LUND UNIVERSITY
School of Economics and Management

Master program in Economic Growth, Population and Development:
Economic History track

A comparison of the Swedish and German wage share in manufacturing 1870 to 1913

Exploring the role of power resources for the wage share

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Abstract: This thesis analyzes the distribution of profits to labor. The factor share distribution has attracted mounting attention from researchers in the last decades, as it has been identified as a central determining factor for economic inequality. However, how the factor share distribution has developed historically is debated. By analyzing the historical wage share for manufacturing workers in Sweden and Germany during the industrialization process from 1870 to 1913, this thesis provides a new angle, examining the wage share in manufacturing testing variables which in previously literature have been pointed out to impact the wage share. The analysis finds limited empirical evidence that union strength impacted the wage share for manufacturing workers during this period, probably due to the low levels of labor organization and exclusive institutions. Instead, the relatively low wage share seems to have spurred an increase in unionization. Emigration stands out as the principal explanatory variable correlating with an increase in the wage share through increasing labor scarcity. This supports the extensive literature which has emphasized the role mass emigration in the 19th century had in enhancing the standard of living for workers in both Sweden and Germany.

Key words: Wage share, power resource, unions, wages, emigration, standard of living, inequality, structural analysis

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1   Introduction

Sweden is perceived to be one of the main success stories of the late 19th-century industrialization, as it experienced a rapid real wage increase for the overall population and especially for unskilled workers. Several scholars argue that the real wage increase for unskilled workers during this period was due to emigration, trade, capital import and overall successful industrialization (Björklund & Stenlund 1995, Molinder and Ericsson 2018, Ljungberg 1997, Ljungberg & Schön 2013, Schön 2010, Söderberg 2010, Williamson 1995, 1998). However, some scholars have questioned if workers disproportionately benefited from this economic expansion. Erik Bengtsson and Svante Prado (2018, Prado 2009) argue that the Swedish real wage growth in manufacturing was lagging behind labor productivity growth, indicating that the wage share decreased, which is explained by the lack of bargaining power among workers during this period. By comparing the Swedish wage share to the German case, where the labor movement developed earlier, this thesis will bring in a new angle on the role of workers' bargaining power for the wage share from 1870 to 1913, in order to identify whether or not more durable power resources among the working class correlates with a higher wage share of total income. Power resources are conceptualized through the theoretical framework of power resource theory formulated by Walter Korpi, which operationalize power resources of the working class through two main variables: *working class party strength* and *unionization rate* (Korpi 1981 p.32-35, 1998 p.52-56). This operationalization of power resources has previously been used by Bengtsson (2014) when analyzing the 20th century wage share development. The analysis thereby estimates to what extent unions and working-class parties together with other control variables, particularly emigration, impacted the wage share for manufacturing workers in this period, by employing manufacturing wage and income data from Phelps Brown and Margaret Browne (1968) to observe the wage share development.

Labor unions and workers' parties in Sweden and Germany were undisputedly weaker before world war one than they were in the 1920s and especially compared to the post-world war era of regulated capitalism (Bartels 2017. Bengtsson & Prado 2018). Nevertheless, these factors could hypothetically impact wage bargaining on the margin, especially in specific sectors where stronger unions had emerged, and where some social reforms had been enacted. Lennart Schön argues that the growing labor movement made a positive impact on the real wage increase in the late 19th century Sweden together with favorable market forces (2010 p.165) and Gerhard Bry makes the same argument for the German case (1960 p.33). Brown and Browne (1968) also identify that wages and unionization started to pick up speed simultaneously in the 1890s.

However, they recognize that the link between the two variables is not entirely straight forward and is not observed for every country in their study. Thereby Brown and Browne conclude that unions sometimes did, and other times did not, affect the wage-setting in this period (1968 p.92-104). Other scholars have instead argued for a type of inverted PRT perspective from 1870 to world war one, as a decreasing wage share is argued to increase unionization. This is because a low wage share caused increased class conflict, resulting in increased unionization (Bartels 2017, Prado 2010). This controversy in the literature makes it relevant to examine how the degree of differences in power resources affected the wage share for manufacturing workers in German and Swedish manufacturing during 1870-1913, or if it rather was other factors that influenced the wage share.

This analysis concludes that the power resources of the working class, operationalized through unions and workers' parties, seem to have been too weak to have had a significant impact on the wage share from 1870 to 1913. Instead, the wage share is observed to fall during the period when unionization started to pick up speed. This thesis argues that it is highly unlikely that unions were causing the falling wage share. Instead, it argues that the causation might have been the other way around, namely that unionization increased due to the relatively low wage share, because of increased conflict over the factor share distribution - a hypothesis previously proposed by Charlotte Bartels (2017). Emigration is the one variable this analysis finds to have a positive covariation with wage share in manufacturing, as a drop in the labor supply due to emigration in Sweden and Germany possibly increased the wage share. This was especially the case in Sweden, where close to 8% of the population left the country during the 1880s (Ljungberg 1997). This indicates that the labor migration possibly impacted the factor share distribution which seems to have had implications for economic inequality and the standard of living for manufacturing workers.

1.1 Purpose of the study

Why should social scientists be interested in understanding the wages share of total income? The economist Mark Blaug once said that it is a great mystery "why anyone regards the share of wages as an interesting problem" (Blaug 1996 p.467) and Gregory Mankiw's textbook on macroeconomics argue that the factor share distribution is uninteresting as the marginal product of the specific production function determines it and that it has been stable over time (2007 p.55-58). Tony Atkinson, one of the chief researchers on economic inequality, has criticized this view and argues instead that factor share distribution are the "principal problem of political

economy" (2009). Atkinson recognizes three crucial reasons for regarding factor shares as an essential topic. Firstly, factor shares can be used to identify links between the national accounts and the income at the household level. He points out that only because the aggregate economy is doing well does not directly translate into improvements on the household level, considering that these gains have identified to be distributed unequally, especially on the lines of capital and labor. Secondly, factor shares can help in understanding inequality through the personal distribution of income by the dual analysis of the division of both of the factors as a pedagogical way of accounting for different types of inequality (Atkinson 2009). Thirdly, from a more philosophical point of view, Atkinson (2009) argues that it addresses the fairness of distribution of different types of income. Wages are often viewed as earned income, while capital income often is regarded as a source of passive rental income. He therefore argues that there must be a sense within the population that a fair share of profit goes to wages, for public legitimacy of the economic system to be in place (2009).

Atkinson's conclusion that the distribution between the factor shares matters, especially for inequality, is supported in Waldenström and Bengtsson's (2018) study on the long-term relationship between the division of factor shares and income inequality for 21 economies since the start of the 20th century. Bengtsson and Waldenström (2018) identify that when capital receives a high share of total profits, it covaries with an increase in the income share for the top income brackets. However, this link seems to vary over time, possibly due to institutional differences (Bengtsson & Waldenström 2018). This growing literature by Atkinson (2009), Bengtsson and Waldenström (2018), and Bartels (2017) on the central role factor share distribution has for economic inequality, demonstrates why factor shares and the wage share should be regarded as relevant. This debate has come to show the importance of factor shares for the changing standard of living for the growing industrial worker segment of society in both Sweden and Germany. A further exploration on the wage share from 1870 to 1913 could therefore be relevant in order to understand the overtime dynamics of this period's high levels of inequality, especially wealth inequality (Piketty 2014 p.355-357).

There are several reasons for comparing the German and Swedish manufacturing wage share from 1870 to 1913, as similar industrial structures emerged in the two countries, centered around electrical engineering, while having integrated markets and business cycles (Schön 2007). Both countries also experienced considerable emigration to the Americas in this period, which several scholars identify as central to the real wage development for the two countries

(Ljungberg 1997, Brown & Browne 1968 p.85-92). However, the Swedish emigration rates peaked at a higher rate in the 1880s at 8% (Ljungberg 1997), compared to Germany which had a 3% emigration ratio during this decade (Willcox 1969 p.335). Another significant factor is that Germany was the origin and inspiration for the Swedish labor movement (Bengtsson 2019, Schön 2010 p.167), and this pinpoints the relevance to identify whether an earlier and better-organized labor movement in Germany was able to achieve a higher wage share in comparison to the Swedish case.

The Swedish and German labor movements, both parliamentary and union branch, were relatively marginalized from 1870 to 1913. However, from observing increase in strength over time, one can identify if there has been any covariation between higher real wages and power resources during this period.

1.2 Research question

Research question: *To what extent did power resources affect the wage share for manufacturing workers in Sweden and Germany from 1870 to 1913?* This thesis will examine the research question by comparing the development of the wage share of total income in manufacturing for Sweden and Germany by observing how this share covaries with changes in workers' power resources, conceptualized through union density and workers' parties' strength. This analysis will also try to answer if other factors seems more prevalent for the wage share shift in manufacturing for the two countries from 1870 to 1913.

This thesis only compares two similar sectors, namely Swedish and German manufacturing and therefore, do not aim to reach conclusions for the entire economies. Prado (2009) has recommended this approach when comparing between countries, as different sectors follow different wage patterns. Further information on which industries the wage data is drawn from is presented in section 4.1, *Nominal wages for manufacturing*. To look at manufacturing workers is further relevant as it was the first group to see major unionization into free trade unions[1] in Germany and Sweden (Welskopp 2019, Bagge, et al. 1933 p.231, Lindbom 1938 p.37-39), making it the most likely group to have experienced any effect from working class organization at that time, and therefore the most relevant material to test the effect of unionization.

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[1] Modern or free unions are unions unconnected to the older guilds tradition and often connected to the emerging socialist tradition (Bry 1960 p.31. Welskopp 2019)

2 Literature review

This literature review will firstly review research on the development of the German and Swedish labor movements from 1870 to 1913 to explore the treatment variable's constituting power resources. It will separately deal with the development of the union and the development of the workers' parties. Secondly, it will discuss research that outlines the real wage development and explain why the specific observed pattern of wage development in Sweden and Germany occurred, in order to identify variables that previous literature deems as essential to take into account when analyzing the wage share of total income in manufacturing. The literature review lastly presents literature on how economic inequality covaries with the wage share, outlining how the wage share might have had broad implications for the structure of society.

2.1 Development of the labor union's movement

This section will outline the development of this thesis' primary treatment variable, the trade union movement in both Sweden and Germany with focus on unionization rate, overall strength, and ability to negotiate deals with employers, from 1870 to 1913.

In Germany, modern trade unions emerged in the 1870s, but Bismarck's anti-socialist laws from 1879 to 1890 banned them, thus hindering any significant union activity. These laws did however not survive the passing of time and were eventually overruled in 1890. Thereafter the unions quickly turned into mass movements throughout the 1890s (Welskopp 2019) and kept on increasing in size, going from 1 million members in 1899 to 3 million members in 1913 (Welskopp 2019). For all of the non-agrarian workers, the unionization rate reached 30% in 1912 (Kjellberg 1982 p.302). From 1900 to the first world war, the German union consolidated their position, as collective bargaining became ever more prevalent, and by 1913 two thirds of union members had obtained collective agreements. Germany also experienced fewer strikes, even though the unions held the resources to strike, indicating that they became recognized in the German labor market (Welskopp 2019). Welskopp (2019) even goes on to argue that the German Metal Workers' Union was the strongest in the world at that time. Gerhard Bry (1960) also argues that German unions started to impact the wage bargaining process at the start of the 20th century. However, some research has come to doubt the supposedly strength of the emerging German unions. For instance, empirical results presented by Charlotte Bartels (2017) do not support the claim that unions had significant impact on the Germany's wage share from 1870 to 1914.

