

The Gothenburg Population Panel 1915-1943  
GOPP Version 6.0

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Tobias Karlsson and Christer Lundh



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tobias.karlsson@ekh.lu.se, christer.lundh@econhist.gu.se

**Abstract:** This paper presents the Gothenburg Population Panel (GOPP), a random sample of individuals who were living in Gothenburg at some point in time during the period 1915-1943. The individuals in the GOPP were searched for every fourth year in the registers of local tax authorities. The hit rate was high; 95 percent of the individuals and 87 percent of the possible observations in the initial master sample were found. The database contains 12,500 observations of 3,767 unique individuals 16 years old or more, who are broadly representative of Gothenburg's adult population in the period of investigation. The sample is augmented with spouses and information on children (birth year and incomes). The paper documents how the database was constructed, describes its historical context, compares it with official statistics, presents some basic sample characteristics and discusses the issue of panel attrition.

**JEL:** C81, J21, J62, J82, N34, N94, Y10

**Keywords:** Sweden, inter-war period, labour mobility, population registers, panel data

**ISSN:** 1653-1000 *online version*

**ISSN:** 1653-1019 *print version*

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University of Gothenburg  
School of Business, Economics and Law  
Department of Economy and society  
Unit of Economic History  
P.O. Box 625  
SE-405 30 GÖTEBORG  
[www.econhist.gu.se](http://www.econhist.gu.se)

## 1. Introduction

The Gothenburg Population Panel (GOPP) is a sample of individuals who were living in Gothenburg (*Göteborg*) at some point in time during the period 1915 to 1943.<sup>1</sup> The panel is based on information from poll-tax records (*mantalslängder*) and includes a number of demographic and labour-market related variables for every fourth year. The database was primarily constructed with the purpose of studying various forms of labour mobility. We were interested in labour market dynamics in the former half of the twentieth century, after the industrial breakthrough, but before the era of labour force surveys. While the early phase of industrialisation in Sweden had a rural character to a large extent, the process of industrialisation was associated with the concentration of labour in cities and large firms. For labour-force participants in early industrial society, job mobility was often associated with medium or long-distance geographical mobility. The labour market of the more mature industrial society was different and could include opportunities to move between industries, occupations and firms at the same location, as well as within firms. We wanted to study an urban environment with a fairly diverse industrial structure. Our choice fell on the city of Gothenburg. An attractive feature of Gothenburg was the existence of a central register of all inhabitants, which made it possible to construct a random sample of individuals to follow over time. Since we were not only interested in studying geographical and occupational mobility but also job mobility (between workplaces) we defined the period of investigation as 1915-1943, which is roughly the period when information on both employer and income is available in poll-tax records and income records (*inkomstlängder*). Given our time and resource constraints we decided to observe individuals every fourth year.

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<sup>1</sup> This paper is based on GOPP version 6.0, last accessed on 1 February 2015. The creation of the database began in 2010 and was initiated and led by Christer Lundh (Department of Economy and Society, Unit for Economic History, Gothenburg University) and carried through in collaboration with Tobias Karlsson (Department of Economic History, Lund University) and the Swedish National Archives in Gothenburg (hereafter GLA). Ulf Andersson (GLA) played an important role in the initiation phase and Karl-Magnus Johansson (GLA) coordinated much of the work with data extraction. A number of people have been involved with the extraction and entering of data: Eva Hasselgren Östberg, Jeanette Johansson-Young, Göran Larsson (GLA), Helena Ahlfors (GLA), Daniel Sjöberg (GLA), Karl-Magnus Johansson (GLA), Marta Blomberg and Tobias Karlsson. Stefan Öberg has contributed valuable help with data management and quality control issues, as well as comments on previous versions of the present paper. We are grateful to Björn Gustafsson who gave us useful advices in the initial stage of data collection and Martin Fritz who commented on the background section. The database was constructed within a research project funded by the Swedish Research Council for Health, Working Life and Welfare (Forte), grant 2008:0459 *Hopp-Jerka, Stann-Anders och Marginal-Malin. En longitudinell studie av arbetsgivarbyten i Göteborg 1916-1945*. Tobias Karlsson received financial support from the same project and from Jan Wallanders och Tom Hedelius Stiftelse, grant W2009-0084:1.

In the present paper we document the construction of the database and discuss some of its basic features. The reader should be aware that the database may be subject to changes in the future, which will be documented in revised versions of this paper.

The paper begins with an account of the spatial and historical context: the city of Gothenburg in the inter-war period. We proceed by describing the source material, sample and data extraction, after which we discuss the representativeness of the database by comparing it with official statistics. Thereafter we present some basic cross-sectional sample characteristics and, finally, look into the issue of panel attrition.

## **2. Gothenburg in the inter-war period**

Situated on the western coast of Sweden, at the mouth of the river Göta älv, Gothenburg has been an important harbour city ever since its founding in the seventeenth century.<sup>2</sup> Its geographical location has exposed Gothenburg to foreign influences – related to production technology, consumer goods and politics. Gothenburg was initially characterised by fishing and foreign trade but evolved into an industrial metropolis and consolidated its position as the country's second city during the latter part of the nineteenth century. From a regional perspective, Gothenburg was the obvious centre of gravity, with more inhabitants than all neighbouring cities together.<sup>3</sup> Compared to Borås, a centre of textile industry and the second biggest city in western Sweden, Gothenburg had a more diversified industrial structure with mechanical engineering as the most prominent industry.

Gotheburg was a node in a system of water borne transport. The transition from sail to steam in the second half of the nineteenth century further boosted transport, particularly those related to international trade and emigration to North America, making Gothenburg the most important port city in Sweden.<sup>4</sup> Integration into the world economy came with improved connections to the rest of the country. From Gothenburg, rail lines emanated to Stockholm, Borås, the traditional industrial region of Bergslagen, the Scanian cities in the south, and the Norwegian border and forest areas in the north.<sup>5</sup>

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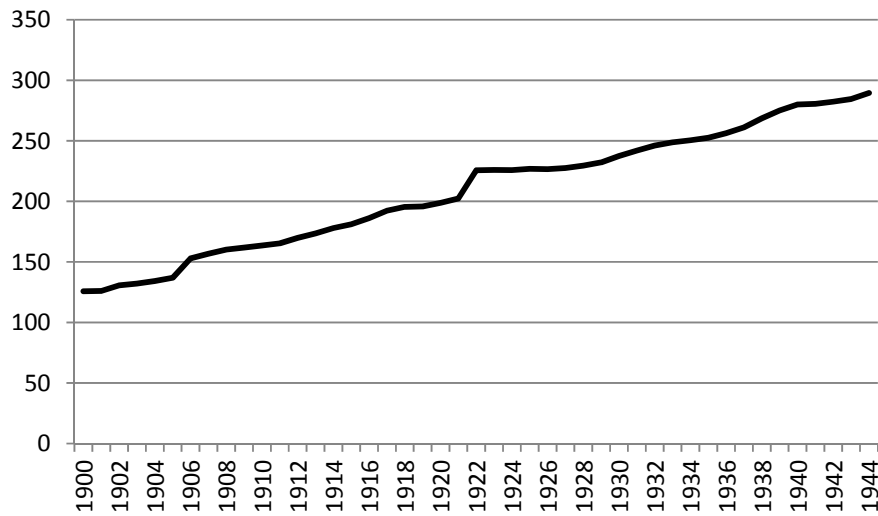
<sup>2</sup> Andersson, Fritz & Olsson (1996); Attman (1963a & 1963b); Bodman (1923).

<sup>3</sup> Olsson (2012: 22-23).

<sup>4</sup> Olsson (2012: 33).

<sup>5</sup> Olsson (2012: 33-33).

FIGURE 1. *Number of inhabitants in Gothenburg, 1900-1944 (thousands)*



Comment: Population at the beginning of each year. Lundby parish was incorporated to the city in 1906 and Örgryte parish in 1922.

Source: *Statistisk årsbok för Göteborg* (1944: 11).

As shown in Figure 1, population growth escalated in the nineteenth century and continued in the first decades of the twentieth century, but with decreasing intensity. From 1900 to 1910, Gothenburg's population increased by 25 percent. Thereafter decadal growth rates fell below 20 percent. In demographic terms, Gothenburg showed the same basic transition pattern as the rest of Sweden; with death rates beginning to fall in the mid-nineteenth century, stable rates of fertility until the turn of the century, followed by a sharp decline in the first decades of the twentieth century. In the 1920s alone, the birth surplus (births-deaths) fell from 50 to 30 percent.<sup>6</sup> At the same time, immigration recovered following some weak years after World War I. In combination, a declining birth surplus and a relatively steady flow of migration into the city, caused changes in the age structure of the population; with a decreasing proportion of under-aged people and increasing proportion of prime-aged adults.<sup>7</sup> Partly as a consequence of the changing age structure, there was also a tendency for the proportion of married people to increase.<sup>8</sup>

A substantial, though declining proportion of Gothenburg's population was born outside the city. The proportion of women, the elderly and those belonging to higher social

<sup>6</sup> This development was seen in Sweden generally and was a matter of great concern among politicians and researchers.

<sup>7</sup> Olsson (1972: 89).

<sup>8</sup> Olsson (1972: 90).

strata (business owners and white-collar workers) who were born outside the city was higher.<sup>9</sup> There were also demographic and socio-economic differences in birth locations among migrants. Blue-collar workers who were born outside Gothenburg were more often short-distant migrants than business owners and white-collar workers.

