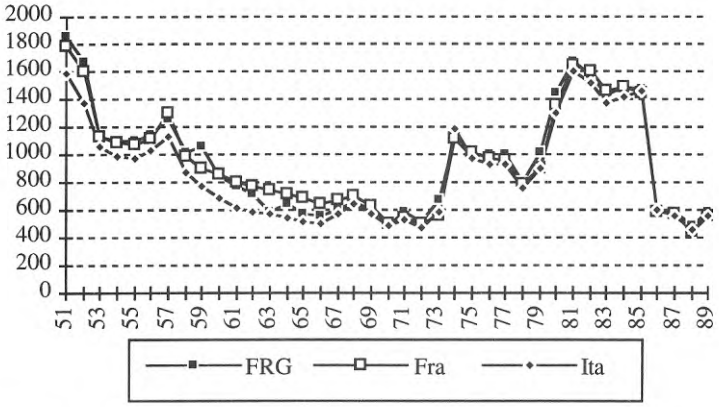
Note 1: Computed as: $\frac{\text{Freigth rate}}{\text{Freigth rate+US coal price, fob Hampton Roads.}}$

Note 2: What is evident from the graphs is, foremostly, that is was solely the decreasing freigth rates that explained the falling prices for US coal in Western Europe after ca 1958. US coal prices were, on the other hand, remarkably stable during the period.

Sources: Fig 1 a-b. **Freigth Rates:** 1950-66: Tramp Shipping Freigth Rates 1950-60, 1955-64, 1957-66 (Daily Freigth Register, London). 1967-73: Statistik der Shiffart (annual) (Bremen). **US Coal:** Statistical abstracts of the United States, (Washington D C). **Dutch Coal:** Derived from Commodity Trade Statistics. UN Statistical Papers, Series D. (New York).

Figure SA 2. Energy prices. Germany, France, Italy, 1951-89. Relative price of crude petroleum, as compared to Ruhr coal.

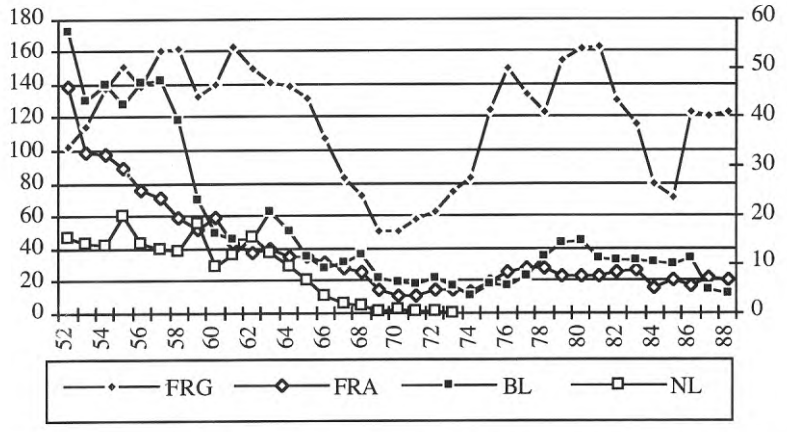
Ruhr coal each year=1000



Sources: **Coal:** List prices, as cited in Statistik der Energiewirtschaft, 1985/86 and 1990/91; (1956-90); Statistisches Jahrbuch der Bundesrepublik Deutschland (1951-55). DEM converted to USD by exchange rates as quoted in Yearbook of Financial Statistics. **Petroleum:** Derived from Commodity Trade Statistics. UN Statistical Papers, Series D. (New York.)

Figure SA 3. Investment in coal-mining: Germany, France, Belgium, Netherlands, 1952-88.

In millions of 1960 USD



Note: **Left hand scale**: Germany, France. **Right hand scale**: Belgium, Netherlands.
In 1960 USD, (deflated by the US price index for capital goods equiment, as cited in Yearbook of International Financial Statistics)

Sources: Die Investitionen in den Kohle- und Stahlindustrien der Gemeinschaft (annual), (Luxembourg).

