OPTIMAL CAPITAL STRUCTURE

- A case study of three real estate companies

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Magnus Eriksson    Johan Hede
ABSTRACT

Substantial parts of the literature concerning capital structure have dealt with issues regarding the leverage ratios. These leverage ratios have been analyzed in all kinds of ways, where most studies have explained observed patterns. Our research will also deal with leverage ratios but in an entirely new way. Our problem concerns the practical matter of deciding an appropriate capital structure and the possibility of improvements, which are formulated below.

- How do the case companies decide their capital structure?
- Are their current capital structures optimal or is there room for improvements?

We have studied three companies within the real estate industry due to comparable issues. Our result reveals that the companies do not use any mathematical model when deciding their capital structure but they do consider many important factors. The business and financial risk have the largest impact on the decision even though there are individual variations. Tradition is another factor that seem to influence the management a lot. Our improvement investigation of the three case companies reveals three different scenarios. Castellum could really improve their capital structure by increasing the leverage level without causing financial distress. Wallenstam had a capital structure that was optimal or at least very close to optimal. Finally, Platzer had a leverage level that was too high since their total risk exceeded an appropriate capital structure.

KEYWORDS
Optimal capital structure, leverage ratios, equity ratios, the real estate industry, Miller & Modigliani, trade-off model, pecking order hypothesis.
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1. INTRODUCTION

This thesis deals with questions concerning corporate capital structure. It examines how three real estate companies decide their capital structure in a real life context. It also examines if there is room for improvement when the companies decide upon their capital structure. Finally, it presents our conclusion based on the case studies.

1.1 BACKGROUND

Modern corporate finance theory was born with the publication of Modigliani and Miller’s (M&M) theoretical model about corporate capital structure in 1958. They showed that, in a capital market free of taxes, transactions costs, and other frictions, the choice of a firm’s capital structure could not affect its market valuation.

Much of the capital structure theory during the past forty years has involved examining how robust the model is to more realistic assumptions regarding market frictions and the information sets available to managers and shareholders. The development of agency theory in the 1980’s, coupled with detailed research into the extent and effects of bankruptcy costs during the 1980’s, leads to a yet more detailed view of the utility of the basic M&M capital structure theory. Finally, cross-cultural examination of observed capital structure patterns in non-U.S. industrialized countries has lead to our current mainstream view that corporations act as if there is a unique, optimal capital structure for individual firms. This results from a trade-off between the tax benefits of increasing leverage and increasing agency and bankruptcy costs that higher debt entails.

The fact that there seems to be an optimal capital structure for each individual firm is very interesting, due to the fact that a company’s result to a large extent depends on what structure it has. This creates incentives for companies to revise their current capital structure.
1.2 PROBLEM DISCUSSION
Substantial parts of the literature concerning capital structure have dealt with issues regarding the leverage ratios. These leverage ratios have been analyzed in many different ways. Our research problem will also deal with these ratios but in an entirely new way. We have not been able to find any material concerning how companies should decide these leverage ratios in practice, except for some theoretical models. These models are unfortunately not applicable in practice because of their inability to deal with important factors such as the firm’s asset structure.

It would therefore be interesting to investigate how companies determine their capital structure since the lack of literature within the area is as great as it is. Could it be the case that companies have developed their own models? Is the difference in the decision process big between companies within the same industry? Does the highest levered company have a totally different procedure from the lowest levered company?

It could be suspected that there exist possibilities for companies to improve their capital structures because of the lack of theoretical guidelines. To be able to examine this kind of questions we believe that we need to investigate companies that are as comparable as possible within the same industry. We will therefore investigate a refined industry, since this approach enables a fair comparison. We have examined all industries in Sweden and come to the conclusion that the real estate industry suits our purpose best. This is because all companies within the real estate industry experience very similar businesses, i.e. buying, selling, managing and acquiring real estate properties. However, an explanation of the selection of companies could be found in section 2.6.

1.3 PROBLEM AND PURPOSE
Our purpose is to solve the research questions stated below, which are formulated on the basis of the problem discussion. It concerns the practical
matter of deciding the appropriate capital structure and the possibility of improvements.

- How do the three case companies decide their capital structure?
- Are their current capital structures optimal or is there room for improvements?

1.4 CONTRIBUTION

Our thesis will shed new light on a specific area of capital structure, namely how companies decide their capital structures. Much work has been done in the statistical field, i.e. comparing leverage ratios through cross sectional analysis or other comparisons. Except for the inapplicable theoretical models we have not been able to find any material concerning how companies should act when determining their capital structure. Our study will complement existing studies since we are investigating important factors that affect the optimal capital structure for real estate companies. A further contribution is the investigation regarding how the companies could improve their current capital structures by combining the existing theory, models and empirical findings.

1.5 DELIMITATIONS

The industry analysis is made up of the seventeen largest real estate companies listed on the Stockholm Stock Exchange. The measure used is stock value. All key figures have been recalculated based on the recommendations of SFF\(^1\), since this enables a fair comparison.

When it concerns the time perspective, all calculations were made through the respective company’s annual report of 1998.

1.6 DISPOSITION

This thesis is divided into eight chapters:

\(^1\) Sveriges Förenade Finansanalytiker
Chapter 2 describes the research methodology that is used for this thesis. It explains the data collection and the research approach. This chapter also discusses the reliability and validity of the thesis.

Chapter 3 deals with different capital structure theories as well as financial distress. These theories are essential for understanding why capital structure matters to the firm. It also discusses prior research conducted by other researchers within this area, depending on the relevance to our study.

Chapter 4 examines key figures that are important to real estate companies. Industry averages are presented as well as extremely low and high figures. Further, it describes empirical patterns concerning leverage. This chapter will greatly assist us in our case study analysis.

Chapters 5, 6 and 7 consist of our analysis and answer the research questions of the thesis. These chapters analyze the research result and state our conclusions.

Chapter 8 presents our overall conclusion, and suggestions for further research in the area of corporate capital structures can also be found here.
2. METHODOLOGY

The purpose of this chapter is to describe our intended approach of answering the research questions stated above. Firstly, we explain different available approaches and secondly we motivate why we have chosen our particular approach. Possible sources of errors and ways to solve the biases are also presented. However, this chapter is not necessary to read in order to understand our investigation, it just presents our research approach.

2.1 SCIENTIFIC APPROACH

This thesis is a mixture of a theoretical and empirical study. A study can either be deductive or inductive, but it can also be abductive when the researchers use a combination of the two approaches. The definition of the problem issue often indicates whether it is an inductive or deductive approach. The deductive approach is preferred when the problem issue can be derived from theory and the theory forms the basis for the empirical study. On the other hand, the inductive way is preferred when the problem issue has no connection to any kind of theory and where the facts speak for themselves and seek regularity in events (Halvorsen, 1992).

2.1.1 Choice of scientific approach

We intend to utilize an abductive approach in our thesis since our first research question is of an inductive nature. This is because it does not rely on theory. However, our second research question is of a deductive nature since this question could be derived from theory and this theoretical framework will form the basis of our empirical case studies.

2.2 STRATEGIC APPROACH

According to Patel and Davidson (1994), every study has a research design. The strategy one uses when conducting a study depends on how much knowledge the researcher has about the problem area and how well the problem is structured and formulated. There are three strategic approaches.
The explorative approach is used when there only exists little or no knowledge of the problem area. Here the researcher often uses several techniques for gathering information and thereby explains the problem from many different angles. It often concerns the initial stage of the research process. It is used to identify a problem, to specify and structure a problem, to generate ideas, and to formulate hypotheses. This research design is characterized by flexibility in order to cope with the unexpected, and to discover ideas that are not recognized at the beginning.

The descriptive approach is used when there already exists knowledge of the problem area and the formulation of the problem is fairly well structured. The study gets a descriptive nature while simultaneously investigating the issue in depth.

The explanatory approach to a study assumes that the researcher has a wide knowledge of the problem area and that there exist theories in the area. An explanatory approach has the purpose to study a cause-and-effect connection.

2.2.1 Choice of strategic approach
We will use the explanatory approach since we have gained a wide knowledge within the problem area and since there exist many theories that we intend to rely on. We further aim to study how different variables affect the capital structure; hence this approach would be suitable.

2.3 RESEARCH DESIGN
The design of the research is one of the most vital parts to determine, when starting a research process. The design of the research, functions as the basis for how the process should proceed and in what form the report will be presented.

When carrying out research there are several different research strategies to choose from. Each strategy has its own advantages and disadvantages.
Depending on what the researcher wants to investigate, the researcher has to determine which research strategy best suits the purpose of the study. There are five different research strategies to choose from: experiment, survey, archival analysis, history and case study.

Three conditions decide which research strategy to choose. Firstly, the researcher has to identify the type of research question, since different strategies are favored for the questions Who?, What?, Where?, How? and Why?.

Secondly, the extent of control over behavioral events and the degree of focus on contemporary events further help the researcher to identify the strategy best suited the purpose of the study. The needed level of control over and access to a certain situation varies in the different research strategies, and they all have their distinctive characteristics. Still, the strategies overlap and no strict boundaries can be drawn between the different strategies. The case study research strategy is preferred when a how or why question is being asked about a contemporary set of events over which the investigator has little or no control.

Thirdly, the case study strategy is advantageous when the purpose of the research is to generalize in an analytical way. The strength of the case study lies in its ability to deal with several sources of evidence, such as documents, interviews and observations (Yin, 1994).

2.3.1 Choice of research design
We will work with the case study since it best suits the purpose of our study. The focus is on contemporary events and their impact on the future capital structure. To carry out our study, we intend to conduct an industry analysis in order to seek patterns regarding leverage and key figures. This analysis will be very valuable to us when analyzing our case companies. Our next step will be to interview our selected respondents. These
information sources and the annual reports of the respective companies will form the basis of our analysis.

2.3.2 Case study design
A research design is seen as the logic that links the data to be collected (and the conclusions to be drawn) to the initial questions of a study. Four basic types of research design can be distinguished, namely single-case, multiple-case, holistic and embedded design.

A distinction is made between the single-case and the multiple-case design. Firstly, a single-case design is advantageous when the case represents the critical test of an existing, well-formulated theory, when the case represents a rare or unique event or when the case fills a revelatory purpose. The multiple-case design is used when the same study contains more than one single case.

Another distinction is made between the holistic and the embedded design. The embedded design is preferable when the same case study involves more than one unit of analysis. These units can be selected through sampling or cluster techniques, or other criteria. If only one unit of analysis is examined, the holistic design is used. Further, the case study is of holistic design, if no logical sub-units can be identified and when the theory underlying the case study is holistic in nature (Yin, 1994).

2.3.2.1 Choice of case study design
We will use the multiple-case design with a holistic view since this has distinct advantages in comparison with single-case designs. The evidence from multiple cases is often considered more interesting, and the overall study is therefore regarded as being more solid. The theoretical framework later becomes the vehicle for generalizing about new cases.
2.3.3 Traditional prejudices against the case study strategy
Perhaps the greatest concern has been the lack of rigor in case study research. Too many times, the case study investigator has been sloppy and has allowed equivocal evidence or biased views to influence the direction of the findings and conclusions. A second concern about case studies is that they provide little basis for scientific generalization. “How can you generalize from a single case?” is a frequently heard question. The answer is not simple. However, consider for the moment that the same question had been asked about an experiment: “How can you generalize from a single experiment?” The short answer is that case studies, like experiments, are generalizable to theoretical propositions and not to populations or universes. In this sense, the case study, like the experiment, does not represent a “sample,” and the investigator’s goal is to expand and generalize theories (analytic generalization) and not to enumerate frequencies (statistical generalization) (Yin, 1994).

2.4 THE QUALITY OF OUR RESEARCH DESIGN
Because a research design is supposed to represent a logical set of statements, the quality of any given design can be assessed according to certain logical tests. Four tests have been commonly used to establish the quality of any empirical research.

2.4.1 Construct validity
This first test is especially problematic in case study research. People who have been critical of case studies often point to the fact that a case study investigator fails to develop a sufficiently operational set of measures and that “subjective” judgments are used when collecting the data.

To meet the test of constructed validity, an investigator must be sure to cover two steps:

- Select the specific types of changes that are to be studied in relation to the original objectives of the study.
- Demonstrate that the selected measures of these changes do indeed reflect the specific types of change that have been selected.

However, there are three methods available to increase the construction of validity. The first one is the use of multiple sources of evidence, and this method is relevant during data collection. A second one is to establish a chain of evidence, also relevant during data collection. The third one is to have the draft case study report reviewed by key informants (Yin, 1994).

2.4.1.1 The constructed validity of this thesis

We believe that the constructed validity of this thesis will be high because we intend to use multiple sources of evidence, such as interviews, annual reports and capital structure theories. We will also establish a chain of evidence through our real estate industry analysis. This analysis will consist of connections among the key figures. We also intend to discuss our preliminary results with key informants, such as our tutor, the three CFO:s at respective company and Ernst & Young Corporate Finance.

2.4.2 Internal validity

Internal validity is a concern only for causal (or explanatory) case studies, in which an investigator is trying to determine whether event x led to event y. If the investigator incorrectly concludes that there is a causal relationship between x and y without knowing that some third factor z may actually have caused y, the research design has failed to deal with some threat to internal validity (Yin, 1994).

2.4.2.1 The internal validity of this thesis

Internal validity exists when the instruments used in a study measure what they are supposed to measure, i.e. the key figures. Our key figures will be recalculated with respect to SFF that guarantees a high quality. The theory also suggests that an explanation-building procedure is appropriate to explanatory case studies. In most existing case studies, explanation
building has occurred in narrative form. Because such narratives cannot be precise, the better case studies are the ones in which the explanations have reflected some theoretically significant propositions. Our intention is to refer to theory throughout the entire analysis section, something that would further increase the internal validity.

2.4.3 External validity
This test deals with the problem of knowing whether a study’s findings are generalizable beyond the immediate case study. The external validity problem has been a major barrier in case studies. Critics state that single cases offer a poor basis for generalizing. However, such critics are implicitly contrasting the situation to survey research, in which a “sample” readily generalizes to a larger universe.

This analogy to samples and universes is incorrect when dealing with case studies. This is because survey research relies on statistical generalization, whereas case studies rely on analytical generalization. In analytical generalization, the investigator is striving to generalize a particular set of results to some broader theory (Yin, 1994).

2.4.3.1 The external validity of this thesis
Using multiple cases is a common strategy to increase external validity. Therefore, in this study, we will analyze three case companies and compare them with each other. Also, our three case companies will have very differing capital structures. We have selected Castellum, which is the lowest levered company in its industry, Platzer that is averagely levered and Wallenstam, the highest levered in the whole industry.

2.4.4 Reliability
The objective is to be sure that, if a later investigator followed exactly the same procedures as described by an earlier investigator and conducted the same case study all over again, this later investigator would arrive at the
same findings and conclusions. The goal of reliability is to minimize the errors and biases in a study (Yin, 1994).

2.4.4.1 The reliability of this thesis
To secure the reliability of our case study, we will cautiously interpret all gathered information throughout the entire research process. Data from different sources will be compared in order to reach the highest possible reliability. In order to secure the reliability of our interviews, we intend to select our respondents according to their knowledge of the company's capital structure.

2.5 ERRORS OF INFERENCE
Lundahl & Skärvad (1999) mention two possible problems when using personal interviews as a data collection method, namely interviewer effect and instrument errors.

2.5.1 Interviewer effect
It is possible that the influence of the interviewer can lead to distortions. An example of interviewer effect can be when the respondent wants to present himself or his company in a favorable light and therefore is not completely honest when answering the questions. However, this is something that is difficult to eliminate totally (Lundahl & Skärvad, 1999). We cannot say anything about the interviewer effect since we have not conducted the interviews yet, but the fact that we are aware of this effect could help us when posing the questions.

2.5.2 Instrument errors
These errors occur if the instruments used fail to reflect the purpose of the study accurately, i.e. if the questions asked do not address the problems they are supposed to investigate (Lundahl & Skärvad, 1999). Since we have not interviewed our respondents yet, we cannot say anything about this effect until after the interviews.


2.6 COLLECTION OF DATA
When we had studied the area of corporate capital structure and our thesis subject was determined, we had to decide which companies to examine. We went through this extensively and came up with the conclusion that one company is probably not enough since this could lead us to the wrong conclusions. We argued that there could be a possibility that we would choose a company that was extreme in itself. If two companies had been chosen we would have had a more solid investigation, but there would still be a potential danger if the selected companies showed contradictory results. With these arguments in mind we decided to conduct three case studies since we wanted to rule out possible misinterpretations.

Our selection of companies was based on the fact that we wanted three companies with totally different leverage ratios. This is why we chose Castellum that had a leverage of 52.7%, which was the lowest in the whole industry. Our choice of Wallenstam was also logical since they had the highest leverage of 84.5%. Finally we selected Platzer as our third company because they had a close to the industry average leverage of 69.9%. Platzer could then serve as a reference point to the extremely levered companies.

The gathered information about the companies capital structures and theories in the area can be classified into either primary or secondary data, where primary data is collected specifically for a certain case through respondents, case studies, simulation and experimentation. Secondary data has already been collected for previous research and purposes (Holme & Solvang, 1991).

2.6.1 Primary data
One of the most important sources of case study data is the interview. Interviews can be of a very different nature, depending on what best suits the purpose of the undertaken research (Holme & Solvang, 1991). We
intend to use the open-ended interview that is focused on questions from a case study protocol.

### 2.6.2 Secondary data
Secondary data can be divided into two categories, which refer to whether it is collected from internal or external sources. Internal data comes from within the organization about which the study is conducted. External data comes from outside the organization (Holme & Solvang, 1991). The secondary data in our thesis will consist of external data gathered from the Economic Library at the University of Gothenburg and annual reports gathered from respective companies. Our secondary internal data will mainly be the annual reports collected from our case companies.

### 2.7 RELEVANCE
The issue of relevance can be divided into two parts, namely practical and theoretical relevance. Practical relevance asks if the subject of the thesis is interesting for anyone not directly involved in its creation. The theoretical relevance of the thesis depends on whether it in any way presents new models or theories that can have applications outside the scope of the paper (Lundahl & Skarvad, 1999).

#### 2.7.1 Practical relevance
When considering the lack of literature concerning the practical implementation issue of capital structure, we feel that this thesis could serve as a starting point in the subject. Our thesis deals with the most important factors that should be taken into account when deciding capital structure. It further offers an insight into the reasoning of our three case companies.