Throughout the nineteenth century, housing stock could not keep pace with population growth. The conditions were particularly difficult on the outskirts of the city, where many poor families lived in basements and in rooms without a fireplace. The local politicians in Gothenburg hesitated to intervene in the building sector. Instead, they relied on philanthropic, cooperative and corporate initiatives to improve the housing situation for the working class.<sup>10</sup> The shortage of housing became worse in the first decades of the twentieth century, resulting in increasing rents. Between 1910 and 1915, the rent for a room without a kitchen increased by 21 percent in Gothenburg.<sup>11</sup> In this phase, the housing shortage was more alarming in Gothenburg than in Stockholm. During the latter part of the 1910s, the political involvement in building increased, for example through subsidised loans and municipal housing.<sup>12</sup> In 1920, tenants in Gothenburg formed a union (*Hyresgästföreningen*) and in the following decade, private builders began to respond to the high level of rents. Over time the supply of housing was improved, both quantitatively and qualitatively.<sup>13</sup> In 1920, it was estimated that 45 percent of Gothenburg's population lived in overcrowded dwellings. In 1945, this proportion had decreased to 7 percent.<sup>14</sup> Over the same time span, facilities such as central heating and water closets became more common. An important aspect of the development in the housing market was the opportunities for young people to establish their own households. From 1920 to 1945, the average household size in Gothenburg decreased from 4.24 to 2.92.<sup>15</sup>

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<sup>9</sup> Wallentin (1978).

<sup>10</sup> Some big employers, such as Gamlestadens Fabriker, built houses for their workers, often close to the workplaces (Hesselgren, 1992: 158).

<sup>11</sup> Hesselgren (1992: 157).

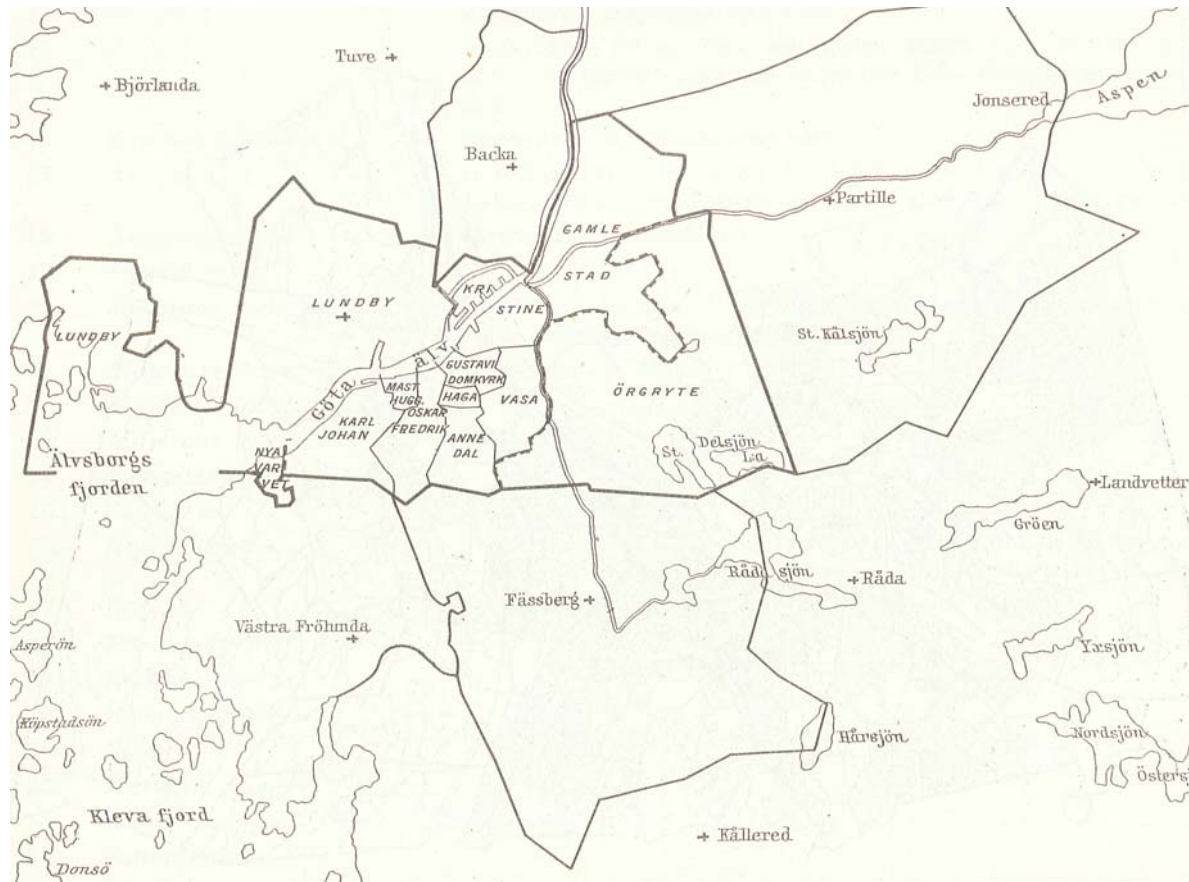
<sup>12</sup> Attman (1963b: 204).

<sup>13</sup> Attman (1963b: 204-205).

<sup>14</sup> Olsson (1972: 41).

<sup>15</sup> Olsson (1972: 88).

FIGURE 2. *Gothenburg and its surroundings in 1922*



Source: *Statistisk årsbok för Göteborg* (1923).

From 1922 onwards, Gothenburg had 11 territorial parishes; namely the parishes of Domkyrko, Kristine, Gamlestad, Haga, Oscar Fredrik, Masthugget, Karl Johan, Annedal, Vasa, Lundby, Örgryte (see Figure 2).<sup>16</sup> Of these, Annedal, Haga and Masthugget may be characterised as old working-class communities, with little space for physical expansion and with stagnating populations. Instead, the bulk of the growth appeared in areas of more recent settlement on the outskirts of the city, such as Lundby, on the island of Hisingen.<sup>17</sup> Gamlestaden, situated east of the Mölndal stream, was another growing parish with a huge concentration of working-class families.

<sup>16</sup> Major changes in the city's territory occurred in 1906 and 1922, when the parishes of Lundby and Örgryte were incorporated. Another notable change took place in 1929 when Johanneberg was separated from Vasa. In addition to the territorial parishes, there were two small non-territorial parishes: the parish of Garnisonen (for persons employed by the Armed Forces) and the parish for the German population (*Tyska*). In 1925, the members of these parishes constituted 0.7 percent of the total population in Gothenburg. Garnisonen ceased to exist in 1927, whereas the German parish remained intact, but with decreasing numbers of members.

<sup>17</sup> Elison (1970: 7); Stråth (1982: 18).

TABLE 1. *Employment structure in Gothenburg 1920, 1930 and 1940*

a) Men

Industry	Year		
	1920	1930	1940
Agriculture	0.01	0.01	0.01
Handicraft & manufacturing	0.52	0.52	0.50
Trade	0.19	0.21	0.18
Communications	0.20	0.19	0.19
Civil servants & free professions	0.06	0.07	0.08
Domestic service	0.01	0.00	0.00
Other	0.00	0.00	0.03
N	68,350	78,211	93,759

b) Women

Industry	Year		
	1920	1930	1940
Agriculture	0.00	0.00	0.00
Handicraft & manufacturing	0.37	0.35	0.32
Trade	0.25	0.31	0.33
Communications	0.04	0.03	0.04
Civil servants & free professions	0.10	0.11	0.16
Domestic service	0.24	0.19	0.13
Other	0.00	0.00	0.00
N	36,940	47,874	47,901

Source: *Statistisk årsbok för Göteborg* (relevant years).

In the 1920s and 1930s, about half of Gothenburg's population was gainfully employed. The employment structure for men and women is summarised in Table 1 and gives the impression of an industrial society approaching its maturity. About 50 percent of the men and 35 percent of the women were employed in industry and handicrafts, but the proportion, particularly for women, showed a downward trend. New opportunities for employment were created in the growing public sector for both men and women. For women, a notable expansion can also be seen in trade, whereas employment in domestic service decreased substantially.

Traditionally, Gothenburg's industrial structure had been characterised by the textile industry and the production of foodstuffs. The decades around 1900 brought diversification; both within established industries and in terms of the overall composition of employment. Within the textile industry, which was dominating in terms of employment, a trend towards production in large mechanical factories that integrated



spinning and weaving, represented by Gamlestadens fabriker, continued. The increased use of steam power allowed relocation of plants from streams in the neighbouring area to the city. The cotton industry remained strong alongside the emergence of relatively new branches of woollen and garment production. The leading firm in Gothenburg's garment industry was Wettergrens' coat factory. Wettergrens' outsourced much of its sewing to female homeworkers, although the preparation and finalisation of the coats took place in the factory.<sup>18</sup> The foodstuffs industry, which was dominating in terms of total sales value, included branches such as sugar refineries, breweries, bakeries, margarine and chocolate factories.<sup>19</sup> A notable feature of some parts of the foodstuffs industry was the concentration of production, seen for example in the formation of a national monopoly in the sugar industry, with one big plant in Gothenburg, Carnegie & Co. The Pripps & Son brewery transformed into a business group that eventually merged with one of the major competitors, Lyckholms (situated in the neighbouring town of Mölndal).

The 1910s, and the period 1915-1920 in particular, was characterised by rapid changes.<sup>20</sup> The growth in this decade was associated with a shift in the industrial structure towards heavy industry, represented, for example, by three big shipyards, Eriksberg, Götaverken and Lindholmens with 500-1,000 workers each before 1914 and about twice as many towards the end of the decade.<sup>21</sup> The shipyards were situated next to each other on the north bank of Göta älv.<sup>22</sup> Another important firm, which experienced and even more dramatic expansion in the 1910s, was Svenska Kullagerfabriken (SKF), a producer of ball-bearings, founded in 1907. Ten years later, SKF had over 4,000 workers in Gothenburg. Whereas the shipyards exclusively employed male workers, SKF had many women in its service.

In addition to manufacturing, trade and communications constituted an important parts of Gothenburg's labour market. Within the trade sector, the period under investigation saw the emergence of major developments. The cooperative movement reached the Gothenburg area fairly late, but from 1920 to 1945, the number of members and stores multiplied ten-fold. The growth of consumer cooperatives, particularly focused

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<sup>18</sup> Olsson (2012: 39-40).

<sup>19</sup> Olsson (2012: 44-45).

<sup>20</sup> Olsson (2012: 42); Stråth (1982: 19-20).

<sup>21</sup> Bohlin (1989); Olsson (1983); Stråth (1982); Svensson (1983).