Figure SA 4.a. Coal production. Germany and the United Kingdom, 1951-92.

In million tons.

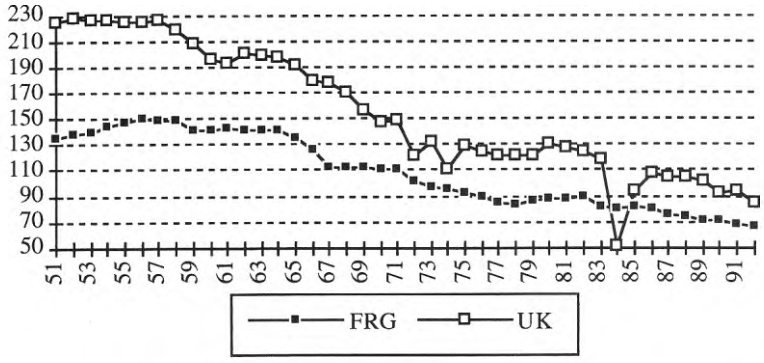
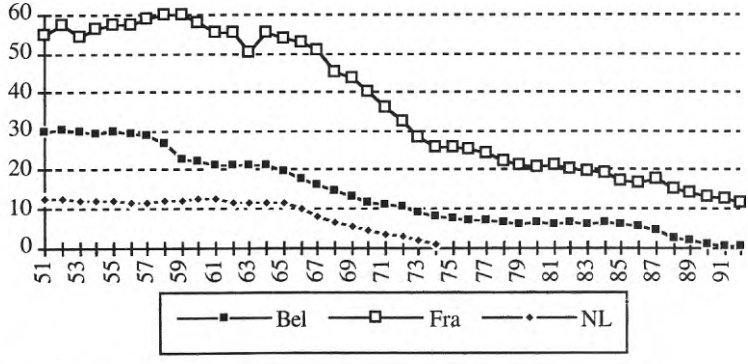


Figure SA 4.b. Coal production. Belgium, France, Netherlands, 1951-92.

In million tons



Sources: See Fig 1 c. (Text).

Figure SA 5.a. Productivity in coal mining, West European countries, 1951-77.

Germany 1951=100

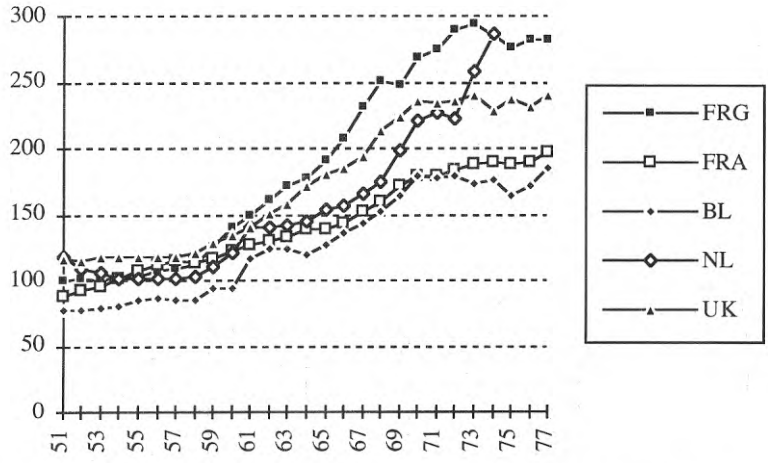
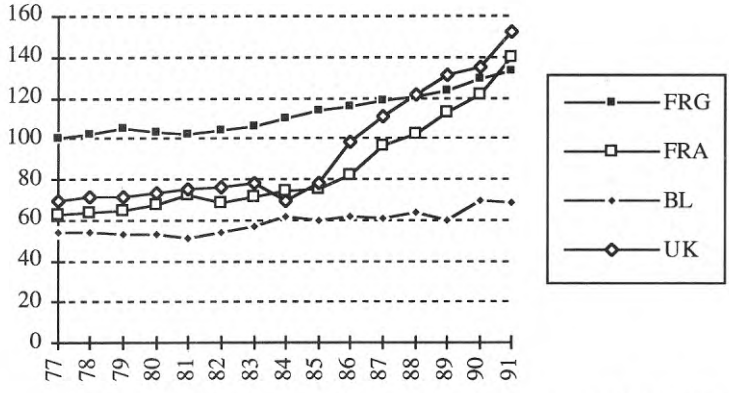


Figure SA 5.b. Productivity in coal mining, West European countries, 1977-91.