#### 2.7.2 Theoretical relevance
Considering the great importance of an accurate capital structure we find it surprising that the quantitative models are as unsatisfactory as they are. We mentioned earlier that they do not take into account many important
factors. Our thesis investigates how these factors affect the decision process. This could contribute to an improvement of the current models.
3. THEORETICAL FRAMEWORK

The purpose of this chapter is to present theories concerning capital structure and to present empirical findings. This knowledge is necessary to obtain in order to understand the case study analysis. More in depth explanations concerning the theories are provided in the appendices.

3.1 MODIGLIANI AND MILLER’S PROPOSITIONS

3.1.1 M&M proposition I with no taxes

In 1958, Franco Modigliani and Merton Miller published their original article concerning capital structure. They have a convincing argument that a firm cannot change the total value of its outstanding securities by changing the proportions of its capital structure. The value of the firm will be the same, regardless which type of capital structure that is chosen. This is a strong argument where the authors explicitly or implicitly assume that:

- Capital markets are frictionless, which means that securities can be purchased and sold costless and instantaneously.
- Individuals can borrow and lend at the risk-free rate.
- There are no costs to bankruptcy.
- Corporations can issue only two types of securities, risky equity and risk-free debt.
- All corporations are assumed to be in the same risk class.
- There are no corporate or personal income taxes.
- There is no growth, all cash flow streams are perpetuities.
- Corporate insiders and the public have the same information, no signaling opportunities.
- There are no agency costs and managers always maximize shareholders’ wealth.
When all the above assumptions are fulfilled, equation 3.1 holds.

\[ V_L = V_U \]  \hspace{1cm} (Eq. 3.1)

\( V_L \) = Value of levered firm  
\( V_U \) = Value of unlevered firm

This model is called the M&M proposition I, where the value of the unlevered firm is the same as the value of the levered firm. This means that the total value of any firm is independent of its capital structure (Modigliani and Miller, 1958). At first, with all the assumptions, the model seems unrealistic, but we will later show that even when some of the assumptions are relaxed the argument still holds.

Proposition I is based on the fact that investors can simply do or undo anything the firm can do on its own, which is commonly referred to as homemade leverage. The homemade leverage finding is considered the starting point of modern managerial finance and is one of the most important findings in the area of corporate finance (Ross et al., 1993). The power of homemade leverage proves proposition I and can be found in appendix I.

### 3.1.2 M&M proposition II with no taxes

An implication of the M&M proposition I is that the expected return on a portfolio consisting of all the firm’s debt and equity is constant, as seen in equation 3.2.

\[ r = \frac{D}{D+\text{E}} \times r_D + \frac{\text{E}}{D+\text{E}} \times r_E \]  \hspace{1cm} (Eq. 3.2)

\( D \) and \( E \) are the amount of the firm’s debt and equity respectively, and the return on asset \( (\text{r}_A) \) is constant, regardless of capital structure. This could also be called the Weighted Average Cost of Capital (WACC) (Copeland &
Weston, 1992). By rearranging the terms, the M&M proposition II is obtained, as seen in equation 3.3.

\[ r = r_e \frac{D}{E} + r_d - r_d \]  

(Eq.3.3)

The M&M proposition II argues that the expected return on equity is positively related to leverage, and also that risk increases with leverage. Since we know that \((r_d)\) is constant for any capital structure, and that the return on debt \((r_d)\) is assumed to be constant, we can calculate the return on equity \((r_e)\) for different kinds of capital structure. The larger the amount of debt is, the larger required return on equity.

We know from proposition I that the company’s WACC \((r_i)\) is constant, and that changing the capital structure cannot affect its value. We also know that the rate of return on equity increases as leverage increases, according to proposition II. How can this be? What happens is that risk increases as leverage increases. When the firm moves from an unlevered structure to a levered structure, the operating income is divided on a smaller amount of outstanding shares, which gives larger \(r_e\). Re has increased, but risk (beta) has also increased (Modigliani & Miller, 1958).

Figure 3.1 shows that \(r_e\) is not important when determining an optimal capital structure. \(r_e\) can always be increased by borrowing, but the increase in \(r_e\) is offset by the higher risk. WACC remains constant even when firms change their capital structure and consequently they are not better off with leverage.
The conclusion of the M&M propositions is that the overall cost of capital cannot be reduced by changing from equity to debt, that seems to be cheaper. As firms add debt, the remaining equity becomes more risky and the cost of equity capital increases. The increase in the cost of equity capital is offset by the higher proportion of the firm financed by low-cost debt. The value of the firm and the firm’s overall cost of capital are invariant to leverage, which is shown by the constant WACC.

3.1.3 M&M proposition I with taxes

One of the more critical assumptions in the M&M Proposition I and II is that there are no taxes. This assumption is not very realistic, since basically every country taxes company income. The government has chosen to “subsidize” interest payments to providers of debt capital, which means that debt financing is tax deductible. In other words, a levered company pays less tax than an all-equity company does. Thus, the sum of debt plus equity is greater for the levered firm, which can be seen in Appendix II.

The value of the levered firm is equal to the value of an unlevered firm plus the present value of the tax shield provided by debt, as seen in equation 3.4.
When the assumption of no taxes is relaxed, the market value of the company increases by taking on more risk-free debt. Consequently the company should take on 100% debt to optimize company value. This is the M&M proposition I with taxes (Modigliani & Miller, 1963).

### 3.1.4 M&M Proposition II with taxes

The M&M Proposition II with no taxes shows a positive relationship between the expected return on equity and leverage. The same intuition holds when we add corporate taxes, as seen in equation 3.5.

\[
\eta = \eta^e + \frac{D}{E} \left(1-T_c\right) \left(\eta^d - \eta^e\right) \tag{Eq. 3.5}
\]

The new WACC, including taxes, is seen in equation 3.6.

\[
\text{WACC} = \frac{D}{D+E} \left(\eta^e + \frac{D}{E} \left(1-T_c\right) \left(\eta^d - \eta^e\right)\right) \left(1+\frac{E}{D+E} \right) \eta^e \tag{Eq. 3.6}
\]

Figure 3.2 shows that a higher leverage level provides the firm with a lower WACC when corporate taxes exist. This can be compared to figure 3.1 where WACC is constant even though leverage is increased. This suggests that the firm value will increase with higher leverage since WACC will decrease, assuming that corporate taxes exist. It is shown that the larger the amount of debt, the higher the value of the firm, which implies that a 100% debt financing should be implemented (Copeland & Weston, 1992).
It is important to keep in mind the restrictive assumptions that must be fulfilled for the M&M propositions to hold. The most important assumption is that the M&M propositions ignore bankruptcy costs, which have been found to exist in reality.

3.2 THEORETICAL MODELS
The M&M propositions have created a starting point for capital structure theory and today there are three models that have made it into the mainstream of corporate finance. Out of these models it is only the Trade-off Model that provides an actual formula for calculating the optimal capital structure. The Pecking Order Hypothesis and the Signaling Hypothesis only try to explain observed patterns, not calculate an optimal capital structure level (Copeland & Weston, 1992).

3.2.1 The Trade-off Model
According to Modigliani & Miller (1963), firms would prefer to be 100% debt financed, to take full advantage of the tax shield. However, a 100% debt financing is not what can be seen in the real world, which is due to the fact that there is a cost to going bankrupt. In the M&M propositions it is
assumed that there are no bankruptcy costs, and this has been shown to be an important determinant of capital structure.

The trade-off model is based on the value of an unlevered firm, where the optimal capital structure is found at the trade-off point where the gain from adding additional debt is offset by the extra incurred cost of financial distress, as seen in figure 3.3.

Figure 3.3 The Trade Off Model


\[ V = \text{Value of the firm} \]
\[ V_U = \text{Value of unlevered firm} \]
\[ PV_T = \text{Present value of the tax deductibles value} \]
\[ PV_{FD} = \text{Present value of the risk for financial distress} \]

The upper curve in figure 3.3 shows the value of the company without considering the cost of the risk for financial distress. When financial distress is taken into account and deducted from the upper curve, we arrive
at the lower curve. The optimal capital structure is where the lower curve has its highest point.

3.2.1.1 Financial distress
Debt provides tax benefits to the firm, but it also puts pressure on the firm, since interest and principal payments are obligations, according to the trade-off model. The closer the firm is to bankruptcy, the larger is the cost of financial distress. The ultimate financial distress is bankruptcy, where ownership of the firm’s assets is legally transferred from the stockholders to the bondholders (Haugen & Senbet, 1978). Bankruptcy costs are made up of two parts, direct and indirect costs.

Direct costs can be seen as out-of-pocket cash expenses, which are directly related to the filing of bankruptcy and the action of bankruptcy. Examples of direct costs are fees for lawyers, investment bankers, administrative fees and value of managerial time spent in administering the bankruptcy (Haugen & Senbet, 1978). In 1990, Weiss estimated the direct cost of bankruptcy for 37 New York and American Stock Exchange firms to be 3.1% of the firm value. Warner (1977) found that direct costs of bankruptcy decrease when the size of the firm increases which implies that for large companies bankruptcy costs are less important when determining capital structure than it is for smaller firms.

Indirect bankruptcy costs are expenses or economic losses that result from bankruptcy but are not cash expenses on the process itself. Examples of such costs caused by bankruptcy are sales that are lost during and after bankruptcy, diversion of management time while bankruptcy is underway, and loss of key employees after the firm becomes bankrupt. Sales can frequently be lost because of fear of impaired service and loss of trust (Titman, 1984).

Altman provided a study in 1984 with a sample of 19 firms, 12 retailers, and 7 industrials that all went bankrupt between 1970 and 1978. By
comparing expected profits with actual profits, he found the arithmetic indirect bankruptcy costs to be 10.5% of firm value. Altman (1984) also estimated that both indirect and direct costs together are frequently greater than 20% of firm value. These findings give us reason to believe that bankruptcy costs are sufficiently large to support a theory of optimal capital structure that is based on the trade-off between gains from the tax shield and losses that come with costs of bankruptcy.

3.2.1.2 Agency costs

Another factor that can be added to the trade-off model is the agency cost, which arises due to conflicts of interests. There are two types of agency costs: agency costs of equity and agency costs of debt.

Agency cost of equity has its roots in the simple argument that you will work harder if you are the owner of the company than if you were an employee. Also, if you own a larger percentage of the company, you will work harder than if you owned a smaller percentage of the company (Copeland & Weston, 1992). A more detailed discussion of the agency cost of equity can be found in Appendix III.

Agency costs of debt occur because there is a conflict of interest between stockholders and bondholders. As a firm increases the amount of debt in the capital structure, bondholders begin taking on an increasing fraction of the firm’s business and operating risk, but shareholders and managers still control the firm’s investment and operating decisions. This gives managers a variety of different ways for selfish strategies, which will increase their own wealth, on behalf of the cost of the bondholders. A more detailed explanation can be found in Appendix IV.

3.2.2 Pecking order hypothesis

While the trade-off model of corporate leverage has to be considered the “mainstream” choice as the dominant capital structure theory today, there are several embarrassing regularities in observed corporate behavior that it
cannot explain. Three real-world patterns are particularly hard to reconcile with even the most sophisticated trade-off model: (1) within almost every industry, the most profitable firms have the lowest debt ratios, which is exactly opposite of what the trade-off model predicts; (2) leverage-increasing events, such as a stock repurchase and debt-for-equity exchange offers, are almost invariably associated with large positive abnormal returns for a company’s stockholders, while leverage-decreasing events lead to stock price declines. According to the trade-off model, these events should both net out to zero abnormal returns, since some firms will be below their “optimal” debt level when they increase leverage, while others will be above the optimum; (3) firms issue debt securities frequently, but seasoned equity issues are very rare. Announcements of new issues of seasoned equity are invariably greeted with a decline in the firm’s stock price (Myers & Majluf, 1984).

Donaldson (1961) has found a pecking order for how firms establish their long-term financing:

1. Firms prefer internal financing to external financing of any sort (debt or equity), when financing positive NPV projects.
2. When a firm has insufficient cash flow from internal sources, it sells off part of its investment in marketable securities.
3. As a firm is required to obtain more external financing, it will work down the pecking order of securities, starting with very safe debt, then progressing through risky debt, convertible securities, preferred stock, and lastly common stock.

The pecking order hypothesis does not provide a formula for calculating an optimal capital structure but it helps to explain observed patterns regarding financing preferences. For a further discussion of the pecking order hypothesis, see Appendix V.

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3.2.3 Signing hypothesis
When valuing a company we cannot be sure that the market knows the return stream of the firm and can value this stream to set the value of the firm. What is valued in the market place is the perceived stream of returns for the firm. However, managers of the firm have access to information about the firm that the public does not have access to. Therefore managers might elect to use financial policy decisions to convey this information to the market. The signaling hypothesis suggests that a higher financial leverage can be used by managers to signal an optimistic future for the firm. Unsuccessful firms cannot mimic these signals because such firms do not have sufficient cash flow to back them up (Ross, 1977).

The signaling hypothesis offers a good prediction of the market responses to the different types of security issues. Debt issues are signaling good news, and are greeted with a positive stock price response, while equity issues are signaling bad news, which is met with significant stock price declines. However, observed capital structure patterns suggest that the signaling hypothesis does not predict actual behavior very well. For example, leverage ratios have been found to be inversely related to profitability in most industries and not directly related as the signaling hypothesis predicts them to be. Another proof to be found is that the signaling hypothesis predicts that industries with extensive growth options and other intangible assets should employ more debt than mature and tangible-asset wealthy industries, since growth companies have more severe information asymmetry problems, and therefore have a greater need for signaling. However, the total opposite has been found in empirical studies. It can therefore be concluded that the signaling hypothesis does not explain the real world of modern corporate finance very well (Megginson, 1997).

3.3 CONCLUDING COMMENTS ABOUT THE MODELS
The pecking order hypothesis and the signaling hypothesis explain observed capital structure patterns and how these structures are financed.
These models do not help us to predict an optimal capital structure. However, the trade-off model provides a formula for calculating an optimal capital structure.

3.4 OBSERVED PATTERNS
We will now present observed patterns found through cross-sectional studies. The cross-sectional studies attempt to explain observed financial leverage as a function of the firm’s tax rate, type of asset, profitability, etc. It is important to recognize these patterns since there could be a reason why similar companies have positioned themselves at similar capital structures. One possible explanation could be that companies strive for an optimal capital structure. We will also present time series studies that show if capital structure has an impact on firm value, through announcement effects on stock price. The time-series studies will reveal whether the capital structure decision really affect the firm value.

3.4.1 Cross-sectional studies
From cross-sectional studies we have found certain variables that significantly affect firm leverage. The seven most important variables are country, industry, taxes, assets, profitability, size and growth.

3.4.1.1 Country
Leverage varies significantly across different countries, which is a well-accepted fact today. The main explaining factor is the nation’s reliance on capital market versus banks for corporate financing. Some countries, for example Japan, work in a close relationship with their banks, and therefore a high leverage can often be found. Other countries, such as the U.S., rely to a much greater extent on their capital markets for financing and in these countries a lower leverage is commonly found. Other factors that influence the capital structure decision are historical, institutional and cultural factors, which are different in different countries. Studies have shown that American, British, German, Australian, and Canadian companies have lower average book value leverage ratios than do their counterparts in
Japan, France, Italy, and other European countries. On the other hand, British and German firms have by far the lowest market value leverage ratios (Rajan & Zingales, 1994).

3.4.1.2 Industry
Different industry groups have been found to have significant differences among capital structure. In all developed countries, it has been found that certain industries, such as utilities, transportation companies, and mature, capital-intensive manufacturing firms, are characterized by high leverage ratios, while other industries, such as service firms, mining companies, and most rapidly growing or technology-based manufacturing companies employ little or no long-term debt financing. In 1997, Ashgharin conducted a study on Swedish companies that tested industry differences. He found that the consultant industry had the lowest average rank in leverage and was significantly different from the highly levered industries. Construction was found as the most leveraged industry with a significantly different capital structure from the industries with low average ratios.

3.4.1.3 Taxes
Studies have proved that increases in corporate income tax rates are associated with increased debt usage by corporations. However, it is a contradictory fact that capital structures of American companies have been remarkably constant over the period 1929-1980, especially compared to the dramatic changes in tax rates that have occurred this century (Bernanke & Campbell, 1988). According to the trade-off model, taxes should greatly affect the leverage level.

3.4.1.4 Assets
The type of assets the firm holds plays a significant role in determining that firm’s capital structure. The reason can be that when a large fraction of the firm’s assets is tangible, assets can serve as collateral, which diminishes the risk of the lender suffering agency costs of debt. The liquidation value of the firm’s assets will also be higher with tangible assets, which will
decrease the probability of mispricing in the event of bankruptcy and make lenders more willing to supply the loans (Rajan & Zingales, 1997). It has also been found that firms can borrow at a lower interest rate if their debt is secured by assets with a stable long-term value (Williamson, 1998). Collateralizing the debt also restricts the firms to use the funds for a specified project and decreases the conflicts between equity holders and debt holders (Jensen & Meckling, 1976). In the Rajan and Zingales (1997) study of European countries, it is found that tangibility of assets is positively correlated with leverage in all countries examined. These findings are consistent with studies made of U.S. companies. Asgharin (1997) found in his study of Swedish companies, that there is a positive relationship between corporate leverage and the collateral value of the firm’s assets. Construction, Transport, and Forest, which are highly leveraged industries, are also industries with large tangible assets.

3.4.1.5 Profitability
Regardless of the industry in question, it has been found that the most profitable firms borrow the least. The finding that the more profitable the firm is, the less they borrow, is against the trade-off model. The trade-off model suggests that profitable firms should borrow more, since they have a greater need to protect income from corporate taxes. What should also support a positive relationship between profitability and leverage is that the probability of bankruptcy decreases as profitability increases (Myers, 1993). Asgharin (1997) found that leverage is negatively correlated with profitability, which is consistent with previous studies. It implies that the more profitable Swedish firms are, the less leverage is kept. In the Rajan and Zingales (1994) study of European countries it is also found that profitability is negatively correlated with leverage for all countries, except Germany. These findings are against the trade-off model, but support the pecking order hypothesis by Myers and Majluf (1984).