<sup>22</sup> The yards benefitted from Gothenburg's role as a harbour city, and shipyard workers were commonly recruited among seamen. According to Bohlin (1989: 260-262, 361), the shipyards did not constitute a common labour market, the flows of workers between them were small.

on foodstuffs, also induced the merging of some private firms in the sector.<sup>23</sup> Tendencies of concentration were also associated with the sales of other commodities, which took place to an increasing extent in department stores. The main business group in this field was headed by Herman Gustaf Turitz who ran the Grand Bazar, along with a wholesale trade business named AB Turitz & Co.<sup>24</sup> Together with Nordiska Kompaniet, Turitz launched the idea of unitary prices (*enbetspriser*), which paved the way for a nationwide chain of department stores.

Industrialisation and urbanisation were associated with a rapid growth of the flow of goods and people. After severe disruption in 1917-1918, shipping in Gothenburg accelerated from the mid-1920s onwards. Expansion was particularly intense in the 1930s, before the traffic was paralysed by World War II. During the inter-war period the trade changed direction, moving from European to transoceanic destinations. In this development, Gothenburg-based shipping companies – of which the Broström group and Transatlantic were the most important – played a central role.<sup>25</sup> The expanding traffic and the increasing ship size also required public investment in the port.<sup>26</sup> The city's central port was extended in the early 1920s and a new port, alongside a bridge over Göta älv, was built between the shipyards in the 1930s.<sup>27</sup> The work of loading and unloading in the ports was organised by Göteborgs Hamnarbetskontor, an employment agency that allocated workers between longshore companies.<sup>28</sup> While the sea bound transports were largely in the hands of private actors, the public sector were more heavily involved in land bound transport. In the last decades of the nineteenth century, the city of Gothenburg invested actively in railroads, but gradually all major lines attached to Gothenburg were incorporated into Statens Järnvägar, who became one of the most important employers in the city. The company in charge of the electrical tram network, owned by the municipality, was another significant employer. In 1910, the company had about 700 people on its payroll. About 40 years later, there were 2,500.

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<sup>23</sup> Attman (1963b: 147-148).

<sup>24</sup> Attman (1963b: 149-151).

<sup>25</sup> Attman (1963b: 153-158).

<sup>26</sup> Attman (1963b: 275-278).

<sup>27</sup> Technological developments also took place in the ports of Gothenburg, such as the transition from hooks to cranes. See Hamark (2014: 108).

<sup>28</sup> Björklund (1984: 74).

The period covered by the GOPP coincides with the democratic breakthrough and its consequences.<sup>29</sup> In the nineteenth century the political scene in Gothenburg was dominated by businessmen and civil servants. In the twentieth century, and most notably after the franchise reforms in the 1910s,<sup>30</sup> elected politicians came to represent broader segments of the population. In 1922, social democrats and communists had taken the majority of seats in local parliament and held that position for decades. The social democrats expedited an expansion of the public sector. A notable development in the period was the separation of poor relief and health care. Most hospitals in Gothenburg had been founded by private donations, but the municipality increased its involvement, particularly from the 1930s onwards. From having a workforce of 700 people in the early 1920s, the hospitals in Gothenburg employed 1,700 in the mid-1930s.<sup>31</sup> The expansion of the public sector was also seen in schooling, although not to the same degree.<sup>32</sup> In addition to poor relief, health care and education, the municipality was also responsible for the basic infrastructure. Part of the city's involvement in infrastructure, such as the distribution of gas and electricity, took the form of business corporations (*affärsdrivande verk*) and these publicly owned firms became significant employers in Gothenburg.

In the long run, employment in most sectors of Gothenburg's labour market grew in absolute numbers. Domestic service, which was an almost exclusively female domain, represented a major deviation. From 1920 to 1940, the numbers employed in domestic service decreased from 9,000 to 6,000 (see Table 1). Compared to other occupations, domestic service had weak appeal for young women.

While the labour market for women appears to have changed more in structural terms, the labour market for men was more affected by swings in business cycles. The years succeeding World War I brought growing business activity and inflation but were followed by a severe downturn in 1920-22. On average, the number of male blue-collar workers decreased by more than 13 percent annually in these years. Plant closures and layoffs hit shipyards and other parts of mechanical engineering relatively hard, employment

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<sup>29</sup> Attman (1963b: 225-230).

<sup>30</sup> In Sweden, suffrage was extended stepwise in reforms during the first two decades of the twentieth century. Universal suffrage (including men and women) was finally established in 1919.

<sup>31</sup> Attman (1963b: 251).

<sup>32</sup> The number of children in Gothenburg's primary schools was fairly stable in the inter-war period, while the number of teachers increased by about 40 percent (from a level of 700 in 1919/20). See Attman (1963b: 267).

dropped 50 percent.<sup>33</sup> Some companies pursued even more drastic cuts. At SKF, for example, which before the crisis was Gothenburg's biggest company, only about 400 workers remained in 1922.<sup>34</sup> The textile and foodstuffs industries, which had greater female presence, were less sensitive to cyclical swings. Within the textile industry there had been a shift from the production of cotton to the garment industry. However, employment in the textile and foodstuff industries showed a marked downturn during the last years of World War I due to shortages of raw material.<sup>35</sup>

The sharp swings experienced by the manufacturing sector are also reflected in the unemployment figures. In Sweden as a whole, unemployment among unionized workers reached almost 35 percent in 1922 but was pushed down below 10 percent in 1924, which still was a relatively high level, historically.<sup>36</sup> Towards the end of the decade unemployment approached 7 percent. The situation in the labour market became worse again, however, with the onset of the Great Depression, but the fall in employment was not as dramatic as in the previous crisis. While unemployment among metal workers in Gothenburg reached 64 percent in 1922, the equivalent level at the bottom of the Great Depression was 32 percent.<sup>37</sup> As observed by Ulf Olsson, the age composition of the unemployed metal workers differed between crises.<sup>38</sup> The 1920-22 depression resulted in particularly high levels of unemployment among young people, and youth unemployment continued to be a severe problem throughout the 1920s. It appears that preference for jobs was given to more senior workers when firms began to expand after the downturn. The crisis in the early 1930s affected young and old workers more evenly. The Swedish economy in general, including mechanical engineering in Gothenburg, recovered relatively quickly from the Great Depression. In the final years of the 1930s, the levels of unemployment among metal workers in Gothenburg fluctuated around 7 percent. In contrast to the situation in the 1920s, most of the unemployed were over the age of 40.

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<sup>33</sup> However, previous research indicates that the shipyards to some extent tried to keep skilled workers employed during downturns (Bohlin, 1989: 360).

<sup>34</sup> To be compared with 3,700 workers in 1917 (Fritz & Karlsson, 2006: 51). SKF's competitor, Nordiska Kullager AB, founded in 1914, was closed down in 1921 (Elison, 1970: 9).

<sup>35</sup> Hesselgren (1992: 31).

<sup>36</sup> Unemployment among union members was probably higher than among non-members. There are no general unemployment figures for Gothenburg in the period of investigation, however, there were series of unemployment among the members of various unions, such as the Metal Workers' Union (see Olsson 1970).

<sup>37</sup> Olsson (1970: 19).

<sup>38</sup> Olsson (1970: 19-21).

The level of unemployment among unionized workers is an indicator that is often used as a summary measure for the demand and supply of labour. Alternative indicators can be obtained from the statistics reported by the public labour exchange in Gothenburg. Figure 3 shows the number of job applicants and vacant positions for the male and female sections of the exchange. As seen in the figure, the number of male job applicants was close to the number of vacant positions in the 1910s, suggesting a relatively strong demand for labour. Thereafter a gap between the number of job applicants and vacancies emerged, which was particularly wide in the period 1931-35. The situation improved somewhat at the end of the 1930s. For women, the balance between job applicants and vacancies remained throughout the 1920s, and thereafter the gap between the number of applicants and vacancies increased substantially.

Rationalisations – featuring both organisational and technical changes – took place parallel to swings in economic activity. The extent and effects of these changes are debated. According to the conventional view, Gothenburg and other parts of the Swedish labour market were mainly affected by the spread of scientific management during the inter-war period – that is to say, the increased use of performance-based pay, time studies and an increased division of labour between blue and white collar workers. The assembly line, and other novelties associated with Fordism, mostly appeared after World War II.<sup>39</sup>

Apart from the economic developments, the inter-war period also saw significant institutional change concerning the labour market. Unionization, which had begun among blue-collar workers in the late nineteenth century, gained strength and spread to white-collar groups. Unionization among blue-collar workers in Gothenburg reached 50 percent in 1906, was pushed back in the following years, characterised by frequent conflicts, and recovered in the years following World War I.<sup>40</sup> There followed a new backlash in the crisis of the 1920s when union density was pushed down to about 20 percent, after which the overall level of organisation again grew and exceeded 45 percent in 1930.<sup>41</sup>

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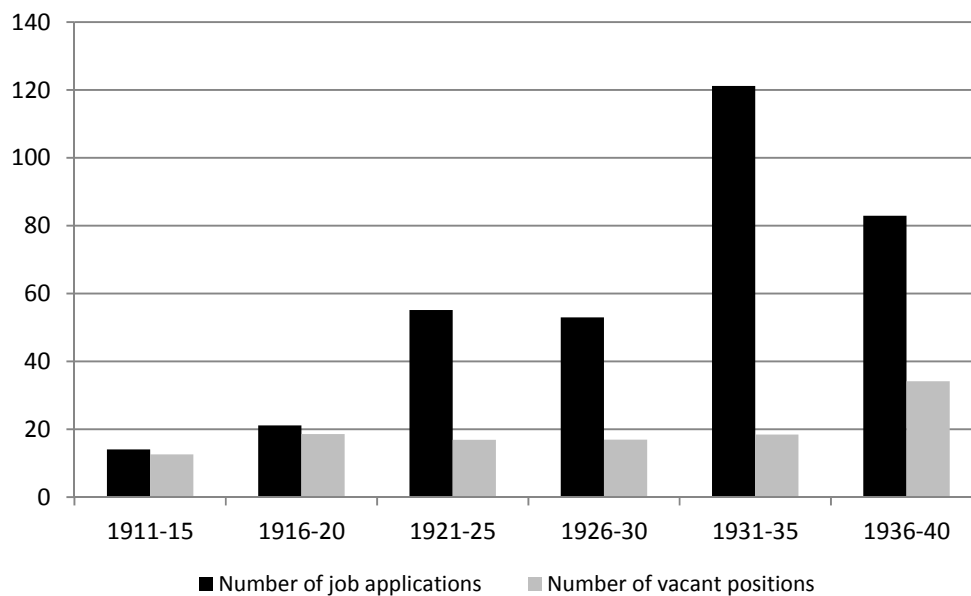
<sup>39</sup> For an account of the rationalisation movement, with particular reference to Gothenburg, see Wallentin (1978: 42-51).