Sweden's trade unions movement was close to nonexistent during the 1870s – some scattered clubs emerged but there was no national organization (Crouch 1994). However, the following period was very transformative, and by the 1900s, the Swedish trade unions movement formed a national body. It was still marginal in size, with 16% of all non-agrarian workers organized, but managed to obtain a well-defined structure with a national body and established close ties to the social democratic party (SAP), providing it a direct link to state affairs (Crouch 1994). The rapid transformation of the unions continued until 1907 when the unionization rate reached a peak with 39% of all non-agrarian workers and 48% of all industrial workers unionized (Kjellberg 1982 p.269). The collective agreements also obtained recognition by the employers' organization during this period through the 1906 December Compromise between *Landsorganisationen* (LO) and *Svenska Arbetsgivarföreningen* (SAF) (Lundh 2004 p.113). In the following years there was a substantial setback in the unionization rate in Sweden, especially because of the failed general strike of 1909, temporarily causing a lowered morale in the rank and file of the Swedish labor unions. This resulted in a lowered unionization rate to 17% for non-agrarian workers and 19% for industrial workers in 1910 (Kjellberg 1982 p.52, 269-270). This development pattern demonstrates that the Swedish union movement strength was volatile, with the unionization rate drastically going up and down illustrated in *figure 1*. Determining the strength of the Swedish unions becomes difficult as this development shows that it might not have been a stable organization able to enforce its demands during this period, even though it at some point had a relatively high unionization rate.

Figure 1: Unionization rate for non-agrarian workers in Germany and Sweden 1900-1913:
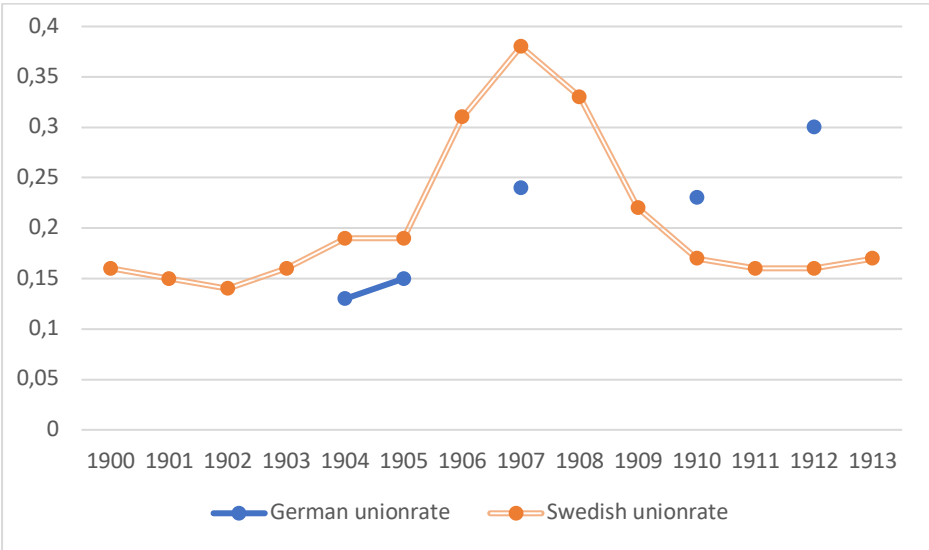
Source: *Kjellberg (1982 p.269,302)*

This account of the two trade union movements' development displays that the German union, had a stronger position than the Swedish in the period after the German state in 1890 legalized the socialist trade unions. However, the Swedish unions quickly came to establish themselves and converged in relation to their German counterpart in unionization rate from 1870 to 1913. Nevertheless, the Swedish unionization rate was still below the German rate in 1912, due to the drop between 1908 and 1909 (figure 1) after the failed general strike. The significant difference is the volatility of the Swedish unionization rate as it came to expand in the first half of the first decade in the 20th century and then contract just as quickly in the end of the decade. The German trade union development was the very opposite with a stable increasing unionization rate.

There is also an apparent similarity in the structure of unionization between branches of the economies in the two countries, as non-agrarian workers to a much higher degree were unionized than agricultural workers in this period (Kjellberg 1982 p.99). According to Kjellberg, a notable organizational difference between the Swedish and German union, is the ideological and organizational unity of the Swedish union, which had no major religious or political fractionalization, in comparison to Germany, where both religious and guild-like business unions emerged (1982 p.166). However, this difference should not be exaggerated as just 70% of the Swedish unionized workers were members of the social-democratic trade union confederation LO in 1914. During the 1880s and 1890s, there were also major internal conflicts in the different unions on whether or not they should cooperate with the socialists (Lindbom 1938 p.94-140). There is no directly comparable measure for Germany but at least 86% of the unionized workers were members of some type of openly socialist union in 1912, while the rest were divided between religious and business unions (Kjellberg 1982 p.302). That such a significant share of all union members were members of socialist unions supports the claim that the unions in both Sweden and Germany predominantly had become ideologically left-leaning movements from the 1890s to the outbreak of world war one.

2.2 Development of workers' parties

The power resource tradition has identified that pro-union preferences among governments alter labor market regulations in favor of employees over employers and that this affects the distributional outcome in society (Kjellberg 1982 p.20, 24, Korpi 2006 p.168). Therefore, it is relevant to operationalize the influence of workers' parties in this period as one of the primary

power resources by the workers at that time. Workers' parties are by the PRT definition social democratic parties and parties to their left, such as communist parties (Korpi 1981 p.34).

The German Social democratic party (SPD) gained in strength during the 1890s up until the first world war. Per Edebalk (2003) argues that SPD influenced German politics both directly and indirectly throughout the period. Indirectly through the threat the German political establishment felt from the growing socialist movement, forcing the Bismarck government to enact social reforms while they simultaneously prohibited SPD (Edebalk 2003). Research by Korpi likewise stress how the German and French cases demonstrates that the emerging socialists' movements in the late 19th century pushed conservative governments to enact social reforms and strengthen workers' rights (2006 p.176). In other words, through their increasing strength, workers' parties seemingly indirectly contributed to a change in national policy. The German social democratic party also gained significant direct power through its electoral success after it became legalized in 1890. From 1912 SPD was in a coalition government, giving the party a significant influence over German politics. One of the principal explanations to the success of the German social democratic party lies in the widespread suffrage for men above 21 in Germany, as 82% were allowed to vote, compared to the Swedish case where only 20% of men above 21 were allowed to vote in 1896 (Bengtsson 2019 p.139). The restrictions on Swedish voting rights were in a sequence of reforms lifted up until 1921 (Aidt et al. 2006). Hence, in 1921, both Swedish men and women above 23 years obtained universal suffrage with some exceptions (Sundevall 2018).

The Swedish Social Democratic Party (SAP) first took seat in the government in 1917 but had significant representation in parliament even during the first decades of the 20th century when suffrage was limited (Bengtsson 2019) with 28% in 1910 and 30% in 1914 (Crouch 1994 p.116). However, Swedish social policy was lagging behind the German, even though reforms were enacted at the very end of the period, with for instance the universal citizen-based pension system reform in 1913, inspired by earlier German reforms (Kunle & Sander 2010 p.70).

The sociologist Göran Therborn (1983) has presented one possible explanation to why the SAP came to attract significant support even when suffrage was limited, namely that the party was established early in the industrial process, before conservative or religious parties were organized, which thereby gave them room to build firm support among the working class (1983). Another explanation for the growing strength of the SAP is given by Bengtsson (2019),

who argues that the suffrage exclusion of lower-income groups created a broad-based coalition in favor of the SAP. Thus, one can say that even if the Swedish labor movement emerged after the German, the Swedish emerged at an earlier step in the process of modernization, something that might have been important for its strength, especially later on in the 20th century. Also, the limit of suffrage might not have been to its disadvantage in the long run.

The main conclusion on the development of the power resources in the form of union and party development is that the literature shows that the German labor movement emerged earlier and gained more power resources than the Swedish counterpart in the period 1870 to 1913. However, the Swedish labor movement came to pick up speed more quickly than the German and had a faster growth pattern, especially the unions up until 1907. Thereafter it came to fall back even before the loss in the general strike and stagnate up until the first world war. However, to what extent this development for unions and workers' parties impacted the wage share in Sweden and Germany up until the first world is quite unexplored.

2.3 Literature on the Swedish wage development pattern 1870 to 1914

This part will present research and theory on real wage development in Sweden and the wage share of total income.

2.3.1 Labor gaining from emigration and structural transformation

The role of globalization in the 19th-century through lowered trade barriers and mass emigration has been stressed by several scholars as essential factors for the Swedish wage increase in the 19th century. The principal research supporting this narrative will be covered in this section. It outlines some of the main reasons for why trade, capital inflow, and emigration should be considered as the main explanatory variables for why Swedish wages increased in the 19th century and gave labor a favorable position in the growth process.

The prominent economic historian Jeffery G Williamson (1995, 1998) has in his work on the globalization period of the late 19th century depicted Sweden and the Scandinavian countries as the primary examples of wage convergence during the late 19th century. The main explanation for the Swedish wage growth, according to Williamson, is the mass emigration from Sweden to the US, which decreased the supply of labor, and subsequently increased the wages for those left in Sweden. Williamson also emphasizes capital inflow as a factor in explaining why real wages grew rapidly. A third factor is that trade appreciated the relative

price of the abundant factor labor while decreasing the scarce factor capital in the Swedish economy, in line with the Heckscher-Ohlin theorem, where the abundant factor in an economy gains from increased trade (1995. 1998). Williamson (1998) argues that these factors combined led to rapid real wage growth and wage convergence between US and Swedish unskilled workers.

Lennart Schön, argues that Sweden experienced a rapid real wage increase following the period of industrialization transformation from 1870 (2010 p.165). He came to stress the role of emigration and emphasized the Swedish structural ability to adapt to the second industrial revolution (Schön 2010 p.164-165). Schön further argues that industrial workers obtained increased bargaining strength during the late 19th century as unions started to form, a factor which made labor able to increasingly affect the wage bargaining process (Schön 2010 p.166). Schön argues that the increasing workers' power reinforced the structural transformation, as less profitable companies were pushed out of business as unions resisted wage cuts, which led to available resources reallocating to new sectors pushing for structural transformation (2004 p.38). Thereby the unions reinforced the long-term growth trajectory, and workers experienced an increase in the wage share during this period (Schön 2004 p.25-27).

Ericsson and Molinder's (2018) working paper on real wages for Swedish unskilled workers from 1831 to 1900, concludes that the industrialization process was advantageous for unskilled workers in Sweden. The general shortage of labor due to emigration and the rapid economic growth spurred massive wage improvements for the Swedish unskilled workers (Ericsson & Molinder 2018). Therefore, they argue that even though Sweden lacked inclusive institutions like universal suffrage and had a low unionization rate, it was still an environment that was improving the living standards of unskilled workers (Ericsson & Molinder 2018).

Johan Söderberg's research on Swedish long-term development of wages also supports the notion that Swedish real wages started to take off in the period after industrialization around 1870 (2010 p.466-467), due to the massive structural transformation in the Swedish economy (Söderberg 2010).

Jonas Ljungberg (1997) study on the effect mass emigration had on Swedish wages and economy in the late 19th century, concludes that emigration was a significant force increasing wages and was beneficial to the entire economy (1997). He argues that the labor shortage

created by mass emigration, when more than 1.2 million Swedes left the country from 1852 to 1914, was central to the increase in Swedish real wages, as it appreciated the relative price of wages to capital (1997). Just like Schön, Ljungberg emphasizes how initial real wage increases created further transformation as the high wages pushed unprofitable companies out of business while making new sectors expand. Ljungberg (1997) further argues that this observed cycle of increasing wages spurred the domestic market expansion, which contributed to further wage growth. Emigration thereby came to impact the structural transformation of the Swedish economy by driving modernization forward due to increased wages.

