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The Effect of a Massive Wage Push on Income Distribution and Employment: Evidence from the 1920 Eight-Hour Workday Reform in Sweden and Its Aftermath

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Abstract

In 1920, the working day in Swedish industry and services was cut from 10 to 8 hours without wages being cut correspondingly. This change resulted in a dramatic wage push, with real wages increasing by about 50 percent in the years from 1919 to the deflation of 1921–22. This paper studies the consequences of this wage push for real wages, unemployment, profits and investments. Since agriculture was not affected by the reform, we compare industry and services with agriculture to separate the effects of the reform from other factors. Furthermore, we distinguish between traded and non-traded sectors. We show that real wage effects were significant but that firms in non-traded industries and services faced more inelastic labour demand and thus could conserve profitability to a higher degree. In traded industries, on the other hand, wages relative to profits increased dramatically, and employers responded by increasing capital intensity, leading to jobless growth in the 1920s but continued low profits. We discuss the implications for the literature on interwar wages and employment, the more general inequality literature and the literature on the 'Swedish model'.

Key words: wages, wage push, unemployment, working hours reform, inequality, wage shares, interwar period, Sweden

1. Introduction

During the late stages of the First World War, Sweden was closer to a socialist revolution than ever before or later in its history. In 1917, a wave of hunger protests and riots swept over the country, protesting the lack of food for the people and the war-time profiteering of the 'goulash barons' and 'bread barons'[1]. The combination of high inequality, heated debate on profiteering and socialist insurrection was of course not unique to Sweden: Britain as well as Germany saw debates on the 'paradise of profiteers' theme (Arnold, 2014; Baten and Schulz, 2005).[2] Protests in Sweden were led by different socialist factions and caused real concern among the élites that a revolutionary insurrection would ensue. In a recent paper, Lapuente and Rothstein (2014:p.1422) point out that 'conditions in Sweden, in the aftermath of the Russian Revolution, were ripe for a violent clash between left or labour organizations versus right or capitalist ones'. There were not only spontaneous protests, but also popular organization increased rapidly: unionization among workers increased from 17 percent in 1910 to 38 percent in 1920 (see Bengtsson, 2014). Furthermore, protesters were correct that war time profits were particularly high: 1916, at the same time as working class families were close to starvation, shows the highest measured share of national income going to capital and top income earners in the modern history of Sweden (Roine and Waldenström, 2008; Bengtsson, 2014). In short, this was a very polarized society economically as well as politically.

However, the revolutionary moods were channeled in a reformist direction. The pressure from below forced élites, as in Acemoglu and Robinson's (2000) revolutionary threat model, to enact two key reforms desired by the labour movement. The first was full extension of suffrage for all women and men, instituted in 1922. The second was work time shortening in industry and services from a ten hour day to an eight hour day, which was made into law in 1919, effective from 1 January 1920. The shortening of the workday had long been a goal of the labour movement – Social Democratic parliamentarians had made proposals to this effect

[1] There are several good treatments of this historical moment in the Swedish historical literature. Isaksson (1990) provides a particularly vivid treatment. The reformist way out of the revolutionary frenzy at the end of the 1910s is the centrepiece in Ohlsson's (2014) recent summary of Swedish political history since 1809.

[2] This wartime debate led to important reforms such as the Excess Profits Duty in Britain (Billings and Oats, 2014) and the first corporate profits taxation ever in France (Hautcœur, 2005: p.185; Hautcœur and Gorard, 2005). Given the importance of taxation in the inequality debate (Piketty, 2014), this seems particularly relevant.

in 1908, 1910 and 1913 but were voted down every time (Isidorsson, 2001:p.53). It was not until the revolutionary threat of 1917–1919 that the liberals and parts of the Right turned around on this issue. The reform was of course not uncontroversial: in the engineering industry, a major conflict broke out in 1920 when employers wanted to cut wages to compensate for the shorter working hours; they failed, however (Isidorsson, 2001: p.54).

The nature and consequences of the power shift from traditional élites to the working class and mass politics around 1920 have been discussed in several places (i.e. Bengtsson, 2014; Lapuente and Rothstein, 2014). Here, we focus on the effect on the economy of the 20 percent shortening of the workday in 1920, as the massive wage push that this implied can be expected to have significant effects on the income distribution between capital and labour, profits, investments and employment. To investigate these issues, we present new data for wages, profits, investments and employment by industry sector from 1917 to 1929. In addition, we exploit the fact that since the reform was only implemented in industry and services, we can compare the development there to development in agriculture to distinguish the effects of the law. We also distinguish between sectors with different levels of sensitivity to wage increases due to the extent of export orientation and capital intensity. Our results show that real hourly wages increased by about 50 percent in industry and services from 1919 to the deflation of 1921–22 and that profits were hurt; however, labour demand was more inelastic in non-traded sectors so that after a couple of years the profit-wage relation recovered. In traded industry, the negative effect on profits and the positive effect on unemployment lasted throughout the 1920s, and the employers responded by increasing capital intensity.

Traditionally, the 1920s are seen in economic history research (Eichengreen, 1994) as well as more socio-political research (Korpi and Shalev, 1979) as a conflictual decade, before the social settlements of the postwar period or, as in Sweden, the Saltsjöbaden Agreement of 1938 – the ‘historic compromise’ between labour and capital (Korpi, 1983). Our detailed study of the aftermath of the eight-hour day reform shows the Swedish labour movement on the offensive in the early 1920s and how it forced structural change in the economy.