<sup>40</sup> In numerical terms, the most important local trade unions in Gothenburg were those who organised metal workers, carpenters in the building industry, labourers in the building industry and workers employed by the municipality. Dock workers constituted an important group of blue-collar workers who were organised rather late, but whose union density increased rapidly after 1916. As elsewhere, unionization was particularly difficult to achieve among workers in the trade sector (Elison, 1970: 24-27).

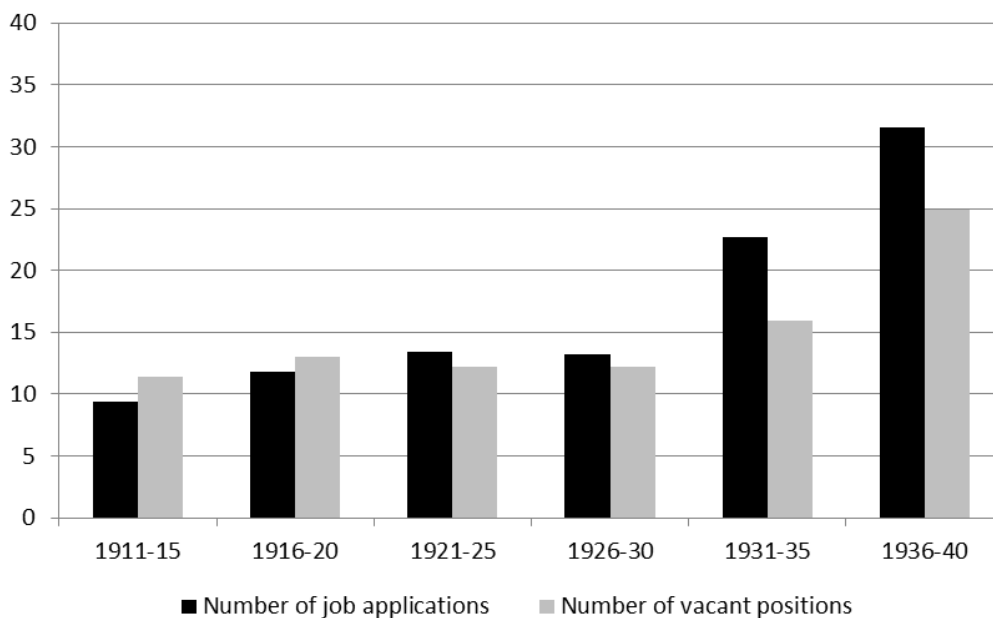
<sup>41</sup> Wallentin (1978: 69).

FIGURE 3. *Number of job applications and vacant positions reported by Gothenburg's public labour exchange (thousands)*

a) 'The male section'



b) 'Female section'



Source: *Statistisk årsbok för Göteborg* (relevant years).

The unions strove for standardisation of wages and employment conditions and were fairly successful in convincing employers to enter collective agreements. From 1920 to 1940, the share of workers (including white-collar workers) covered by collective agreements in Gothenburg increased from 37 to 59 percent.<sup>42</sup> If white-collar workers are excluded, the share covered would be even higher. Overall, the Swedish labour market in the inter-war period was characterised by a pronounced demarcation between blue-collar and white-collar workers, where the latter group achieved high union density and collective agreements.<sup>43</sup> The same development did not occur for white-collar workers until after World War II.

### 3. The Gothenburg Population Panel

#### 3.1 Source material

The source material on which the GOPP is based originates from the civil population registration. The registration served as the basis for taxation, social control, various rights related to citizenship and population statistics.<sup>44</sup> It was regulated in laws whose stipulations allowed for some adjustment for local circumstances. Particularly in the big cities of Stockholm and Gothenburg, the authorities recognised a need to strengthen administrative resources to keep track of the population since the mobility of people, across the cities borders and within the cities, was considerable.<sup>45</sup> While magistrates were typically responsible for maintaining civil population registration in cities, special authorities were set up in Stockholm and Gothenburg. In the following, we primarily describe how population registration was organised in Gothenburg in the first half of the twentieth century.<sup>46</sup> The poll-tax records and income records in Gothenburg were initially kept in separate books, where the former included all inhabitants and the latter only those who had declared incomes.<sup>47</sup> In 1919, the income records were integrated in the poll-tax records.

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<sup>42</sup> See *Statistisk årsbok för Göteborg* for the years in question.

<sup>43</sup> Lundh (2010).

<sup>44</sup> Andersson (2006).

<sup>45</sup> Jakobsson (1977).

<sup>46</sup> More specifically, the period 1906-1946.

<sup>47</sup> *Mantalslängder 1916-1944*, FI aa, vol. 329-947, Göteborgs mantalskontors arkiv (hereafter GM), GLA and *Taxeringslängder över inkomstbevillningen och inkomstlängder*, FIII a, vol. 127-137, GM, GLA. For examples of previous research using Gothenburg's poll-tax records, see Gustafsson & Johansson (2003); Gustafsson & Jansson (2008); Gustafsson & Jansson (2010); Hesselgren (1992); Jansson (2011); Johansson (1999); Kuuse (1970); Lane (2004) and Olsson (1972). In an on-going PhD-project, Malin Nilsson (2015) has constructed a database of industrial home workers with a similar design to the GOPP. Nilsson's sample is

The poll-tax records were established at the end of each year and included information on all individuals. Information came from two sources: the household head and the employer. Based on the norm that the provider of the information was a male household head, the legislation stated that the information should concern “himself and those, who belong to his household”.<sup>48</sup> The household head was to complete a form with information about name, age, birth location, property ownership, and the rent for himself and other household members. The household was not strictly defined in the legislation.<sup>49</sup> The completed form (*mantalsuppgift*) was to be handed to the house owner on the first weekday after 15 November. The house owners were then to compile the information into a ‘main list’ (*huvudlista*) and add the rental value of their own apartment and rents for the remaining apartments in the house.<sup>50</sup> The main list was to be submitted to the poll-tax office on 20 November at the latest. Thereafter, the staff of the poll-tax office examined the forms and main lists, for example by comparing them with the records of the previous year and contacting colleagues responsible for the registration in other districts. The staff of the poll tax office (*mantalskontoret*) had access to church records and were also authorised to visit properties to scrutinise contracts. After examination, the actual poll-tax record was established, although more information was added at the beginning of the following year; most importantly concerning income from property, capital, employment and business.<sup>51</sup>

Tax legislation changed during our period of investigation. Until 1919, all individuals with annual incomes that were at least SEK 800 were obliged to declare their incomes to the tax authorities. After 1919, the limit for obligatory declaration was lowered to SEK 600 (including benefits and pensions).<sup>52</sup> From that point in time, the obligation to declare also applied to individuals who had earned at least SEK 600 the previous year, but had a lower income in the present year. The change to income limits appeared simultaneously with a

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based on a survey of industrial homeworkers made in 1911 and she traces the individuals in the survey every fourth year in the poll-tax records until 1943.

<sup>48</sup> Norrman (1933: 39).

<sup>49</sup> The original intention of the legislators was that agricultural labourers and assistants of business owners and similar people should be registered at the address of their employer. As noted by Norrman (1933: 39) praxis changed over time, so that those employees who were not living in the household of the employer were registered separately, at their place of residence. This praxis was followed in the GOPP period.

<sup>50</sup> Neither the household forms nor the main lists have survived for the period and location we are investigating.

<sup>51</sup> The final adjustment of the poll tax records was made on 1 March at the latest.

<sup>52</sup> Individuals had fairly strong incentives to declare income, as failure to do so, or conscious mis-reporting, was illegal. See Sköld & Vanner (1939). Compared to present-day standards, overall tax pressure was much lower in the period of investigation. In 1928, a single male with an annual income of SEK 3,000 would pay 4.5 percent to the state and about 6-9 percent to the municipality. These percentages were the same for a man with an income of SEK 10,000 (Kuuse, 1970: 39).



period of rapid inflation and nominal wage growth. Individuals in GOPP are thus much more likely to have supplied income statements after 1919 than before.

As with the statements made for the basic poll tax, both individuals and the employers were assumed to submit information on earnings. Previous research has shown that between 80 to 100 percent of all male employees in Gothenburg provided income declarations in the latter half of the 1920s.<sup>53</sup> To some extent, the incidence of income declarations may have been related to occupation. Declarations are, for example, more likely to be missing in highly mobile occupations than in occupations where employment relationships were more stable. Referring to the period before the mid-1920s, Jan Kuuse reports a lower incidence of income declaration among bricklayers than among school teachers and textile workers.<sup>54</sup> Thereafter, the gap in declaration was substantially reduced. Kent Olsson has studied the correspondence between individual and employer information, and found it to be high in general.<sup>55</sup> The tax authorities estimated incomes in those few cases where both individual and employer declarations were missing (based on occupation and previous earnings). These estimations were probably somewhat higher than actual earnings,<sup>56</sup> and may have been raised over time in order to promote the inclination to declare incomes.<sup>57</sup> Previous research has also shown that the correspondence of actual earnings and earnings stated in the tax records increased over time.<sup>58</sup>

The above-mentioned research on income statements applies to men. Whether the income statements for women were of equal coverage and quality has not been investigated as extensively. Since women on average had lower wages and worked shorter hours one may expect to find fewer income statements than among men overall, but also that income statements become increasingly common over time, as the quality of the tax administration improved and, most importantly, more women earned incomes above SEK 600. Kuuse argues that the income statements of women in full-time employment are equally valid as those for men in the period of investigation.<sup>59</sup>

The poll-tax records, as they appear for modern-day users, are books with pre-printed columns. Until around 1930, the books had pre-printed columns and headings and

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<sup>53</sup> Olsson (1972).