3.4.1.6 Size
Size is an important determinant of capital structure. Studies in the area have been made by Friend & Lang (1988), Marsh (1982), Clason &
Wilhelmsen (1988) and Asgharin (1997), and they have all reached the same conclusion: the firm’s size has a significant positive effect on capital structure. A possible explanation is that larger firms are more diversified and bear lower bankruptcy risk. A lower expected bankruptcy risk gives a lower bankruptcy cost which enables them to take on more leverage.

### 3.4.1.7 Growth

It has been found that growth has an impact on leverage. Titman & Wessels (1988), Friend & Lang (1988), Marsh (1982), and Asgharin (1997) have shown that firm growth and leverage have a positive relationship when it comes to capital structure. This counters the argument that growing firms have more flexibility in their investment choices and may accept risky projects. Consequently, growth is expected to have a negative correlation with the leverage ratio (Jensen & Meckling, 1976). Another argument is that highly levered companies are more likely to procrastinate profitable investment opportunities (Myers, 1977). These arguments state that firms expecting a high future growth should use a larger amount of equity financing, which implies a negative relationship. The studies show a positive relationship between leverage and growth, which supports the pecking order hypothesis rather than any other theories.

### 3.4.2 Time series studies

Generally speaking, leverage-increasing exchange offers have significant positive announcement effects on the stock price. This has been found by comparing the two-day announcement effects for a wide variety of corporate events. Leverage-decreasing events, such as exchanging debt for common stock, have been shown to have significant negative effect on the stock price. Evidence by Masulis & Korwar (1986), Asquith & Mullins (1986), Kolody & Suhler (1985), and Mikkelson & Partch (1986) indicates that issues of seasoned equity are interpreted as bad news by the marketplace, with significantly negative announcement date effects on equity prices. This result is consistent with the Myers & Majluf (1984) pecking order hypothesis of capital structure. Firms will use equity only as
a last resort where stock repurchases are at the opposite end of the spectrum. An increase in leverage is interpreted as favorable signals about the future prospects (Copeland & Weston, 1992). We can conclude that all leverage-decreasing events have negative announcement effects, and all leverage-increasing events have positive announcement effects. Consequently, capital structure affects the value of the firm.

3.5 FACTORS DETERMINING CAPITAL STRUCTURE

We have so far introduced the theoretical models behind an optimal capital structure. The most important model for our purpose is the trade-off model because it explains and also provides a formula for calculating the optimal capital structure. The cross-sectional studies have shown capital structure patterns but not explained how the patterns have occurred and if they are optimal from a firm’s point of view. By combining the knowledge from these sources we can conclude which factors are the most important ones when determining an appropriate capital structure for a company in the real estate industry.

3.5.1 Making use of the tax shield

A major reason for using debt is that interest is tax deductible, which lowers the effective cost of debt. The more money a firm borrows, the greater the benefit of the tax shield. Furthermore, the higher a firm’s corporate tax rate is, the greater the advantage of debt (Modigliani & Miller, 1963). However, if much of a firm’s income is already protected from taxes by accelerated depreciation or tax loss carry-forwards, its tax rate will be low, and in this case debt will not be as advantageous as it would be to a firm with a higher effective tax rate. Also, if the firm is not making a profit, there is no tax advantage to debt at all.

The cross-sectional studies have found that profitability is negatively related to leverage, which is against the trade-off theory of capital structure. A profitable firm should have all intentions to protect its income from taxes, but the opposite is seen in real life. Very profitable firms use the tax shield to a smaller extent, because these firms do not need much debt
financing. Their high rate of return enables them to do most of their financing with retained earnings (Donaldson, 1961). From a trade-off model point of view this observed pattern is not optimal.

3.5.2 Limitations to borrowing
Lending and rating agencies play an important role when determining how much debt a firm can issue and to what extent the tax shield can be used. Banks might not want to issue loans to firms that are already exposed to a high leverage level. An unsatisfactory debt coverage ratio could also be a limit by creditors when issuing additional loans. In the real estate industry, a debt coverage ratio of 1.25 is considered to be a minimum requirement by creditors (Maisel, 1987). Further, the institutes may downgrade a firm’s bonds when more debt is issued, and this effect can influence firms to finance their expansion with equity (Weston & Brigham, 1990).

3.5.3 Business risk
Business risk is defined as the uncertainty inherent in projections of future returns on assets (ROA) if no debt is used. The greater fluctuation in ROA, the larger is the firm’s business risk. The larger the firm’s business risk, the lower is its optimal leverage level. Business risk is therefore one of the most important factors when making the capital structure decision. Business risk could either be determined by fundamental factors as stated below or by unlevered beta. Unlevered beta is derived from beta equity. Beta equity consists of a firm’s business and financial risk; consequently the beta equity must be unlevered in order to refine the business risk, using equation 3.7. A higher levered company will have a higher equity beta since a larger financial risk is used (Copeland & Weston, 1992).

\[
B_u = \frac{E}{D^*(1 - \frac{E}{C}) + E} \beta_F + \frac{D}{D^*(1 - \frac{E}{C}) + E} \beta_R \quad (Eq. 3.7)
\]

Equation 3.7 shows how the unlevered beta is calculated and is only one measure used when estimating business risk. Fundamental factors will also be used in order to estimate the business risk of the three companies.
3.5.3.1 Industry
It can be assumed that companies belonging to the same industry face the same economic conditions, but the economic conditions may vary among industries. Consequently, industry classification can be used as a proxy for business risk. The cross-sectional study in paragraph 3.4.1.2 has shown that different industries experience different capital structure patterns, which proves that industry classification can be used as a proxy for business risk (Asgharin, 1997).

3.5.3.2 Growth rate
Capital-intensive firms with few growth opportunities should be highly levered while technology-based industries with many growth opportunities should have relatively little debt. This is due to the fact that growing firms have more flexibility in their investment choices and may accept risky projects (Myers, 1977).

3.5.3.3 Asset structure
In the cross-sectional studies we found that firms with tangible assets have a higher leverage ratio compared to firms with intangible assets. This can be explained by the possibility of using tangible assets as collateral for loans. Therefore, it can be assumed that companies with tangible asset structures experience a lower business risk. The real estate companies are usually highly levered, whereas companies involved in technological R&D employ less debt. Tangible assets reduce business risk and therefore also the cost of financial distress (Asgharin, 1997).

3.5.3.4 Factors that cause stability or variance in future earnings
- Demand variability. The more stable the unit sales of a firm’s products are, other things held constant, the lower is its business risk. With stable sales a firm can more safely accept more debt and incur higher fixed charges than a company with unstable sales.
Optimal Capital Structure

Sales price variability. Firms whose products are sold on highly volatile markets are exposed to higher business risk than similar firms whose output prices are relatively stable.

- Property characteristics. A real estate company’s degree of commercial properties compared to residential ones influences business risk. A higher proportion of commercial properties often means a higher business risk, ceteris paribus. The reason is that demand fluctuates to a larger extent compared to residential properties (Maisel, 1987)

3.5.4 Financial risk

Financial risk is defined as the portion of stockholders’ risk, over and above basic business risk, resulting from the use of financial leverage (Weston & Brigham, 1990). The following factors will be used in order to estimate financial risk:

3.5.4.1 Leverage level

A company experiencing a larger leverage level is also experiencing a larger level of required fixed interest payments. Compared to equity financing there are no obligatory fixed payments. Consequently, a larger leverage level is equivalent to a larger financial risk.

3.5.4.2 Debt coverage ratio

The fixed charges of a firm include principal and interest payments on debt and lease payments. If the firm wants to take on additional debt, which increases fixed charges, the firm should analyze its expected future cash flow, since fixed charges must be met with cash. The inability to meet these charges may result in financial insolvency and bankruptcy. To gain knowledge of the debt capacity of a firm, the debt coverage ratio is helpful. When the debt coverage ratio is equal to one, it means that the firm is just able to pay its interest expenses. Consequently, a ratio below one means that the firm will not be able to pay its interest expenses. The larger the debt coverage ratio is, the lower is the company’s financial risk (Van Horne, 1986).
3.5.4.3 Financial beta
A company’s total risk is a combination of business and financial risk. In section 3.5.3 business risk was estimated by using unlevered beta. To refine financial risk from the total risk it is necessary to subtract a company’s business risk from the total risk. Consequently, financial risk is estimated by subtracting unlevered beta (beta asset) from beta equity (total risk). Evidently, what is left is a measure of a company’s financial risk.

3.5.4.2 Interest rate sensitivity
The interest rate sensitivity analysis reveals what happens to a firm’s result when one percentage unit change in the borrowing rate occurs. This sensitivity analysis measures the exposure to financial risk.

3.5.4.3 Financial flexibility
It is crucial for firms not to be forced to turn down promising projects because funds are not available. The firm should always be in a position to raise money, even when times are bad. In bad times, suppliers of capital are more willing to make funds available through bonds, to firms with a strong balance sheet and secured positions. The greater the probable future need for capital, and the worse the consequences of a capital shortage, the stronger the balance sheet should be. The goal of the firm is to maintain financial flexibility, which means maintaining adequate reserve borrowing capacity (Weston & Brigham, 1990). The lower the firm’s financial flexibility, the higher is the firm’s financial risk.

3.5.5 Business and Financial risk
A company’s total risk consists of a combination of business and financial risk. The total risk is important since it will determine the rate of return the investor demands from the company. In order to reach an appropriate total risk, a company’s financial risk must be determined in relation to the company’s business risk. As stated in sections 3.5.3 and 3.5.4, business risk is determined by the industry and competitive environment in which the
company operates, while financial risk depends upon the capital structure and financial policies adopted by the company. As risk levels are determined by the volatility of future expected returns, a high leverage level will result in a high perception of financial risk since interest has to be paid as a fixed expense. Conversely, a company which exclusively uses equity funding will have a much lower level of financial risk since dividend payments are not obligations. It is the combined level of risk that is important for a company, which enables an appropriate combination of business and financial risk, to be established for any company. An appropriate combination of business and financial risk is either in the lower right corner where the company faces a low business risk and a large financial risk or in the upper left corner facing a high business risk and a low financial risk, as seen in figure 3.4. When such positioning is achieved, the company’s total risk is at a satisfactory level. An inappropriate positioning is in the upper right corner where the company faces a high business risk and a high financial risk. The company’s total risk will be excessively high and its probability of total collapse will increase dramatically. Another inappropriate positioning is in the lower left corner where a company faces a low business risk and a low financial risk. Such a company would benefit if it accepted a larger financial risk, thus making use of the advantages that come with debt financing, such as the low cost of debt which is significantly lower than the required rate of return on equity and the benefit of the tax shield. A high financial risk is possible for a low business risk company, since it has strong consistent profits and cash flows to cover the fixed debt payments. However, many such companies would argue that, since they are now highly profitable and cash positive, they do not need to raise debt financing for their business. This is a dangerously “fat and happy” attitude, which has led to the situation where many companies have been taken over by corporate raiders. The corporate raider is looking for exactly this type of target company with a sound competitive strategy but with an inappropriate financial strategy (Weston & Brigham, 1990).
Figure 3.4 Business and financial risk

<table>
<thead>
<tr>
<th>High Business Risk</th>
<th>Low Financial Risk</th>
<th>High Financial Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appropriate:</strong> High Business Risk</td>
<td><strong>Appropriate:</strong> Low Business Risk</td>
<td><strong>Appropriate:</strong> High Financial Risk</td>
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<tr>
<td><strong>Inappropriate:</strong> Low Business Risk</td>
<td><strong>Inappropriate:</strong> Low Financial Risk</td>
<td><strong>Inappropriate:</strong> Low Financial Risk</td>
</tr>
</tbody>
</table>

**Financial Risk**

Source: Ernst & Young Corporate Finance

Figure 3.4 shows the appropriate and inappropriate positions regarding business and financial risk in terms of a company’s total risk.

3.5.6 Management attitudes

The last factor to consider when determining an optimal capital structure is managerial attitudes. Some managers are simply more aggressive than others. Therefore some firms are more inclined to use debt in an effort to boost profits, whereas some managers are very conservative and prefer the capital structure that has always been used, even if it is not optimal (Weston & Brigham, 1990).

By taking all of the above factors into account a decision regarding capital structure can be made when evaluating the three case companies.
4. THE REAL ESTATE INDUSTRY

The purpose of this chapter is to introduce the conditions that the real estate industry is operating under. Key figures that relate to business and financial risk are analyzed within the industry and across industries. The companies’ total risk profiles are finally presented, which determines whether their capital structures are appropriate or not.

4.1 HISTORY

The history of the real estate industry in Sweden has been one with drastic turns and huge variations. The industry faced a crisis between the end of the 1970s and the beginning of the 1980s. However, in the late 1980s Sweden had a major real estate boom. The industry faced favorable conditions due to low interest rates, high inflation and the belief in an eternal increase in real estate prices. The inflation and tax deductions made the real cost of borrowing negative in some cases. However the good time were drastically changed in 1991, when the interest rate was radically raised and another real estate crash was a fact. It is important to keep the drastic history in mind when deciding an appropriate capital structure. We will see that historical events have a substantial impact on the capital structure decision.

4.2 TREND OF TODAY

Recent studies have shown that the real estate prices probably will increase in the coming years. However, a long-term prediction is more insecure and a decrease in prices is not unthinkable. During the last year, the demand for properties in the three major metropolitan areas and the university and college towns remained strong. Business activity on the market was intense, partly due to efforts of real estate companies to focus their operations through specialization and greater geographical concentration. In the rental market, office rents showed a positive trend in the major metropolitan areas and particularly in Stockholm, where a continued strong demand is combined with low investment in new projects. Gothenburg and
Malmö also showed a promising development in the last year. The rental trend in the residential market remained weak, although demand continued to rise sharply, above all for prime locations in the metropolitan areas. In general, it can be said that the market climate for real estate companies has brightened in recent years. A positive GDP growth has been further buoyed by low interest rates. All the above factors are important when a real estate company faces a capital structure decision, since business risk has to be estimated.

4.3 THE FUTURE
The Swedish real estate market is entering an exciting phase, with further restructuring in 1999. This will give the real estate companies many interesting business opportunities – both to concentrate on their operations and to expand within their segments. There is also an ongoing debate concerning the Swedish business climate about the double taxation. If this debate leads to a removal, it would affect the real estate companies in a positive way, since most of these companies are valued below their substance value. There is reason to believe that the future for the real estate industry is bright, which could encourage companies to accept a higher financial risk (Diligentia, annual report 1998).

4.4 POLITICAL DECISIONS
Today, municipally owned housing companies are price leaders in each city. This means that rents in the public housing sector also determine the rent levels for both newly built and existing apartments owned by the private housing companies. This is an unacceptable fact, spokesmen for the real estate industry claim. According to current practice, the rent for a privately owned, comparable apartment may be about five percent higher than an apartment in the public housing sector without being considered unreasonable. In 1998, the trend towards market rents continued, i.e. the difference in rents for equivalent apartments in attractive and less attractive locations has increased. Acceptance of market-related rents is slow, and the correctness of this has been questioned on the grounds that the utility value
system has resulted in attractive apartments having similar rents. The government has appointed a commission to study the social aspects of housing and at the beginning of 1999, its chairman strongly questioned the utility value system and called for market rents. As a result, the trend towards market-related rents will probably accelerate. Another political decision concerning real estate companies is the interest subsidies. These subsidies will decrease in a near future, according to a government decision. However, the interest subsidies have only a small effect on the companies’ results, while an implementation of market rents could lead to approximately 25% higher rental levels in general (Wallenstam, annual report, 1998).

4.5 OPERATIONAL DECISIONS
One widespread conception of real estate companies is that their value growth and results are governed entirely by the economic cycle, politics, taxes and interest rates. While this view does hold some truth, there are many variables that can be directly influenced, for example, the company’s current market, leverage level, loan structure, maturity spread and interest subsidies. These factors affect the company’s business and financial risk and thereby its capital structure decision. This will be analyzed under the case study section (Maisel, 1987).

4.6 INDUSTRY KEY FIGURES
The real estate key figures do not tell us much individually, but put in a context and related to the other real estate companies they could be valuable sources of information when analyzing the case companies. Our purpose with these key figures is to identify the companies’ business risk, financial risk and industry trends that are all related to capital structure. When we know the pattern and norm in the industry, we can use this information in order to draw conclusions in our case studies and further compare the key figures with theory. In all figures the companies are listed in order of their leverage level using book values, Castellum being the least levered and Wallenstam being the most levered. The data has been
collected through *Veckans Affärer* and the companies’ respective annual reports. The data collected through *Veckans Affärer* should be trustworthy since it has no reason to influence the variables. However, the data collected through the respective annual reports has been recalculated to meet the standards of SFF\(^2\), which minimizes possible measuring problems.

### 4.6.1 Size

Figure 4.1 shows the size of the different companies regarding their stock value in the real estate industry. We can see that Drott is the by far largest company in the industry and Castellum is the second largest.

Figure 4.1: Size of the real estate companies in the industry

![Size of the companies](image)

Source: *Veckans affärer nr. 49, 1999.*

### 4.6.2 Business risk

We have used two measures when determining the real estate companies’ business risk, which are the unlevered beta and fundamental factors. The most important fundamental factor is whether a company is focused on residential or commercial properties. The importance is due to the fact that

\(^2\) *Sveriges Förenade Finansanalytiker*
commercial properties experience a higher rental level risk and thereby a higher business risk. However, residential properties, with a low vacancy, result in a greater stability in operating income, and therefore a lower business risk.

4.6.2.1 Unlevered beta

Figure 4.2 shows the average unlevered beta for different industries. We can see that the real estate industry experiences the lowest unlevered beta, and we therefore conclude that the business risk is very low for the real estate industry. The low business risk in the real estate industry may be derived from the tangible assets and the capital-intensive business.

Figure 4.2: Unlevered beta for different industries

![Diagram showing unlevered betas for different industries](source: Veckans affär nr. 49, 1999.)

Figure 4.3 shows the unlevered beta for the different companies within the industry. When using unlevered beta as a measure of business risk, Platzer is facing the highest risk by far, nearly twice as high as Humlegården and Castellum, which have the second and third highest business risk respectively. All other companies in the industry are, facing a low business risk.
Figure 4.3: Unlevered beta for the real estate industry


4.6.2.2 Percentage of residential and commercial properties

What the 17 companies in the industry have in common is that they are all pure property companies, made up of a mixture of residential and commercial properties.