2. Interwar Sweden in international perspective: wages, unemployment and inequality

2.1 The international debate

The 1910s and 1920s saw deep social polarization in European societies and an intensification of class conflict. Eichengreen (1994), in his influential analysis of postwar economic growth, contrasts the success of the postwar period to an alleged economic failure of the interwar period. His explanation of the difference is two-fold. On the international level, he stresses that in the postwar period, peaceful international cooperation came to the fore and international trade grew rapidly, while the interwar period saw growing nationalism and protectionism. More importantly for our purposes, on the domestic side, the postwar period saw class collaboration and investment-enhancing wage moderation, while in the interwar period, 'wage pressure was intense', which decreased profits and hurt investments and growth (Eichengreen, 1994:p.884).[3]

Germany is a special case. Borchardt (1982) famously argued that even before the Depression hit Germany after the Wall Street crash of 1929, the Weimar economy was hurting and investments were low because trade unions, due to their political alliances, had become too strong and pushed up wages too far, reducing profits and investments. Borchardt claimed that this stranglehold on the economy destabilized the Weimar Republic, increasing the rightist opposition to democracy. Borchardt's analysis is certainly not without critics (see Voth, 1995), but it has also found support, especially by Broadberry and Ritschl (1995) and Dimsdale et al (2006). In this framework, the importance of the Swedish 1920 eight-hour workday reform becomes obvious. Broadberry and Ritschl have very patchy data for Germany, but they show that both there and in Britain real wages increased more than productivity after 1914 until the early to mid-1920s, increasing the wage share. They support Borchardt's thesis that this redistribution caused the high unemployment of the 1920s (Ebell and Ritschl, 2008 make the same argument for the United States.)

However, the argument that high wages caused high unemployment in the 1920s is not universally accepted. Voth (1995) has opposed Borchardt's analysis of the Weimar economy,

[3] But see Hatton and Boyer (2005) and Bengtsson (2014) for criticism of Eichengreen's interpretation of the postwar period.

showing inconsistencies in Borchardt's data and pointing at a too tight monetary policy, rather than high wages, as the cause of high unemployment. Voth (1995), just like the studies he criticized, had only data for industry as a whole, so separating the effects of monetary policy and the wage push were complicated. Our sectoral design, on the other hand, allows us to single out the effects of the wage push, as it differs between sectors, while monetary policy was the same for all sectors.

Also, in the British debate, it has been suggested that the high unemployment in the 1920s may be have been more Keynesian than caused by generous unemployment insurance and high wages (Hatton, 1983). Most recently, Geary (1997) claims that a negative demand shock in 1921–22, rather than the supply side shock of the eight-hour day, caused mass unemployment in shipbuilding. On the other hand, Scott and Spadavecchia (2011) argue that the negative effects on output of shorter hours were partly counteracted by increased productivity.

Piketty (2014) provides another perspective on the wage push of the period. In Piketty's story, the First World War is the start of an exceptionally equal period in the developed economies, lasting until about 1980. In his story, wartime destruction of capital plays an important role in lowering capital incomes and increasing equality, but it has been pointed out in the cases of Spain (Prados de la Escosura, 2008:p.300) and Sweden (Bengtsson 2014) that these countries, which did not participate in the war, saw the same equalization of incomes. This means that wartime destruction fails as a monocausal explanation of the decrease in inequality. Acemoglu and Robinson (2015) correspondingly point to politics and institutions as more important factors. In sum, scholars differ in their explanations of these changes in inequality patterns, but there is agreement that the years around the First World War are fundamental to what Williamson (2015) calls 'the Great Egalitarian Leveling'.[4] We believe that our study of the Swedish social struggle and distribution in these years is highly relevant to this debate.

2.2 The Swedish case

[4] Piketty (2014: p.149) at one point refers to the 1913 to 1950 period as the 'euthanasia of European capitalists'. The relevance of the present study of wages and profits for this discussion is hopefully evident.

The Swedish 1920 eight-hour workday reform is interesting for debates both on interwar unemployment and inequality. So, what research has been conducted about the reform and its context so far? Rosengren (2009:ch. 2) studies the public commission that prepared the ground for the reform. He shows a very expected disagreement: union representatives were in favour of reform and stressed that the long working days wore workers down, while employer representatives were opposed to the reform, worried that a shortening of the workday would lead to a one-to-one reduction of production. Isidorsson (2001) studies working time since the early 20th century and devotes some attention to the 1920 reform (pp.58–60); he sees it as a Social Democratic reform in alliance with the Liberals. Sanne (1995) stresses the interconnectedness between the eight-hour workday reform in 1919 and the introduction of full male suffrage the same year. The eight-hour bill was first voted down, and only after the government had called a new election with a then very different voter composition could it push the bill through during a special called-in session. Sanne also shows how the liberal party was divided into a social liberal faction and a business friendly faction. The later was bought over to support the reform only after it was promised that only companies with more than five employees would be affected.

As in other countries (Cross, 1984), the shortening of the work day had been a main trade union goal, and work time had also seen a decreasing trend before the 1920 reform. Average weekly working hours in manufacturing decreased from 64 in 1885 to 60 in 1905 and 55 in 1919 before the reform hit, and the average reduced to 48 in 1920.[5] Thus, even though work time already had a decreasing trend in the decades before 1920, the reform shortened working time almost as much in one year as had happened in more than 30 years previously. In other words, the 1920 reform was very drastic and may be expected to have interesting effects.

Not surprisingly, the reform led to conflicts between employers and workers on how wages should adjust to the workday reform. Workers in engineering demanded full wage compensation for their fewer hours with the eight-hour reform; after negotiations, employers consented when it came to hourly wages but not regarding piece-rate wages. The workers then

[5] Calculated from three government publications: Arbetarförsäkringskommittén (1888), Kommerskollegii avdelning för arbetsstatistik (1911) and SOU 1925:45.

went on a strike, which lasted two months before it was ended by mediation and a compromise solution to the issue of piece-rate wages (for all this see Törnqvist, 1954:pp.323–325). However, the fact that workers were compensated for their fewer hours is indicative of their bargaining power in 1920. Törnqvist's study also shows the union's own classification of bargaining rounds from 1919 as 'offensive' and 'defensive' rounds. In 1919 the Metal Workers had 2819 offensive rounds and only 16 defensive, and in 1920, there were 365 offensive rounds versus 92 defensive rounds. However, in 1921, the relation had completely turned around: there were 11 offensive rounds to 445 defensive rounds; it was similar in 1922 (4 offensive–456 defensive) and 1923 (34 offensive–205 defensive). This change is indicative of how initiative swung between workers and employers during this very turbulent period.