<sup>54</sup> Kuuse (1970: 37).

<sup>55</sup> Olsson (1972: 73-74).

<sup>56</sup> Wallentin (1978: 116).

<sup>57</sup> Kuuse (1970).

<sup>58</sup> Olsson (1972: 73-74); Öhngren (1974: 126). Furthermore, comparisons of tax records with other sources, suggest greater deviances in the upper end of the earnings distribution, particularly for business owners.

<sup>59</sup> Kuuse (1970: 44).

information was entered by hand. Thereafter information was machine typed. The exact number and order of columns, and their headings, changed somewhat over time, but the content remained basically intact. In addition to residential address, the records include information on occupational title, civil status (unmarried, married, divorced and widow/-er), date of birth, birth location, number of employees and rent. There is also a field labelled 'notes' (*anteckningar*), which was typically used for information on employers (if the person was employed), type of business activity and its location (if the person was a businessman/woman), ownership of fixed capital (buildings) and insurances. The records also contain a number of columns that served various administrative purposes related to taxation.<sup>60</sup>

Each territorial parish had its own book(s), and each parish book was organised according to district, quarter and lot.<sup>61</sup> Under each lot, individuals were listed and grouped into households, with the household-head appearing first and, where relevant, their spouse and under-aged children following, then children over the age of 15, servants and lodgers. Thus, in the records the *de facto* definition of a household was a group of people who shared the same rent. The household head was the person with a stated rent, whereas there were no rent statements for the other people in the household. Under-aged foster children were sometimes indicated in the records.<sup>62</sup>

In addition to the annual poll-tax and income records, the poll-tax office in Gothenburg, maintained a card-based central register. The central register was established in 1916 but did not reach full coverage until around 1921.<sup>63</sup> The register includes cards for each inhabitant over the age of 15 with information on name, birth date, occupational title, address (with date of arrival) and, in relevant cases, date of death, date of outmigration and destination.<sup>64</sup> Unlike the poll-tax records, the central register was updated continuously. In many cases, the cards reveal the timing of a whole series of moves within the city and

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<sup>60</sup> These parts of the records changed more over time, are more difficult to interpret for a modern-day observer, and have not been included in the GOPP.

<sup>61</sup> Individuals in non-territorial parishes were registered in the poll-tax records of the relevant territorial parish.

<sup>62</sup> Apart from comparing family names, there is no way of establishing whether a household member over the age of 15 was a son or a daughter of the household head (or the household head's spouse), a servant, or a lodger.

<sup>63</sup> Separate registers were kept for men and women. Cards for individuals who died or moved out of the city were put in separate boxes. Göteborgs stads centralregister: män, avlidna och utflyttade, CIV aa, vol. 1-201, GM, GLA; Göteborgs stads centralregister: män, aktuella 1967, CIV ab, vol. 1-180, MA, GLA; Göteborgs stads centralregister: kvinnor, avlidna och utflyttade, CIV ba, vol. 1-363, MA, GLA; Göteborgs stads centralregister: kvinnor, aktuella 1967, CIV bb, vol. 1-183, MA, GLA.

<sup>64</sup> The cards only contain information related to the individual, not their family or household.

sometimes across the city's borders. For our purposes, the central register makes it possible to establish whether an individual was in the city at a certain point in time and where to look for them.

### *3.2 Sample criteria*

The initial master sample was based on birth dates and the names of individuals who lived within the administrative city borders in the period 1923 to 1943 and had reached the age of 16.<sup>65</sup> For selection we used the first letter of the family name (14 letters) and the birth date (4 dates). Basic information on these individuals was obtained from the central register. The information we used was: family name, all given names, birth year, parish of residence, year of in-migration (to current address, name of former location included in the case of migration from places outside the city), year of out-migration (to another address within the city), year of out-migration (to named parish outside the city), year of death, and notes indicating whether the individual was lodged in another household, changed name or was missing. Typically, individuals in the central register were given a new register card when changing name.<sup>66</sup> Sometimes changes of residence were registered on both cards, sometimes only on the new card. Thus, in our preliminary file with extracted information from the central register, the same individual could appear on more than one row in the files, even though no change of residence was made. We therefore went through the files manually and constructed a preliminary ID-number for each individual on the basis of available information on names, year of birth and addresses. These preliminary ID numbers were later revised as new information was entered in the database.<sup>67</sup> In order to eliminate the ability to identify individuals, we have anonymised the individuals in the final database by excluding all names.

From the master sample we selected individuals who lived in Gothenburg in the end of at least one of the following years: 1923, 1927, 1931, 1935, 1939 or 1943.<sup>68</sup> The

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<sup>65</sup> In a later stage the sample was expanded by also including individuals living in the city in the years 1915 and 1919 (see below). The age restriction was necessary since individuals under the age of 16 typically only appear with a first name and year of birth. However, there were deviations in the poll-tax records and when we encountered individuals under the age of 16 who otherwise fulfilled the sample criteria we extracted information on them as well. These individuals are included in the database but not in the descriptive statistics and tables presented in the present paper.

<sup>66</sup> This is of particular concern for women, who typically took the family name of the husband upon marriage.

<sup>67</sup> When we found individuals in the poll-tax records we obtained information on their complete date of birth, birth location, their occupation and, in relevant cases, the equivalent information on their spouses.

<sup>68</sup> Note that poll-tax records were finalised with one year lags, and thus, we have used information from the records of 1916, 1920, 1924, 1928, 1932, 1936, 1940 and 1944.

individuals were traced in the poll-tax records every fourth year from their first appearance until death or out-migration. The database was augmented with the spouses of the people who fulfilled the sample criteria.

In a later phase, we expanded the database to also cover the years 1915 and 1919. We not only traced individuals from the master sample backwards but also added individuals in accordance with the sample criteria. We did not have access to the same information from the central register for these years, however, and therefore we had to adjust the procedure of data extraction.

### *3.3 Data extraction*

Based on the information from the central register we were able to construct lists of individuals for each parish and panel year. The lists included name, birth year and residential address and were used to locate individuals in the poll-tax records. When an individual was found in the records, data was extracted onto a specific paper form and a back-up photo was taken of the relevant opening of the records.

It turned out that the address information in the central register was in some cases incomplete or missing. We also had to adapt extraction procedures because of insufficiencies in the administrative structure of two parishes, namely Lundby and Örgryte. These parishes had a rural character and lacked the clear division into districts and blocks that were found in the other parishes. While we could establish lists of sample individuals, we could not use address information to find them, but had to go through the records page by page.

The same procedure was applied to the years 1915 and 1919, for which information in the central register was incomplete. For these years, the application of the sample criteria and links between years of observations were also problematic due to name changes, particularly among women. Our strategy here was to include individuals who could fulfill the criteria. Thereafter we linked individuals appearing in the years 1915 and or 1919 to individuals appearing in the later years, based on available information. Since the central register does not always include the birth names of individuals who changed their last name before 1920, we failed to establish whether some women found in 1915 and 1919 actually

fulfilled the sampling criteria. For the moment, they remain in the database, and so women in these years are somewhat over-represented.<sup>69</sup>

Because of imperfect or missing information in the central register and the human factor, we have to date not been able to extract information for all panel years for all the individuals in the sample.<sup>70</sup> Although our preliminary analyses suggested that the non-response bias was only weakly related to observable socio-economic characteristics, we have made further attempts to find missing individuals by returning to the poll-tax records of those parishes and years for which the outcome in the first round of extraction was particularly low in relation to the expected outcome.

### *3.4 Size and scope of the database*

The GOPP's master sample includes 4,006 unique individuals (1,710 men and 2,296 women). Of these, we were able to find 3,767 individuals (1,600 men and 2,167 women) at least once in the poll-tax records. The total number of possible observations amounts to 14,290, of which we actually found 12,500. Thus, in relation to unique individuals the hit rate was 95 percent and in relation to the total number of possible observations 87 percent. The distribution of observations per men and women is displayed in Figure 4. While the proportions of men and women without observations are roughly the same (5-6 percent), the female distribution is relatively more concentrated due to low numbers of observations per individual. Thus, the mean number of observations is lower for women than for men (3.1 compared to 3.5).

In addition to the people sampled we have extracted information on their spouses; in total 6,195 observations of 2,147 individuals. The spouses appear in the database with their own rows for the years their corresponding sample was found at the address, but are not included in the tables and figures in the present paper.

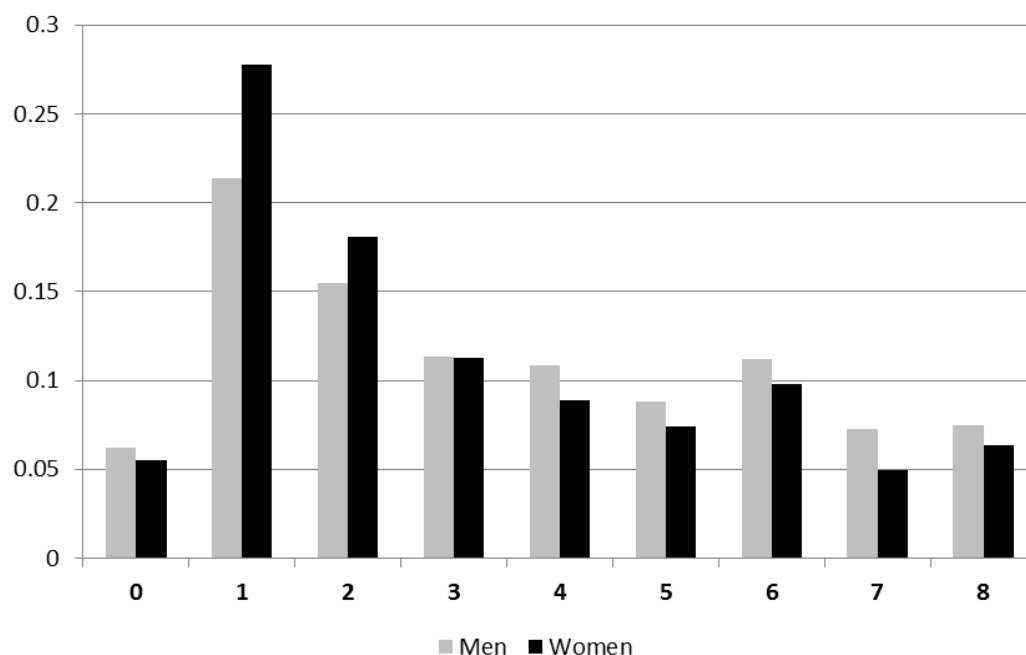
The GOPP contains 49 variables that have been directly extracted from the central register, poll-tax and income records and a number of variables that have been constructed on the basis of the same information. Summary statistics of the variables most directly related to labour mobility are presented in Section 5.