Figure 4.4: Residential vs. commercial properties

Figure 4.4 shows that Heba, Mandamus, and Wallenstam are focused on residential properties with a proportion of 89, 76, and 72 percent respectively. Platzer, Hufvudstaden, and Piren are focused on commercial properties with a proportion of only 0, 1, and 3 percent in residential properties. The latter companies are likely to face a higher business risk, ceteris paribus, compared to Heba, Mandamus and Wallenstam. The industry average is a 37 percent proportion of residential properties.

4.6.3 Financial risk
A company’s financial risk can be measured in different ways. We have chosen four important measures. The measures used are the leverage level, the debt coverage ratio, the interest rate sensitivity and the financial beta.

4.6.3.1 Leverage level
The real estate industry is known for being extremely levered compared to other industries. The high leverage level can be explained by the fact that the industry consists of mature companies and not growth companies. Asgharin (1997) found that growth companies on average take on lower leverage levels compared to mature companies. Another reason for the high leverage level is the companies’ asset structure. Their assets are almost purely made up of properties, which are very tangible and liquid in nature. Properties also make up very good collateral for loans, which makes it easy for real estate companies to borrow money.

3 No figures were found regarding percentage share of residential properties for Humlegården and Pandox.
Figure 4.5: Leverage levels in different industries

Figure 4.5 shows that the real estate industry faces the second highest leverage level of 65% compared to other industries. Only the banking industry faces a higher leverage with 83%.

Figure 4.6 shows the leverage level within the real estate industry. It can be seen that the leverage level oscillates between Castellum’s 53% and Wallenstam’s 85%. The average leverage level in the industry is 64.5%, using book values. Only 9 out of the 17 companies in the industry have valued their properties using market values\(^4\). The proportion of debt financing has increased, due to the higher market value of properties. We argue that market values are more accurate, since book values are purely accounting measures.

\(^4\) The market values used are the companies’ own evaluation of their properties and are not calculated through the stock price. Consequently, there could be a possibility that these market values are over- or underestimated. However, the market values are only used as a comparison to book values in order to show the difference between the two measures.
Figure 4.6: Leverage levels for the real estate industry

![Leverage level chart]


4.6.3.2 Equity ratio

Another ratio illustrating capital structure is the equity ratio. This ratio is inversely related to the leverage level, except for the non-interest bearing liabilities. Figure 4.7 shows that the real estate industry experiences the second lowest equity ratio compared to other industries. Only the banking industry faces a lower equity ratio than the real estate industry.

5 The non-interest bearing liabilities are excluded from the debt financing level. The reason is that we want to measure the costly debt with total equity and liabilities. This creates the difference.
Figure 4.7: Equity ratios for different industries

Figure 4.8 shows the equity ratio within the real estate industry and the result is similar to what the leverage level illustrates. Again, Castellum is the company with the largest equity ratio of 41% and Wallenstam has the lowest equity ratio of 12%, where the average is 26.7%. The adjusted equity ratio takes market values into account, which makes this ratio larger than the equity ratio.

Figure 4.8: Equity ratios for the real estate industry

4.6.3.3 Debt coverage ratio

The debt coverage ratio demonstrates how well the company manages its debt burden and if additional debt is appropriate. When the debt coverage ratio is close to 1, the company is just able to cover its net financial items with its operating income. We have not included sale of real estates in the debt coverage ratio since this belongs to extraordinary events, according to SFF.

Figure 4.9: Debt coverage ratio for the real estate industry

![Debt coverage ratio chart]


A common phenomenon for real estate companies is that they secure their loan portfolio through interest swaps with different durations, which enables the companies to maintain a low debt coverage ratio. The average debt coverage ratio in the industry is 1.7 where Heba has the highest ratio of 3.3 and Platzer has the lowest ratio of 1.02, as seen in figure 4.9. The debt coverage ratio is a measure that also is of interest to creditors. A common level for creditors in the real estate industry is not to accept a debt coverage ratio below 1.25 (Maisel, 1987).
Optimal Capital Structure  

4.6.3.4 Interest rate sensitivity

All the companies within the industry have conducted a sensitivity analysis, which reveals what would happen to the company’s result if the interest rate changed by one percentage unit. The figures are recalculated due to comparable issues, i.e. the effect of a one percentage unit change reveals how large the effect is, in relation to the company’s profit before tax.

Figure 4.10: Interest rate sensitivity for the real estate industry

![Interest rate sensitivity chart](image)


The industry average is 27.6 % but it varies significantly between the different companies, from nearly zero up to 72.3 %. Platzer and Heba have secured a large part of their portfolio with swap agreements and thereby reduced their sensitivity. Wallenstam, on the other hand, is heavily leveraged and consequently more sensitive to interest rate changes (figure 4.10).

4.6.3.5 Financial beta

The last measure used when estimating the financial risk is the financial beta. We can conclude that Wallenstam is facing by far the highest financial beta while Platzer faces the second largest financial beta. Castellum faces a financial beta slightly above average, as seen in figure 4.11.

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Optimal Capital Structure The Real Estate Industry

Figure 4.11: Financial beta for the real estate industry

![Financial beta chart]

Source: Own construction

4.7 BUSINESS AND FINANCIAL RISK

We will compare business risk with two different measures of financial risk in order to determine whether the companies’ capital structures are appropriate or inappropriately positioned, according to figure 3.4. The measures of financial risk used are the debt coverage ratio and the leverage level.

4.7.1 Business risk and debt coverage ratio

According to figure 3.4, an appropriate position in figure 4.12 is either in the lower right corner or in the upper left corner.
There are basically two companies that really stand out. Heba has an extremely low business risk and could therefore accept a much higher financial risk. If they followed this advice, they would experience an appropriate position instead of their current inappropriate position. Platzer, on the other hand, has a large business risk and a large financial risk, which lead to their inappropriate position in the upper right corner. From a capital structure point of view Platzer’s financial risk should be decreased by increasing the debt coverage ratio. Wallenstam experiences an excellent positioning in the lower right corner where the low business risk motivates their high financial risk. Castellum is in-between the two appropriate positions and could improve their position by slightly increasing the financial risk through a higher leverage. We argue that this position would be better for Castellum than their current position, from a total risk point of view.
4.7.2 Business risk and leverage level

The second measure used to determine financial risk is the leverage level. Figure 4.13 shows business risk and leverage level for the companies within the real estate industry. Platzer’s position concerning leverage level in figure 4.13 is again inappropriate. This figure further illustrates their need of a decreased financial risk. Wallenstam is best positioned again, in the lower right corner, while Castellum is positioned in-between the preferable positions. We argue again that a slight increase in the financial risk, through a higher leverage, would improve Castellum’s position.

Figure 4.13: Business risk and leverage level for the real estate industry

![Business risk and leverage level graph](image)

To get an overview where the real estate industry is positioned concerning business and financial risk, different industries are also compared. As seen in figure 4.14, the real estate industry is facing the lowest business risk, using unlevered betas, compared to the other industries. At the same time, the real estate industry has the second largest leverage level compared to other industries. Only the bank industry faces a higher leverage level. Having figure 3.4 in mind, the real estate industry is positioned in the
appropriate lower right corner, facing a low business risk and a high financial risk.

Figure 4.14: Business risk and leverage for the real estate industry compared to other industries

4.8 COMPARING KEY FACTORS

4.8.1 Comparing leverage level with debt coverage ratio

By comparing the companies’ leverage level and the debt coverage ratio we can see if it is possible for the companies to increase their leverage. Figure 4.15 shows that a lower debt coverage ratio is often experienced with a higher leverage level. Companies that have a large debt coverage ratio could increase their leverage level. For example, we can see that Heba, having the largest debt coverage ratio in the industry, is taking on a smaller than average level of leverage. Heba could increase their leverage level without experiencing a low debt coverage ratio which would be unacceptable. By increasing their leverage level Heba would increase the
value of the tax shield, without being exposed to an unacceptable cost of financial distress. However, a company having a low debt coverage ratio should not, unconditionally of its current capital structure, increase the leverage level. An example of such a company is Platzer, which has a debt coverage ratio of 1.02, even though its leverage level is just above the industry average. Wallenstam is, from an optimal capital structure point of view, a company that is making the most out of the tax shield, and still has a reasonable debt coverage ratio. Castellum’s debt coverage ratio indicates that a higher leverage could be accepted, and would thereby increase the value of the company.

Figure 4.15: Comparing the debt coverage ratio with leverage level for the companies in the real estate industry.

4.8.2 Comparing leverage level with borrowing rate

By comparing the leverage level with the average borrowing rate we can see if the interest rate increases with a higher leverage level. Figure 4.16 shows that borrowing rates seem to slightly increase with an increase in the
leverage level. We need to keep in mind that debt financing is a cheaper fund than equity financing.

Figure 4.16: Borrowing rate and leverage level for the real estate industry

According to theory, approaching bankruptcy and facing a larger cost of financial distress should have an impact on interest rates the companies pay on their loans. We could therefore expect that companies taking on a higher leverage level should face a higher borrowing rate on loans. In the last year Wallenstam experienced the highest average rate of interest of 6.7%, and they were also the most heavily levered company in the industry. Humlegården had the lowest average borrowing rate of 4.7% and they were the second least levered company in the industry. Castellum’s borrowing rate of 6.2% was very high, which is remarkable due to the fact that they have the lowest leverage in the industry. This could be interpreted as proof of their high business risk. Platzer also had a borrowing rate of 6.2%, which is normal in the industry considering their leverage level. The
differences may be perceived as small, but it is important to understand that a small difference in the borrowing rate could substantially affect the company’s result. The average borrowing rate for all companies was 5.9%.
5. THE CASE OF CASTELLUM

The purpose of this chapter is to present Castellum and its capital structure. Furthermore we will analyze how they determine their capital structure and if any improvements can be made in their current capital structure.

5.1 INTRODUCTION

Castellum is one of the largest real estate companies in Sweden and was introduced on the Stockholm Stock Exchange in 1997. Castellum was established during the economic recession and bank crisis that faced Sweden in the beginning of the 1990s. In 1993, Nordbanken had severe problems with their real estates and they started a company named Securum. Securum operated as a "credit-destroyer" for mortgaged receivables that were not sufficiently large and several real estate companies were adopted. Castellum was created, when they overtook the deposited guaranteed properties from Securum. From that day, Castellum has had a strategy to be a strong equity based company, in order to manage a future financial crisis. Castellum’s business strategy is to acquire and take part in new construction of properties with a high development potential. They will add value to these properties and when no further value can be added, these properties will be sold off. Castellum focuses on a local presence in each region in which it operates in, since this creates a close contact with the market. The real estate portfolio is geographically concentrated to the Greater Gothenburg area, the Öresund Region, the Greater Stockholm area, Western Småland and Mälardalen. Castellum’s portfolio is dominated by commercial properties, which represent 63% percent of its total portfolio.
5.2 CASTELLUM’S CAPITAL STRUCTURE

5.2.1 Leverage ratios
Castellum is the lowest levered company in the real estate industry by 52.7%, as seen in figure 5.1, which should be compared to the real estate industry average of 64.5%.

Figure 5.1: Castellum’s capital structure

If market values are used instead of book values, Castellum has a leverage level of 43%, as seen in figure 5.2. This ratio is lower since the properties are valued above their book values.

Figure 5.2: Castellum’s capital structure adjusted to market values of properties

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6 A WACC of 8.5% has been used when calculating market values of properties, which Castellum has calculated using their own valuation model.
5.2.2 Equity ratios

Figure 5.3 shows how Castellum’s equity ratio has increased from 39% to 41% during the last three years. The adjusted equity ratio has only been calculated for 1998 and is 51.1%. The adjusted equity ratio is larger compared to the equity ratio due to the higher market values of properties. Castellum has the largest equity ratio in the industry since a major part of its investments are equity financed.

Figure 5.3: Castellum’s equity ratio

![Equity Ratio Chart](chart.png)


5.3 CAPITAL STRUCTURE IN THE FUTURE

Castellum’s goal and target ratio regarding capital structure are to reach a 35% equity ratio, according to Torbjörn Olsson, CFO at Castellum. Castellum’s current equity ratio is 41%, which reveals that Castellum is not at their target ratio. To reach their goal, Castellum needs to increase their amount of debt financing in relation to equity financing.

Castellum has decided to state their goals in terms of book values instead of market values. The long-term goal of a 35% equity ratio was set three years ago and at that time, the book values were identical to the market values of properties. Today, these values are not identical. Mr. Olsson argues that
using book values is accurate, and if the adjusted equity ratio would be used instead, Castellum would experience an even more attractive ratio than today. Consequently, Castellum perceives a high equity ratio as more attractive than a low.

5.4 WACC AND SHAREHOLDER VALUE

Mr. Olsson does not believe that the current capital structure optimizes the value of the company, nor the target equity ratio of 35%. An optimal capital structure for the shareholders would mean a higher debt financing than today. Mr. Olsson defends Castellum’s capital structure by saying that it is preferable for Castellum as a company to keep the high level of equity financing. The high equity level allows Castellum to stay financially flexible and keep the possibility of acquiring new properties. Mr. Olsson does not feel that a high leverage of a company is proof of a strong company even though the stock market prefers the low WACC. He further believes that a heavily debt financed company, sooner or later, will experience a debt burden too large for the company to survive.

5.5 HOW CASTELLUM DETERMINES CAPITAL STRUCTURE

As seen, Castellum has positioned itself as the least levered company in the real estate industry and they would still be one of the lowest levered companies in the industry, even if their goal to decrease the equity ratio were fulfilled. We will now look further into how Castellum has decided upon this capital structure, if any models have been used, and what factors are important when making the capital structure decision.

By interviewing the CFO at Castellum we found out that they do not use any of the models explained in Chapter 3 when they decide upon their capital structure. The arguments for not using any of the models are that they are not familiar with them. Neither have they estimated the cost of bankruptcy, which is a necessity for using the trade off model. The closest Castellum has come to calculating the cost of bankruptcy is to estimate the worth of the assets if they were sold off. However, instead of using any
models, there are several factors that Castellum does take into consideration when they make their capital structure decision. The factors are the strength of the assets, history and the debt coverage ratio.

- **Strength of the assets.** Castellum’s mortgage level of their properties is important when deciding capital structure. Castellum will prevent that their properties reach an unsatisfactory high mortgage level, since Castellum prefers being a strong real estate company with a strong balance sheet. Keeping assets strong allows Castellum to stay financially flexible and minimize the financial risk.

- **History.** History also plays an important role when Castellum decides its capital structure. When Castellum was introduced on the Stockholm Stock Exchange in 1997, they made their principal guideline regarding their long-term strategies and goals. These strategies and goals were decided with respect to the deep economic recession, from which Castellum had emerged. By keeping a strong equity base Castellum wanted to be prepared if another real estate crisis would occur.

- **Debt coverage ratio.** The debt coverage is another factor used by Castellum to determine its capital structure. The ratio reveals how sensitive they are to financial risk and whether a possibility exists to increase the leverage level.

All of the above factors are taken into account when Castellum decides upon their capital structure. However, Mr. Olsson argues that the most important factor is history.

Further findings regarding Castellum’s capital structure decision are that they would consider changing their capital structure if the tax rate changed. Castellum does not think in terms of business risk when it decides upon its capital structure, although it perceives its business risk as lower than its competitors.
5.6 ANALYSIS OF CASTELLUM’S CAPITAL STRUCTURE

We will now continue by analyzing Castellum’s capital structure and it will be shown that there are factors that argue for keeping the low leverage level, but there are also factors that are in favor of the chosen, relatively low, leverage level. In this part, we will list the factors that need to be considered when analyzing capital structure, and we will analyze each of these points, and we will move on to draw conclusions from our findings. With the help of the industry analysis and the theory in the field we will be able to say if the currently low leverage level is satisfactory as it is, or if Castellum could be better off having a larger and lower leverage level.

There are several factors and questions that need to be taken into account when determining an optimal level of capital structure. 1) A company should try to make maximum use of the tax shield, which means using debt financing as long as the debt burden does not constrain the company. This factor is a straight implementation of the trade off model. 2) Practical limitations to debt financing must be investigated. For example, do the lending institutes allow the company to borrow more money and if they do, is the interest rate acceptable? 3) The company’s business risk should be estimated. By knowing the business risk, the size of an appropriate financial risk can be estimated. 4) The company’s financial risk should be estimated. Further, the company’s ability to cope with the current financial risk and future financial risk should be investigated. 5) The company should determine the effect that leverage would have on the company’s WACC and shareholder value.

5.6.1 Making use of the tax shield

Castellum has made a large profit during the two years they have been listed on the Stockholm Stock Exchange, which is an argument for using the debt tax shield to a maximum. A larger amount of debt financing will also reduce Castellum’s WACC, which will increase the value of the company, according to Copeland & Weston (1992). According to the trade off theory, debt financing should be used as long as the gain from the tax
shield exceeds the cost of financial distress. There is much evidence indicating that Castellum has not yet reached the trade off level, as seen in figure 3.3. Castellum is the least levered company in the industry, which gives us reason to believe that they have not reached the trade off level. The debt coverage ratio further supports our view since it is unnecessary high (see figure 4.9). We can see that additional debt could be accepted without placing the company in financial distress. The interest rate sensitivity analysis adds additional proof that a larger leverage can be accepted (see figure 4.10). To find an appropriate leverage level we will analyze Castellum’s business risk and financial risk, but first we will examine if there are any practical limitations to acquire additional debt.

5.6.2 Limitations to borrowing
At the current leverage level, Castellum experiences no problem concerning additional borrowing. The reason is that they are lightly mortgaged and their properties are excellently collateral. Using book values, Castellum has only mortgaged its properties with 44%, whereas the industry average is 67%. Castellum could borrow up to the industry norm of 75% without experiencing a higher interest rate, and if they borrowed above the industry norm, interest rates would only rise a few basis points. We can therefore argue that there are no practical limitations for Castellum to take on additional debt with its current capital structure. Since there are no practical limitations to debt financing, the appropriate leverage level depends upon Castellum’s business and financial risk.

5.6.3 Business Risk
We have used three measures for estimating Castellum’s business risk: the industry average, the unlevered beta and other factors that could cause variations in future earnings. None of these factors provides a perfect measure of business risk alone, but by using the result from each of these measures a good estimation of business risk can be made.
5.6.3.1 Industry average
Figure 4.5 shows that the average leverage level in the industry is about 65%, which compared to other industries is seen as a high leverage level. A high leverage level in the industry is a sign that the industry is facing a low business risk (Grundy & Ward, 1996). This is exactly what is seen in the real estate industry, and therefore we can assume that the industry faces a low business risk.