To conclude, there is a mounting research literature that has come to emphasize the role of emigration, capital imports, and GDP growth, in order to explain why Sweden experienced rapid real wage growth. These factors will be incorporated as control variables in this analysis, as they might have impacted not only the real wage growth but the share of total income going to wages.

2.3.2   Perspective of structural cycles

Lennart Schön is one of the leading advocates for the theoretical perspective of structural cycles in the economy of 40 to 50 years. He argues that these cycles have significant implications for the wage share of the total value added in the economy, as they experience different phases which allegedly affect the composition of the growth process, which affects the return that the two production factors, labor and capital, receives (Schön 2004 p.27).

The structural cycle perspective identifies that the cycles of 40 to 50 years experience two distinct phases. Firstly, a transformation phase, which initiates due to a significant structural crisis when older firms have been made unprofitable, resulting in layoffs and capital being left idle. The crisis lowers the prices of capital goods and enables new industries to emerge, which sparks a new wave of innovation and increased investment, resulting in subsequent transformation (Schön 2009). The second phase is a rationalization process. When the transformation phase has incorporated the new innovations into the economy, business centers on refining the new innovations (Schön 2009). During the rationalization phase, the capital investment ratio is low. This drives down the reward for capital in favor of labor and labor therefore receives a higher share of total profit as it is used more intensely (Schön 2004 p.35-38). The rationalization period comes to a halt after approximately 20 years, when the ability

to rationalize is spent. This results in decreased profitability, setting off a structural crisis that initiates a new 40 to 50-year cycle.

Regardless if one supports the theory of structural cycles or not, long cyclical patterns are observed by Schön in the wage share of value-added data. Notably, in periods when capital investment is low, one observes an increase in the wage share of total value-added. Capital seems to obtain a lower share when it composes a smaller part of total production as labor rise in relative price when employed more intensively (Schön 2004 p.35-38).

The theory of structural cycles is not the primary theoretical perspective of this thesis. Nevertheless, this analysis will take into account the insight from the perspective – that the composition of the growth process affects the factor shares, by taking into account the changes in the capital investment ratio, which according to the theory, should have significant impact on the wage share.

2.3.3   Perspective of export-driven growth

There is also an older narrative in Swedish economic history championed by Lennart Jörberg (2000), arguing that it was the exogenous factor of increased demand in forestry and agricultural products from foreign markets, especially Great Britain, that drove the Swedish industrialization (2000 p.51-52). Instead of the emphasis on transformation and increased demand in the domestic market, this perspective implies that it rather was wage restraints and export growth that pushed industrialization. However, this has been questioned in later research by Ljungberg and Schön (2013) who argues that the Swedish economy's growing wages and subsequent endogenous developments were the primary explanation for the rapid economic growth taking place at the end of the 19th century.

Jörberg (2000) argues that exports of agriculture and natural resources drove the industrialization from 1870 to 1890 and that these exports created the basis for later industrial development. However, in the following decades, emigration and increased growth, especially through productivity, came to have a positive effect on wages, according to Jörberg (2000 p.63).

Even though Jörberg agrees that major internal transformation took place and led to increased productivity – especially in industry, he argues that the profit distribution was in favor of the employers, not the employees (2000 p.78), as Sweden produced low refined product, where the

employees' human capital advantage was low. Therefore, Jörberg leans towards the more pessimistic narrative on the degree to which labor gained more than capital from this process of early industrial growth in Sweden.

Jörberg exemplifies that some scholars previously have argued that the labor market was not overwhelmingly in favor of the workers during the early industrialization process. The next section will outline more recent research following this interpretation, namely that circumstances were not in favor of the workers in every aspect.

2.3.4 The perspective of bargaining power

There has been a growing body of criticism directed towards Williamson and other scholars claiming that real wages increased rapidly in Sweden. Svante Prado (2009) criticizes Williamson's (1995, 1998) use of data on unskilled Swedish worker wages, arguing that the use of ironworkers as a proxy for all Swedish unskilled workers are unrepresentative, as ironworker wages are known to have been considerably higher than other unskilled wages (Prado 2009). Instead, Prado (2009) looks at manufacturing wages and concludes that the wage increase and the wage convergence between US and Swedish workers were less significant. According to Prado's research, there is no doubt that Swedish real wages increased, but that this was a smaller increase than the one presented by Williamson.

Prado's main argument for why Swedish real wage growth in the manufacturing should be regarded as slow is that real wage growth was lower than the labor productivity growth, which is generating questions surrounding the distribution of profits made from increasing labor productivity (Prado 2010 p.494). The decreasing wag share is something Prado sees as a possible macroeconomic explanation to the workers' growing dissatisfaction which he argues manifested itself in the 1909 general strike (2010 p.495).

A possible explanation to the wedge between labor productivity and real wages is given by Bengtsson and Prado (2018), as they argue that the lack of a strong labor movement was unable to impact the wage bargaining process in any significant sense before the 1910s. This indicates

that the weak labor movement and limited access institutions[2] in Sweden, from the start of the industrialization up until the 1910s, might have contributed to the relatively slow wage growth in comparison to productivity growth.

Bengtsson's (2014) analysis of the Swedish industry's wage share throughout the 20th century finds that the period around the 1920s saw a critical regime shift. This happened through the enactment of universal suffrage, the upswing of unionization, and the implementation of the 8-hour workday, which resulted in a significant increase in the wage share of total value added (Bengtsson 2014). However, the period before the 1920s reforms was a period of relatively low power resources for industrial workers in Sweden.

2.4 Research on the German wage growth pattern

This part will describe the wage development in German industry, outline some of the main explanations for the real wage growth in the German economy from 1870 up until the first world war.

2.4.1 German productivity and wage increase

Stephen Broadberry and Carsten Burhop's (2010) analysis of German and British wages concludes that there is an overall agreement in the economic history literature on German wage growth, namely that a significant standard of living improvement occurred in the late 19th century until the first world war. They especially find results supporting that German wages came to converge to the higher British real wages over time, due to the rapid productivity growth in the manufacturing industry, which came to outcompete the British in crucial industries like iron and steel production (Broadberry & Burhop 2010). This has partially been explained by the German accessibility to cheap Swedish raw materials for steel production (Allen 1979). Broadberry further argues that Germany came to have GDP per capita convergence to Great Britain due to changes in the factor composition of the economy when there was an overall shift of the German workforce from the low productive agriculture to the more productive industry. This drastically improved the per capita income and thereby

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[2] Limited access institutions, defined as a state where the political system had limited entry and extract major rents from the rest of society in accordance with the definition by North, Wallis, and Weingast (2006)

strengthened the German economy and increased the median standard of living, through expanding the most productive sector industry as a share of employment and total GDP (Broadberry 1998). This research says little about the wage share but argues that this period was favorable for German labor, as productivity increases came to improve the overall standard of living.

2.4.2   Emigration's impact on the German wage share

Germany, just like Sweden, experienced a wave of emigration to the Americas in the second half of the 19th century, which allegedly decreased the labor supply and drove the wages up. Oliver Grant (2003), however, argues that this effect on the German economy is estimated to be much smaller than the Scandinavian one, as the emigration rate was lower in Germany and came to a halt earlier in the German case. Germany also experienced a labor supply increase from immigration from southern and eastern European countries. Grant (2003) therefore concludes that emigration did not play the same role in increasing the wages in the German case, which is supported by the lack of wage rate convergence between Germany and the US after the German emigration rates decreased in the mid 1880s. The overall emigration rate data from Willcox (1969) are also in alignment with the notion by Grant that the emigration rates peaked at 3% in Germany during the 1880s (1969 p.335).

The reason why Germany did not experience the same high emigration in the 1880s as in the 1870s and 1860s, was, according to David Khoudour-Casteras, the German social policy enacted in the 1880s, which made Germans on average less inclined to emigrate (2008). Furthermore, Khoudour-Casteras' data illustrates that there was a sharp drop in the cumulated decade emigration rate from the 1880s and onwards, indicating that the social reforms did decrease emigration rates, as some of the push factors from emigration decreased (2008). Khoudour-Casteras further identifies that this contributed to the stable wage ratio between Germany and the US, indicating that the decreased emigration rate caused lowered wage growth in Germany from the 1880s to world war one (2008).

2.4.3   Crisis and high cost of living restraining the German real wage growth

Broadberry and Burhop recognize that there were some complications in the German wage development pattern, as workers and industry were struck hard by the *Panic of 1873 (Gründerkrise)* – harder than their British counterparts – created a big downward temporary shock to industrial workers' wages. Another factor restraining the real wage growth

in Germany was trade policy, with high tariffs on agricultural products, which increased the cost of living for industrial workers. Asymmetric tariffs were the major issue for industrial real wages, as there were high tariffs on agricultural products, products they relied on for subsistence. In contrast, German tariffs on industrial goods produced by industrial workers were low and this kept down the industrial workers' purchasing power (Broadberry & Burhop 2010).

Gerhard Bry's (1960) conclusions on Germany's overall wage development are consistent with Broadberry & Burhop. Bry points out that Germany's average real weakly earnings increased by 35% from 1871 to 1914 (1960 p.70). Especially the period from 1894 to 1914 had the highest wage growth, something Bry explains by the steep increasing price development and growing labor organizations (1960 p.54). However, Bry also points several major crises occurring between the 1870s and 1914, which temporary set of wage gains. He especially points out the 1873 crisis (Bry 1960 p.54) and the steep price increases due to tariffs which decreased the real wage growth during the period 1900 to 1910 (1960 p.73). Bry further points out how there was an overall equalization between sectors, regions, sex, and qualification groups in the workforce during this period. For example, the wages of unskilled building workers converged to the wages of skilled building workers, and wages between regions in Germany converged (Bry 1960 p.59).

2.4.4   The role of unions, social policy, and labor market regulations

During 1879-1890, the period of anti-socialist laws in Bismarck Germany when socialist parties and unions were banned, some social policies were instated as concessions for the growing dissatisfaction with the industrial conditions. The main social policies enacted were insurance schemes for sickness, old age, and disability (Bry 1960 p.39). However, even if these policies were important for the individual in question, it did not significantly increase the average income of the German worker, and no minimum wage was enacted. Meanwhile, union leaders were persecuted and little to no union power over wages existed during this period (Bry 1960 p.39). This likely had a downward pressure on German wages. However, these conditions came to shift in the subsequent decades, as the anti-socialist laws were lifted in the 1890s— initiating a period with fast unionization. The unionization rate went from 1 million in 1903 to 3 million in 1912, corresponding to 18% of the total labor force in 1912. According to Bry, this was the first time wide-scale collective bargaining agreements were negotiated, and unions thereby became important in determining wages and working conditions (Bry p.33). However, the size of this possible effect of increased union power is not estimated. Bry also recognizes that the

German state did not legally recognize the collective agreements until 1914 (1960 p.40). That the German state still did not recognize collective agreements struck by the unions and single employers can be seen as an indicator that the political branch of the labor movement was not able to hold a significant influence on German politics until the end of the period, corresponding to the fact that the SPD did not become part of the government until 1912.

2.5 Research on how income inequality is linked to factor share distribution

This section will outline research that has tried to observe to what extent the factor shares distribution has impacted inequality and the standard of living for the two respective countries. The highlighted literature points out the relevance of studying factor shares and sheds light on the Swedish, Germany and international factor share development since the late 19th century.

2.5.1 German inequality and factor shares

Charlotte Bartels (2017) has researched the long-term development of top income development in Germany and finds that the period from 1870 to the first world war was a period with overall high levels of income inequality in Germany. Large industrial owners, bankers, and merchants were becoming increasingly affluent, which demonstrates that they took an increasing share of the national income while the other income groups received a smaller share (Bartels 2017).