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<sup>69</sup> In future versions of the GOPP, we intend to look more closely at these linkage problems and reduce the extent of oversampling in 1915 and 1919.

<sup>70</sup> Some sample individuals were also impossible to find since they were missing in the poll-tax records. According to prevailing legislation all individuals who were missing for two taxation years were transferred from the poll-tax records to a special record for "non-existing" individuals (*obefintliga*).

FIGURE 4. *Observations per individual, frequencies among men and women*



Source: Own calculations. Data from the GOPP.

#### 4. Representativeness: Comparison with censuses and other official statistics

If related to the total number of inhabitants (Table 2), the GOPP corresponds to about 0.8-0.9 percent of Gothenburg's population over the age of 15, according to the official statistics.<sup>71</sup> In this section we take a closer look at the representativeness of the panel, in relation to the total population of Gothenburg. The overall impression is that the GOPP gives a fairly good picture of Gothenburg's adult population in the years of investigation, but there are also some notable deviations between the database and the population at large.

##### 4.1 Sex composition

For as long as there have been reliable statistics, there has been a higher proportion women in the Swedish population. In the first half of the twentieth century, the surplus was concentrated to urban areas and may be explained by higher rates of rural-urban migration among women. Women were attracted by the greater opportunities in and outside the labour market that were found in the cities. As seen in Table 3, the proportion of women in Gothenburg was fairly stable over time at around 53 percent. Our sample contains

<sup>71</sup> Spouses of sampled persons excluded.

somewhat higher proportions in the two first years of observation, thereafter the proportion is 1-2 percentage points lower in 1923, about the same in 1927, 1931 and 1935 as in the official statistics, and again higher in 1939 and 1943. The observed change in the proportion of women was expected, since we had to oversample women in 1915 and 1919, as mentioned in Section 3.3.

TABLE 2. *Gothenburg's population and the GOPP*

Year	Population according to official statistics			GOPP D	GOPP/Total population 16 and over D/C
	Total population A	Proportion under 16 B	Population 16 and over C		
1915	186,180	0.300	130,326	1,179	0.009
1919	198,814	0.283	142,550	1,302	0.009
1923	225,745	0.266	165,697	1,282	0.008
1927	229,462	0.249	172,326	1,373	0.008
1931	246,084	0.232	188,993	1,592	0.008
1935	256,231	0.207	203,191	1,725	0.008
1939	280,033	0.189	227,107	1,994	0.009
1943	289,546	0.205	230,189	2,053	0.009

Comment: Column A is *mantalskriven folkmängd*, measured at the end of each year. Column B is estimated based upon the nearest census.

Source: Own calculations. Data from the GOPP and *Statistisk årsbok för Göteborg* (relevant years).

TABLE 3. *Gothenburg's population by sex (proportion of men and women)*

Year	Official statistics		GOPP	
	Men	Women	Men	Women
1915	0.47	0.53	0.43	0.57
1919	0.47	0.53	0.44	0.56
1923	0.47	0.53	0.49	0.51
1927	0.47	0.53	0.47	0.53
1931	0.47	0.53	0.47	0.53
1935	0.47	0.53	0.46	0.54
1939	0.48	0.52	0.44	0.56
1943	0.47	0.53	0.43	0.57

Source: Own calculations. Data from the GOPP and *Statistisk årsbok för Göteborg* (1944: 11).

#### 4.2 Age structure

Detailed information on the age structure of Gothenburg's population may be obtained from the censuses that were taken at five- or ten-year intervals. The shaded columns in Table 4 display the age structure of the population (individuals under the age of 16

excluded) according to the censuses taken in the years 1920, 1930, 1935, 1940 and 1945. Over time the censuses reveal a decreasing proportion of the population aged 16 to 24 and increasing proportions middle-aged and elderly.

The non-shaded columns show the equivalent age structures of the GOPP. Since the census years do not exactly match our observation years (with the exception of 1935) we do not expect to find perfect correspondence. A significant deviation arises from the fact that the GOPP includes few individuals older than 67 in the years 1915 and 1919. This is because the poll-tax rolls for these years only reported birth years for elderly people and it was impossible to determine whether an individual should belong to the sample or not. After 1919, the proportion of elderly in our sample is about the same or somewhat lower than in the censuses.

Overall, the age structure of our sample is fairly similar to that of Gothenburg's population as a whole. We do not believe that our procedures for sampling and data extraction have caused serious biases with regard to age.

TABLE 4. *Gothenburg's population structure by age group according to censuses and the GOPP*

Age	G1915	G1919	C1920	G1923	G1927	C1930	G1931	C1935	G1935	G1939	C1940	G1943	C1945
16-24	0.23	0.22	0.23	0.22	0.24	0.22	0.24	0.20	0.22	0.20	0.19	0.18	0.16
25-34	0.28	0.28	0.26	0.27	0.23	0.24	0.24	0.24	0.27	0.28	0.25	0.26	0.23
35-44	0.22	0.22	0.19	0.19	0.21	0.21	0.19	0.21	0.18	0.20	0.20	0.22	0.21
45-54	0.14	0.15	0.13	0.16	0.15	0.15	0.15	0.16	0.15	0.15	0.17	0.17	0.17
55-66	0.13	0.13	0.11	0.12	0.11	0.11	0.11	0.12	0.12	0.11	0.13	0.12	0.14
67-	0.00	0.01	0.07	0.05	0.07	0.07	0.06	0.07	0.06	0.06	0.07	0.06	0.08

Comment: C=census, G=GOPP. Individuals under the age of 16 excluded.

Source: Own calculations. Data from the GOPP and *Statistisk årsbok för Göteborg* (relevant years).

#### 4.3 Civil status

In Table 5 we compare the GOPP, classified according to civil status (married, not married, divorced and widowed) with the equivalent proportions in the census years.<sup>72</sup> This comparison suggests that married people are overrepresented in the GOPP in the years 1915 and 1919 in particular. There is a corresponding underrepresentation of unmarried people in the same years. The divorced group is very small whereas the widowed group is somewhat larger and seems to be accurately captured in our sample.

<sup>72</sup> Persons under the age of 16 have been assumed to be unmarried and excluded from the census figures.



The overrepresentation of married individuals in 1915 and 1919 is a matter that may be important to consider when studying various kinds of dynamics in the Gothenburg labour market over time.

TABLE 5. *Gothenburg's population by civil status according to censuses and the GOPP*

Status	C1910	G1915	G 1919	C1920	G1923	G1927	C1930	G1931	C1935	G1935
Married	0.41	0.48	0.49	0.43	0.47	0.48	0.46	0.48	0.50	0.50
Not married	0.52	0.45	0.45	0.49	0.47	0.45	0.46	0.45	0.42	0.43
Divorced	0.00	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.02	0.01
Widow/-er	0.07	0.05	0.05	0.07	0.05	0.06	0.06	0.06	0.06	0.06

Comment: C=census, G=GOPP. When calculating proportions by civil status for the census years, individuals under the age of 16 have been excluded.

Source: Own calculations. Data from the GOPP and *Statistisk årsbok för Göteborg* (relevant years).

#### 4.4 Average income

For 1920 and 1930, the statistical yearbooks for Gothenburg include information on average incomes. In Tables 6 and 7 we compare the average total incomes (excluding individuals without stated incomes) in the census with the nearest GOPP year. Thus, we compare the 1920 census with 1919 and the 1930 census with 1931. We exclude individuals without stated incomes (in accordance with praxis in the census reports) and individuals with extremely high incomes (total income >SEK 200,000), which would have affected the calculated averages for the GOPP due to the limited number of observations. Both comparisons result in somewhat higher average incomes in the GOPP than in the census. While the average income of people in Gothenburg in 1920 was SEK 3,623 according to the census, the GOPP average is SEK 3,902. In 1930 the average income according to the census was 2,772, and 2,882 according to the GOPP. Looking at the 95 percent confidence intervals, we see that the averages of the censuses in both cases fall within the lower and upper bounds of the GOPP estimation.

We conclude that although there is a certain overrepresentation of individuals with high incomes in GOPP, this bias is not a serious problem.

TABLE 6. *Average total incomes in Gothenburg in the 1920 census and the GOPP 1919*

C1920 Average income	Average income	Standard error	G1919		N
			95 % confidence interval		
			Lower bound	Upper bound	
3,623	3,902	198	3,512	4,291	786

Comment: C=census, G=GOPP. Individuals without stated incomes have been excluded when calculating the average for the GOPP in order to make the figures comparable. Individuals with incomes over SEK 200,000 have been excluded in order to reduce the influence of extreme values.

Source: Own calculations. Data from *Statistisk årsbok för Göteborg* (1924: 36-37) and the GOPP.

TABLE 7. *Average total incomes in Gothenburg in the 1930 census and the GOPP 1931*

C1930 Average income	Average income	Standard error	G1931		N
			95 % confidence interval		
			Lower bound	Upper bound	
2,772	2,882	111	2,665	3,099	1,001

Comment: C=census, G=GOPP. Individuals without stated incomes have been excluded when calculating the average for the GOPP in order to make the figures comparable. Individuals with incomes over SEK 200,000 have been excluded in order to reduce the influence of extreme values.