5.6.3.2 Unlevered beta
Figure 4.3 shows that Castellum is facing an unlevered beta of 0.29, which is the third largest in the industry. The high unlevered beta gives us reason to believe that Castellum is facing a larger business risk compared to their competitors.

5.6.3.3 Factors that cause stability or variance in future earnings
- Focus on commercial properties. Castellum’s portfolio consists of 37% residential properties and 63% commercial properties. This increases Castellum’s business risk, since commercial properties are riskier than residential ones.
- Rent out level. Castellum’s strategy is to sell off properties where a maximum rent out level has been reached and then acquire new properties where the rent out level has not yet reached a maximum. This strategy increases the business risk.
- Rental prices can be seen as fairly stable, and are more likely to increase than decrease. For residential properties it is very likely with an increase in rental prices since market rents are likely to be established.

We believe that these factors are arguments for a higher than average financial risk.
5.6.4 Financial risk

We have used four measures for estimating financial risk: the leverage level, the debt coverage ratio, the financial beta, and the interest rate sensitivity.

5.6.4.1 Leverage level

Figure 4.6 shows that Castellum is the least levered company in the industry, using book values. Castellum’s leverage level of 52.7% should be compared to the industry average of 64.5%, and Castellum’s equity ratio of 41.3% should be compared to the industry average of 29.5%. Both these measures are signs of an extremely low financial risk.

5.6.4.2 Debt coverage ratio

Castellum’s debt coverage ratio of 2.1 is the third highest in the industry, as seen in figure 4.9. Apparently it does not show any signs of financial distress, and indicates that a higher leverage can be accepted.

A debt coverage ratio of 1.25 is traditionally set as a minimum ratio that creditors will accept (Maisel, 1987). The consequence is that Castellum could increase its current interest expense of SEK 291 million up to SEK 489.6, and still keep an acceptable debt coverage ratio of 1.25. Since the maximum interest expense is known, we can also calculate the maximum interest-bearing loan amount that can be accepted. We assume that additional loans can be accepted at Castellum’s current average interest rate. This is a valid assumption to make since interest rates on loans basically do not change up to a 75% mortgage level of properties, and above a 75% mortgage level will only increase the interest rate by a few basis points. Castellum could then increase their interest-bearing liabilities

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7 Maximum debt payment = (Operating income after financial items + interest expense)/minimum debt coverage ratio, (SEK 321 million + SEK 291 million)/1.25.
8 Maisel, Sherman J., “Real Estate Finance”, pp 404-405
9 Maximum loan = maximum debt payment/mortgage constant

According to both Mrs. Cederkvist, CFO at Wallenstam and Torbjörn Olsson, Financial Treasurer at Castellum.
from the current SEK 4,765 million to SEK 7,896.7 million. This means an increase in the loan portfolio of SEK 3,131.7 million, which will leave Castellum with a capital structure of 87.4% debt financing using book values and 71.3% debt financing using market values of properties. Compared to today’s debt financing values of 52.7% and 43.0%, we can see that large changes in the capital structure can be made without facing an undesirable debt coverage ratio below 1.25.

Now the same procedure is repeated with a debt coverage ratio of 1.69 which is the industry average. Now the maximum debt payment is SEK 362 million, which should be compared to the current debt payment of SEK 291 million. Keeping the same assumptions as above regarding the interest rate on loans, the maximum loan amount is SEK 5,841 million. The current loan portfolio is SEK 4,765 million, which means that the loan portfolio could be increased by SEK 1,076 million, and still have a debt coverage ratio equaling the industry average. The new capital structure would be debt financed by 65% using book values and 53% using market values, which should be compared to today’s values of 52.7% and 43% respectively. We can see that the leverage level can be increased to 65% using market values, without experiencing a low debt coverage ratio.

Castellum’s WACC is currently 6.18% and by increasing the leverage level from 52.7% to 65% would decrease WACC to 5.70%. This decrease in WACC would increase the theoretical value of the company (Copeland & Weston, 1992). The calculations can be found in Appendix VI. To conclude, Castellum’s high debt coverage ratio illustrates a low financial risk.
5.6.4.3 Financial beta
Castellum’s financial beta is slightly above the industry average, indicating a financial risk that is slightly above the average, as seen in figure 4.11.

5.6.4.4 Interest rate sensitivity
A sensitivity analysis is used to see how exposed Castellum is to interest changes. This analysis reveals that a one percentage unit change in the borrowing rate will change the result by SEK 47 million, which equals a 14.6% change of the result. Castellum is not easily affected by changes compared to their competitors. For the industry on average, a one percentage unit change in the interest rate will change the result by 22% (see figure 4.10). The interest rate can rise by almost seven percentage units before Castellum is making a loss, if all other factors kept constant. This reduces Castellum’s financial risk.

5.6.5 Coping with financial risk
Castellum is not worried about its ability to raise new capital if new investment opportunities occur, since its properties are lightly mortgaged. Castellum stays financially flexible by not accepting a large financial risk. Their large profit will further increase the equity base. Consequently, Castellum is considered a strong company, with virtually no limitations to entering new investment opportunities.

5.7 CONCLUSIONS

5.7.1 How Castellum determines its capital structure
Our conclusion regarding how Castellum determines its capital structure is that it does not use any models explained in Chapter 3. The reason is that they are not familiar with these models. Instead of using models, Castellum takes several fundamental factors into account. Castellum analyzes each fundamental factor individually and from these separate findings an overall picture regarding the capital structure decision is created.
The most important fundamental factor when Castellum’s capital structure decision is made is to sustain a strong equity base. The reason is that Castellum was established during the real estate crisis, and their long-term goal of a high equity ratio was determined in order to survive another potential crisis. Another important factor is the debt coverage ratio which is used as a control instrument in order to assure that the operating income covers the net financial items.

5.7.2 Improvements in Castellum’s capital structure
From our analysis we can conclude that Castellum’s leverage level is too low. This conclusion is based on the fact that Castellum has an inappropriate combination between business and financial risk. Our business risk analysis reveals that Castellum has a higher than average business risk. The high business risk can be derived from the fact that they have the third largest unlevered beta in the industry. Further, the fundamental factors also indicate a high business risk. At the same time, Castellum is facing an exceptionally low financial risk due to the high debt coverage ratio, the low leverage level and the low interest rate sensitivity. We argue that Castellum’s current position regarding their total risk, as can be seen in figures 4.12 and 4.13, is inappropriate, according to figure 3.4. Even though the business risk is higher than the average, we argue that the leverage does not have to be the lowest in the industry.

Another argument supporting an increased leverage level is based on the trade-off model. Castellum made a profit of SEK 320 million in 1998, which is an argument for using the tax shield to a maximum. Castellum is a financially strong company, which is proved by their debt coverage ratio and the interest sensitivity analysis, but they have chosen not to take on a higher leverage. We argue that it would be theoretically possible for Castellum to increase its leverage, without suffering financial distress. Consequently, Castellum has not tried to find the trade-off level, where debt should be accepted as long as the gain from the tax shield exceeds the
cost of financial distress, which according to the trade off model is the optimal capital structure.

Both arguments above claim that an increased leverage level is appropriate. The debt coverage ratio analysis has shown that an increase by 12.3 percentage units from the current leverage level of 52.7% to 65% is reasonable while still having a debt coverage ratio that is equal to the industry average. If this change is made, Castellum’s WACC would decrease from the current level of 6.18% to 5.70%, which in turn would increase the theoretical value of the company.

We should point out that Castellum is aware that a higher leverage would increase the theoretical value of the company. Even though they are aware of this fact, Castellum prefers not to take on more debt since their strategic goal regarding capital structure states a low leverage.
6. THE CASE OF WALLENSTAM

The purpose of this chapter is to present Wallenstam and its capital structure. Furthermore, we will analyze how they determine their capital structure and if any improvements can be made in their current capital structure.

6.1 INTRODUCTION

Wallenstam is one of the largest real estate companies in Sweden and their business consists of acquiring, building, managing, refurbishing, and selling properties. Wallenstam was founded as a company in 1944 and in 1984 they were introduced on the Stockholm Stock Exchange. Currently, Wallenstam is active in the four major urban areas in Sweden, which are Stockholm, Gothenburg, Helsingborg, and Malmö. The location makes them very geographically concentrated to attractive properties, in high liquid markets. Wallenstam is not only geographically concentrated, but also concentrated regarding the type of properties. Their portfolio is dominated by residential properties, which represent about 70% of the total floor space and 75% of rental income. The remainder of the portfolio consists of commercial properties. Wallenstam’s strategy is to make long-term investments in residential properties, since it is a safe and reliable segment. They believe in keeping good long-lasting customer relations which give them incentives to be customer-oriented and in having an effective property management.

6.2 WALLENSTAM’S CAPITAL STRUCTURE

6.2.1 Leverage ratios

Wallenstam has the highest leverage level in the real estate industry, with 84.5% in 1998, using book values of properties (see figure 6.1). Wallenstam’s leverage level can be compared to the real estate industry average of 64.5%.
Figure 6.1: Wallenstam's capital structure

<table>
<thead>
<tr>
<th>Capital structure</th>
<th>Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.4%</td>
</tr>
<tr>
<td></td>
<td>12.1%</td>
</tr>
<tr>
<td></td>
<td>84.5%</td>
</tr>
<tr>
<td>Interest-bearing liabilities</td>
<td></td>
</tr>
<tr>
<td>Non interest-bearing liabilities</td>
<td></td>
</tr>
</tbody>
</table>


Figure 6.2 shows that Wallenstam has been consistent in its capital structure from 1995 and on. Wallenstam's capital structure was extremely levered in 1994, but a major change was made in 1995, which lowered the leverage level from 92.6% to 83%. The quite drastic change in the leverage level can be explained by the new issue of stock that was made in 1995.

Figure 6.2: Wallenstam’s leverage level

After the stock issue in 1995, we can see that Wallenstam has been consistent in its capital structure, with only minor fluctuations. When using market values of properties instead of book values, it can be seen that the leverage shows the same overall pattern, but is consistently lower, due to the higher market value of properties compared to book values.

6.2.2 Equity ratios

Wallenstam’s current equity ratio is 12.1%, which is the lowest in the industry. The average equity ratio in the industry is 26%, which is considerably higher than Wallenstam’s ratio. The equity ratio drastically increased in 1995, which was an effect of the stock issue. Before the stock issue in 1994, the equity ratio was extremely low, being only 4.1%. When the adjusted equity ratio of 29% was calculated for 1998, the market values of properties were used instead of book values. Figure 6.3 illustrates a consistently higher equity ratio, which is explained by the higher market value of properties compared to the book value of properties.

Figure 6.3: Wallenstam’s equity ratio

6.3 CAPITAL STRUCTURE IN THE FUTURE
Wallenstam’s quantitative guideline and goal concerning capital structure are to have an equity ratio not lower than 10%. It means that Wallenstam’s strategy is to maintain the current debt level, or increase it by a maximum of 2 percentage units. The goal concerning the adjusted equity ratio is to reach 40%, which means that an increase by 11 percentage units is required. To reach the adjusted equity goal, the value of the properties must increase, since Wallenstam wants to keep the leverage level constant in terms of book values.

6.4 STRATEGY REGARDING CAPITAL STRUCTURE
Wallenstam’s strategy to achieve its capital structure goal is to mortgage each property as much as possible, and using a maximum leverage level as its capital structure. Wallenstam’s properties are currently mortgaged up to 88% using book values of properties and 70% using market values of properties, even though the mortgage norm in the industry is 75% using book values. In other words, Wallenstam’s current and also preferred capital structure is above the industry norm for leverage.

6.5 WACC AND SHAREHOLDER VALUE
Wallenstam’s high leverage level has resulted in a low WACC of 5.4% as seen in Appendix VI, which increases the value of the firm, according to Copeland & Weston (1992). Mrs. Cederkvist, CFO at Wallenstam, argues that the leverage level could be further increased, but she does not feel that the lower WACC achieved by a higher leverage would increase the stock price. This is argued because the interest rate has had a downward trend during the last years, which according to theory should have increased the stock price because the cost of debt decreased. Wallenstam has experienced the opposite phenomenon. Their WACC has decreased but the stock price has also decreased. The reason that the lower WACC has not had an impact on the stock price could be that other industries are more popular at the moment, according to Mrs. Cederkvist. The real estate industry is stable with low variance, which does not attract investors.
6.6 HOW WALLENSTAM DETERMINES CAPITAL STRUCTURE

As seen, Wallenstam has positioned themselves as the most levered company in the real estate industry. We will now look further into how Wallenstam has decided upon this capital structure, if any models have been used, and what factors are important when making the capital structure decision.

By interviewing the CFO at Wallenstam we found out that no specific models are used when the capital structure decision is made. The argument for not using any of the models is that they are not familiar with them. Also Wallenstam has never estimated the cost of bankruptcy, which is necessary for using the trade-off model. The argument for not estimating bankruptcy cost is that they simply do not think in terms of going bankrupt. However, instead of using any models, there are several factors that Wallenstam does take into consideration when they make their capital structure decision. These factors are their current business risk, current financial risk, interest rates, management attitudes, rental income compared to interest expense, the strength of the balance sheet’s asset side, and borrowing.

- **Business risk.** Wallenstam’s business risk is considered to be the most important factor when the capital structure decision is made, according to Mrs. Cederkvist. She argues that a low business risk motivates a high leverage. Currently, Mrs. Cederkvist perceives Wallenstam’s business risk as lower compared to its competitors, which is derived from their high rental level and high demand for attractive, central residential properties.

- **Financial risk.** Wallenstam’s current financial risk is also important when determining capital structure. Mrs. Cederkvist perceives Wallenstam’s financial risk, to be extremely high, but she does not see it as a threat. She further states that the high financial risk is justifiable because of the low business risk. By knowing how well they cope with their current financial risk they can make a good prediction if a change in the financial risk is appropriate.
Optimal Capital Structure  The Case of Wallenstam

-**Interest rates.** To find an appropriate leverage level Wallenstam uses simulation to examine the effect that changes in the interest rate will have. The simulation takes into account different risk- and interest rate levels and also how different loan levels will affect Wallenstam’s financial situation. When this kind of analysis is needed, they hire an external consulting firm. A sensitivity analysis is also conducted, which provides Wallenstam with information about the consequences of interest rate movements.

-**Management attitudes.** Tradition is a managerial attitude that further influences the capital structure decision. Wallenstam has traditionally been a highly levered company, which is used as a norm when they decide their leverage level.

-**Rental income compared to interest expense.** Wallenstam compares its rental income to their interest expense when they decide upon an appropriate leverage level, to be certain that the fixed costs are not too large.

-**Strength of the balance sheet’s asset side.** When making the capital structure decision, Wallenstam evaluates how strong the asset side of the balance sheet is. The stronger the asset side is, the higher leverage can be accepted. Mrs. Cederkvist claims that Wallenstam has a strong balance sheet mainly because of its unmortgaged properties in central areas.

-**Borrowing.** A last point regarding the capital structure decision is not a factor, but a strategy. Wallenstam simply borrows as much money as possible when it enters a new investment. By doing this they can keep their capital structure at a high debt level.

All of the above factors are taken into account when Wallenstam decides upon an appropriate capital structure. Mrs. Cederkvist argues that the most important one of these factors is to determine their business risk. Since at the moment they perceive their business risk as low, a high financial risk can be motivated.

According to Mrs. Cederkvist, further findings are that the size of the tax rate does not influence Wallenstam’s decision regarding capital structure.
The size of the profit is also irrelevant when they determine their capital structure. Profit will only affect capital structure in the sense that profits will increase equity, which will change the balance between debt and equity (assuming dividends are kept constant).

6.7 ANALYSIS OF WALLENSTAM’S CAPITAL STRUCTURE
We will now continue by analyzing Wallenstam’s capital structure. Firstly we will list what factors need to be considered when analyzing capital structure, secondly we will analyze each point, and thirdly we will draw conclusions from our findings. With the help of the industry analysis and the theory in the field we will be able to say if the current capital structure is satisfactory as it is, or if Wallenstam could be better off having a higher and lower leverage level respectively.

There are several factors and questions that need to be taken into account when determining an optimal level of capital structure. 1) A company should try to make maximum use of the tax shield, which means using debt financing as long as the debt burden does not constrain the company. This factor is a straight implementation of the trade off model. 2) Practical limitations to debt financing must be investigated. For example, do the lending institutes allow the company to borrow more money and if they do, is the interest rate acceptable? 3) The company’s business risk should be estimated. By knowing the business risk, the size of an appropriate financial risk can be estimated. 4) The company’s financial risk should be estimated. Further, the company’s ability to cope with the current financial risk and future financial risk should be investigated. 5) The company should determine the effect that leverage would have on the company’s WACC and shareholder value.

6.7.1 Making use of the tax shield
According to the trade off model, a company should try to make maximum use of the tax shield that comes with debt financing. A crucial assumption for benefiting from the tax shield is that the company is making a profit.
Wallenstam has made a profit for the last five years and we argue that they use the tax shield to a maximum, since they are the most levered company in the industry. The question is if Wallenstam could accept even more debt, and use the tax shield to a greater extent, or if the level of debt financing is already too high. According to the trade-off model, debt financing should be used as long as the gain from taking on extra debt exceeds the cost of financial distress that the extra debt brings. To investigate whether their current leverage level is optimal, we must examine their sensitivity to financial distress. To find the optimal leverage level we will analyze Wallenstam’s business and financial risk, but first we need to find if there are any practical restrictions for Wallenstam to take on additional debt.

**6.7.2 Limitations to borrowing**

There are basically no practical limitations to borrow money for Wallenstam. The market conditions facing Wallenstam are good and according to Mrs. Cederkvist, Wallenstam is in the position to borrow basically as much capital as they prefer. They can keep their borrowing capacity since they have established a close long-term relationship with their bank, and at the moment other banks are almost begging for lending money to Wallenstam. Even though Wallenstam’s capital structure is already extremely high, Wallenstam are in the position to borrow more money, and that for an interest rate that is just a few basis points higher than the current borrowing interest rate. Wallenstam’s average interest rate is 6.3% which is just slightly higher than the industry average that is 6.0%. We can conclude that Wallenstam has no practical limitations for taking on additional debt to a reasonable cost. Since there are no practical limitations to debt financing, the limit of the leverage level depends upon Wallenstam’s business risk and financial risk.