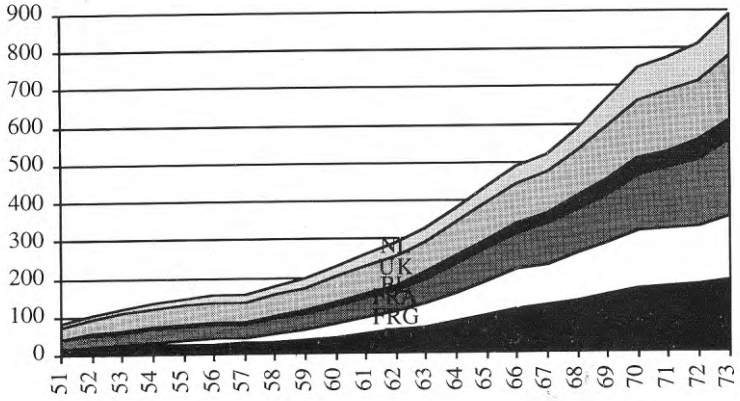
Germany 1977=100



Sources: **ECSC Countries:** 1951-69 Glückauf. 1970-91 Glückauf: Jahrbuch Bergbau, Öl und Gas (Essen).**United Kingdom:** 1951-66 Quarterly Bulletin of Coal Statistics for Europe (Quarter IV each year) (Geneva); 1966-69: Annual bulletin of Coal Statistics 1970-91: Same as for the original ECSC countries

Figure SA 6. Imports of crude petroleum into West European countries, 1951-73.

Italy 1965=100.

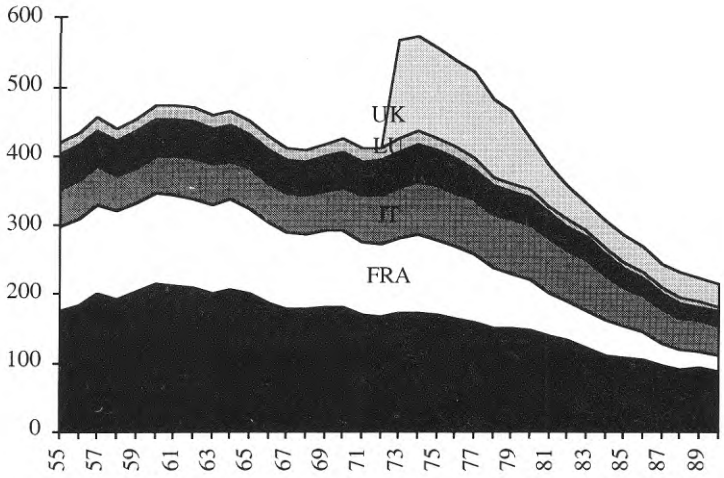


Note: The countries are, from bottom and up: Italy, Germany, France, Belgium , the United Kingdom and the Netherlands.

Sources: **ECSC Countries:** 1951-58: Statistische Information, Vierteljahrshefte zur Wirtschaftlische integration Europas, 1962 1/2: Energiestatistik (Statistisches Amt der europäischen Gemeinschaft, Brussels) **United Kingdom:** 1951-58: Commodity Trade Statistics. UN Statistical Papers, Series D. (New York.) **All countries:** 1959-73: Statistics of energy (OECD, Paris 1974).

Figure SA 7. Employment in the steel industry, West European countries, 1955-90.