The fact that the unions were on the defensive in 1921–1923 is related to the recession that hit Sweden in those years. After the expansive, inflationary years at the end of the 1910s, there was a sharp turn with a deflationary shock emanating in the United States, leading to an unprecedented drop in industrial production and employment in 1921 and 1922. Another important deflationary pressure was the decision to return to the gold standard at prewar parity from 1924 (Klovland, 1998). Sweden swung drastically in these years from rapid inflation in the late 1910s to price index decreases of 20–30 percent in 1922–23 (Holmlund 2013, p. 132). We have – in many cases, new – annual data for wages, output, unemployment and other variables, so we can study the development of the wage push in the rapid turnaround from the top to the bottom of the business cycle.

There are several studies of wages in Sweden in the 1920s. Fregert and Magnusson (1994) claim, Borchardt style, that high wages explain the persistence of high unemployment during this decade. Their purpose is similar to ours, but they have only wage data for the manufacturing sector as a whole, unemployment for the economy as a whole, a weak proxy measure of capacity utilization and no profits data. These issues mean that they cannot really connect wages to unemployment in a stringent way (since one variable is for manufacturing only and the other for the entire economy), that they cannot investigate profits and investments, and that they cannot make distinctions between exporting and non-traded industry or manufacturing with and agriculture without the work time shortening. Nevertheless, our research interest is clearly related to theirs. Holmlund (2013) studies wages

from 1913 to 1939 econometrically and finds the eight-hour workday reform increased wages substantially. He also notes that it triggered severe labour market conflicts, as with the 'compensation conflict' discussed above, making 1920 an extreme year in this regard.

Several papers discuss wage differentials between sectors and their connection to wage bargaining institutions. Fregert (1994) shows that the non-traded sector's wage advantage over the exporting sector rose in the early 1920s and claims with a theoretical model (but no empirical evidence) that wage competition between the sectors led to wage bargaining centralization being enforced by traded sector unions, to tame non-traded sector unions' wage policies (see also Swenson, 1991). He does not explore connections to unemployment or profits. In their study of the urban-rural wage gap in Sweden, Lundh and Prado (2015) find that in the early 1920s urban workers gained massively relative to rural workers. The authors ascribe this difference to the asymmetric responses to deflation in labour markets with different levels of unionization i.e. market wages in agriculture and sticky wages in industry. However, they only study the engineering industry and do not make any comparison with services or between different industries.

A more immediately relevant paper for our purposes is Bengtsson's (2014) analysis of the wage share in Sweden from 1900 to 2000. He finds a major shift upwards in the wage share around 1920, and he explains this shift with the wave of labour militancy during the period and the eight-hour working day legislation of 1919–20. He claims that this began a new era in the distribution of income between capital and labour, which never again – at least not in the 20th century – went back to the very capital-friendly distribution of the early years of World War I.

To summarize, the Swedish eight-hour workday reform of 1920 is interesting for those concerned with employment issues in general, especially the high unemployment of the 1920s (Borchardt, 1982; Broadberry and Ritschl, 1995; Voth, 1995; Scott and Spadavecchia, 2011), as well as income distribution (Bengtsson, 2014; Piketty, 2014, Acemoglu and Robinson 2015). The reform can be seen as causing a profit squeeze harming investments and the entire economy, or as a redistribution from capital to labour, decreasing inequality. We can here, with our sectorial data – previous studies have only used national data – investigate these two different effects, on investments and on inequality, in more detail. The next section presents

the New Keynesian model that we use and our sectorial design.

3. Model and design

3.1 The model

In this section, we present our theoretical framework in two steps. First, we present the macro-relationship between wages and unemployment and how it relates to wage bargaining institutions. This is the same basic framework that has been used in the studies on wages and unemployment in the interwar period that we cited above. Second, we draw on the literature on 'labour demand' to generate hypotheses on the way in which we expect the effect on wages and unemployment to differ in the traded- and non-traded sectors. This relationship is also implicit in the more macro-oriented literature, but since the focus there has been at the aggregate level, the implications for unemployment dynamics when sectors are traded and non-traded have seldom been noted. We argue, on the contrary, that this distinction is essential for understanding the effect of wage militancy on the living conditions of the working class.

In the regular goods market, the underutilization of a resource will lead to prices falling such that the resource becomes fully employed. In the case of labour, however, markets do not always clear and real wages do not decrease even if there is involuntary unemployment. This situation is often denoted as 'classical unemployment'. From the late 1970s, the New Keynesian model has come to dominate the discussion. Here, unemployment in the long run is indeed classical and caused by too high wages. In the short run, however, unemployment can also be caused by a shortfall in demand, but as time goes on, firms and workers can fully adjust to new relative factor costs.[6] More recently, the reason for real wages being too high has also been modelled as the results of wage bargaining setups and labour market institutions (Layard, Nickell and Jackman, 1991; Blanchard, 1997).

As we have shown in the literature review, historical work has seen several applications of this basic theoretical framework to individual economies and in comparisons between countries, however, these applications have always been for the aggregate economy

[6] Since we are interested in the longer run effects of a wage push, we take a fairly long perspective, 13 years (1917–1929), so that such demand factors becomes irrelevant and firms have had time to adjust to new relative factor costs. Hence, if we observe high unemployment and sluggish employment growth several years after the push in real wages, we can be confident that this is in fact a case of classical unemployment.

or the manufacturing industry as a whole.[7] However, by ignoring the different conditions in traded and non-traded sectors, a large part of the dynamics in the relationship between unemployment and real wages has been overlooked. Already Phelps Brown and Hart (1952) pointed out that the effect of a wage push on wages and profits will be very different depending on the competitive situation of the employer: can they raise prices to compensate for higher wages, or does competition stand in the way for such compensation? From theory, the rate at which unemployment responds to real wages is influenced by two factors: capital intensity and product market competition. In sectors with low capital intensity and thus a high labour share of value added, output prices will increase more for a given percentage increase in the real wage since wage makes up a larger part of production costs. The ultimate effect on labour demand, however, is determined by the elasticity of product demand. Thus, in a sector with low capital intensity and high product market elasticity, the effect of a given percentage increase in the real wage will be higher because: a) product prices increases more since labour is a large part of total costs and b) the effect of a given product price increase will be stronger since consumers can buy from firms without increased costs (Hamermesh, 1986). Thus, our theoretical prediction is that real wages will increase less in sectors with low capital intensity and high product market elasticity, and to the extent that the real wage increases, the effect on employment will be much stronger. Since the level of capital intensity and product market competition differs considerably between sectors within the economy, the effect of a big wage push, such as the one that we study, should also vary between sectors. One empirical innovation in our paper in relation to previous studies of wages and unemployment in the interwar period is that we take explicit note of these differences across sectors.