**6.7.3 Business risk**

We have used three measures to estimate Wallenstam’s business risk: the industry average, the unlevered beta and other factors that could cause variations in future earnings. None of these factors provides a perfect
measure of business risk alone, but by using the result from each of these measures a good estimation of Wallenstam’s business risk can be made.

6.7.3.1 Industry average
Figure 4.5 shows that the average leverage level in the industry is 64.5%, which, compared to other industries, is seen as a high leverage level. According to theory, a high leverage-level in the industry is a sign that the industry is facing a low business risk (Grundy & Ward, 1996). This is exactly what is seen in the real estate industry, and therefore we can assume that the industry faces a low business risk.

6.7.3.2 Unlevered beta
Figure 4.3 shows business risk in terms of the unlevered beta and we can see that Wallenstam is facing an average business risk compared to their competitors. However, the overall unlevered beta in the real estate industry is low compared to other industries, as seen in figure 4.2. Wallenstam faces a low unlevered beta compared to their competitors (figure 4.3), and an even lower unlevered beta compared to other industries. We can then conclude that their business risk is low. However, we argue that the unlevered beta, which is derived from the stock market, should only be used as an indicator of business risk. This is due to the fact that the stock market includes non-fundamental factors, such as psychology.

6.7.3.3 Factors that cause stability or variance in future earnings
- Rental income. Since Wallenstam’s rental income has fluctuated very little in the past, accurate predictions of future profits can be made. There is reason to believe that rental income will increase in the future when approaching market rents.
- Low rental level risk. Another factor related to business risk is the rental level risk, which is the risk that current tenants will move out. For residential properties, the risk does not really exist, since there is a great demand for residential living in the urban areas of the large cities where Wallenstam has their properties. For commercial
properties a rental level risk exists to a larger extent. Wallenstam is strongly focused on residential properties, as seen in figure 4.4, which reduces the rental level risk to a minimum, and therefore also reduces business risk. The rental levels have oscillated between 97 and 99% the last five years, which is proof of a stable demand.

- **Liquid assets.** Wallenstam’s residential properties are all in the center of the cities, which makes them very attractive places of living, as stated in section 4.4. As a result of their attractiveness the properties can easily be sold. In other words, Wallenstam’s assets are very liquid, which further reduces business risk.

- **Concentration to few large cities.** Wallenstam’s concentration to the four largest cities in Sweden reduces business risk because of the higher demand, as stated in the industry analysis, and it also means that they more easily can keep a close contact and knowledge of their market.

We believe that these fundamental factors indicate that Wallenstam is experiencing a lower business risk than their competitors.

### 6.7.4 Financial risk

We have used four measures to estimate financial risk: the leverage level, the debt coverage ratio, the financial beta, and the interest rate sensitivity.

#### 6.7.4.1 Leverage level

Figure 4.4 shows that Wallenstam is the highest levered company in the industry, using book values. Wallenstam’s leverage level of 84.5% should be compared to the industry average of 64.5%. Wallenstam’s equity ratio of 12.1% should be compared to the industry average of 26%. The high leverage level indicates that Wallenstam faces a high financial risk.

#### 6.7.4.2 Debt coverage ratio

Wallenstam’s debt coverage ratio, for the last five years, can be seen in Table 1.
Table 6.1: Wallenstam’s Debt coverage ratio.

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt coverage ratio</td>
<td>0.92</td>
<td>0.89</td>
<td>1.03</td>
<td>1.04</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Source: Wallenstam’s Annual report 1998

In 1994 and 1995, Wallenstam’s operating profit did not cover the net financial items. However, during the years 1996, 1997, and 1998, Wallenstam experienced a debt coverage ratio above 1.0. Wallenstam has the second lowest debt coverage ratio in the industry with 1.1 (see Figure 4.9), which can be compared to the industry average of 1.7. The low debt coverage ratio reveals that Wallenstam is exposed to a high financial risk.

6.7.4.3 Financial beta

Wallenstam experiences the highest financial beta in the industry of 0.61 as seen in figure 4.11, which can be compared to the second highest of 0.38. This indicates that Wallenstam is exposed to the highest financial risk within the industry, considering financial beta.

6.7.4.4 Interest rate sensitivity

To see how exposed Wallenstam is to the risk of interest rate changes, a sensitivity analysis is used. This analysis reveals that a one percentage unit change in the borrowing interest rate will lead to a decrease of Wallenstam’s result with SEK 21,1 million, which equals a 72% change of the result. According to the interest rate analysis, Wallenstam would suffer the largest reduction in profits compared to the industry, as seen in figure 4.10, if there was a decrease in the interest rate. The interest rate could rise by only 1.3% before the company would make a loss, assuming all other factors are kept constant. It is important to remember, according to Mrs. Cederkvist that an increase in interest rates is often due to an increase in inflation, and an increased inflation will bring up the rents. Therefore, it is only relevant to assume that all other factors are constant in the short run. It
also means that the effect of an interest change will not in the long run affect Wallenstam as profoundly as argued above.

6.7.5 Coping with financial risk

6.7.5.1 Strategies for financial flexibility

The analysis above states that Wallenstam is exposed to a high financial risk, which Wallenstam is aware of. They use two strategies to prevent insolvency. The first strategy is the “golden egg” strategy and the second is to keep a long-term relationship with their bank.

The “golden egg” strategy is to save the most central and attractive residential properties unmortgaged as long as possible. Wallenstam calls these attractive properties their “golden egg” properties. If they are ever forced to mortgage the “golden egg” properties, these will be the first properties they amortize. By keeping the “golden egg” properties unmortgaged, these properties can be used as a buffer if there is a recession in the economy or if Wallenstam is in need of capital. This is due to the fact that these properties are extremely attractive and liquid.

The second strategy used by Wallenstam to stay financially flexible is to keep a close relationship with their bank. Wallenstam works in a long-term relationship where trust is the common denominator between the two parties. It means that Wallenstam does not “shop around” for the cheapest loans like many of their competitors do, even if their bank happens to be a few basis points more expensive. In return of being faithful, the bank is willing to offer Wallenstam new loans when times are not as lucrative, and when other companies might experience severe difficulties in raising new capital from banks.

Another danger by being as highly levered as Wallenstam is that the fixed charges are high. Wallenstam must be confident that they can keep a sufficient cash flow to cover the fixed interest costs. With equity financing
there is not as much pressure put on the company as there is with debt financing, as explained in Chapter 3. From the debt coverage ratio we can see that the income from operations barely covers the interest cost.

6.8 CONCLUSIONS

6.8.1 How Wallenstam determines its capital structure

Our conclusion regarding how Wallenstam determines its capital structure is that they do not use any models explained in Chapter 3. The reason is that they are not familiar with the models and that the models are too technical to use. However, we believe that Wallenstam unintentionally follows the trade-off model, even though it is not put in any quantitative numbers. This is due to the fact that Wallenstam makes the most out of the tax shield, since they are the highest levered company in the industry. We further argue that Wallenstam has estimated the financial risk of adding more debt as being too large, just as the trade-off model states. A higher leverage would certainly mean a higher risk of bankruptcy and an increased cost of financial distress. From the above arguments we feel that the trade-off model is unintentionally in use, which takes into consideration the benefit of the tax-shield, and the cost of financial distress. Wallenstam does not use any models intentionally. Instead they take several fundamental factors into account. Every fundamental factor is analyzed and a general picture regarding their capital structure is then created.

The most important factor for Wallenstam when deciding an appropriate capital structure is business risk, which is a starting point when they determine their leverage level. Wallenstam argues that the lower the business risk is, the higher the leverage level that can be accepted. They perceive their business risk as very low based on the high rental level and the fact that their properties are centrally located and in great demand. The fact that Wallenstam perceives its business risk as very low allows them to take on an exceptionally high leverage. Another important factor is tradition. Wallenstam has historically been a highly levered company,
which they also use as an argument in order to justify a high leverage ratio in the future. This means that they have a tendency to use historical data when determining current capital structure.

6.8.2 Improvements in Wallenstam’s capital structure

From our analysis we can conclude that Wallenstam’s capital structure is optimal or close to optimal. This conclusion is based on the fact that Wallenstam has an appropriate combination of business and financial risk, and that they make maximum use of the tax shield and deal with the high financial risk in an excellent way. Our analysis reveals that Wallenstam has a low business risk. We derive this from the fact that Wallenstam experiences an average business risk within the industry when using the unlevered beta as a measure. It is important to remember that the real estate industry already faces a low business risk compared to other industries. Therefore, we can say that having an average unlevered beta in the real estate industry means having a low business risk. The fundamental factors further strengthen their low business risk, especially since they have very attractive central residential properties. This low business risk justifies a high financial risk. We believe that Wallenstam’s current financial risk is high due to the high leverage level, the low debt coverage ratio and the high interest rate sensitivity. We argue that Wallenstam has positioned themselves as having a low business risk and a high financial risk, as seen in figures 4.12 and 4.13, which is an appropriate positioning, according to figure 3.4.

Wallenstam’s debt coverage ratio indicates that a higher leverage cannot be accepted due to the fact that the debt coverage ratio is already very close to 1. If additional debt were accepted, the operating income would not cover the fixed interest expense, thus putting the company in financial distress. The low debt coverage ratio can be maintained at the currently low level because of Wallenstam’s low business risk, their “golden egg” strategy and the close relationship with their bank.
We argue that keeping the current leverage level is both possible and appropriate, since the current cash flow is large enough to cover the fixed interest expense. The low business risk further indicates that Wallenstam can maintain the current position since future cash flows are stable and predictable. Therefore we are convinced that the current leverage level can be maintained in the future without causing financial distress. Lowering the leverage would decrease the financial risk, but at the same time make less use of the tax shield, hence lowering the value of the firm.

To conclude, we argue that Wallenstam’s current capital structure is optimal or close to optimal and we suggest that no changes should be made.
7. THE CASE OF PLATZER

The purpose of this chapter is to present Platzer and its capital structure. Furthermore we will analyze how they determine their capital structure and if any improvements can be made in their current capital structure.

7.1 INTRODUCTION

Platzer is a relatively small real estate company that was founded in 1969, and in 1983 they were introduced on the Stockholm Stock Exchange. Together with Wallenstam, Platzer is one of the few real estate companies that actually managed to survive the real estate crisis in the beginning of the 1990s. Today, they have a market leading position in the Gothenburg area when considering commercial properties, which account for 97% of their portfolio. Their business mainly consists of managing, acquiring, selling and developing commercial properties. Platzer’s business strategy is to continue their current concentration to the Gothenburg area and further to develop their customer relations. Another aim is to develop their target areas through a close connection to the business society and local authorities, as well as educational and research institutions.

7.2 PLATZER’S CAPITAL STRUCTURE

7.2.1 Leverage ratios

In 1998, Platzer used a 69.9% debt financing, using book values of properties, as seen in figure 7.1. This can be compared to the industry average of 64.5%.

Figure 7.1: Platzer’s capital structure

![Capital Structure Diagram]

Figure 7.2 shows that Platzer has had a slowly increasing and persistent pattern regarding their capital structure. Their leverage level has increased from 1994 to 1998 by 5.6 percentage units.

Figure 7.2: Platzer’s leverage level

We would have liked to calculate the leverage level using market values of properties, but Platzer has not conducted such a valuation, even though they plan to do so this in the near future. Platzer’s reasoning is that the book values of properties are just the same as market values. However, for all other companies that have estimated market values of properties it can be shown that market values are larger than book values, and therefore give a lower leverage level, as seen in figure 4.6.

7.2.2 Equity ratios
Platzer’s current equity ratio of 25.7% is slightly below the industry average of 29.5%. Figure 7.3 shows that the equity ratio has increased by 7.7 percentage units from 1994 until today.
The increase in the equity ratio from 1996 to 1997 is a result of the stock issue that was made in 1997, which increased the equity ratio with almost 5 percentage units. We have not been able to calculate the adjusted equity ratio due to the fact that market values were not available. The common pattern, though, is that the adjusted equity ratio is slightly higher than the equity ratio, as seen in figure 4.8. Again this is explained by the higher market values compared to book values of properties.

7.3 CAPITAL STRUCTURE IN THE FUTURE

Platzer’s main future goal concerning its capital structure is to obtain and keep an equity ratio of 25%. Platzer’s strategy is to maintain the current equity level or just slightly decrease it, since the equity ratio of today is 25.7%. Mr. Brihs, CFO at Platzer, also argues that the equity ratio should not under any circumstances fall below the 20% level, since then the shareholders will not be entitled to any dividends at all, which of course is an undesirable situation. Regarding the leverage level, Platzer’s management has set a target ratio of 70% to be achieved. Figure 5.2 shows that Platzer reached the target ratio in 1998, which means that Platzer is satisfied with its existing capital structure, and consequently this capital

structure will be kept even in the future. To be able to keep the preferred capital structure, Platzer must finance most new investments with debt.

7.4 HOW PLATZER DETERMINES CAPITAL STRUCTURE

As seen, Platzer has positioned themselves as a company with an average capital structure and a debt financing level that is just slightly above the industry average. We will now look further into how Platzer has decided upon this capital structure, if any models have been used, and what factors Platzer considers important when it makes its capital structure decision.

By interviewing the CFO at Platzer we found out that no specific models are used when Platzer determines its capital structure. The argument for not using any of the models is that Platzer is not familiar with them, nor have they estimated their cost of bankruptcy, which makes it impossible to use the trade-off model. However, instead of using any models, there are several factors that Platzer does take into consideration when they take their capital structure decision. These factors are the industry average leverage, current business and financial risk, impact of interest rates, and management attitudes.

- **Industry average leverage.** Platzer’s most important factor when determining capital structure is the average leverage level in the industry. Platzer argues that there is a reason why the industry is positioned as it is. The reason is that companies in the same industry face the same business risk, and since they face the same business risk, similar capital structures can be used. Because of this argument Platzer has chosen to position its capital structure close to the average level.

- **Business risk.** Business risk is also important when Platzer determines its capital structure. Platzer perceives its business risk as lower than that of their competitors, which affects the way Platzer is financed.

- **Financial risk.** Another important factor influencing Platzer’s capital structure decision is its current financial risk. They perceive their financial risk as lower compared to their competitors, a perception based on short
Optimal Capital Structure

Platzer's current mortgage level is 76%, which illustrates that further mortgage is possible. Platzer uses simulation when considering how different interest rates will affect the result. Financial consultants are usually hired for this kind of analysis. Another tool when capital structure is decided is the sensitivity analysis, which reveals what will happen to Platzer’s result, if for example interest rates on debt rise. When the impact of interest rates is known, an appropriate leverage level can more easily be determined. Platzer’s management also relies on historical factors when determining capital structure. They feel it is important to keep an equity base as a buffer for future unforeseen events, since they have the real estate crisis in mind.

All of the above factors are taken into account when Platzer determines an appropriate capital structure. However, Mr. Brihs argues that the most important one of these factors is to follow the industry average.

Further findings about Platzer’s reasoning regarding capital structure are that the size of the tax rate will not influence their capital structure decision, which shows that they do not think in terms of protecting their profit with the tax shield. The size of Platzer’s profit is also irrelevant when they set capital structure, since most of Platzer’s profit will be used for other purposes, such as paying out dividends and renovating properties.

7.5 ANALYSIS OF PLATZER’S CAPITAL STRUCTURE
We will now continue by analyzing Platzer’s capital structure. Firstly we will list the factors that need to be considered when analyzing capital structure, secondly we will analyze each point, thirdly we will draw conclusions from our findings. With the assistance from the industry analysis and the theory in the field we will be able to say if the current capital structure is satisfactory as it is, or if Platzer could be better off having a higher and lower leverage level respectively.
There are several factors and questions that need to be taken into account when determining an optimal level of capital structure. 1) A company should try to make maximum use of the tax shield, which means using debt financing as long as the debt burden does not constrain the company. This factor is a straight implementation of the trade-off model. 2) Practical limitations to debt financing must be investigated. For example, do the lending institutes allow the company to borrow more money and if they do, is the interest rate acceptable? 3) The company’s business risk should be estimated. By knowing the business risk, the size of an appropriate financial risk can be estimated. 4) The company’s financial risk should be estimated. Further, the company’s ability to cope with the current financial risk and future financial risk should be investigated. 5) The company should determine the effect that leverage would have on the company’s WACC and shareholder value.

7.5.1 Making use of the tax shield

Making a profit is a necessary assumption to benefit from the tax shield. Platzer has made a profit in four out of the last five years, which should give them an incentive to take full advantage of the tax shield. Platzer is currently protecting their profit from taxes, with carry-loss forwards from earlier years, which essentially gives the same protection as debt financing does. The carry-loss forwards amounts to SEK 61.4 million and can be used in the future to protect profit from taxes. We believe that Platzer has an incentive to realize the benefits from the carry-loss forwards as early as possible since their effect decreases over time with the inflation. Even though there are carry-loss forwards, the tax shield created by debt financing will save the carry-loss forward to a future date, which is an incentive for using debt financing. To find an optimal leverage level, we will analyze Platzer’s business and financial risk, but first we need to find if there are any practical restrictions for Platzer to take on additional debt.
7.5.2 Limitations to debt financing
During the economic crisis there were strict restrictions on the level of debt financing accepted by the banks. Today, Platzer can mortgage their properties up to 100%, for just a few basis points more, compared to the mortgage level of 76%. Thus, currently there is no restriction set by the banks regarding Platzer’s debt financing level, which means that it is practically possible for Platzer to take full advantage of the tax shield by borrowing money up to the 100% mortgage level. Since there are no practical limitations to the size of debt financing, the leverage level depends upon Platzer’s business and financial risk.

7.5.3 Business risk
We have used three measures to estimate Platzer’s business risk: the industry average, the unlevered beta and factors that could cause variations in future earnings. None of these factors provides a perfect measure of business risk alone, but by using the result from each of these measures a good estimation of Platzer’s business risk can be made.

7.5.3.1 Industry average
Figure 4.5 shows that the average leverage level in the industry is about 65%, which compared to other industries is seen as a high leverage level. According to theory, a high leverage-level in the industry is a sign that the industry is facing a low business risk (Grundy & Ward, 1996). This is exactly what is seen in the real estate industry, and therefore we can assume that the industry faces a low business risk.