In thousands of men



Sources: Siderurgie, Statistique Annuelle, 1964-91 (Luxembourg).

Figure SA 8.a. Steel production. Germany, Italy, France, the United Kingdom, 1951-90.

In million tons.

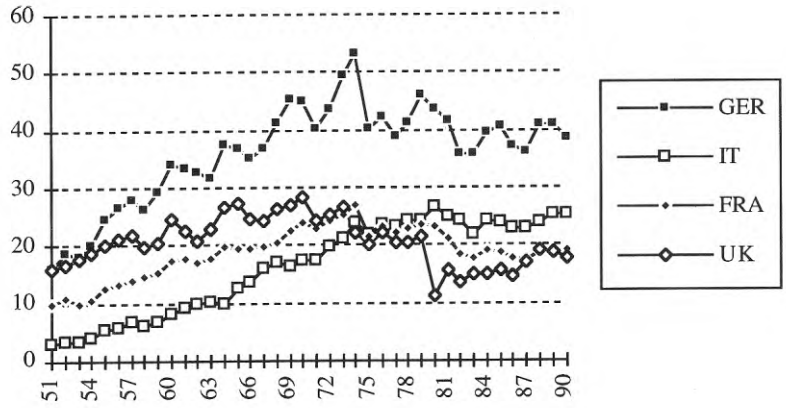
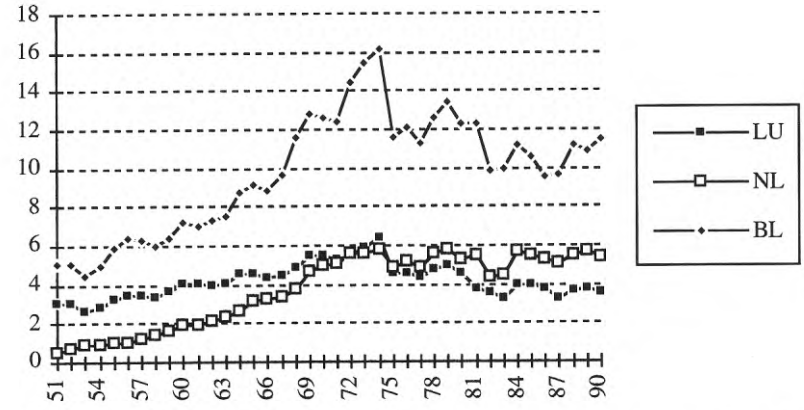


Figure SA 8.b. Steel production. The Benelux countries, 1951-90.

In million tons



Sources: All countries 1951: Quarterly Bulletin of Steel Statistics for Europe (Geneva). ECSC Countries 1952-90: Siderurgie Annuaire. UK: 1952-73: Quarterly Bulletin of Steel Statistics for Europe (Geneva). Thereafter same source as the ECSC countries

Figure SA 9.a. Investment in the steel industry: Germany, Belgium, the United Kingdom and Luxembourg.

In 1960 USD per ton of rolled steel produced.