Bartels (2017) specifically examines the correlation between unionization rate and top income and finds that the period from 1870 to 1913 is the only one where there is no evidence that trade unions decreased the top income share, something Bartels explains with the lack of union power in this period. However, Bartels stress that unions did increase from 1870 to 1913 and that workers might have been upset by the growing income to the top income earners, which possibly further pushed unionization in this period (2017). Bartels thereby contradict the claim made by Bry (1960) that unions at the end of this period started to have some sway over the wage-setting structure.

These findings by Bartels (2017) are interesting as they firstly indicate that even though German labor unions had emerged, they still did not have significant influence over the income structure. Secondly, the findings indicate that factors share distribution do matter for the overall economic inequality, and thirdly that a low wage share seems to have pushed further unionization.

2.5.2 Factor shares and inequality throughout the industrialized world

Bengtsson and Waldenström's (2018) paper on the capital shares development since the late 19th century find similar results as Bartels but in a cross-country study with 21 nations. They identify that a higher capital share has a positive covariation with higher income inequality. They also identify that the period before the 1920s was a period with a high capital share and income for most of the countries in their sample. They especially find that different institutional settings seem to influence both the factor shares and income inequality and is therefore possibly detrimental for the factor share distribution (Bengtsson & Waldenström 2018).

A new discussion paper from Erik Bengtsson, Enrico Rubolino, and Daniel Waldenström (2020) analyzes the over time development of factor shares, going beyond Bengtsson and Waldenström's paper on the link between inequality and the capital share (2018). They focus on trying to identify what events have caused changes in the distribution between factor shares since the late 19th century until the late 20th century. They identify that increases and decreases in the union share seem to affect the factor shares, by observing events in history when external shocks have decreased the unionization, for example, the British 1984s *trade unions act* which drastically decreased unionization and seems to have caused a significant drop in the wage share (increase in the capital share). They also find that left-wing government victories are positively correlated with decreases in the capital share (Bengtsson et al. 2020). Thereby they provide results indicating that power resources seem to matter for the factor share distribution in their dataset. Other factors that they find have affected the factor share distributions are wars and colonial emancipation, where they identify that wars actually increased the capital share, contradicting the conclusion by Walter Scheidel. The latter consider wars to be "great levelers" (2017). Bengtsson et al. (2020) instead argues that wars seem to ramp up prices, and therefore increase the assets of the already wealthy. They further find that colonial emancipation covaries with a lowered capital share (Bengtsson et al. 2020). This research on the link between factor share distribution and inequality illustrates the importance of power resources, as both unionization and politics seem to have affected the factor share distribution during the 20th century.

2.5.3 Swedish inequality and factor shares

Bengtsson (2014) analyzes the Swedish wage share development over the 20th century employing the data from Schön (2004) in which he finds that the wage share had some significant fluctuations over this period. Bengtsson's analysis find that periods with a high

unionization and left-wing governments seem to be the periods with the highest wage share. The period with the lowest wage share was before the 1920s when suffrage was limited, and significant reforms impacting the factor share distribution such as the 8-hour workday had not been enacted. Bengtsson (2014) argues that these reforms had significant implications for the wage share and furthermore identifies a link between an increasing wage share and increasing income inequality (Bengtsson 2014). Research on the Swedish inequality can also indicate that factor shares do seem to matter for income inequality, and that power resources are as central to the Swedish wage share determination as in Germany (Bartels 2017) and internationally (Bengtsson & Waldenström 2018).

3 Theory: Power resource theory

This analysis main theoretical perspective is power resource theory (PRT). PRT is a sociological framework constructed by Walter Korpi, conceptualizing the power of individuals and groups within a capitalist society. According to the PRT perspective, the working class' two main components of power resources are unions and working-class parties (Korpi 1981 p.30-35 Korpi 1998 p.52-56). This perspective has been used to explain different distributional and institutional outcomes through power relation formations between classes within capitalist societies (Korpi 2006). The PRT framework starts from the assumption that there is no given law of the division of resources in society but that the distribution instead is decided through distributive conflict and compromises between different interests, which occurs continuously. The distributional conflicts take place between different groups and based on different lines of conflict. According to the PRT perspective, one of the central conflict lines in capitalist societies is between employers and employees, taking the form of conflicts surrounding welfare state configuration and labor market distributions (Korpi 2006).

The microfoundation for PRT is that collective action is preferable for workers based on the idea that human capital is their primary market resource. Human capital is widely spread and, therefore, generally has a low level of bargaining power when acting without any coordination, making collective action through unions and class-based workers' parties preferable for workers, in order to obtain stronger bargaining power. Employers on the other hand hold capital, a highly concentrated resource that does not need the same type of coordination to hold power. Therefore, coordination based on class lines is an essential resource in the distributional conflict between employers and employees, according to the PRT perspective (Korpi 2006)

PRT is today a recognized approach within economic historical research. It has for example been employed by Jacob Molinder, Tobias Karlsson, and Kerstin Enflo (2019), which in their article revisits Korpi's PRT explanation on the decline in strikes in Sweden during the 1930s. As earlier mentioned, research by Erik Bengtsson has employed the PRT approach in an analysis of the development of the wage share in Sweden (2014). Bengtsson presents results supporting the conclusion in the PRT approach that unions and working parties, through increasing state spending, labor market regulations, and increasing unionization rate, strengthen workers' bargaining power. Thereby affecting the distributional outcome in capitalist societies, resulting in an increased wage share at the expense of capital in the case of Sweden (2014). However, Bengtsson emphasize that it was first in the 1920s that bargaining power grew to such an extent that it shifted the wage share of value-added in manufacturing (2014).

This study will apply the PRT approach to analyze to what degree working-class power, operationalized through unions and working-class parties, can explain part of the Swedish and German wage share development in the period 1870-1913. The aim is not to test the theory as a whole but rather to explore if PRT's main explanatory variables, unions, and working-class parties, have any relevance to the Swedish and German case in the late 19th century when the labor movement was emerging.

Operationalization of union strength is not entirely straightforward as union density as a measure of union strength has been questioned by Anders Kjellberg, one of the researchers in the power resource school. Kjellberg agrees that unions are an essential measure of workers' bargaining power, but how union strength is measured is complicated, especially as some unions organize substantial numbers of new workers in times of strike. Kjellberg, therefore, argues that union presence at the workplace possibly captures union strength better, as it captures places were unionization could drastically increase in times of strike as an additional variable that might be able to catch another dimension of the strength of unions, through their de facto presence and potential to act at specific workplaces (1982 p.16-18). Kjellberg's critique can be seen as a valid questioning of this thesis' operationalization of the theoretical perspective of power resources. Unfortunately, there are no records of union presence in Sweden or Germany for this period, therefore will Kjellberg's alternative operationalization of union strength, de facto presence, not be tested in this analysis.

This thesis will progress using unionization and strength of working class parties, and partially strikes, to test to what extent power resources seem to impact the wage share for manufacturing workers in Sweden and Germany from 1870 to 1913.

4   Dataset

This chapter will describe which quantitative sources are employed and describe their strengths and weaknesses to the empirical analysis.

4.1 Nominal wages for manufacturing

The manufacturing wage data employed in this thesis comes from Phelps E.H Brown and Margaret H. Browne's book (1968) which includes data on manufacturing wages in Sweden and Germany from 1870 to 1913. The specific focus from Brown and Browne to gather manufacturing wage data make it a relevant empirical material for this analysis. The specific sectors included in Brown and Brownes wage data for Sweden is only male wages in: *mining, quarrying, iron & steel, metal & engineering, sawmills, pulp & paper, textiles, leather, rubber, chemicals, food production* plus wage data for women in *textile* and *food production* (1968 p.44). For Germany, the average annual wage-earning incomes from wages in *mining and quarrying*, *18 different manufacturing branches, transport by land and water, warehouses, tramways*. The sectors in the two respective countries are not entirely matching, which is something this analysis has to take into account, when assessing the over time change and level differences between the two countries.

Limiting the analysis to only look at manufacturing stems from limiting the analysis to only looking at the more modern sectors of the economy. The sector of the economy which had the most widespread unionization in the early 19th century (Kjellberg 1983 p.270). Manufacturing is relevant in itself as it was a growing segment of the Swedish modern industrial sector, for instance in 1890 it had grown to employ 17% of all working Swedes (Schön 2010 p.199) and in Germany manufacturing, mining, building and crafting together employed around 39% of the labor force in the year 1895.

4.2 Total income

The total income data for the manufacturing industry employed in this thesis comes from Brown and Browne's dataset (1968). It contains the total income generated per occupied person in manufacturing in Germany from 1880 to 1913 and from 1870 to 1913 in Sweden. The German

dataset measures the output generated per occupied person in the industry for mining, manufacturing, and handicraft workers. For Sweden, it is output per person in mining, manufacturing, and crafts, including building (Brown & Browne 1968 p.44). Nether here is there total matching between the total income sectors measured for the two countries.

4.3 Wage share

The wage share estimate comes from dividing the average wage in manufacturing, with the total income generated per person in manufacturing. Thereby observing how much of the total income went to labor, in this way capturing this thesis dependent variable wage share of total income in manufacturing plus the residual capital share of total income in manufacturing.

There could be between country level differences which are the result of measurement differences rather than structural factors such as unionization or emigration rate. This makes it necessary to factor in these differences and emphasize trends rather than levels.

4.4 Union density

This thesis has constructed an own estimate of the unionization rate in the entire workforce, for Germany and Sweden, because of the overall lack of unionization rate measures in the late 19th century. The Swedish unionization for the entire workforce comes from taking the total number of union members in Gösta Bagge, Erik Lundberg & Ingvar Svennilson (1933 p.232) study for the period 1888 to 1913. Bagge et al. union member are divided by the total workforce each year estimated by Rodney Edvinsson *(2005)*. This metric gives the ratio of the unionization rate in the total workforce. This metric is blunt but has the advantage of in no way overestimating the total number of unionized workers. The same estimate of total unionization rate is also done for Germany by taking Gerhard Brys (1960) numbers of union members (Bry 1960 p.32) and total number in the workforce (Bry 1960 p.28), from the year 1891 the first year there are any records of unionization in Bry (1960).

Considering that this thesis looks at manufacturing specifically, measurements of unionization on industry specifically would be the most optimal measure. However, data on unionization in the industry is scarce, and only a few data points can be found. One of the few sources that contain information on industrial workers' unionization for this period is Kjellberg (1982), which is concentrated to the period 1900 to 1914 and only for Sweden. The same goes for Kjellberg's data on unionization for non-agricultural workers, which also contains data for

Germany. The unionization rate for non-agrarian workers is an essential measure of union strength, as agricultural workers systematically had a lower unionization rate compared to other sectors throughout the period. A measurement of non-agrarian workers can be a helpful proxy for the unionization in industry. However, this data is concentrated to the 20th century. Therefore, can this data only be applied when taking a closer look at the post 19th century period. The lack of data for branch level unionization rate in the 19th century make it necessary for this thesis to construct an own measure.

4.5 Vote share of workers' parties

The data on vote share for working-class parties are quite scarce, but some overtime data over the vote share of social democratic parties can be found in Colin Crouch (1994) for both Germany and Sweden from 1870 to 1913.

Unfortunately, the number of observations is too small to include in any regression analysis, as they would be unable to generate any significant results. Instead, is this measure included in the discussion and when doing the comparative trend analysis where no regression is employed.

4.6 Emigration

The data employed to control for the effect of emigration is the cumulated emigration ratio for every decade from 1870 for Sweden to 1913 from Ljungberg (1997). In the German case, the very same cumulative data is used but for 1870 to 1913 from Walter F Willcox book International migrations volume 2 (1969). The cumulated emigration ratio for each decade is employed because it is more relevant than emigration rates for single years. As the aggregate effects for every decade can have a major effect on the labor supply, thereby making the emigration ratio a more suitable metric over each decade—the cumulated emigration rate per decade illustrated in *figure 2*.