7.5.3.2 Unlevered beta
In figure 4.3 we measure business risk using the unlevered beta and we can see that Platzer faces by far the highest unlevered beta in the industry. Platzer’s unlevered beta is 0.62, whereas the second highest industry unlevered beta is 0.31. This gives us reason to believe that Platzer’s business risk is higher than that of their competitors. Remember that Platzer perceives their business risk as lower than their competitors.
Currently, Platzer’s unlevered beta is twice as high as the second highest in the industry. However, we argue that the unlevered beta could be a misrepresentation. The reason is that Platzer’s stock price has fluctuated more than that of their competitors, which leads to the higher beta. Since psychological factors are included in stock prices and consequently in unlevered betas, we argue that the fluctuations may have other reasons than fundamental factors. We believe that their business risk is higher than that of their competitors, but not as high as the unlevered beta indicates.

7.5.3.3 Factors that cause stability or variance in future earnings

- **Focus on commercial properties.** Platzer focuses on commercial properties, which brings a higher business risk compared to residential properties. This will tend to increase Platzer’s business risk. However, Platzer’s commercial properties are attractive since they are located in large cities and 70% of their properties were built or rebuilt after 1986.

- **Increase in rental income.** The rental prices have been stable in the past and Platzer could possibly only experience an increase in rental income, when approaching market rents in the future. They believe that the rental level can be maintained or even increased in the future, from the current level of 88%. However, a rental level of 88% is considered low compared to the industry, which tends to increase business risk.

- **Few large customers.** Platzer’s five largest rental guests’ account for 41% of the total amount of contracted rents. The average remaining tenant duration for these properties is 5.4 years. Having properties focused on a small amount of tenants increases business risk, whereas having a duration of 5.4 years reduces the risk.

- **Sold unattractive properties.** Platzer has sold properties in less attractive areas and focused on the west side of Sweden. Platzer currently has the highest rental value of commercial properties in Gothenburg among all their competitors, according to an analysis conducted by an external consulting firm.
These fundamental factors indicate that Platzer is experiencing a high business risk compared to their competitors.

7.5.4 Financial risk
We have used four measures to estimate financial risk: the leverage level, the debt coverage ratio, the financial beta, and the interest rate sensitivity.

7.5.4.1 Leverage level
Platzer’s leverage level is just above the industry average, and the financial risk from a debt financing point of view can be assumed to be slightly above the average in the industry. Platzer’s leverage level is similar to the average industry leverage level, but it should be remembered that the average leverage level in the real estate industry is high, as can be seen figure 4.5. By keeping a 69.9% leverage level (using book values) Platzer is exposed to a financial risk that is slightly above the industry average, which should be considered as high financial risk.

7.5.4.2 Debt coverage ratio
Platzer’s debt coverage ratio for the last two years can be seen in table 5.1.

<table>
<thead>
<tr>
<th>Year</th>
<th>1997</th>
<th>1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt coverage ratio</td>
<td>0.93</td>
<td>1.02</td>
</tr>
</tbody>
</table>

Platzer has the lowest debt coverage ratio in the industry, 1.02, which can be compared to the industry average of 1.7. The low debt coverage ratio does not give any room for fluctuations in the rental income, operating expense, or interest expense, since just a small change could alter the result from positive to negative. The low debt coverage ratio illustrates a high financial risk, which means that a higher leverage level cannot be accepted.
A debt coverage ratio of 1.25 is traditionally set as a minimum ratio that lenders will accept (Maisel, 1987). If Platzer increases the debt coverage ratio from 1.02 to 1.25, it would mean that they have to decrease the level of debt financing. The current interest expense of SEK 146 million should be decreased to SEK 119 million to increase the DCR to an acceptable level. Since the maximum interest expense that should be accepted is known (SEK 119 million), we can also calculate the maximum interest-bearing loan amount that can be accepted. We assume that Platzer’s borrowing rate will be constant, which is a valid assumption since the loan level is decreased and banks will see this as favorable. Platzer should then decrease the interest-bearing liabilities from SEK 2,088 million to SEK 1,924 million. This means a decrease in the loan portfolio of SEK 164 million, which will leave Platzer with a capital structure of 64.4% debt financing using book values of properties. Compared to today’s leverage of 69.9%, we can see that a decrease in the leverage level is necessary to achieve a more desirable debt coverage ratio.

Platzer’s WACC is currently 6.03 and by decreasing the leverage level the WACC would increase to 6.37%. This increase in WACC would decrease the theoretical value of the company (Copeland & Weston, 1992). The calculations can be found in Appendix VI.

7.5.4.3 Financial beta
Platzer has the second highest financial beta in the industry of 0.39 and only Wallenstam has a higher financial beta of 0.61, as seen in figure 4.11. The high financial beta indicates a high financial risk.

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14 Maximum debt payment = (Operating income after net financial items + interest expense)/minimum debt coverage ratio, (SEK 2,8 million + SEK 146 million)/1.25
15 Maisel, Sherman J., “Real Estate Finance”, p 404-405
16 Maximum loan = maximum debt payment/mortgage constant
17 SEK 119,3 million/0.062 = SEK 1,924.5 million
18 SEK 1,924.5 million/SEK 2,986.5 million using book values.
7.5.4.4 Interest rate sensitivity

The interest rate sensitivity analysis conducted by Platzer reveals that a one percentage unit change in the borrowing rate, keeping all other factors constant, will not have any significant effect on the result (see figure 4.10). Most companies’ result depends upon the interest rate, but through swap agreements Platzer has eliminated most of its sensitivity to interest rates. Being almost insensitive to increases in the interest rate reduces Platzer’s financial risk.

7.6 COPING WITH FINANCIAL RISK

Platzer has an extremely low debt coverage ratio, which indicates that they have chosen to keep a low buffer for unforeseen events. Any small change in the operating income, operating expense, or interest expense could alter the result from positive to negative. According to Platzer, it has been possible to choose such a strategy of a low debt coverage ratio due to secured low interest rates, which have been secured by extended duration swap agreements. However, the risk of changes in the operating income and operating expense still remains, and could alter the debt coverage ratio to below 1.0.

7.7 CONCLUSIONS

7.7.1 How Platzer determines its capital structure

Our conclusion regarding how Platzer determines its capital structure is that they do not use any models explained in Chapter 3. The reason is that they are not familiar with these models and that these models are inapplicable in practice, according to Platzer. Instead of using models, Platzer takes several fundamental factors into account. Platzer analyzes each fundamental factor and from these separate findings an overall picture regarding the capital structure decision is created.

The most important fundamental factor for Platzer is the average leverage level in the industry. They argue that there is a reason that the industry is
positioned as it is. The reason for similar capital structures within the industry is that the companies face the same business risk, and therefore similar capital structures can be used. With this argument in mind, Platzer aims to position themselves close to the industry average. Platzer’s business and financial risk is also an important factor when the capital structure decision is to be made. Platzer perceives its business risk as lower than the industry average and consequently they argue that a higher financial risk can be accepted.

7.7.2 Improvements in Platzer’s capital structure

From our analysis we can conclude that Platzer’s capital structure is too heavily levered. This conclusion is based on the fact that Platzer has an inappropriate combination of business and financial risk and on the debt coverage ratio analysis.

Platzer’s current leverage level could be maintained, if their business risk was as low as they perceive it to be. However, we have come to the conclusion that Platzer’s business risk is much higher than they perceive. This is mainly based on their extremely high unlevered beta and it is further strengthened by their focus on commercial properties. Currently, their unlevered beta is twice as high as the second highest in the industry. However, we know that the unlevered beta could be somewhat misrepresentative, since psychological factors are included in the stock price. To conclude the business risk, we argue that it is higher than the industry average and higher than Platzer’s perception, but not as high as the unlevered beta indicates.

Since business risk is directly related to financial risk, we argue that Platzer’s financial risk should be lower compared to their competitors. The current financial risk is high, due to the low debt coverage ratio, the average debt financing in the highly levered industry, and the high financial beta. However, they have reduced their financial risk through swap
agreements and extended durations on loans, which can be seen in the low interest rate sensitivity.

We argue that Platzer has positioned themselves as having a higher than average business risk and a higher than average financial risk, as seen in figures 4.12 and 4.14. In figure 3.4 we can see that an optimal positioning is when the company faces a high business risk and a low financial risk or vice versa. Platzer is, according to this argument, inappropriately positioned. In order to improve their current position we suggest that they should decrease their leverage level by 5.6 percentage units. This decrease is based on the debt coverage ratio analysis. Platzer’s current DCR of 1.02 is extremely low and should not even be accepted by a company experiencing a very low business risk. Consequently, this ratio is inappropriate to Platzer since a minor change in the result-affecting factors could alter the result from positive to negative. Changes in these factors can be expected due to Platzer’s high business risk. Platzer has already dealt with the interest rate factor and insured themselves against interest rate changes. We do not believe that this insurance is enough to justify the low DCR, since other factors remain. We argue that an appropriate DCR ratio should be 1.25 which is considered as a minimum standard by creditors. In order to reach a DCR of 1.25 Platzer needs to decrease their interest-bearing liabilities from the current amount of SEK 2 088 million to SEK 1 924 million. This would result in a decrease in the leverage level from today’s 69.9% to 64.4%, which is the industry average. This would increase WACC from 6.03% to 6.37% and consequently decrease the value of the firm. However, we believe that this decrease in the leverage level is necessary in order to avoid financial distress.
8. OVERALL CONCLUSIONS

This chapter will present our overall conclusions regarding how the case companies determine their capital structure and if their current capital structure is optimal or if it could be improved.

We have come to the conclusion that none of the three case companies uses a mathematical model when deciding their capital structure. Neither have they estimated their bankruptcy cost, which is a necessity for using the trade-off model. We can conclude that no theoretical models are used as a basis for the capital structure decision. However, Wallenstam seems unintentionally to follow the trade-off model, even though they are not aware of it. We believe that they have reached the trade off point, where adding extra debt would put the company in financial distress. Instead of using theoretical models, all three case companies use certain important key factors as guidelines when determining a capital structure. We believe that our result concerning the use of models in our three case companies applies to the whole industry. This is based on our interviews with three independent consultant firms. None of these consultant firms has ever implemented these models, nor have they heard about any companies that use the models. Our conclusion is also based on our interviews with respective CFOs at our case companies.

Even though there are individual variations concerning key factors, a common pattern can be seen. History is a factor that all case companies have considered very important when their capital structure decision is made. This is probably due to the drastic turns that the real estate industry has faced. From an optimal capital structure point of view we argue that this logic is questionable, since decisions should be based on current data and not historical data. Another interesting finding is that none of the companies has used the unlevered beta when estimating their business risk. We believe that this measure can be a good indicator and complement to the fundamental factor analysis. The reason is that we have found a large variation between the case companies’ unlevered beta and their perceived
business risk. All three companies have perceived their business risk as lower than the industry average, and it has proved to be correct in only one of the cases. It seems that these companies have underestimated their business risk, which may be an interviewer effect, i.e. they want to present the company in a favorable light. Consequently, we argue that the actual business risk is higher than the companies’ perceived risk but lower than the unlevered beta indicates. Another finding is that tradition in the real estate industry plays an important role in the capital structure decision process, which can be seen in all three case companies. Wallenstam has always been a highly levered company, whereas Castellum has always been a strong equity based company, something which they both use as guidelines when determining a future capital structure. Platzer, on the other hand, has always tried to reach an industry average leverage, which they use as a guideline. We believe that this reasoning is questionable, since the capital structure decision should be based on current data, not historical data. A final remark concerning how the case companies have decided their capital structure is that their decision does not get the attention it deserves. It seems that their decisions are based on intuition rather than a clear analysis. Consequently their capital structure decision is not as important to them as theory suggests it should be.

Our analysis of possible improvements in the capital structure reveals three totally different case scenarios.

We argue that Castellum’s capital structure is inappropriately positioned, due to their slightly higher than average business risk, in combination with their exceptionally low financial risk. The business risk is based on the high unlevered beta and the fundamental factors. We further perceive Castellum’s financial risk as extremely low, based on the high debt coverage ratio, the low interest rate sensitivity and the fact that it is the least levered company in the industry. We argue that this combination of business and financial risk allows an increased leverage, in order to reach an appropriate position, according to figure 3.4. Another argument for
increasing the leverage level is that the trade-off model is not followed since they do not make maximum use of the tax shield. Further, our debt coverage analysis reveals that an average industry leverage level of 65% is possible for Castellum, while still keeping a debt coverage ratio above the industry average level. To conclude, a more appropriate capital structure position is reached by increasing today’s leverage level of 52.7% to our proposed leverage level of 65%. If our suggested leverage is implemented, Castellum’s WACC would decrease from 6.18% to 5.70% which increases the theoretical value of the company.

Wallenstam, on the other hand, is appropriately positioned due to their very low business risk and their exceptionally high financial risk. This combination is considered as an optimal positioning, according to figure 3.4. The low business risk is derived from the low unlevered beta, which is further strengthened by the fundamental factors. Their high financial risk is based on the low debt coverage ratio, extremely high interest rate sensitivity and the fact that it is the highest levered company in the industry. The fact that Wallenstam makes maximum use of the tax shield, without putting the company in financial distress, further emphasizes that they are close to an optimal capital structure, according to the trade-off theory. The debt coverage ratio shows that the leverage ratio cannot be further increased. However, it is possible to maintain the current leverage level due to Wallenstam’s strategies that cope with the financial risk. To conclude, we consider Wallenstam’s current capital structure of 84.5% as being close to optimal.

We argue that Platzer’s capital structure is not optimally positioned, which is based on two arguments. Firstly, they are inappropriately positioned, according to figure 3.4, due to their extremely high business risk and high financial risk. Their business risk is derived from their exceptionally high unlevered beta and their strong focus on commercial properties. We perceive their financial risk as high due to their extremely low debt coverage ratio and the fact that they are levered slightly above the industry.
average. This in combination with an extremely high business risk and a high financial risk results in a combined risk that is too high. In order to reach a more appropriate position we suggest that the leverage level should be decreased. Our second argument is that Platzer’s debt coverage ratio of 1.02 is truly too low, and such a low debt coverage ratio should not even be accepted by a company experiencing a very low business risk. We argue that the lowest debt coverage ratio Platzer should accept is 1.25, since this ratio is considered as a minimum requirement by creditors. In order to reach the ratio of 1.25 Platzer has to decrease its leverage level from today’s 69.9% to 64.4%. We are aware that this will increase Platzer’s WACC from 6.03% to 6.37% and consequently decrease the theoretical value of the company. However, we believe that this change in leverage is necessary, in order to avoid financial distress.

8.1 SUGGESTIONS FOR FURTHER RESEARCH
We were surprised that the theoretical models were totally inapplicable in practice. This is due to the fact that the models failed to take many important factors into account. These models were supposed to calculate an optimal capital structure without considering profitability, tangibility of assets and growth, etc. Currently, the best theoretical model calculating an optimal capital structure is the trade-off model, but as Myers & Majluf stated in 1984, there are several factors that the trade-off model cannot explain. We argue that it must be possible to develop a model that is much better than the existing ones, especially for the real estate industry. The reason is that the companies in the real estate industry are fairly similar compared to other industries and consequently there are fewer factors that need to be taken into account.
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Magazines

Veckans affärer, nr. 46, 1999
10. APPENDICES

10.1 APPENDIX I

The power of homemade leverage:

Table 10.1

<table>
<thead>
<tr>
<th></th>
<th>Unlevered</th>
<th>Levered</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets</strong></td>
<td>10 000 000</td>
<td>10 000 000</td>
</tr>
<tr>
<td><strong>Debt</strong></td>
<td>0</td>
<td>5 000 000</td>
</tr>
<tr>
<td><strong>Interest rate on debt</strong></td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Price/share</strong></td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><strong>Shares outstanding</strong></td>
<td>100 000</td>
<td>50 000</td>
</tr>
</tbody>
</table>

Assume that the initial situation for The Alpha Company is the unlevered situation. Managers now question what will happen if the capital structure is changed to a 50% debt and a 50% equity capital structure (see table 10.1). To see this we have to forecast what will happen in the future. Three different possible outcomes for the following year will be considered, as seen in table 10.2.

Table 10.2 shows how the return on equity (ROE) and the earnings per share (EPS) fluctuate with different earnings scenarios. Since the company is all equity financed, the ROE and the ROA are equal. Now let us see what happens to ROE when the company chooses to leverage the company up to 50%.
Table 10.2

<table>
<thead>
<tr>
<th>Possible outcomes</th>
<th>Bad</th>
<th>Unlevered</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings before interest</td>
<td>500 000</td>
<td>1 500 000</td>
<td>2 500 000</td>
</tr>
<tr>
<td>Interest expense</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Earnings after interest</td>
<td>500 000</td>
<td>1 500 000</td>
<td>2 500 000</td>
</tr>
<tr>
<td>ROE</td>
<td>5%</td>
<td>15%</td>
<td>25%</td>
</tr>
<tr>
<td>EPS</td>
<td>5</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>ROA</td>
<td>5%</td>
<td>15%</td>
<td>25%</td>
</tr>
</tbody>
</table>

Table 10.3

<table>
<thead>
<tr>
<th>Possible outcomes</th>
<th>Bad</th>
<th>Levered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings before interest</td>
<td>500 000</td>
<td>1 500 000</td>
</tr>
<tr>
<td>Interest expense</td>
<td>-500 000</td>
<td>-500 000</td>
</tr>
<tr>
<td>Earnings after interest</td>
<td>0</td>
<td>1 000 000</td>
</tr>
<tr>
<td>ROE</td>
<td>0</td>
<td>20%</td>
</tr>
<tr>
<td>EPS</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>ROA</td>
<td>5%</td>
<td>15%</td>
</tr>
</tbody>
</table>

The numbers of shares outstanding are now half the amount, compared to the unlevered case. The interest expense deducted from Earnings before interest is different from the unlevered case. New ROE and EPS are a fact, which are higher in the Average outcome and the Good outcome compared to the unlevered situation, but the shareholders are worse off in the Bad outcome, as seen in Table 10.3. Thus it seems that the effect of financial leverage depends on the company’s income. If the company income is in
the Average or Good outcome, stockholders are better off with leverage, but in the Bad outcome stockholders are better off with the unlevered company. This is shown in figure 10.1, where Earnings before interest are in thousands of SEK.