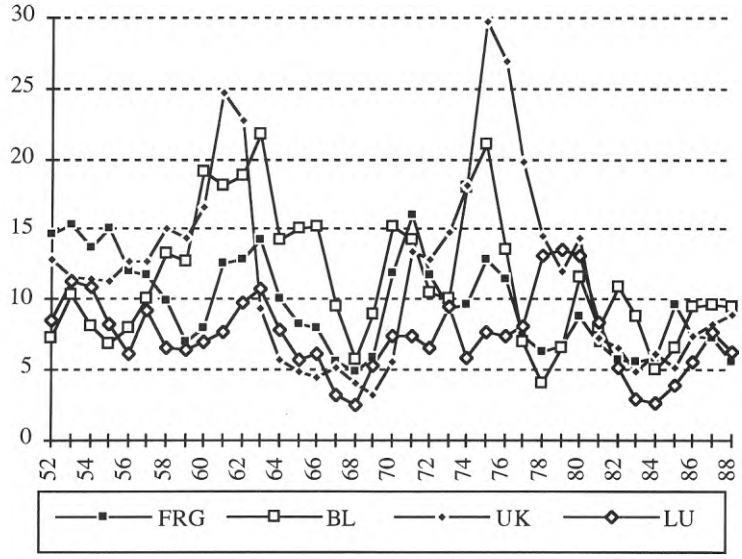
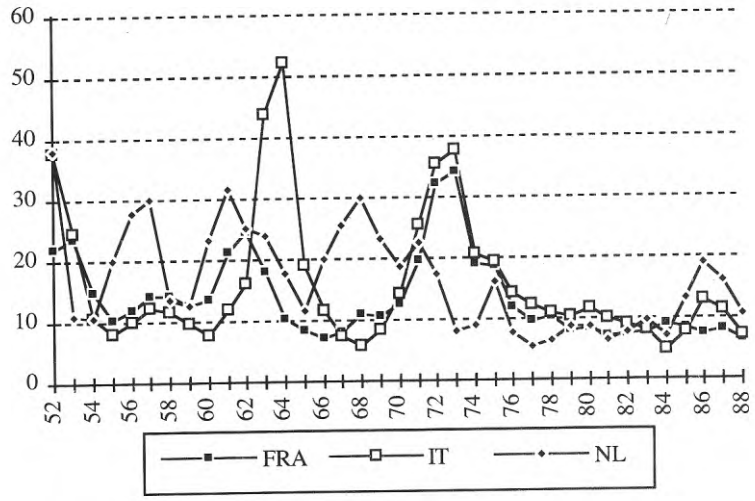


Figure SA 9 b. Investment in the steel industry. France, Italy, the Netherlands.

In 1960 USD per ton of rolled steel produced.



Note: In 1960 USD, (deflated by the US price index for capital goods equiment, as given in Yearbook of International Financial Statistics)

Sources: **Investment:** ECSC: Die Investitionen in den Kohle- und Stahlindustrien der Gemeinschaft (annual), (Luxembourg). UK: The Steel Market. **Rolled Products:** 1952-72: Quarterly Bulletin of Steel Statistics for Europe; 1973-87 Annual Bulletin of Steel Statistics for Europe. 1988: The Steel Market.

Figure SA 10.a. Production of iron ore. France, 1951-91.
1960=100

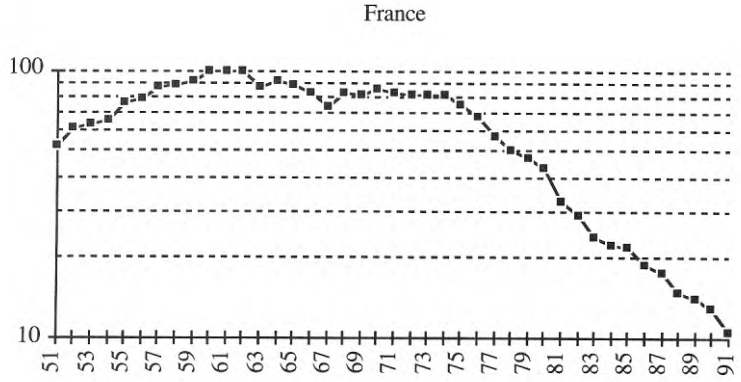
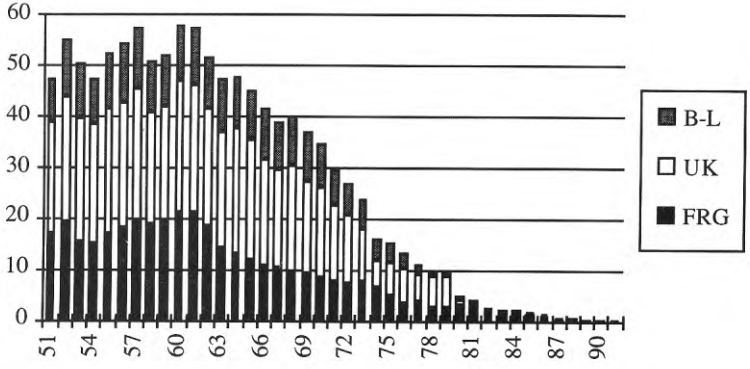


Figure SA 10.b. Production of iron ore. Belgium-Luxembourg, the United Kingdom and Germany, 1951-91.