Figure 2: Cumulated Emigration rate per decade in Germany and Sweden, from 1870 to 1913
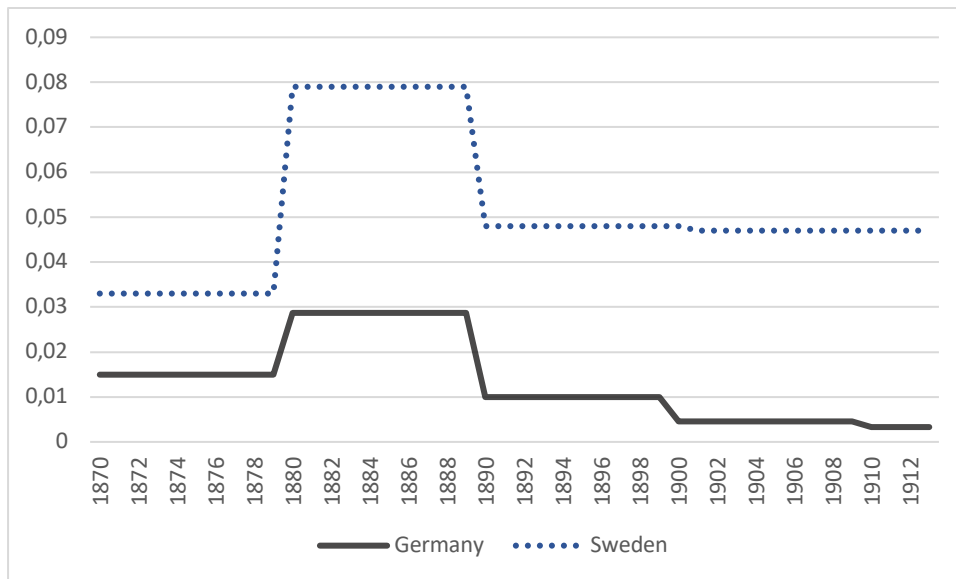
Source: Emigration rate for Sweden from Ljungberg (1997), and Willcox (1969 p.335) *for Germany*

4.7 Capital investment

Schön's (1994) capital investment ratio is employed for Sweden. The five-year average for the capital investment ratio from 1870 to 1913 will be extracted. For Germany, no corresponding measure was found. Therefore, has this thesis constructed an own capital investment ratio measure for Germany by taking the total capital investment from Hoffman (1965 p.257-258) and divided it by total GDP in current prices from Torp (2011 p.338), giving a capital investment ratio in Germany from 1870 to 1913.

4.8 Human capital

The proxy used to measure human capital is the primary school enrollment rate. The Swedish primary school enrolment rate for the group 7-14 comes from Ljungberg and Nilsson (2009). The school enrollment ratio for Germany children from 5 to 14 comes from Peter H Lindert (2004 p.91).

Human capital is central to this analysis, considering that Korpi regards human capital as the primary market resource of employees in a capitalist economy (2006). It is thereby being central to include when applying the power resources perspective. There are several ways of measuring human capital but one way which has been operationalized by several economic historical researchers has used have used school enrolment to capture the human capital level of broader masses, for example, Lindert (2004), Ljungberg and Nilsson (2009).

4.9 GDP per capita growth rate

The GDP per capita growth rate for Sweden and Germany from 1870-1913 is taken from the Maddison projects database (Bolt et al. 2018). The role of GDP per capita growth for the wage share is not something previous literature has researched to any great length. However, considering some literature has pointed out that the growth process was favorable for labor, for example Ericsson and Molinder (2018) it could be relevant to control if different growth phases covary with the wage share.

5 Method

This thesis will employ two separate methods. Firstly, this analysis will observe trends in the wage share through time series. Secondly, it will employ an OLS regression model to look at the covariation between the treatment variables *union density*'s effect on the outcome variable wage share in manufacturing, with several control variables identifying the direction of these relations and if these are statistically significant.

5.1 Observing and comparing trends in time series

This thesis analysis will start by using time series analysis to observe and compare trends in the wage share development over time in German and Swedish manufacturing. Comparing the specific country wage share average over time, enables the analysis to identify deviations when the wage share of total income in the manufacturing was above or below the average for the entire period. However, as there might be short term cyclical patterns, it is recommended by quantitative economic methodological literature to use 5-year moving averages to smoothen the curves and see trends over prolonged periods and minimize the effect of the regular business cycles on the data in the time series (Hudson & Ishizu 2017 p.153-159).

This thesis not only looks at within-country change over time but also compare the Swedish and German wage share of total income in manufacturing industries. It looks at the overtime development and then analyzes how different factors might have impacted these patterns, especially how differences in power resources has impacted the wage share, but also the capital investment ration to GDP, human capital development, emigration ratio, and economic growth during this period.

5.2 OLS regression

$$(1) \quad y_{ci} = \alpha + \beta_1 Union_{ci} + \beta_2 E_{ci}, + \beta_3 C_{ci} + \beta_4 HC_{ci} + \beta_5 g_{ci} + \beta_6 D_c + \epsilon_{ci}$$

This baseline OLS regression (1) tests if the strength and significance of the treatment variable union strength $Union_{ci}$ for country c in year i covaries with the wage share of total income in manufacturing y_{ci}. The control variables included are factors which has been identified as central to the wage determination in the literature, namely: emigration rate per decade E_{ci}, (Ericsson & Molinder 2018, Grant 2003, Ljungberg 1997, Schön 2010, Williamson 1995,1998), capital investment ratio C_{ci} (Schön 2004 p.25-27), human capital level HC_{ci} (Korpi 2006) and GDP per capita growth rate g_{ci} (Broadberry & Burhop 2010, Ericsson & Molinder 2018, Söderberg 2010,). A country dummy D_c is also included to capture unobserved between country differences, where Germany is 0 and Sweden 1, the constant α and error term ϵ_{ci}.

The OLS analysis use level data. However, as wages often are sticky and reacts slowly, it is necessary to control for a possible time lag in the wage share response. Therefore, this analysis has included a robustness check, with the same models but with a one-year time lag for unionization to control for sticky wages. The time lag in unionization takes away two observations which could be a problem in model 1 and 2 which only have 49 observations, which lowers the significance level. Therefore, this lagged model will merely be a robustness check rather than the main OLS model, included in the appendix.

Workers' parties' vote share, an additional central variable in the power resources literature, is not included in the OLS because of the overall lack of datapoints, as workers' parties' vote shares first really came to increase at the very end of the period for the analysis. This practically makes it impossible for workers' parties to have any significant direct impact on the wage share. A more plausible indirect effect could be through the threat political establishments felt from the growing labor movements at that time, discussed in section *2.2 Development of workers' parties*. This possible indirect effect will therefore be considered in the comparative time series trend observation.

This dataset has a limited ability to produce significant results as the dataset only contains 77 observations in total, and only 49 when including unionization, as unionization first is recoded in 1888 for Sweden and 1891 for Germany. There is one observation for each year and each country, 43 observations in total for Sweden and 34 for Germany, as the German wage share

data starts in 1880. The lack of observations is a critical shortcoming of the dataset employed, but it is still possible to observe some significant covariation within the dataset.

6   Results and analysis

This part will present empirical results from the comparative analysis and the OLS regression. Firstly, separately analyze each country's overtime wage share development, secondly compare the results between countries and thirdly analyze if observed covariations generate significant results in the OLS regression, strengthening the case for covariation and laying the ground for ideas about possible causal relations.

6.1 A comparison of time series trends in the wage share in Swedish and German manufacturing

This part will predominantly look at overtime trends in the wage share of total income per person in Swedish and German manufacturing. First present the main trends for the wage share in each country and discuss possible explanations for this development. Secondly, compare the results for the two countries.

6 .1.1 Over time trends in the Swedish wage share

The Swedish wage share of total income from Brown and Browne's (1968) data on wages and total income in manufacturing displays several significant changes within this period. The 1870s had a systematically lower wage share of total income in manufacturing. However, from the 1880s there is a gradual and sustained increase in the wage share in manufacturing, in 1884 it surpasses the average, and from 1887 to 1894 the Swedish economy experience a peak in the wage share for the entire period under analysis illustrated in *Figure 3*.

Figure 3: Wage share of total profits in Swedish manufacturing to the average of the wage share for the entire time period 1870 to 1913
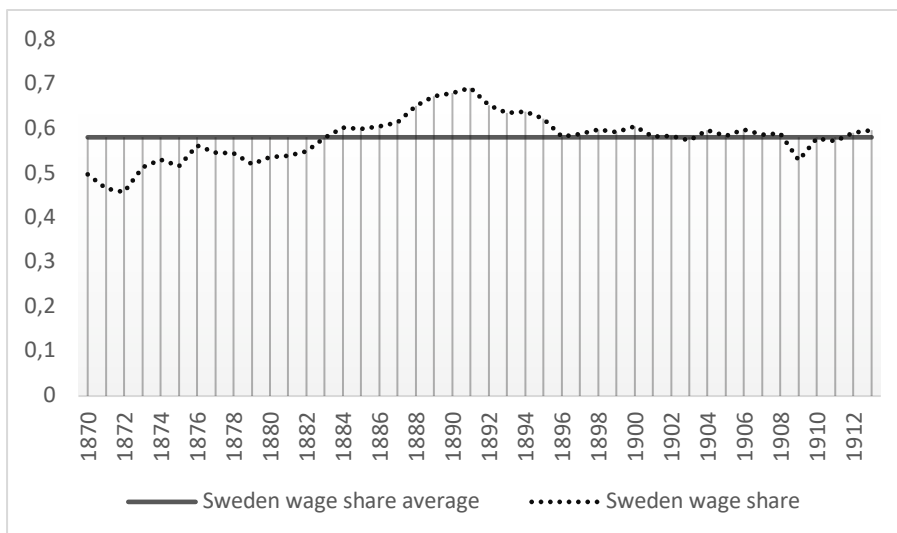
Source: Wage share collected and calculated by using Brown and Browne's (1968 p.435-456, 438-439) wage and total income data.

After the peak, there was a contraction in the wage share again. However, this decrease did not lead the wage share to return to its previous average, but instead stabilize around a new higher wage share average. *Figure 4 illustrates* the higher wage share average form 1896-1913 compared to the one seen in 1870-1883 before the 1880s increase in the Swedish wage share for manufacturing workers.

**Figure 4:** Wage share of total income in manufacturing, and the average wage share from 1870 to 1883 and the average wage share 1886 to 1913 in Sweden.
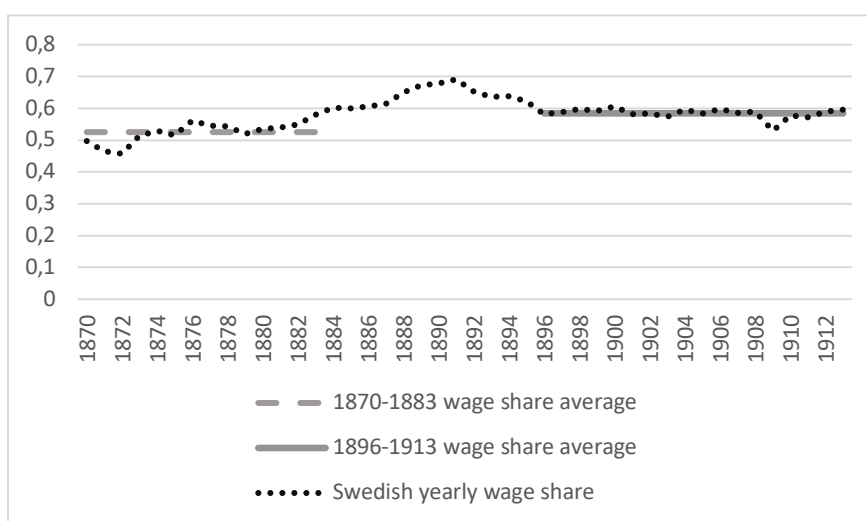
Source: Wage share collected and calculated by using Brown and Browne's (1968 p.438-439) wage and total income data

What explains the increase in the wage share from the 1880s and the higher wage share average during 1896-1913 compared to the average before the 1880s? This analysis' primary explanatory variable power resources and especially union density hardly matches the timing of the initial wage share increase. In the early 1880s when the increase started, very few workers were unionized, and the first workers' party corresponding to the PRT definition was not founded until 1889. The first recorded unionization rates this thesis has found for Sweden is from 1888. In 1888 there was a 0.2% percent unionization rate in Sweden (Figure 5). However, one indication that organized labor started to arise was that the phenomena of strikes started to take off as 40 strikes were recorded between 1880-1885 (Lindbom 1938 p.70). This might have been the one way that organized labor impacted the wage share in the 1880s. However, this effect of organized labor is hard to pinpoint, and labor was still quite unorganized during the 1880s.