Figure 10.1

The black line represents the case of no leverage. The line begins at the origin, indicating that earnings per shares (EPS) would be zero if earnings before interest (EBI) were zero. The EPS rises in tandem with a rise in EBI. The gray line represents the leveraged case, where a 50% equity and a 50% debt structure are chosen. If EBI is below 500,000, EPS will be negative, which is caused by the interest expense on debt. The interest must be paid regardless of the firm’s profits. The slope of the leveraged line is steeper than the slope of the unlevered line. This occurs because the levered firm has fewer shares of stock outstanding than does the unlevered firm. Therefore, any increase in EBI leads to a greater rise in EPS for the levered firm because the increase in earnings is distributed over fewer shares per stock. Since the levered line has a lower intercept but a higher slope, the two lines will intercept. The break-even point occurs at 1,000,000 EBI. At this level, the levered and the unlevered case would both have an EPS at 10, and the shareholders are indifferent to financing decision. As can be seen in the graph, when EBI is above 1,000,000 stockholders are better off with a leveraged structure, and when EBI is below 1,000,000 stockholders
are better off with an unlevered structure. From what we see, it appears that capital structure does have an effect for stockholders.

The M&M proposition I states that capital structure should not affect stockholders, but from the argument above it seems that capital structure does have an impact on stockholders. How can this be? Now we need to introduce homemade leverage, which means that stockholders can do or undo anything the company does on its own. For homemade leverage to work, the assumption is that private investors can borrow and lend at the same rate as corporations. If, for example, the company decides to leverage, borrow money, the stockholder can undo leverage by doing the exact opposite to the company, namely lend money. If, for example, the company goes from the unlevered case to the levered case, the investor can offset the effect on Return on invested capital by lending the same amount as the company borrows, which in this case is half of the investment. Let us first look at how an investor investing in an unlevered company can make the Return on money invested exactly as if the company was levered.

Table 10.4

<table>
<thead>
<tr>
<th>Make unlevered levered</th>
<th>Buy two unlevered shares for 200 and borrow 100 for one share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings 2 shares</td>
<td>10</td>
</tr>
<tr>
<td>Less interest</td>
<td>-10</td>
</tr>
<tr>
<td>Net earnings</td>
<td>0</td>
</tr>
<tr>
<td>Return on 100 Inv.</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 10.4 shows that by buying two shares in the unlevered company, and borrow money for buying one of the shares, the Return on invested money is exactly the same as if it would be if investing in a levered company. The invested amount of money is only 100, since the money for one of the shares is borrowed. The investor has created leverage on his own. The argument works the opposite way as well, namely going from a levered...
return to an unlevered return on invested capital, which can be seen in table 10.5.

Table 10.5

<table>
<thead>
<tr>
<th>Make levered unlevered</th>
<th>Buy one levered share for 100 and lend 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPS levered</td>
<td>0</td>
</tr>
<tr>
<td>Plus interest 10%</td>
<td>10</td>
</tr>
<tr>
<td>Net earnings</td>
<td>10</td>
</tr>
<tr>
<td>Return on 200 Inv.</td>
<td>5%</td>
</tr>
</tbody>
</table>

The investor buys one share for 100 and lends 100. This offsets the levered position that is in the company and makes the Return on invested capital equal to the return of the unlevered case. This is what is meant by homemade leverage or as it is sometimes called, the “Do it Yourself Alternative”. Homemade leverage is the proof for the M&M proposition I, which shows that leveraging the company will not change the value of the company, if the above assumptions are fulfilled (Megginson, 1997).

10.2 APPENDIX II

Table 10.6

<table>
<thead>
<tr>
<th>Income statement</th>
<th>Unlevered</th>
<th>Levered</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBIT</td>
<td>1 500 000</td>
<td>1 500 000</td>
</tr>
<tr>
<td>Interest payment</td>
<td>0</td>
<td>-500 000</td>
</tr>
<tr>
<td>EBT</td>
<td>1 500 000</td>
<td>1 000 000</td>
</tr>
<tr>
<td>Tax payment 30%</td>
<td>-450 000</td>
<td>-300 000</td>
</tr>
<tr>
<td>Net Earnings</td>
<td>1 050 000</td>
<td>700 000</td>
</tr>
<tr>
<td>Value of Equity</td>
<td>10 500 000</td>
<td>7 000 000</td>
</tr>
<tr>
<td>Value of Debt</td>
<td>0</td>
<td>5 000 000</td>
</tr>
<tr>
<td>Total Value</td>
<td>10 500 000</td>
<td>12 000 000</td>
</tr>
</tbody>
</table>
As seen in table 10.6 the tax bill of the levered company is 150,000 less than that of the unlevered company. This is due to the tax shield that exists for debt financing. Valuing the tax shield, equation 10.1.

\[
(T_r \times \frac{D}{(1 + r_g)} + (T_r \times \frac{D}{(1 + r_g)} + \ldots = T_r \times D)
\]

We assume that the risk of the tax shields is equal to that of the interest payment generating them, and that debt is perpetual. If debt is not perpetual, the value of the tax shield will depend on \( r_g \). We also need to keep in mind that the tax shield can only be used when the company is making a profit.

Now the value of the levered firm, including taxes, is as equation 10.2.

\[
V_c = EBIT \times (1 - T_c) + T_c \times D = V_c = T_r \times D
\]

**10.3 APPENDIX III**

AGENCY COST OF EQUITY

Assume that there is a firm that is 100% owned by a single entrepreneur. He is then both the Owner and Manager (O-M). For all actions taken the O-M bears all benefits or the full cost. For example, if the manager takes one day off, he bears the full cost of doing this. The O-M also benefits to the full from all work he does, and he will take every possibility to increase his own wealth. However, if a portion of the company is sold by external equity to new shareholders, the O-M is co-owner, and no longer bears all the benefits and the full cost of his actions. When a fraction of the company is sold, the entrepreneur only bears his remaining fraction of the company, of the consequences of his actions. Since the entrepreneur no longer bears the full cost of his actions, there is an incentive for him to engage in “perk” activities. He no
longer bears the fully cost of perks, but he can benefit fully from the perk activities. The entrepreneur has lowered the cost of perk activities. But on efficient markets, investors are aware of this behavior of entrepreneurs, and it reflects the stock price. Consequently, when a fraction of the company is sold, the stock price will be reduced. The stock price will reflect perks, so one can say that even if a fraction of a firm is sold by external equity, the entrepreneur still bears the full cost of perks. By this behavior society is harmed and suffers a cost of equity, reducing value of corporate assets (Jensen & Meckling, 1976).

If the company decides to choose debt financing, instead of external equity, you are still the sole owner, and will benefit fully from actions taken. When issuing external equity, you have to share the extra cash flow with the other owners, whereas if you are the sole owner you receive the full cash flow after interest is paid for. In other words, you are expected to work harder when the firm is financed with debt than with external equity. Sharking is more common when equity is issued (Ross et al., 1993). The agency cost of external equity may be reduced if the management and shareholders agree to hire an independent auditor. Another approach to reduce this cost is to issue more debt, whereas debt holders also act as auditors.

10.4 APPENDIX IV

There are four different ways in which agency cost of debt can occur: (1) undertake risky projects, (2) undertake negative NPV projects, (3) milking property, and (4) incentive toward under investment (Megginson, 1997).

Undertake risky projects. Assume that there are two projects which have the same expected return, but different variances (see box below). When looking for debt financing, the firm assures they will take on the safe project, where the bondholder is certain to get the loan paid back, both in states of recession and boom. Both outcomes are higher then the loan principal. Because of the safe project presented, the firm will get a low rate
of interest on its loan, reflecting the safe project. But now the firm invests in the risky project instead, which has the same expected outcome, but in a recession, the outcome is less than the loan principal. In a recession, stockholders will have to default, and bondholders take on an empty corporate shell. If the firm is successful (there is a boom) with the risky project, the firm will fully repay bondholders and pocket excess project returns. The firm will take on a high risk/return project with an interest rate for a low risk/return project. This strategy is called bait-and-switch.

Money to borrow = 3,500

<table>
<thead>
<tr>
<th>Probability</th>
<th>Safe</th>
<th>Risky</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boom</td>
<td>0,5</td>
<td>4500</td>
</tr>
<tr>
<td>Recession</td>
<td>0,5</td>
<td>5500</td>
</tr>
</tbody>
</table>

Milking property. As the fraction of debt in a company increases, bondholders take on increasing fraction of firm’s business risk. Managers then have the incentive to expropriate the bondholder wealth for the benefit of themselves and stockholders. The extreme example is a company that borrows money and then pays out all the borrowed money as dividends. After company default there is no money left for bondholders, since the stockholders have received all of it. An interpretation of this can be that when a company is in financial distress, it pays out extra dividends, and milks out all the money there is in the company to the stockholders. The result is that at bankruptcy there is no money left for bondholders, as it has all gone to stockholders. Later we shall see ways for bondholders to protect themselves against milking of property.

Incentive toward under-investment. When a firm is close to bankruptcy, it is often found that new investments will help bondholders at the expense of stockholders. The rationale is that stockholders contribute with all the financing, but the gain is shared with bondholders. If the stockholders invested money into a positive NPV project, the firm as a whole would
gain. But if the stockholders finance the project, and all the money the
project brings in goes to bondholders, stockholders will lose money on the
project. Stockholders' gain is less than their investment. Such a positive
NPV project would be accepted in an all-equity firm, and also in a levered
firm that is not close to bankruptcy, but when a levered firm is close to
bankruptcy the project will be rejected. The unlevered firm always takes on
positive NPV projects, but the levered firm might deviate from this policy.

Undertaking negative NPV projects. When a firm is close to bankruptcy it
might accept projects with negative NPVs. The reason is that stockholders
have limited liability. Let us look at a project with a 0.02 probability of
success, which generates a cash flow of 20,000 and a 0.98 probability of
failure, which generates a cash flow of 0. The expected cash flow from the
project is 400, and the investment cost is 1,000, which implies a negative
NPV (-600). Also assume that stockholders have principal loan payments
of 10,000 coming up and only have 1,000 left. Stockholders can now invest
the money that will become the bondholder’s money in case of bankruptcy.
Stockholders will receive 0 if the project is turned down, and also if the
project is accepted but is unsuccessful. But if the project is accepted and
successful the company no longer goes bankrupt (Megginson, 1997).
Stockholders have nothing to lose by gambling, whereas bondholders are
better off not taking on the negative NPV project.

Agency costs of debt are nothing new to bondholders. Bondholders are
aware that when firms come close to financial distress, stockholders have
this behavior. For bondholders to protect themselves against agency costs,
they charge higher interest rates for companies that are close to bankruptcy
and therefore might act in the described way. The closer firms are to
financial distress, the higher the interest rate bondholders demand. Thus, it
is again, ultimately, the stockholders that pay for their selfish strategies.

There are several ways of reducing the above-mentioned agency costs and
bankruptcy costs, which are costs to debt financing. We could see that in
the end, it is the stockholders that have to pay for agency costs, so it is also in their interest to reduce agency costs. Consequently, bond investors will take steps to prevent managers from entering the above agency strategies.

The most effective preventive step bond investors can take involves writing very detailed covenants into bond contracts, which sharply constrain the ability of the borrowing firm’s managers to engage in inappropriate behavior. Writing these detailed covenants can be very costly and make bond agreements costly to negotiate and enforce, but it may still be less costly than agency costs. Bond covenants can be classified as either positive or negative, depending upon whether they mandate what the borrowing must do or must not do. Positive covenants can, for example, mandate that the borrowing firm must provide creditors with audited financial statements, purchase insurance against fire damage to the firm’s property, and maintain minimum working capital ratios. Negative covenants can mandate that the borrowing firm’s management team must not dispose of the firm’s assets without permission, acquire another company without prior approval, or issue new debt with equal or higher seniority status (Megginson, 1997). Positive and negative covenants can be grouped into four different categories: (1) default triggers, (2) cash flow controls, (3) operating controls, and (4) strategy controls. Default triggers specify what constitutes a loan default and states what actions the creditor are entitled to. Cash flow controls limit the borrower’s ability to pay out dividends or repurchase shares. Operating controls mandate that management acts responsibly to safeguard the firm’s physical and intangible assets. Strategy controls limit the firm’s ability to pursue mergers, acquisitions, divestitures, or other strategies that would substantially change the nature of the firm’s operations. Smith and Warner examined public issues of debt in 1975 and found that the most common covenant is one that restricts the issuance of additional debt, which was found in 91% of the bond indentures included in the study (Smith & Warner, 1979).
Secured debt is another way of reducing agency cost of debt. Debt is then collateralized by tangible assets owned by the firm. If the firm goes bankrupt, bondholders are entitled to the salvage value of the tangible asset held in firm. Scott showed in 1976 that the optimal leverage may be related to the collateral value of tangible assets held by the firm (Scott, 1976). Secured debt substantially reduces bondholders’ monitoring costs.

10.5 APPENDIX V
Myers & Majluf (1984) also included in the pecking order model that dividend policy is “sticky”, which means that the firm at all costs tries to maintain a constant dollar/share dividend. There will be neither a decrease nor increase in dividends in response to temporary fluctuations in current profits. When adding this last assumption we have what we today call the Pecking Order Hypothesis. This model focuses on the motivations of the corporate manager, rather than on capital market valuation principles. The model also presumes severe market imperfections that are hard to accept. Myers provides a viable theoretical justification for the pecking order theory, based on asymmetric information. He assumes that a firm’s manager knows more about the company’s current earnings and investment opportunities than do outside investors, which is an asymmetric information assumption. Secondly, he assumes that managers act in the best interest of the firm’s existing shareholders.

The pecking order helps to explain why the stockholders punish new equity issues. Managers will only issue equity as a last resort, which means that internal earnings are not large enough and the firm cannot get more debt financing. The announcement of leverage-increasing events suggests that corporate managers are confident enough of the firm’s future earning power that they can increase corporate debt levels without impairing the firm’s ability to fund its investments internally. Therefore, leverage-increasing events are taken positively by the stock market. The model is accurate when it comes to explaining corporate financing choices, what securities firms choose to issue, and market response to security issues.
Limitations of the pecking order are that it does not take into consideration the effect of taxes, bankruptcy costs, and agency problems (Myers & Majluf, 1984).

### 10.6 APPENDIX VI

To calculate the WACC we have used equation 10.3 (Copeland & Weston, 1992).

\[
    \text{WACC} = \frac{D}{D+E} r_D * (1-T) + \frac{E}{D+E} r_E
\]

(Eq. 10.3)

where

- \( D \) = debt
- \( E \) = equity
- \( T \) = tax rate
- \( r_E \) = required return on equity
- \( r_D \) = required return on debt

To calculate \( r_E \) the equation 10.4 is used (Copeland & Weston, 1992).

\[
    \text{CAPM} = r_F + (r_M - r_F) \times B_f
\]

(Eq. 10.4)

where

- \( r_F \) = risk free interest rate
- \( r_M \) = return of the market

We have used market values when calculating WACC for all the three case companies.
To calculate the value of the levered company equation 10.5 is used (Copeland & Weston, 1992).

\[ v_v = \frac{(NOI)(1 - T)}{WACC} \]  
\text{(Eq. 10.5)}

**Castellum**

First, \( r_e \) needs to be calculated using equation 10.3.

\[ r_e = 0.055^{18} \]
\[ r_e = 0.105^{19} \]
\[ b_e = 0.59 \]

\[ \text{CAPM} = 0.055 + (0.105 - 0.055)0.59 \]
\[ \text{CAPM} = 0.0845 \]

Then WACC can be calculated using equation 10.4.

\[ \text{WACC} = 0.48 (0.0555(1 - 0.28) + 0.52 (0.0845) \]
\[ \text{WACC} = 0.0631 \]

Value of Castellum using equation 10.5.

\[ v_v = 320/0.0631 \]
\[ v_v = 5071 \text{ M} \]

If our suggestion is followed to increase the leverage level from 43% to 53%, using market values, the following WACC would be experienced.

---

18 According to Stockholm Stock Exchange
19 According to Stockholm Stock Exchange
WACC = 0.58(0.057)(1 – 0.28) + 0.42(0.0845)  
WACC = 0.0593

Value of Castellum with new leverage:

\[ V_c = \frac{320}{0.0593} \]
\[ V_c = 5396 \text{ M} \]

We can now compare the theoretical value of Castellum before the leverage change and after the leverage change. The value has increased by (5396 – 5071) 325 million.

**Platzer**

\[ \text{CAPM} = 0.055 + (0.105 - 0.055)1.01 \]
\[ \text{CAPM} = 0.1055 \]

Then WACC can be calculated using equation 10.3.

\[ \text{WACC} = 0.743 \times (0.0583)(1 – 0.28) + 0.257 \times (0.1055) \]
\[ \text{WACC} = 0.0583 \]

Value of Platzer using equation 10.5.

\[ V_d = 13,140,0583 \]
\[ V_d = 224,7 \text{ M} \]

\[ 0.53 + 0.05 \text{ (non-interest bearing liabilities)} \]
\[ 21 \] is larger due to the higher proportion of interest bearing liabilities to non-interest bearing liabilities.
If our suggestion is followed to decrease the leverage level from 69.9% to 64.4%, the following WACC would be experienced:

\[ WACC = 0.688^{22}(0.0580)^{23}(1 – 0.28) + 0.312 \times (0.1055) \]

\[ WACC = 0.0617 \]

Value of Castellum with new leverage:

\[ V_c = 13.10.0617 \]
\[ V_c = 212.3 \text{ M} \]

We can now compare the theoretical value of Platzer before the leverage change and after the leverage change. The value has decreased by \((224.7 – 212.3)\) 12.4 million.

**Wallenstam**

\[ \text{CAPM} = 0.055 + (0.105 – 0.055)0.73 \]
\[ \text{CAPM} = 0.0915 \]

Then WACC can be calculated using equation 10.3.

\[ WACC = 0.717 \times (0.0683)(1 – 0.28) + 0.283 \times (0.0915) \]
\[ WACC = 0.0588 \]

\(^{22}\) 0.644 + 0.044 (non-interest bearing liabilities)

\(^{23}\) \(r_e\) is smaller due to the lower proportion of interest bearing liabilities to non-interest bearing liabilities.
Value of Wallenstam using equation 10.5.

\[ V_a = 27,300,058.8 \]
\[ V_L = 464.3 \text{ M} \]

No change is suggested regarding Wallenstam.