In an economy with a large export sector such as the Swedish economy in the interwar period, output can be viewed as produced a traded and a non-traded sector (cf. Swenson, 1991; Fregert, 1994). In the traded sector, output is mainly designated for exports, firms are price takers and cost increases have a direct effect on profitability, which induces dynamic responses: either through a reduction in output or changes to the ratio of capital to labour. As a

[7] Many studies frame this as wage rigidity, which is simply the other side of the coin. In that case, wages do not adjust downwards after unemployment increases as to restore equilibrium. Instead, we highlight the active role of wages increases by looking at the effect of the eight-hour day. It is important to notice that this is only a difference in emphasis.

result, unemployment increases. In the non-traded sector, output is mainly designated for domestic consumption, and cost increases can more easily be passed on to consumers. As a result, profitability is less affected and unemployment increases less. The price increase in the non-traded sector decreases the real wages for workers in the traded sector through higher consumer prices.[8]

3.2 The sectorial design

To investigate the effects of a wage push on profits, investments, employment and income distribution, we use a sectorial design in two steps. Firstly, we use a manufacturing and services vs. agriculture-comparison as manufacturing and services but not agriculture were affected by the eight-hour legislation and were strongly unionized (cf. Lundh and Prado, 2015). Secondly, we make a distinction between traded and non-traded sectors that were affected by the legislation. We distinguish between traded industry, non-traded industry and non-traded services. To include this last sector is a novelty in the literature; previous studies have focused solely on the manufacturing industry. The historical context, on the other hand, clearly requires explicit attention to non-traded services since the sector employed a large part of the labour force (Edvinsson, 2005). Fregert (1994) acknowledges this but only has data for manufacturing.

Following the manufacturing and services vs. agriculture-comparison, we then in the first stage compare traded industry to non-traded industry and services to analyze the effect on wages and unemployment in these three unionized sectors that were affected by the eight-hour legislation. In the second stage, we compare traded industry to non-traded industry, where we have more detailed data, to analyze the effect on capital intensity and profits.

With reference to the discussion above and previous research on the Swedish labour market during the interwar period, we define traded industry, non-traded industry and non-traded services in the following way. Non-traded services are defined as all production in building, transport and circulation. These activities made up about 30 percent of all non-farm

[8] This does not entail, however, that final prices as observed from statistics in the sectors change in a predictive way following such a wage push. Since a multifold of factors affects the firms' pricing decisions, we can only infer the effect of price competition indirectly, and we cannot differentiate between the role of export competition and capital intensity.

employment in 1919 (Edvinsson, 2005). Traded industry is defined as the mining and metal, quarrying, wood, pulp and paper, textile and clothing and leather industries.[9] These sectors constituted 90 percent of blue-collar employment in manufacturing in 1919. Non-traded industry, following Fregert (1994), is defined as food product industries, which made up 10 percent of manufacturing blue-collar employment in 1919. The manufacturing sector as a whole made up about 45 percent of the non-farm labour force in 1919.

While we do not have capital stock data for non-traded services, it is safe to assume that this sector was fairly labour-intensive vis-à-vis manufacturing. Thus, the difference between non-traded services and traded industry that we observe should be more immediately related to differences in product market competition. In non-traded industry, however, the amount of capital per worker was almost double that of the traded industry in 1919 (Holmquist, 2003). So, in addition to the difference in product market competition, we expect employment to be less sensitive in non-traded industry because of the higher capital intensity.

Drawing on the theoretical discussion and our sectoral design, we can summarize our main hypotheses in the following way. In practice, we think of the unions in the traded and non-traded sectors as facing different choice sets. In the non-traded sectors, unions can push up the wage more without causing unemployment than in the traded sector. Unions in the traded sector instead have to choose between somewhat lower unemployment at the cost of lower relative wages or whether to 'buy' some relative wage increases at the cost of higher unemployment. Thus, while we expect real wages to increase more in the non-traded sectors after the eight-hour day legislation, the relevant metric is the combination of real wages and unemployment that workers in each sector are able to achieve. In the empirical section, we will first analyze the evolution of real wages, followed by employment and unemployment. Thereafter, in a comparison between traded and non-traded manufacturing, we look closer at the effect on the capital-to-labour ratio and the profit rates. In the following, section we present the data.

[9] While the Swedish pulp and paper industry was very export oriented and therefore likely a price taker, it was also very capital intensive. This should affect the results against our hypothesis of a larger unemployment effect in the traded sector, but we still opt to include it in the traded sector. In any event, our results are robust to the inclusion or exclusion of paper and pulp.

4. Data

There are wage data for Swedish industry since 1860, but frustratingly, previously due to lack of sectoral hourly worked data, there have not been any sectoral wage data for the interesting years 1914 to 1920 (see Prado, 2010). The official industry statistics only started reporting hours worked in 1921. Thus, this paper adds data for worked hours during these years. The source is a number of official investigations in conjunction with the introduction of the eight-hour day in 1919. The most important of these is the statistical report carried out by a public working time committee, which was given the task of preparing the legislation (*Arbetstiden inom industri och hantverk m.m i Sverige vid år 1917*), henceforth referred to as OI 1917). OI 1917 presents very rich data: gross and net daily working hours, net weekly working hours, net working hours on Saturdays, breaks, the incidence of work on Sundays and holidays, overtime, shift work etc. The coverage of companies and workers is also very good with almost full coverage. To assess the effect of the legislation, a new official investigation was launched in 1922. The results from this investigation were included in a later and more thorough investigation effectuated in 1925, which we have drawn on for the information on working time in 1919 and 1920 (SOU 1925:45).