Figure 5: Unionization rate for the entire workforce, in Sweden and Germany 1888 to 1913
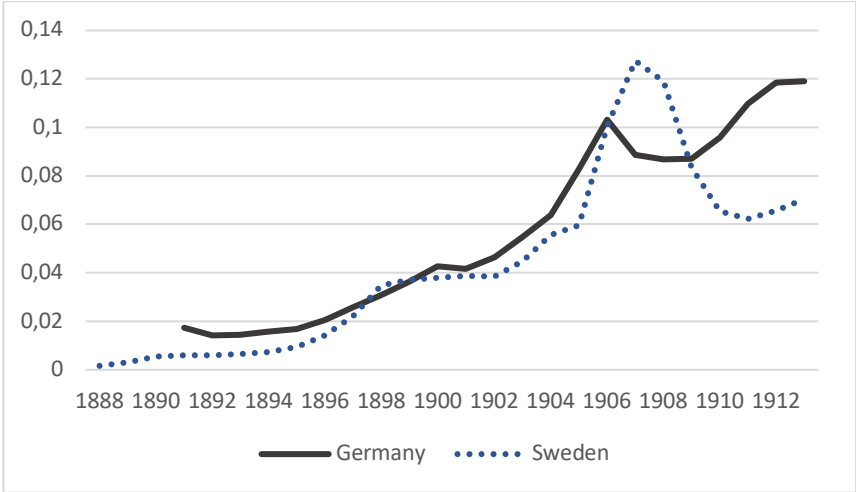
Source: The unionization rate measure is calculated by taking the union numbers from Bagge et al. (1933 p.232) for Sweden and Bry (1960 p.32) for Germany and dividing them by the total workforce numbers taken from Edvinsson (2005) for Sweden and Bry (1960 p.28) for Germany, to get the unionization rate.

Other factors appear to be better-suited candidates for explaining the considerable wage share increase during the 1880s and early 1890s. Sweden experienced a significant increase in the emigration rate during the 1880s, where close to 8 percent of the population emigrated (Ljungberg 1997). Scholars have previously identified emigration as a significant factor

contributing to the Swedish real wage increase as the decreased labor supply ramped up the overall real wage in the Swedish economy (Ericson & Molinder 2018, Ljungberg 1997, Schön 2010 p.164-165, Williamson 1995, Williamson 1998). This makes it likely that the rapid real wage growth came to increase quicker than the overall productivity, resulting in an increased wage share. Especially the timing of these events hints towards emigration affecting the wage share as the increase in the emigration rate preceded the wage share increase and then the decline in emigration rate preceded the wage share decreases at the end of the period.

Table 1: Cumulated emigration rates per decade from 1870 to 1913 in Germany and Sweden

decade	German emigration	Swedish Emigration
1870s	1.5%	3.3%
1880s	2.87%	7.9%
1890s	1%	4.8%
1900s	0.5%	4.7%
1910-1913	0.33%	4.7%

Source: Cumulated emigration rates for Sweden from Ljungberg (1997) and Wilcox (1969 p.335) for Germany.

Another factor that is stressed when explaining the increasing Swedish wage share is the falling capital investment ratio in the industry during the 1880s (Schön 2004), illustrated in *Figure 6*. The mechanisms outlined by Schön for why lowered capital investment increased the wage share is that when the labor intensity in production increased, labor also came to receive a larger share of total profits (Schön 2004 p.25-27). The changing factor composition of industry, where capital intensity decreased and labor intensity increased, created a shift in the distribution from changes in the growth process. This process of decreasing capital shifted in the late 1890s when the Swedish economy once again saw major transformation coincide with the decline in the Swedish wage share in the late 1890s. Furthermore, a simple scatterplot over the relation between wage share in manufacturing and capital investment ratio supports that there is a positive covariation in the Swedish case (Appendix A).

Figure 6: The capital investment share of GDP in fixed prices in Swedish industry from 1860 to 1913, 5-year averages
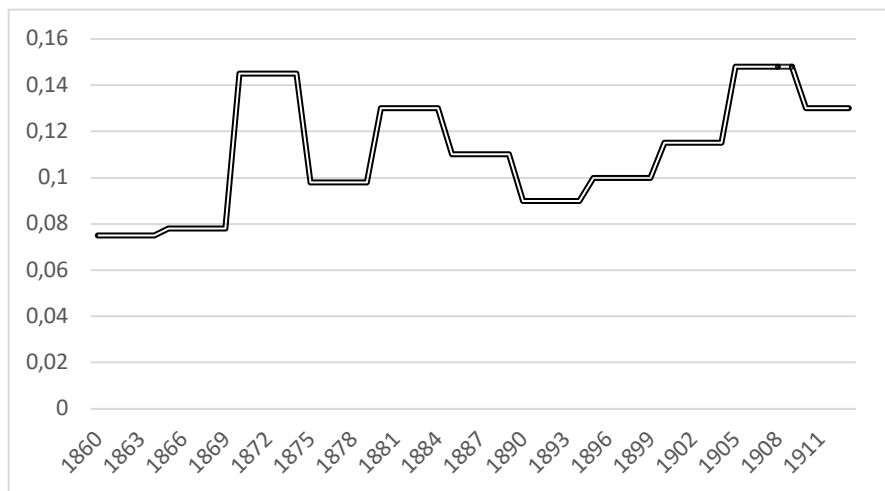
Source: Capital investments share of GDP form Schön (1994)

In the period from 1896 to 1913, the wage share reached a higher average compared to the period between 1870 to 1883, before the wage share peak in the late 1880s (Figure 4). Why the higher average from 1896 to 1913 occurred is not necessarily linked to what caused the initial increase in the wage share. Schön has stressed that the unions came to be essential for resisting the wage cuts happening in the wake of structural crisis, leading to an increased inability for unprofitable companies to sustain themselves, resulting in increased modernization from the high transformation pressure (2004 p.38). This could mean that the growing Swedish labor movement, which reached about 20% unionization among industrial workers in 1900 (Kjellberg 1982 p.270), possibly played a part in upholding the larger wage share of total profits and thus hindered the previous wage share average from being restored.

Ljungberg (1997) has also presented results that imply that emigration came to have a prolonged effect on the wage structure and growth. He argues that the growing consumption from the increasing wages contributed to the creation of a mass-consumer society, which resulted in further sustained growth while upholding previous wage gains. The increase in consumption-based growth could thereby possibly also play a part in upholding the wage share as it was labor that led the consumption-based growth, and also benefitted the most from it.

Whether it was the new market consumption behavior, sustained emigration, or increased unionization, which made it possible to obtain a new higher wage share average from 1896 to

1913 will be discussed further in the between country comparison section 6.1.3 and in the OLS analysis. However, it is nonetheless possible that these factors were important as previous literature have stressed the role of unions (Bry 1960, Schön 2010). Emigration (Ericson & Molinder 2018 Ljungberg 1997 Schön 2010 p.164-165 Williamson 1995 Williamson 1998), and the role of new market conditions for the factor shares and the general wage growth pattern (Ljungberg 1997, Schön 2004). This part has at least provided some indications that especially the variables of emigration, capital investment ratio, unionization and strikes could affect the wage share. Therefore, it is relevant to test these variables covariation with the wage share in an econometrical model, something which will be presented in the result part *6.2 OLS regression*.

6.1.2 Over time trends in the German wage share

Germany experienced a somewhat different wage share pattern from 1880 to 1913 illustrated in *Figure 7*. Firstly, there is a clear short cyclical pattern in the wage share in German which peaks every 6 to 7 year. This cyclical pattern follows something of a classical business cycle pattern. To better understand the long-term trends singling out the short term cycles this thesis looks at 5 year moving average wage share in the wage share pattern illustrated in *Figure 8*.

Figure 7: Wage share of total income in German industry from 1880 to 1913

Source: The German wage share data extracted from Brown and Browne (1968 p.435-45)

Figure 8: 5 year moving average of the wage share of total income in Germany for the period 1880 to 1913
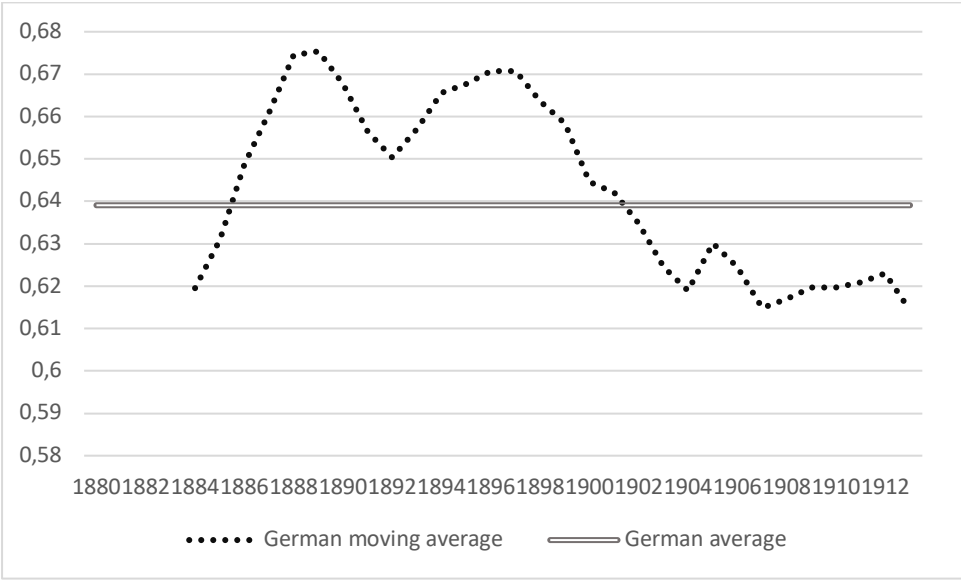
Source: Wage share data extracted from Brown and Browne (1968 p.435-45))

The German economy, just like the Swedish, saw an increase in the wage share after the last significant German emigration from 1880 to 1882 when the US experienced an economic boom pulling several hundreds of thousands of Germans to the US. This trend was reinforced by political persecution from the anti-socialist laws pushing even more Germans to emigrate (Khoudour-Casteras 2008). However, the high emigration ratios quickly came to diminish after social legislation was enacted by Bismarck's conservative government, starting with the health insurance scheme in 1883 (Khoudour-Casteras 2008). However, the timing of the wage share shift makes it uncertain if emigration created the shift as the German peak in the wage share occurred in 1887, five years after the emigration peak. Therefore, one can wonder if the wage share shift was the result of a time lag before wages started to respond or if the changing factor share distribution occurred as a response to entirely different factors.