Source: Own calculations. Data from *Statistisk årsbok för Göteborg* (1940: 15) and the GOPP.

## 5. Sample characteristics

In the following section we present some cross-sectional sample characteristics related to labour-force participation, namely income, occupation and employer.

An attractive feature of the tax records is that they distinguish between four types of incomes: income from property, capital, employment and business. Table 8 shows the proportions of individuals each panel year with a recorded income of a particular type. It is evident from the table that incomes from property were unusual.<sup>73</sup> Capital incomes were more common and the proportions of men and women with that kind of income increased over time. For men, the proportion with income from employment was 10 percentage points lower in 1915 than later, probably a reflection of the tax reform in 1919. Between the years 1919 and 1939, about 80 percent of the men in our sample had income from employment. In the last year of investigation the proportion had increased to 85 percent. The equivalent proportion of women with income from employment was, as expected, considerably lower than for men, however, the gap between men and women in this respect narrowed in the late 1930s and early 1940s. In 1943, half the women in the sample had income from employment. The distinction between income from employment and income from business was not always clear cut. It appears that the incomes from the

<sup>73</sup> Note that income from property was not reported in the poll-tax records in the years 1915 and 1919.

operators of small businesses were sometimes recorded as income from employment. The proportion of people with income from business fluctuated between 6 and 9 percent for men and increased from 2 to 3 percent for women.

For an era without labour-force surveys, income sources can be used as indicators of labour-market attachment. Whereas individuals who only have incomes from property and/or capital are outside the labour market, those with incomes from employment and/or business are participating in the labour market. The GOPP does not allow direct identification of unemployed individuals, in the modern sense (those without jobs who are actively looking for work). Yet, there are, at least indirectly, opportunities to capture 'underemployed' people, that is to say: individuals with incomes so low that they cannot be associated with full-time work.<sup>74</sup>

TABLE 8. *Proportions of various types of incomes by year and sex*

a) Men

Year	Type of income			
	Property	Capital	Employment	Business
1915	0.00	0.03	0.75	0.07
1919	0.00	0.06	0.85	0.09
1923	0.01	0.09	0.80	0.07
1927	0.02	0.10	0.78	0.07
1931	0.01	0.11	0.79	0.07
1935	0.01	0.13	0.77	0.06
1939	0.01	0.13	0.83	0.07
1943	0.08	0.14	0.85	0.06

b) Women

Year	Type of income			
	Property	Capital	Employment	Business
1915	0.00	0.01	0.11	0.02
1919	0.00	0.03	0.36	0.02
1923	0.00	0.04	0.41	0.02
1927	0.00	0.05	0.37	0.02
1931	0.00	0.05	0.41	0.03
1935	0.00	0.09	0.40	0.03
1939	0.00	0.08	0.45	0.03
1943	0.02	0.10	0.51	0.03

Source: Own calculations. Data from the GOPP.

<sup>74</sup> See Nyberg (1989) and Wallentin (1978).

TABLE 9. *Numbers and proportions of individuals with occupational title and employer, respectively*

Year	Men			Women		
	N	Occupation	Employer	N	Occupation	Employer
1915	511	0.94	0.59	668	0.38	0.15
1919	579	0.95	0.64	723	0.39	0.19
1923	623	0.94	0.60	659	0.44	0.26
1927	647	0.92	0.62	726	0.41	0.28
1931	742	0.93	0.63	850	0.44	0.29
1935	795	0.91	0.61	930	0.39	0.28
1939	883	0.93	0.67	1111	0.38	0.31
1943	883	0.92	0.70	1170	0.40	0.32

Source: Own calculations. Data from the GOPP.

Before the introduction of systematic labour force surveys in the 1960s, official statistics often reported numbers and proportions of ‘gainfully employed’. The meaning of this concept is widely debated and may have varied over time.<sup>75</sup> It appears that having an occupational title was a key feature of gainful employment. Information in the column for occupation in the poll-tax records has been given HISCO codes (van Leeuwen, Maas & Miles, 2002).<sup>76</sup>

Table 9 shows the numbers and proportions of men and women in our sample with a stated occupational title (pure status titles, such as *fru* or *fröken*, excluded). As seen in the table, over 90 percent of the men had an occupational title, compared with around 40 percent of the women. For men, it was more common to have a recorded occupational title than to have income from employment and/or business. This was because retired or temporary unemployed individuals could retain their occupational title in the poll-tax records.<sup>77</sup> For women, we observe a different pattern. Until the late 1930s, women more often had recorded occupational titles than an income from employment. Thereafter, it became more common for women to have an income than to have an occupational title.

Another gender difference that we see in the data concerns occupational structure, reported in Table 10, which was more dynamic for women. This is in accordance with the picture given in the official statistics presented above (see Table 1), in spite of different

<sup>75</sup> Nyberg (1998); Wegerman (2008).

<sup>76</sup> Thanks to Patrick Svensson for sharing standardised occupational titles and HISCO codes from the Scanian Economic Demographic Database (SEDD). We have made one important deviation from the HISCO principles; by using information on employers, we have as far as possible tried to give assistants (*biträden*) specific occupational codes rather than -1, which is prescribed by HISCO. We found that most of these individuals were shop assistants (HISCO 45130). We have also coded the subsidiary HISCO variables Status and Relation.

<sup>77</sup> The title was in such cases preceded by the abbreviation *f.d.*

occupational classifications. About two thirds of the men in our sample were employed in the HISCO major groups 6-9. About 10 to 12 percent had professional, administrative or managerial jobs (HISCO major groups 0, 1 and 2) and about 10 percent were employed in offices (HISCO major group 3). The proportions with commercial (HISCO major group 4) or service (HISCO major group 5) occupations were about 8 and 5 percent, respectively.

Relatively fewer women were found in production (about a third in HISCO major groups 6-9), whereas women with office, trade and service jobs were more common. Over time, service occupations lost some importance while office and trade-related occupations became more common.

Our final indicator of labour-market status is whether a person had a recorded employer. We have extracted and standardised information about employers from the field

TABLE 10. *Distribution of occupations by sex*

a) Men

Major group	Year							
	1915	1919	1923	1927	1931	1935	1939	1943
Professional, technical and related (0-1)	0.06	0.05	0.06	0.06	0.06	0.07	0.05	0.05
Administrative and managerial (2)	0.04	0.06	0.05	0.05	0.05	0.05	0.06	0.06
Clerical and related (3)	0.10	0.10	0.10	0.13	0.12	0.11	0.10	0.10
Sales (4)	0.08	0.08	0.08	0.09	0.08	0.08	0.07	0.08
Service (5)	0.04	0.04	0.05	0.05	0.07	0.06	0.05	0.05
Agricultural, production and related (6-9)	0.67	0.67	0.66	0.63	0.62	0.62	0.66	0.66
N	480	551	583	594	690	726	820	808

b) Women

Major group	Year							
	1915	1919	1923	1927	1931	1935	1939	1943
Professional, technical and related (0-1)	0.06	0.08	0.08	0.08	0.07	0.07	0.09	0.10
Administrative and managerial (2)	0.04	0.07	0.03	0.04	0.06	0.05	0.04	0.06
Clerical and related (3)	0.08	0.15	0.14	0.14	0.13	0.14	0.16	0.18
Sales (4)	0.10	0.11	0.10	0.10	0.14	0.15	0.14	0.12
Service (5)	0.39	0.29	0.33	0.31	0.30	0.32	0.27	0.24
Agricultural, production and related (6-9)	0.32	0.30	0.32	0.34	0.31	0.27	0.29	0.30
N	251	281	287	298	375	362	421	464

Comment: HISCO major groups in parenthesis. Groups 0-1 and 6-9, respectively, collapsed.

Source: Own calculations. Data from the GOPP.

with various notes in the poll-tax records.<sup>78</sup> Each employer (or in a few cases, combinations of employers) have been given a unique code. Our rule of thumb has been to define the employer as narrowly as possible. We distinguish between different firms in the same business group, but not between different working places within the same firm. For example, Svenska Amerikalinjen and Svenska Ostindiska Kompaniet have been categorised as different employers, even though these organisations belonged to the business group Broström & Co. We have as far as possible considered mergers of organisations, such as the fusion between Pripps and Lyckholms (breweries) in 1927. Shifts of generations and ownership have given rise to spelling variations of existing firm names, indicated by “& Son” or “Efttr.”. These have not been given unique employer codes.

Table 11 reports absolute numbers and the proportions of sample individuals with recorded employers of those who also reported income from employment. Again, we see level differences between men and women. For men in our sample, the proportion who had a recorded employer shows a tendency to increase from around 70 percent in 1915 to 80 percent in 1943. For women, the equivalent proportion was strikingly high in 1915, when few women declared income from employment, lower in the years 1919 and 1923 and thereafter higher.

TABLE 11. *Numbers and proportions of individuals with a stated employer, given income from employment, by year and sex*

Year	Men		Women	
	N	Proportion	N	Proportion
1915	384	0.72	74	0.76
1919	490	0.73	257	0.51
1923	496	0.71	268	0.56
1927	507	0.75	266	0.66
1931	583	0.76	348	0.63
1935	613	0.74	375	0.60
1939	734	0.80	505	0.64
1943	747	0.80	597	0.61

Source: Own calculations. Data from the GOPP.

<sup>78</sup> For some occupational groups the explicit information on employers is often missing. This is probably because those who filled in the forms for the registration, or the final records, thought that the employer was obvious. If no other information was available, and if the individual had income from employment, we have assumed that: all customs officers (HISCO 31040) were employed by the customs authority; all policemen (HISCO 58220) were employed by the local police authority; all first-level education teachers (HISCO 13320) were employed by the local school authority, all tram conductors (HISCO 36040) were employed by the local tram corporation and all postmen (HISCO 37030) were employed by the post office.