We calculate two sets of hourly wage data. The first refers to male hourly wages and covers all three sectors. We would prefer mean wages for both sexes, but since there are no labour force weights for males, females and minors available for non-traded services, we are restricted to male wages. As a consequence, we assume that the evolution of working hours was the same for all categories of workers. These sectors were strongly male dominated so it is unlikely that this assumption makes much of a difference. In the second set, we calculate hourly mean wages for traded- and non-traded industry where we have full information on the number of employed males, females and minors. See Appendix A for a more thorough discussion of the calculation of the hourly wage series.

Our data on profits in traded and non-traded industry is derived from two sources. For 1917–1925, the data comes from an official investigation on the balance sheets of Swedish limited companies the years 1911–1925 (SOU 1929:4) and for 1927–1929 from Dahmén (1950). Both datasets refer to profits as a share of own capital and are drawn from the balance sheets of publicly traded companies. The Dahmén data does not contain information on the

amount of own capital, however, so the weighting of sub-industries has been done using data on horsepower from official industry statistics. The weighting procedure is explained in more detail in Appendix B.

Our unemployment data are based on the reporting by local public labour exchanges to the Social Board (*Socialstyrelsen*) and published in the periodical Social Messages (*Sociala meddelanden*). We have excerpted these data and created series for our four sectors: agriculture, traded industry, non-traded industry and non-traded services. [10]

In addition, we use industry capital stock data from Holmquist (2003), employment and hours worked data from official industry statistics, employment in the sectors included in non-traded services from Edvinsson (2005) and hourly wages in agriculture from Lundh and Prado (2015).

5. Results

5.1 The wage push: a descriptive sectorial approach

What did the wage push look like? Figure 1 shows our calculation of real hourly consumption wages from 1917 to 1929. Between 1919 and 1921 the eight-hour working day legislation was implemented in industry. From 1919 to 1921, we see the real wage lying flat in agriculture at 0.57 kronor. On the other hand, we see large increases in manufacturing and services. In traded industry the wage increases from 0.74 to 1.12 kr, an increase of 51 percent. In non-traded industry, the wage increased from 0.79 to 1.33 kr, (68 percent). And in non-traded services, the wage increased from 0.82 to 1.33 kr, (63 percent).

[FIGURE 1 HERE]

The lack of wage growth in agriculture, not affected by the workday shortening, is compatible with Lundh and Prado's (2015) distinction between unionized industry and non-unionized agriculture. It seems that institutions play an important role for wages here. We can also compare our results with Holmlund's (2013) estimated coefficient for the workday regression

[10] We have chosen not to use the unemployment reports from the unions as the sector breakdown of this data is harder to do since labourers was organized in their own union and was not reported in the sector unions figures.

in a wage regression with wage growth from 1915 to 1939 as the dependent variable. Holmlund (2013:p.147) himself expresses distrust at how strong his coefficients are, but from the perspective of this paper, it seems likely that 1920 really was a year of exceptional wage pressure, as our real wage increases of 51 to 68 percent from 1919 to 1921 would indicate. To demonstrate the need for a special look at what happened in 1920, we run ordinary wage regressions, which show that ordinary variables cannot explain what happened in 1920. In the first model, we let nominal wage increases for the average male manufacturing worker be determined by consumer price inflation and productivity growth. In the second model, we add the change in unemployment during the previous year. In the third model, we also add growth in the share of workers who are members of trade unions. The results are shown in Table 1 (all variable discussion and sources in the table note).

[TABLE 1 HERE]

As we see, as expected, nominal wages increase more in years with higher inflation: the coefficient is around unity. Productivity growth is positively correlated with wage growth but does not reach statistical significance. Unemployment growth is negatively correlated with wage growth, and unionization as expected is positively correlated. What is more interesting, however, is that no matter if we control for all these variables, wage growth in 1920 is still exceptionally high: the dummy for year 1920 has a coefficient around 22 in the two first models and around 18 in the third model, where we control for unemployment and unionization as well as inflation and productivity. This means that hourly wages in 1920 still increase around 20 percent more than we would expect given the economic and institutional fundamentals. This large non-explained part of the regression results encourages the belief that there is something special about 1920, meriting further attention beyond the methodological restrictions of wage regressions.

The difference between industry and agriculture is only part of the story. As discussed in sections 2 and 3, the sectorial differences within industry are also very important for our concerns. Considering the relatively small wage differences between traded industry, non-traded industry and non-traded services before 1920, the rift that appeared afterwards is

remarkable. What was the effect of this wage push in the three sectors? That is the question we turn to in the next section.

5.2 The wage push: immediate effects on unemployment and profits

As stressed in the literature review, Bengtsson (2014) sees the post-WW1 wage push as pure redistribution from capital to labour, increasing the wage share to a new level, while from Broadberry and Ritschl's (1995) perspective, the wage push is rather an unemployment-creator. We have stressed (in section 3) that we expect the effect of the wage push to be stronger in the traded industry than in the non-traded sectors. How did employers in the two sectors adjust to the wage push after 1919? Figure 2 shows an index of employment in the three sectors.

[FIGURE 2 HERE]

In traded industry, employment declines rapidly between 1920 and 1922, and while it starts to recover in 1923, it remains below the level in 1917 throughout the 1920s. On the other hand, in non-traded industry and services, employment increases or remains stable. There is no indication of a an increase in unemployment even though the wage push was even more marked in those sectors as compared to traded industry. If we look at agriculture, our counterfactual of no reduction in working time, employment also remains stable throughout the decade.

The evolution of employment only tells one part of the story. If lackluster employment growth in traded industry were really the result of too high wages, we should see larger unemployment in this sector compared to the non-traded sectors. Figure 3 shows the ratio of job applicants per job vacancy at the public labour exchanges.

[FIGURE 3 HERE]

The picture is very striking: in 1920 the ratio of job applicants to vacancies was basically the same in traded industry as in non-traded industry and non-traded services, but in 1920 the

difference increases markedly: suddenly there are more than 20 applicants per job in traded industry but less than five in the other sectors. Now, of course, this can depend on both supply and demand: the rapid wage increases probably caused workers from other sectors to apply for jobs in the traded industries, but the entire increase cannot be due to such a supply side effect: it should also be about demand. If this were the case, we should see a similar increase in the non-traded sectors as workers applied for high wage jobs there. Given the massive divergence in applicants per vacancy between traded industry and the other sectors, it does seem like the eight-hour day did have a Broadberry–Ritschl kind of effect in traded industry. This is in line with the conjectures of Fregert and Magnusson (1994) but in contrast with Holmlund (2013), who treats industry as homogenous. What about the non-traded sectors? Do we see more of a pure redistribution effect (as in Bengtsson, 2014) there? To answer these questions, we need to look in more detail at capital-labour substitution and profits data. What about the profits? Figure 4 shows return on capital in traded industry and non-traded industry from 1917 to 1929.