That the wage share increased during part of the 1880s might seem counterintuitive considering that this was a period where the power resources of the unions diminished as union and workers' party leaders were prosecuted. Which from the power resource perspective should have resulted in decreased wage share, however this effect seems to have been minor, probable due to the limit of that times organization and that other factors such as increased emigration from prosecution (Khoudour-Casteras 2008) could have enhanced the wage share as labor scarcity increased. It is therefore hard to draw any definitive conclusions from this experience, but that

the wage share did not drop during the 1880s during the anti-socialist laws do indicate that power resources of the German working class was weak prior to the 1880s.

The period from 1885 to 1899 when the German workers experienced the highest wage share is neither the period with the highest unionization nor the highest emigration rates. The initial high emigration in the early 1880s might have contributed to increase the wage share, but what made the German wage share have a sustained higher share from 1885 to 1899 is more uncertain. Why the wage share in the industry came to decrease to a lower average 1900-1913 compared to 1885-1899 is also as uncertain. It is clear that even if the German metal union was the strongest in the world in the first decade of the 20th century (Welskopp 2019), it was still not able to maintain the high wage share average from the previous period 1885-1899 (Figure 7-8). This thesis identifies three main possible explanations from previous research for why this wage share decrease could have occurred. Firstly, changing market forces could contribute to this shift in the wage share. The labor shortage in the late 19th century was exchanged with increasing migration to Germany in the early 20th century, creating increasing labor abundance, depreciating wage growth (Grant 2003). Secondly, the power resources in the hands of labor were not that strong and could not sustain the gains from previous decades with favorable market forces. As Bengtsson et al. (2020) point out, it was first after the suffrage reform and left-wing governments were in place that the capital share decreased, and the wage share increased for most of the twenty countries in their dataset. In the German case the regime shift took place in 1912 when SPD won the German general election, it is therefore highly likely that an institutional shift in favor of labor did not have time to take place before the outbreak of world war one. Thirdly, the factor composition of the growth process could also contribute to a shrinking wage share, as indicated by Schön in the Swedish case (2004). Where increasing capital investment ratio in Germany could push up capital returns as it therefore would constitute a larger share of total production and hens' the share of total income. However, a simple scatter plot with a fitted line only show a slight negative trend where periods with a higher capital investment experience a lower wage share in German manufacturing (Appendix A), thereby not supporting this hypothesis for the German case.

These explanations do not give any definitive answers, but they indicate that certain factors such as emigration and unions might play a part in the German wage share development and will therefore be incorporated into the econometrical testing.

6.1.3 A comparison of the Swedish and German wage share trends

The very first thing that needs to be said when comparing the German and Swedish wages share in manufacturing is that Germany had a slightly higher wage share average, observed in *Figure 9 and 10*. However this difference could be the result of differences in measurement, especially as the sectors under analysis for the two respective country's differ somewhat which is discussed in part 4.1 *Nominal wages for manufacturing* and 4.2 *Total income*. Therefore, will this analysis focus on observing trends rather than the absolute levels, when comparing between the two countries.

Figure 9: Comparing the wage share in German and Swedish manufacturing from 1870 to 1913
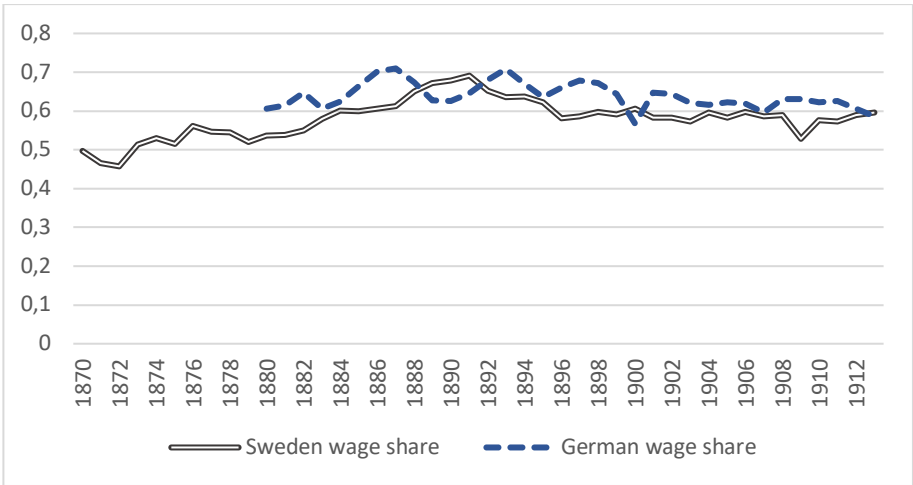
Source: Wage share data calculated from Brown and Browne, wage and total income data for manufacturing in both Sweden and Germany (1968 p.435-456, 438-439.)

Figure 10: Comparing the 5-year moving average of the wage share in manufacturing in Germany and Sweden

Especially the mutual upward wage share trend in the mid 1880s is noticeable. A factor which has been used to explain this upward trend in both countries is emigration. When doing a simple scatter plot with a fitted line, for the two countries separately one sees an upward-sloping line between the emigration rate and wage share indicating that a higher emigration rate positively covaries with a higher wage share (Figure 11). Therefore, it is relevant to analyze if the covariation is statistically significant when exposed to econometrical testing.

Figure 11: Scatterplot and fitted line over the wage share and emigration
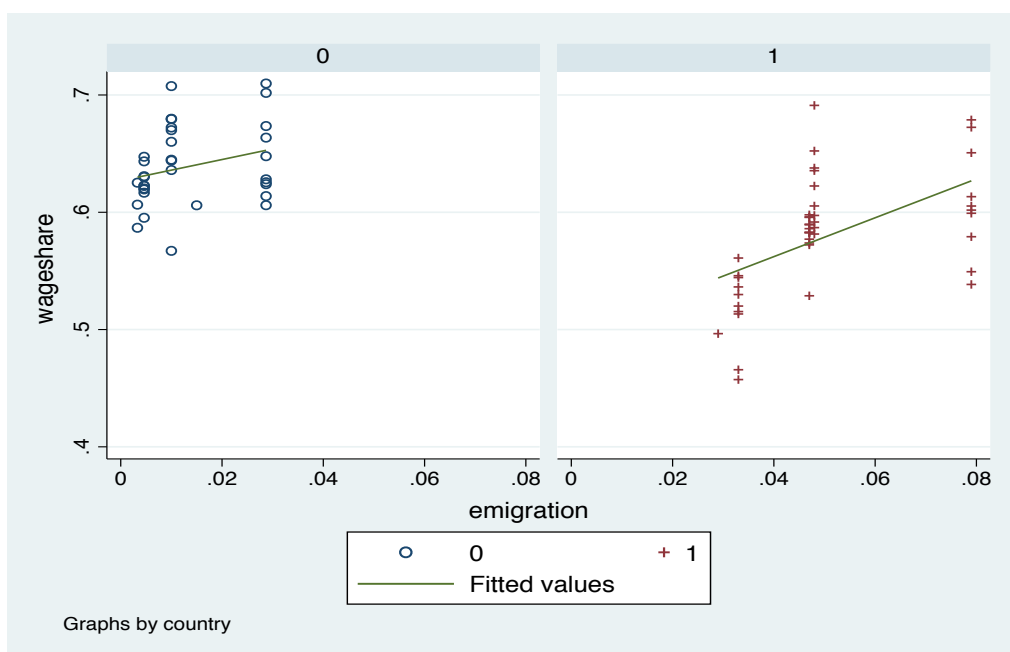
Note: *The numerical value 1 is Sweden and 0 is Germany*
Source: *Wage share for both Germany and Sweden is taken from Brown and Browne (1968 p.435-456, 438-439). Cumulated emigration ratio for Sweden form Ljungberg (1997) and the German one from Wilcox (1969 p.335).*

That emigration possibly caused more favorable circumstances for laborers who stayed behind is also in line with previous literature on the impact of the emigration on real wages in the Swedish economy during the industrialization process (Ericsson and Molinder 2018, Ljungberg 1997, Schön 2010, Williamson 1995, 1998) and with the German literature empathizing the role of emigration when it started to drop (Grant 2003 Khoudour-Casteras 2008). This indicates

that the conclusion of this literature corresponds with the German and Swedish trends observed in the wage share data from 1870 to 1913.

The data do not support that unionization increased the wage share in Germany, as the period with increasing unionization saw a decrease in the wage share. This is contradicting Bry (1960), who argues that real wages did seem to have been spurred by unionization in the period, as this thesis finds that there was a negative trend in the wage share even if unionization increased. This result is somewhat surprising, considering that the German unions were described as mass movements (Welskopp 2019) and SPD had major parliamentary support already in 1898 with 27% of the vote share (Crouch 1994 p.97), giving the labor movement at least some sway over policy. This period in Germany did see some social reforms (Bry 1960 p.39) but this seemingly did not influence the wage share. One possible explanation to why the stronger German unions were not able to impact the wage share more was because collective agreements did not become legally recognized by the German state until 1914 (Bry 1960 p.40). This indicates that the SPD were not able to influence policy in this instance until 1914.

Another surprising result is that there is only a slight negative trend between capital investment and the Germany's wage share, while there is a clear negative trend in the Swedish case (Appendix A). Schön argue that the capital investment impacts the wage share based on his empirical analysis of the Swedish economy. However, only a limited negative trend between capital investment and the wage share in manufacturing can be observed in the German case, while there is a clear such covariation in the Swedish case.

6.2 Results from the OLS regression

This section is outlining and interpreting the results for this analysis' primary OLS model (1), presented in section 5.2 *OLS regression*. This model looks at the covariation between unionization and the wage share for Germany and Sweden from 1870 to 1913, with the control variables, emigration, capital investment ratio, human capital, GDP per capita growth, and a country dummy variable to control for between-country differences. Two additional models will also be presented and interpreted. OLS model 2 takes away two of the insignificant variables, capital investment level and GDP per capita from model 1. OLS model 3 looks at the covariation between emigration and the wage share, controlling for all of the control variables included in model one (except for emigration which is the treatment variable).

Table 2: Estimating the covariation between the outcome variable wage share and the treatment variables unionization and emigration in three OLS models

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3
Unionization rate	-0.479***	-0.487***	
	(0.146)	(0.121)	
Cumulated emigration rate per decade	1.634**	1.636**	1.651***
	(0.783)	(0.746)	(0.275)
Capital investment ratio	-0.0192		-0.349**
	(0.186)		(0.154)
Human capital	0.0894	0.0945	0.662***
	(0.290)	(0.277)	(0.115)
GDP per capita growth rate	0.0831		0.0206
	(0.172)		(0.134)
Country-dummy	-0.111***	-0.109***	-0.115***
	(0.0367)	(0.0316)	(0.0135)
Constant	0.589***	0.584***	0.192**
	(0.215)	(0.209)	(0.0885)
N	49	49	78
R-squared	0.594	0.591	0.648

Standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Note: *Model 1 is the baseline OLS model (1), outcome variable wage share of total income in manufacturing, treatment union density, control variables cumulated emigration rate per decade, capital investment ratio to GDP, human capital, GDP per capita, country dummy and the constant. Model 2 is the same as the first model minus capital investment ratio to GDP and GDP per capita. Model 3 has emigration as the main explanatory variable with the same control variables as model 1, minus unionization.*

Sources: *Outcome variable wage share in manufacturing is collected from Brown and Browne (1968). The treatment variable union density is calculated by taking the union numbers from Bagge et al. (1933) for Sweden and from Bry (1960) for Germany, which then is divided by the total workforce numbers to obtain the unionization ratio, from Edvinsson (2005) for Sweden and from Bry (1960) for Germany. The emigration ratio is from Ljungberg (1997) for Sweden and from Wilcox (1969) for Germany. The capital investment ratio of GDP for Sweden comes from Schön, and the German one is the total investment in manufacturing from Hoffman (1965) which is divided by total GDP in current prices from Torp (2011). The human capital measures*

comes from taking the total primary school enrolment in Sweden from Ljungberg and Nilsson (2009), and the German primary school enrolment from Lindert (2004). The GDP per capita growth rate for both countries comes from Bolt et al. (2018).