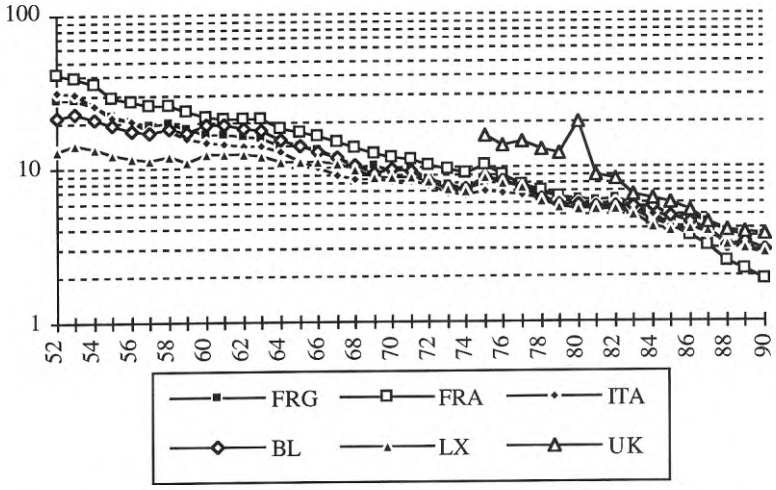
French production in 1960=100.



Sources: United Nations: Statistical Yearbook (UN, New York). 1988-91: Monthly Bulletin of Statistics (UN, New York).

Figure SA 11. Productivity in West European steelmaking, 1952-90.

Man-hours per ton of rolled products produced.



Sources: **Man-hours:** Siderurgie, Statistique Annuelle, 1962-91 (Luxembourg). **Rolled Products:** 1952-72: Quarterly Bulletin of Steel Statistics for Europe; 1973-87 Annual Bulletin of Steel Statistics for Europe. 1988-90: The Steel Market.

Figure SA 12.a. Exports of Long Products to Western Europe, 1963/4-85.

In thousands of tons

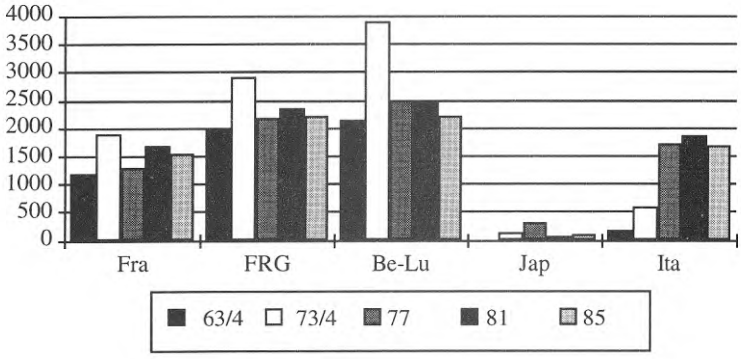


Figure SA 12.b. Exports of Long Products to the American continents, 1963/4-85.