[FIGURE 4 HERE]

Despite the very rapid wage increase in 1920 shown in Figure 1, we see no sudden fall in profits here; in the traded industry, profits fell slightly from 1919 to 1920, but they had already been falling in 1917 and 1918 too. However, what we do see with the exception of an odd spike in 1920 is that the very high profit levels of the war time economy (see 1917) certainly are not reproduced in the 1920s; generally, in the 1920s, profits in traded industry are only around five percent of own capital. In non-traded industry, the profit situation is both more favourable and more stable: this sector did not see the same success in 1917 as the export sector, but the situation actually improved after the war (as domestic consumption grew), and profits were better, around eight percent, than in traded industry for the entire period from 1919 to 1929.

How did firms adjust to the change in the price ratio between capital and blue-collar labour, when the latter became more expensive? Figure 5 shows the capital-labour ratio in the two sectors.

[FIGURE 5 HERE]

In traded industry, capital intensity grows slowly before 1920, but after the eight-hour day and deflation hit, the ratio jumps up. This indicates that labour was shed much faster than capital during the deflation. The striking thing, however, is that as production recovers from 1922 onwards, the ratio does not return back near to pre-crisis levels. Between pre- and post-deflation, the ratio increases by 20 percentage points. This puts numbers on the conclusion of Fregert and Magnusson (1994:pp.791–792) that capital intensity increased in the 1920s. Thus, while much of the capital stock is retained and started to expand again from 1923 onwards, labour is not reemployed at the same rate, a situation of jobless growth seemed to have characterized traded industry in the 1920s. In non-traded industry, to the contrary, there were no large changes in the ratio at all, suggesting that firms were content with the existing factor proportions even though the nominal cost ratio between wages and capital changed.

In the international debate, the alleged profit squeeze caused by the eight-hour day and union militancy in the 1920s is the main transmission channel from institutional factors to the poor employment performance of the decade (Broadberry and Ritschl, 1995; Ebell and Ritschl, 2008). Also Swedish economic historians have seen a profit squeeze around 1919–20 but without pointing to any employment effects (Bengtsson, 2014). Our analysis, to the contrary, indicates that actually the workday shortening in Sweden had both kinds of effects: worker-friendly redistribution but also increased unemployment. This relativizes Bengtsson's (2014) argument that there was a major redistribution from capital to labour connected to the eight-hour day: this was not the case for all sectors. It also relativizes Piketty's (2014) stress on war-time destruction as the source of increasing income inequality during this period: in non-belligerent countries such as Sweden there were also equalizing factors in play (cf. Acemoglu and Robinson, 2015).

5.4 Did non-traded industry drive up wages in traded industry?

As we have argued, there are theoretical reasons to believe that employment is less sensitive to wage increases in non-traded industry and services than in traded industry. Our empirical

investigation has also shown that real consumption wages did increase in industry and services after 1920 as compared to our counterfactual: agriculture. While the relative increase was larger in non-traded industry and services than in traded industry, real wages increased across the board. Our finding suggests, however, that the effect on profits and employment was much stronger in traded industry, leading to high unemployment in that sector. Thus, the relative wage would have needed to be even lower in traded industry for unemployment to decrease. There are both an internal union and a market reason for why this was unlikely to happen. If unions in traded industry cared about relative wages, they would not be willing to see their peers in the non-traded sector gain even more than they had already done. From the employers' perspective a relative decrease was just as unlikely, since they competed with the non-traded sector for labour. It therefore lies close at hand to see the wage push in the non-traded sectors as the causal factor behind the unemployment problem in the traded sector. Is this corroborated by international evidence?

Two investigations conducted in 1931 and reprinted in Styrman (1946) can help to shed some light on this question. The first survey was conducted by the Engineering Employers Association in Switzerland on wages for skilled workers in engineering across European countries. The results showed that of all the countries in the survey, Swedish engineering workers had the highest wage (in local currencies converted to Swiss francs), above that in England, Switzerland, Germany and Holland. In addition, a survey conducted in October of the same year by the International Labour Organization compared the wages of engineering and building workers in European capitals. In Stockholm, the relative wage of a skilled building worker was 200 percent of a skilled worker in the engineering industry, the highest in the survey. Thus, while Swedish engineering workers were the most expensive in Europe, they still earned relatively little compared to building workers (included in non-traded services) who had managed to push up their wage. Such absolute (compared to other industrialized countries) and relative (compared to workers in non-traded sectors) wage relations are unlikely to appear in a free market. This situation is probably due to institutional factors: a strong trade union movement in an economy with fundamentally different market conditions for traded and non-traded sectors (cf. Swenson, 1991; Fregert, 1994).

6. Discussion

With our comparison of industry, affected by the eight-hour workday reform of 1920, and agriculture, not affected by this reform, we have shown that the eight-hour workday reform in Sweden had significant effects on real wages. As we have shown with our wage regressions (Table 1), wage growth in 1920 really was exceptional and cannot be explained in a regression framework by high inflation, low unemployment, increasing union density or growing labour productivity. While in 1919 the average hourly wage in traded industry was about 47 percent higher than in agriculture, in 1921 and 1922 the difference was 100 percent. Furthermore, we have shown a very significant difference between traded industry and non-traded industry. Traded industry saw more unemployment, a larger reduction in employment, a large increase in capital intensity and a fall in the profits-to-wage-ratio. As they were competing in international markets, these employers could not adjust to the new high wage pressure environment of strong trade unionism in the 1920s by increasing prices and thus shoveling the costs of the wage push to consumers. In non-traded industry, we saw very different developments: profits were not as hurt, due to the inelasticity of labour demand, worked hours did not decrease as steeply as in export industry, unemployment did not increase as much and capital intensity did not increase as much. Thus, compared to the previous literature on the wage push of the eight-hour workday legislations (Fregert and Magnusson, 1994; Broadberry and Ritschl, 1995; Bengtsson, 2014), we show how important it is to use sectorial data and distinguish between different types of sectors.