When observing the covariation between the treatment variable unionization ratio and the wage share in the primary OLS model, there is a negative relationship, statistically significant at the 0,01 level, indicating that the working class' power resources were not strong enough to impact the wage share during this period. The unions where still a long way from being able to reach the unionization rate which it obtained in the after-war period when unions have been recoded to have major impact on the wage share. The working class parties, might have been successful in pushing for social welfare policy reform, such as pension and sickness insurance, but they seemingly were not able to shift labor market regulations and make the state recognize and regulate collective agreements up until the very end of the period. Even if agreements between unions and employers were negotiated before. When including a one-year time lag in the first two models on unionization, in order to account for the fact that wages are sticky and often do not directly react to exogenous events, there is no significant change in the models, and the negative covariation between unions and the wage share still persists (Appendix B). This strengthens the hypothesis that unions did not increase the wage share in Germany and Sweden for this period. That unions caused the decrease in the wage share seems like a highly unlikely proposition – even though there is a negative covariation – considering it is contradicting the unions' aim to increase their members' material well-being. One possible explanation as to why there is a negative covariation is presented through Bartels (2017) proposition that the causation runs the other way, namely that when the wage share was relatively low before world war one, unionization increased, as a low wage share intensified class conflict. This means that a lowered wage share was building up power resources for the working class, which were employed at a later stage when unions, together with working-class parties, became more dominant and, to a larger extent, affected the wage share during the afterwar period (Bartels 2017, Bengtsson 2014). That the causation went in that direction is also in line with Prado's (2010) idea that a decreasing wage share in manufacturing led to increased economic dissatisfaction which caused the general strike of 1909 and an overall increase in labor market conflicts (2010 p.495). This indicates that unions grew in strength from workers disadvantaged position.

Emigration ratio is the only variable in the first OLS model which is found to have a statistically significant positive covariation with the wage share. This variable is only significant at the 0.05

level but considering that this analysis has 49 observations when including unionization, it is not surprising that one only can find slightly significant results. When unionization is excluded in model 3, there are 78 observations, as there are no observations for unionization prior to 1888 which decreases the number of observations in the first two models. In this third model there is positive covariation between higher emigration and a higher wage share in manufacturing, statistically significant at the 0,01 level. This gives increased support for the notion that increased emigration has a positive covariation with an increased wage share. That emigration covaries with an increasing wage share is renewed empirical support for the long-standing literature on the role of the emigration to America as a crucial factor for the real wage growth in Sweden, and the lack of it in the German case, in Ericsson and Molinder (2018), Grant (2003) Ljungberg (1997), Schön (2010), and Williamson (1995, 1998). Furthermore, these results indicate that high emigration rates not only increased the real wage growth but potentially also caused the wage share to increase, as increased labor scarcity brought up the price of labor and thereby seemingly impacted the wage share. The result of the OLS analysis suggest that emigration had an equalizing effect on the income distribution for the two countries, as the highly unequally distributed factor capital obtained a smaller part of total income while the more equally distributed factor labor came to increase. That an increased wage share would decrease inequality is based on the findings of Bartels (2017), Bengtsson (2014), and Bengtsson and Waldenström's (2018) analyses of the capital and wage shares impact on inequality.

Other variables that positively covaries with the wage share is for example, the human capital level operationalized through primary school enrolment, which has a statistically significant positive covariation with the wage share, but only in the third model. This supports the notion that human capital could be important for labors reward and wage share. Giving underlying support for the notion by Korpi (2006) that Human capital is a fundament labor market resource for workers.

Capital investment ration is the variable that most notably has been pointed out to impact the wage share negatively (Schön 2004). It is not found to significantly impact the wage share in the two first OLS regression. However, in the third model with more observations, there is a statistically significant negative correlation between capital investment and the wage share at the 0.05 level, indicating that the lowered capital investment ratio in industry possibly increased the wage share in this period for both countries.

When summarizing the findings from the OLS analysis, four conclusions are reached. Firstly, the analysis has showed that there is a negative covariation between unionization and the wage share. This indicates that a decreasing wage share spurred increased unionization. Secondly, this analysis finds renewed support that emigration had a major impact on the wage development and seemingly increased the wage share. Thirdly, the factor of human capital seems to have influenced the wage share positively in the third model. Fourthly, increased capital investment ratio in industry seems to have a negative effect on the wage share, based on the results from the third OLS model.

Future research could benefit from collecting firm level data on the wage share and unionization to increase the precision in this type of analysis. This setting would enable comparisons between firms with strong union presence to others with weaker union presence, which would give increased precision in estimating differences in the wage share in Swedish and German manufacturing from 1870 to 1913.

7 Conclusion

This thesis aimed to measure the effect power resources had on the wage share in Swedish and German manufacturing from 1870 to 1913. To this aim, this analysis has not been able to find results that indicates that power resources of the working class, in the form of unions or working class parties, were able to increase the wage share – probably due to their lack of power resources. This conclusion supports the literature which argues that bargaining power for the working class was limited in the early 20th century and that this hindered further wage growth (Prado & Bengtsson 2018, Prado 2009). Instead, the causation seems to have went in the opposite direction as the wage share from the late 19th to early 20th century possibly was causing increased unionization, a hypothesis presented in Bartels (2017). This gives a possible explanation as to why there is a negative covariation between the unionization rate and wage share in Sweden and Germany for this period. However, one possible way that unionization impacted the wage share might have been through preventing the wage share average from returning to a previous lower wage share average (Figure 4) through increased organization, after that the most considerable wave of emigration had occurred.

However, this analysis do find that the 1880s and 1890s, especially in Sweden and partially in Germany, experienced a wage share increase for manufacturing workers. In this case, emigration stands out as the primary explanatory variable for this increase, as the emigration

rate increased before the wage share increased, and emigration decreased before the wage share decreased. All three OLS models also find statistically significant results supporting the positive covariation between an increased emigration ratio and the wage share in manufacturing for both countries (Table 2). These results are in line with previous research, which has emphasized the role emigration played for the rapid real wage increase (Brown & Browne 1968, Ericsson and Molinder 2018, Ljungberg 1997, Schön 2010, Williamson 1995, 1998) and the fallback in the wage growth, especially for Germany (Grant 2003, Khoudour-Casteras 2008). The thesis' results thereby support much of the literature which has examined the effect emigration had for the wage development and strengthens that the same pattern is observed for the wage share as for the real wage development. These results indicate that the emigration possibly had an equalizing effect for economic inequality, as emigration seems to have increased the wage share, which is the more equally distributed factor share.

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Appendix A: Scatterplot over wage share in manufacturing and capital investment ratio in industry for Germany and Sweden from 1870 to 1913
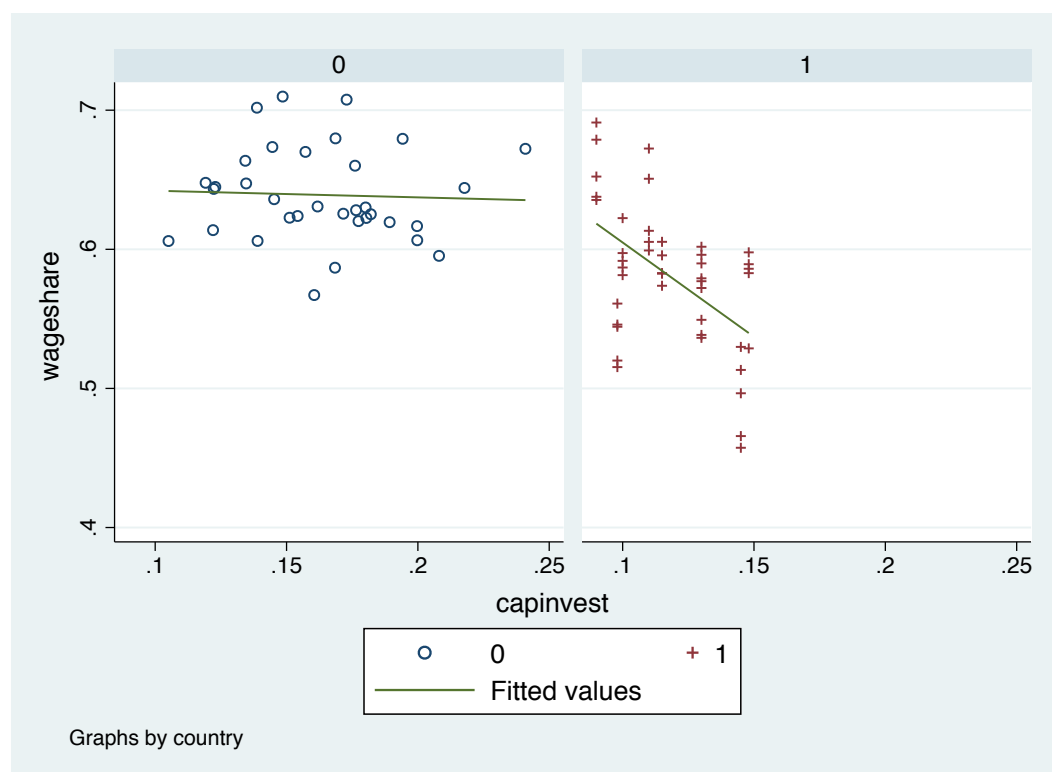
Note: *Scatterplot wage share in manufacturing and capital investment ratio in industry from 1870 to 1913. Germany has the numerical value 0 and Sweden 1.*

Source: *Wage share data form Brown and Browne (1968). The capital investment ratio of GDP for Sweden comes from Schön, the German one is the total investment in manufacturing from Hoffman (1965) and dividing it by total GDP in current prices form Torp (2011).*

Appendix B: Lagged OLS models estimating the covariation between wage share in manufacturing and unionization in Germany and Sweden from 1870 to 1913

	model1 b/se	model2 b/se
unionrate	-0.552***	-0.540***
	(0.14)	(0.12)
emigration	1.736*	1.744*
	(0.76)	(0.72)
capinvest	0.007	
	(0.19)	
humancap	0.069	0.064
	(0.31)	(0.29)
GDPpercapg~h	-0.069	
	(0.18)	
country	-0.112**	-0.114***
	(0.04)	(0.03)
_cons	0.604*	0.607**
	(0.23)	(0.22)

Note: The two first OLS models in table 2, with 1-year time lag on unionization rate. Model 1 is the baseline OLS model (1), outcome variable wage share of total income in manufacturing, treatment union density, control variables cumulated emigration rate per decade, capital investment ratio to GDP, human capital, GDP per capita, country dummy and the constant. Model 2 is the first model minus capital investment ratio to GDP and GDP per capita.

Sources: *Outcome variable wage share in manufacturing is collected from Brown and Browne (1968). The treatment variable union density is calculated by taking the union numbers from Bagge et al. (1933) for Sweden and from Bry (1960) for Germany, which then is divided by the total workforce numbers to obtain the unionization ratio, from Edvinsson (2005) for Sweden and from Bry (1960) for Germany. The emigration ratio is from Ljungberg (1997) for Sweden and from Wilcox (1969) for Germany. The capital investment ratio of GDP for Sweden comes from Schön, and the German one is the total investment in manufacturing from Hoffman (1965) which is divided by total GDP in current prices from Torp (2011). The human capital measures come from taking the total primary school enrolment in Sweden from Ljungberg and Nilsson (2009), and the German primary school enrolment from Lindert (2004). The GDP per capita growth rate for both countries comes from Bolt et al. (2018).*