It is evident from the figures that many men and women with stated income from employment had no explicit employer. Why was this? This is a question that deserves further inquiry. As mentioned above, some business owners declared income from employment rather than income from business. Some individuals had several employers over the course of the panel year and some had been employed for a part of the year but were unemployed at the time when they supplied information to the tax authorities. For women, there was also the fact that a substantial number were in domestic service and thus not employed by a firm, but by private individuals.

## 6. Panel attrition

So far, we have focused on cross-sectional sample properties of the database, however, the database is in essence a panel that individuals are allowed to enter, remain or leave. Individuals enter as they reach the age of 16 or move into Gothenburg at later ages. Individuals leave because of death, out-migration, avoidance of registration in the poll-tax records or because of errors in the process of data extraction. The nature of the panel implies that some individuals are observed on several occasions, whereas others disappear after having been observed at just one point in time.

In this section we present some basic patterns of panel attrition, which may serve as a point of departure for further analyses of the issue, depending on the specific research question. We distinguish between attrition due to (1) death, (2) out-migration and (3) not being found in the records.<sup>79</sup>

On average, the rate of panel attrition from one point of observation to the next is 16 percent, but there are differences related to the year of observation, sex and age group. Looking at attrition by year, displayed in Table 12, we see the highest rates in 1915-19 and 1919-23; around 20 percent for men and 30 percent for women. Thereafter the attrition rates fell to levels around 10-14 percent for both men and women. The high rates of attrition at the beginning of the period are related to problems of linkage (see Section 3.3), and higher rates of out-migration. The correlation between various types of attrition and age is shown in Table 13. What we see is basically higher levels of attrition due to migration at young ages, whereas deaths become a more important cause of attrition in older ages.

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<sup>79</sup> For the period before 1921 we do not have information on death and outmigration, and therefore we only report the total rate of attrition for these years.

TABLE 12. *Panel attrition by year, type and sex*

a) Men

<b>Year <math>t</math></b>	<b>N</b>	<b>Remain in panel</b>	<b>Died</b>	<b>Move out from city</b>	<b>Not found at address</b>	<b>Total rate of attrition</b>
1915	511	0.80				0.20
1919	579	0.79				0.21
1923	623	0.86	0.03	0.09	0.03	0.14
1927	647	0.89	0.03	0.05	0.03	0.11
1931	742	0.87	0.04	0.06	0.03	0.13
1935	795	0.88	0.02	0.06	0.03	0.12
1940	883	0.86	0.03	0.07	0.04	0.14

b) Women

<b>Year <math>t</math></b>	<b>N</b>	<b>Remain in panel</b>	<b>Died</b>	<b>Move out from city</b>	<b>Not found at address</b>	<b>Total rate of attrition</b>
1915	668	0.72				0.28
1919	723	0.66				0.34
1923	659	0.88	0.03	0.06	0.03	0.12
1927	726	0.90	0.02	0.06	0.02	0.10
1931	850	0.86	0.03	0.07	0.04	0.14
1935	930	0.91	0.02	0.04	0.03	0.09
1940	1,111	0.88	0.02	0.06	0.04	0.12

Comment: N=number of observations in year  $t$ . Attrition is calculated from year  $t$  to year  $t+4$ . Spouses of sampled persons not included.

Source: Own calculations. Data from the GOPP.

Men and women over the age of 70 also leave the panel simply because they are not found at their addresses, which may be due to hospitalisation and changes of residence.

There are a range of possible determinants for panel exits. In Table 14, we present results from a multinomial logistic regression where we analyse the probability of leaving the panel from year  $t$  to year  $t+4$ , keeping the distinction between three types of attrition. As seen in the table, women are less likely to leave the panel due to death, whereas the difference between men and women are small when it comes to outmigration and not being found at an address. Old age is, as expected, associated with increased risk of dying but also a decreased risk of leaving the city through migration. Having a recorded occupational title is associated with a higher risk of exit through migration. Being in an employment relationship has the opposite effect (a lower probability of migration). These results probably reflect underlying migration patterns where young individuals with a weak attachment to the labour market more often moved out of Gothenburg. It is also notable that individuals with income from business are less likely to leave the city.



TABLE 13. *Panel attrition by age group, type and sex*

## a) Men

<b>Age group</b>	<b>N</b>	<b>Remain in panel</b>	<b>Died</b>	<b>Move out from city</b>	<b>Not found at address</b>	<b>Total rate of attrition</b>
>=16<20	447	0.88	0.00	0.10	0.01	0.12
>=20<25	599	0.84	0.01	0.12	0.03	0.16
>=25<30	629	0.86	0.00	0.11	0.02	0.14
>=30<35	591	0.86	0.01	0.11	0.02	0.14
>=35<40	507	0.83	0.01	0.14	0.02	0.17
>=40<45	450	0.88	0.02	0.08	0.03	0.12
>=45<50	418	0.89	0.02	0.07	0.02	0.11
>=50<55	343	0.89	0.04	0.06	0.01	0.11
>=55<60	292	0.88	0.05	0.04	0.02	0.12
>=60<65	228	0.82	0.05	0.09	0.03	0.18
>=65<70	142	0.77	0.14	0.04	0.06	0.23
>=70	134	0.61	0.24	0.01	0.14	0.39

## b) Women

<b>Age group</b>	<b>N</b>	<b>Remain in panel</b>	<b>Died</b>	<b>Move out from city</b>	<b>Not found at address</b>	<b>Total rate of attrition</b>
>=16<20	511	0.85	0.00	0.12	0.03	0.15
>=20<25	769	0.80	0.01	0.16	0.03	0.20
>=25<30	818	0.83	0.00	0.14	0.02	0.17
>=30<35	725	0.85	0.01	0.12	0.02	0.15
>=35<40	592	0.89	0.00	0.09	0.02	0.11
>=40<45	539	0.86	0.01	0.11	0.02	0.14
>=45<50	430	0.90	0.00	0.08	0.02	0.10
>=50<55	356	0.85	0.03	0.09	0.03	0.15
>=55<60	307	0.85	0.02	0.13	0.00	0.15
>=60<65	260	0.80	0.03	0.15	0.01	0.20
>=65<70	160	0.81	0.06	0.07	0.06	0.19
>=70	198	0.61	0.22	0.03	0.15	0.39

Comment: N=number of observations in year  $t$ . Attrition is calculated from year  $t$  to year  $t+4$ . Spouses of sampled persons not included. If no other information was available, panel exits in 1915-1919 and 1919-1923, were counted as moves out from the city.

Source: Own calculations. Data from the GOPP.

TABLE 14. *Determinants of panel exit from year t to year t+4*

	<b>Died</b>	<b>Moved out from city</b>	<b>Not found at address</b>
Woman	-0.55**	-0.11	-0.05
Age group			
>=16<20	ref	ref	ref
>=20<25	0.85	0.39**	0.50*
>=25<30	-0.34	0.14	0.17
>=30<35	0.60	0.02	0.00
>=35<40	0.43	-0.19	0.15
>=40<45	1.33**	-0.68**	0.07
>=45<50	0.92	-0.73***	-0.28
>=50<55	2.42***	-0.89***	-0.15
>=55<60	2.37***	-1.05***	-0.98*
>=60<65	2.58***	-0.60*	-0.04
>=65<70	3.43***	-2.33***	0.93*
>=70	4.39***	-1.22**	2.02***
Have occupational title	-0.04	0.84***	0.27
Have employer	-0.12	-0.55***	-0.72***
Have income from employment	-0.19	-0.19	0.15
Have income from capital	-0.49*	0.09	-0.04
Have income from business	-0.01	-0.97***	0.37
Year t			
1923	ref	ref	ref
1927	-0.14	-0.25	-0.20
1931	0.20	-0.11	0.17
1935	-0.26	-0.30*	0.03
1939	-0.09	0.05	0.37*
Parish	YES	YES	YES
Constant	-4.93***	-2.48***	-3.65***

Comment: Coefficients from multinomial regression with 'Remain in the panel' as base category. Spouses to sample people not included. N=7,966. The years 1915 and 1919 excluded. \*p-value<0.10, \*\*p-value<0.05, \*\*\*p-value<0.01.

## 7. Concluding remarks

In this paper we introduced a longitudinal database of individuals living in the dynamic industrial city of Gothenburg in the period 1915-1943. The city's labour market was clearly segregated by gender; men were concentrated in shipyards and other heavy industries and women were more often found in domestic services, and the textile and foodstuffs industries. After a boom following World War I, Gothenburg was hit by the severe crisis in the early 1920s, after which unemployment levels, in particular for men, remained high until the second half of the 1930s. Overall, the period under investigation was characterised

by changes in the organisation of work, such as the introduction of performance-based pay and other rationalization measures, and industrial relations as increasing proportions of the workforce came under the coverage of collective agreements.

This is, in brief, the context in which we have traced a random sample of adult inhabitants of the city, corresponding to about 1 percent of the population and supplemented by spouses, every fourth year. A central register of all inhabitants in the city helped us to find and extract information on the sampled individuals from poll-tax records. The hit rate was high; 95 percent of the individuals and 87 percent of the possible observations in the initial master sample were found.

Our main conclusion when comparing basic sample characteristics with official statistics is that the GOPP is broadly representative of Gothenburg's population at large, however we find three deviations that are worth considering: (1) higher proportions of women at the beginning and end of the period of investigation, (2) individuals over the age of 67 are missing in the years 1915 and 1919, and (3) married individuals are overrepresented in the sample in the years before the 1930s.

The poll-tax records include information on a number of labour-market related issues, such as incomes of various kinds, occupational titles and names of employers. We briefly reviewed some of these basic sample characteristics by year and sex. For example, we showed that over 90 percent of the men and about 40 percent of the women had occupational titles. Considerable proportions of men and women also have information about their employer. In future research we will further elaborate on the combination of various characteristics and the flows between occupations and employers.

Another issue that should certainly be further elaborated is the issue of panel attrition. In the paper we show that on average 16 percent of the sample leaves the panel within a four-year period. Attrition was particularly common at the beginning of the period of investigation, which was in accordance with our expectations. Except for the periods 1915-19 and 1919-23, the total rates of attrition were not higher among women.

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