We have studied the dynamic adjustment that firms made in traded industry after the increase in labour costs. It turns out that the ratio of capital labour to blue collar labour increased as a consequence. The puzzling pattern of unemployment during the 1920s, discussed for example by Fregert and Magnusson (1994), can thus to some extent be explained by accounting for the large increase in labour costs interacting with the elasticity of labour demand, which was much stronger in sectors with high export penetration.

The eight-hour workday legislation was driven by the labour movement (Ohlsson 2014): in times of a revolutionary threat, élites accepted popular reforms such as this one (Acemoglu and Robinson, 2000). We have shown that in terms of living standards, the legislation had contradictory effects on the Swedish working class. On the one hand, the

legislation together with rather successful defence of nominal wages by trade unions in the deflationary years of the early 1920s did push up wages massively and decrease the profits-to-wages ratio, an important indicator of inequality (Piketty, 2014). But on the other hand, this wage push also increased unemployment. Can we calculate the net effect on working class living standards, absolute and relative? Probably not in an advanced quantitative way. But an educated guesstimate from this study would be that, overall, the working class made major advances during the years after the First World War: more leisure time for workers and higher wages for the hours worked, to some degree at the expense of capitalists. This is interesting in the context of the international debate on the great equalization of income in industrialized economies around 1920, which began a historical period of equality lasting until the late 1970s (Piketty, 2014; Acemoglu and Robinson, 2015; Williamson, 2015). It also discredits monocausal explanations like Wright's (2006) of increasing equality in the early 1920s. Wright attributes a decrease in inequality in the United States during these years to decreasing immigration to the country leading to a decreased labour supply, but Sweden, a country without the same immigration turnaround, sees the same kind of wage development. This indicates that economic historians should be less susceptible to monocausal explanations and more open to institutional effects – specifically in the context of the early 1920s, unionization and political pressure from below – and not only look to market forces in explanations of income inequality. One way forward for research would be to test econometrically with a panel of countries c. 1914–1930 the Piketty hypothesis that war time destruction was most important for the fall in inequality, Wright's (2006) stress on migration flows, and the institutional focus of Acemoglu and Robinson (2015) as well as our analysis. Here, the shortening of work time as well as unionization would be relevant institutional variables.

Another implication of our study is for the debate on social polarization and different political outcomes in the interwar period. That Sweden in the 1920s saw the same kind of wage push that Weimar Germany saw (according to Borchardt, 1982; Broadberry and Ritschl, 1995) but took a very different political route in the early 1930s puts into question the connection between social polarization and fascism that Borchardt (1982) hypothesized. We must wonder how Sweden, so socially polarized and with such rapid economic swings in the early 1920s, found a stable democratic way out of the crises of the interwar era. Lapuente and

Rothstein (2014) provide one possible explanation, focusing on the quality of the bureaucracy, but this seems highly partial. How the labour radicalism of the early 1920s was channelled in a thoroughly reformist direction is still an interesting question. One part of this investigation should be looking at labour market institutions and wage setting. Swenson (1991) and Fregert (1994) have both claimed that cross-class coalitions in the 1920s were fundamental for the rise of the 'Swedish model'. In their story, export-oriented employers reacted to the high wages and costs in non-traded industry and services (especially construction) and allied with unions in their sectors against the home market sectors to tame wage developments there. Our results on the differential effects of the eight hour workday wage push on traded and non-traded industry, connected to a redistribution from capital to labour generally, shed new light on this issue. Our results show that it was not all about cross-class alliances and intra-class divisions but also about the old-fashioned conflict between the classes, with labour generally gaining and capital generally losing. The wage push around 1920 was the first major union-led wage push in Swedish history (Bengtsson, 2014) and stands at the portal of the 'Great Egalitarian Leveling' of the 20th century (as in Williamson, 2015): in this perspective, the new labour market institutions of the 1930s with the 1938 Saltsjöbaden Agreement between employers and unions in the centre should be seen against the background of significant trade union strength, not only against the background of intra-class division as in Fregert (1994) and Swenson (1991).

Another important issue in relation to our results is the following: what were the effects of the wage push on productivity? A wage push can, through the channel of increased capital intensity and induced innovation, increase productivity. The Swedish economic history literature has put some emphasis on the rationalization movement' of the 1920s (cf. Fregert and Magnusson, 1994: p.792), and it would be interesting to connect this quantitatively to the wage pressure of the period, as Scott and Spadavecchia (2011) have done for Britain.

In 1975, Dowie (1975) published a paper with a very clear claim already in the title: '1919–20 is in Need of Attention'. We believe that this paper supports this argument. The very turbulent years when European economies went from war-time profiteering, an all-time high in inequality and mass social unrest to major social and political reforms – universal suffrage, workday shortening and profits taxation – and massive redistribution from capital to

labour stand at the beginning of the historically equal period from around 1920 to about 1980 (Piketty, 2014): ‘the Great Egalitarian Leveling’ in Williamson’s (2015) term. The social mobilization and conflicts of this period left lasting marks on the social and political configuration of European countries. Indeed, still, the period 1914 to 1930 is in need of new attention in economic and social history.