In thousands of tons

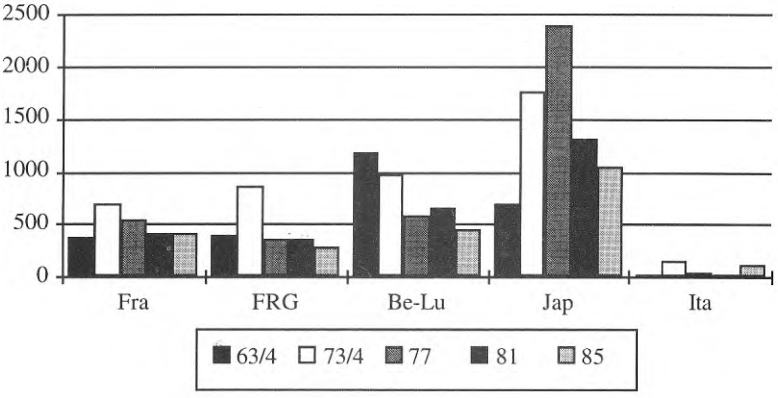
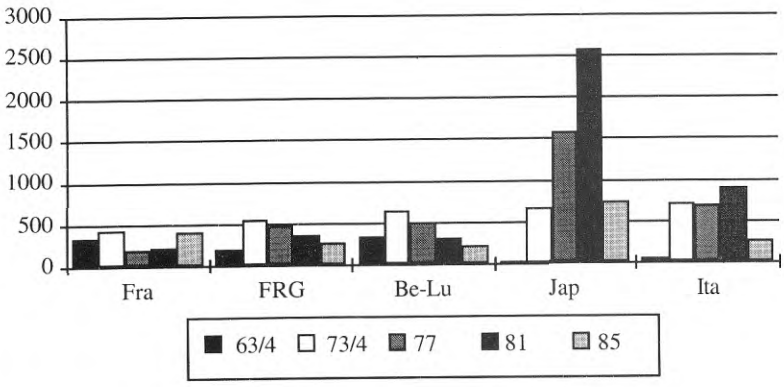


Figure SA 12.c. Exports of Long Products to Africa and the Mid-East, 1963/4-85.

In thousands of tons



Note 1: Heavy and light sections.

Note 2: 1963/4 is an average of the two years.

Sources: 1963/4: Commodity Trade Statistics. United Nations Statistical Papers Series D, (New York). 1973-85: Statistics of World Trade in Steel, (New York).

Abbreviations used

AGIP–Azienda Generale Italiana Petroli
ARBED– Acieres Reunies de Burbach-Eich-Dudelange
ASW– Allied Steel and Wire
BBB– British Bright Bar
BC– British Coal
BE-LU– Belgium and Luxembourg
BEF– Belgian Franc
BEL– Belgium
BOF– Basic Oxygen Furnace
BOP– Basic Oxygen Process
BS– British Steel
C-S– Cockerill-Sambre
CC– Continuous Casting
CCPS– Comite de Concertation de la Politique Siderurgie
CDF–Charbonnages de France
CDT– Cold Drawn Tubes
CIPE–Comitato Interministeriale per Planificazione Economica
CNPC– Comite Nationale de Planification et de Controle
CR– Cold Reduction (finishinig facilities for rolled steel)
CSSF– Chambre Syndicale de la Siderurgie Francaise
DEM– German Mark
DHHU– Dortmunder Hörde Hüttenwerk Union.
DSC– Direct Strip Casting
ECSC–European Coal and Steel Community
EDF–Electricite de France
EEC–European Economic Community
ENEL– Ente Nazionale per l'Energia Elletrica.
ENI–Ente Nazionale Idrocarburi
FRA– France
FRF– French Franc
FRG– Federal Republic of Germany
GBP– British Pounds
GDR– German Democratic Rebublic
GIS– Groupement de l'Industrie Siderurgie
GKN– Guest, Keen and Nettlefold's
HADIR– Haut Fourneaux et Acieres de Differdange-St. Ingbert-Rumelange
HOAG– Hüttenwerk Oberhausen AG.
IRI– Istituto per la Recostruzione Industriale

ISC– International Steel Cartel
ITA– Italy
JSG– Joint Steering Group
LIT– Italian Lire
LME– Lamine Marchands Europeans
LTV– Ling, Temco and Vought
LUX– Luxenbourg
mn t–million tons
mn t/y–million tons per years
mtce– million tons of coal equivalent
mtoe– million tons of oil equivalent
NCB– National Coal Board
NL– The Netherlands
NUM– National Union of Mineworkers
OH– Open Hearth
OPEC–Organization of Petroleum Exporting Countries
PS– Parti Socialiste, (Socialist party, Italy).
RAG– Ruhrkohle AG
ROGESA– Roheisen Gesellschaft Saar
RTB– Richard Thomas and Baldwins
S&L– Stewart and Lloyds
SACILOR– Soc. Acieres et Laminoirs de Lorraine.
SCOW– The Steel Company of Wales
SF– Sheffield Forgemaster
SFS– Societe Financiere de Siderurgie
SG– Societe Generale
SIDMAR– Siderurgie Maritime SA. In Flemish: Maritieme Staalnijverheid NV.
SMS– Societe de Mosellane de Siderurgie
SNFS– Ste Nationale de Participation et de Financement de la Siderurgie
SNS– Ste Nationale de Participation et de Financement de la Siderurgie
ST– Seamless Tubes
TI– Tube Investors
TMM– Thy Marcinelle Monceau
TRC– Texas Railroad Commission
TSC– Thin Slab Casting
UCPMI– Union des Consommateurs de Produits Metallurgiques et Industriels.
UES– United Engineering Steels
UK– United Kingdom
UMB– United Merchant Bar

UN– United Nations
USD– US Dollars
USINOR– Union Siderurgique du Nord et de l'Est de la France. USINOR
USS– US Steel
VS– Vereingte Stahlwerke
YST–Youngstown Sheet and Tube
ZKS– Zentral Kokerei Saar

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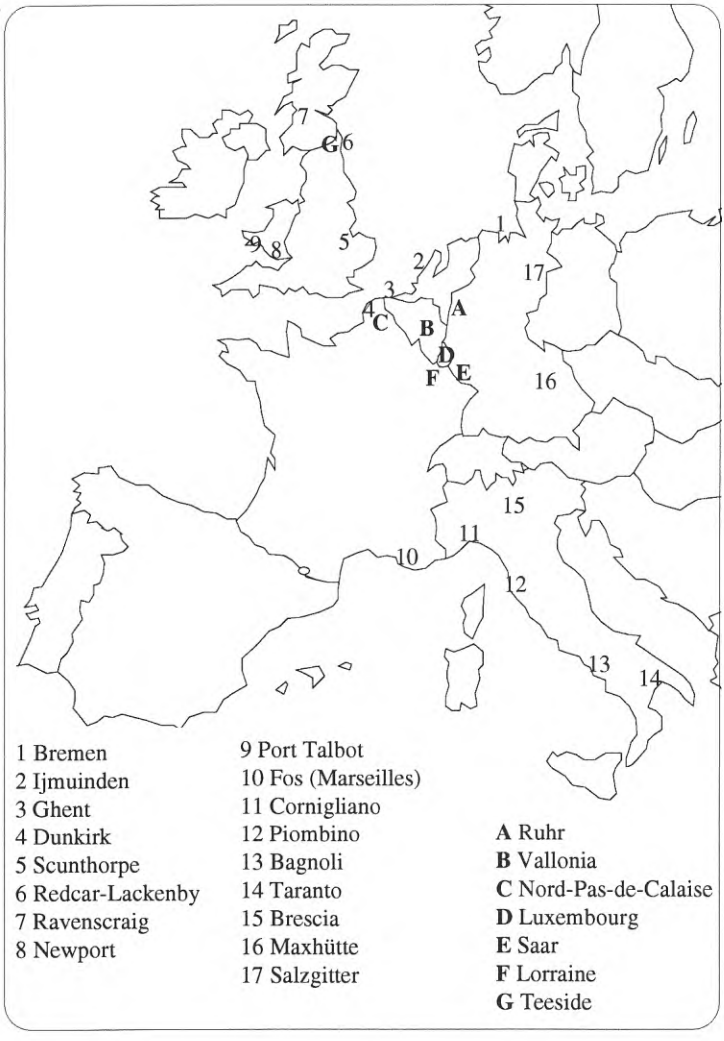

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