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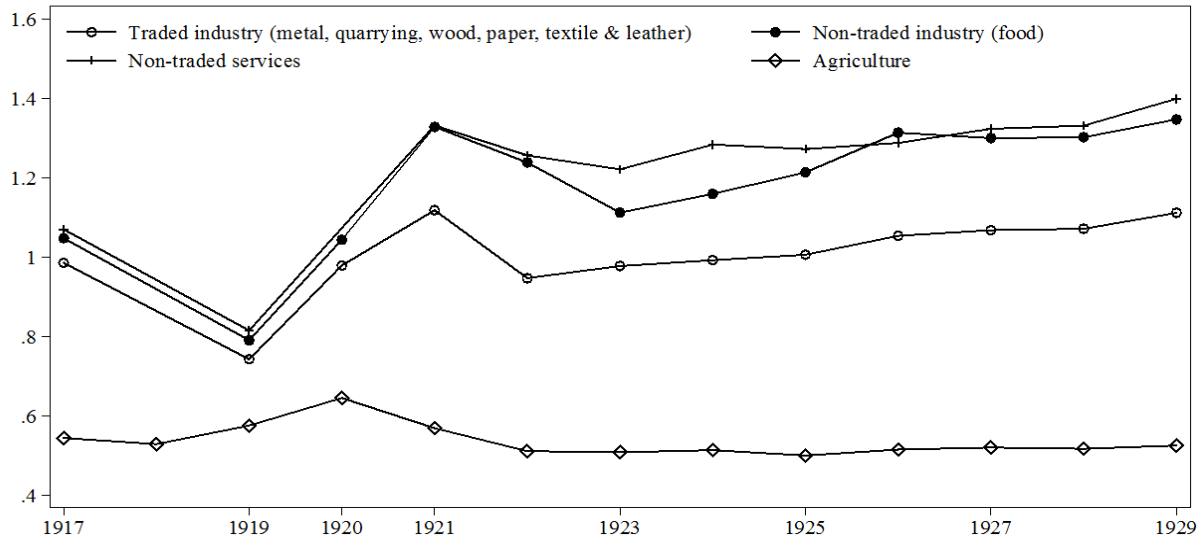
Table 1. Wage regressions, 1900–1949

	Model 1	Model 2	Model 3
Inflation	0.97***	0.93***	0.76***
	(0.09)	(0.10)	(0.13)
Δ Productivity	0.34	0.34	0.01
	(0.21)	(0.27)	(0.31)
Δ Unemployment $_{t-1}$		-0.51**	-0.39
		(0.23)	(0.23)
Δ Union density			1.33*
			(0.71)
1920 dummy	22.01***	22.53***	18.00***
	(5.65)	(6.11)	(6.37)
Observations	48	36	36
R-squared	0.76	0.80	0.82

Standard errors in parentheses. *** means that the coefficient is statistically significant at the 1 % level, ** at the 5 % level, * at the 10 % level.

Note. Wage growth is growth in male hourly wages in manufacturing, from Prado (2010) table A10.1. Productivity is a three year average of value added in 1910/12 prices from Schön (1988) table I14 divided by number of employees in manufacturing and handicrafts from Edvinsson (2005). We use the three year average as a measure of trend productivity growth, which should be more important for wage setting than the very fluctuating year-to-year changes. Inflation is growth in the consumer price index from Edvinsson and Söderberg (2010). Unemployment is unemployment among union members and only available from 1911 on. The data are from public social statistics and fetched from Molinder (2012). Unionization rate is share of labour force which is member of a trade union, from Bain and Price (1980, pp. 142–143). Except for unemployment, all variables are available for all years.

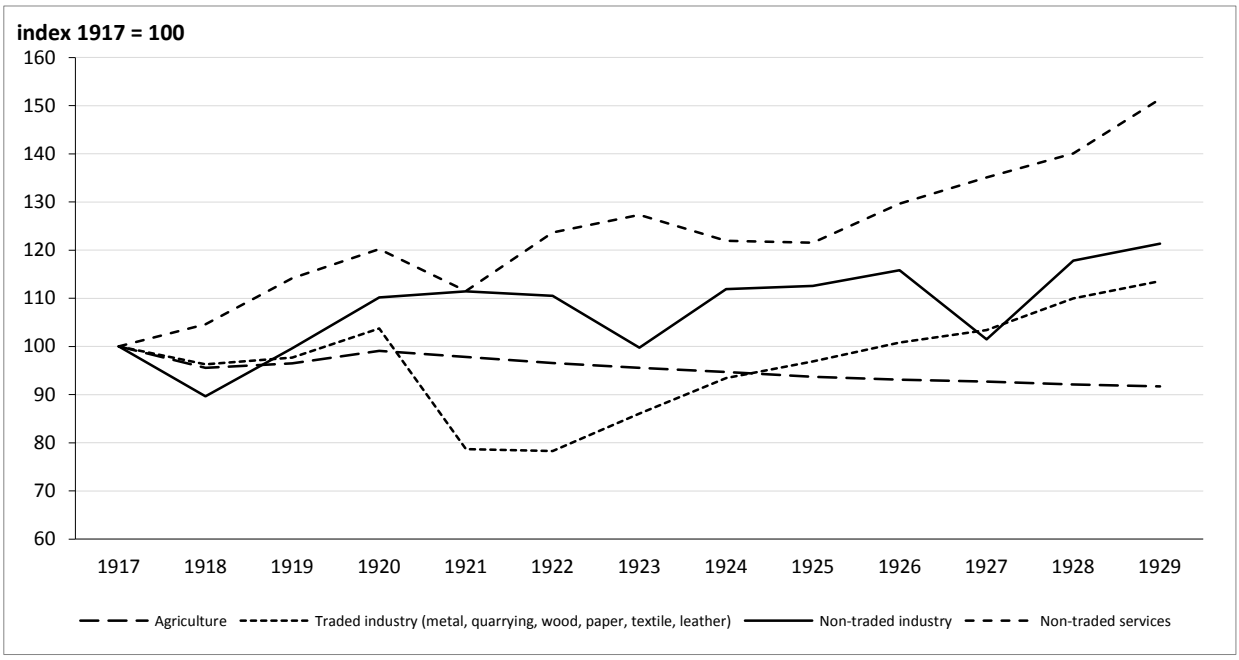
Figure 1. Male Real Hourly Consumption Wages, 1917–1929



Sources: Authors' calculation from official reports, HILD-database, official wage and industrial statistics. Deflated by consumer price index from Edvinsson and Söderberg (2010), 1917 prices. Agriculture wages refer to wages for day workers in their own diet. The hourly wage in agriculture has been estimated using the working time figures in Lundh and Prado (2015:p.38), which gives numbers for 1911, 1920 and 1929. Between 1920 and 1929, no change in average working hours took place. Between 1911 and 1920, it was reduced from 9.2 to 8.8 hours. We have assumed that this reduction took place in conjunction with the eight-hour workday legislation in 1920. Non-traded services is an employment weighted average of building and construction, transport and communication and circulation.

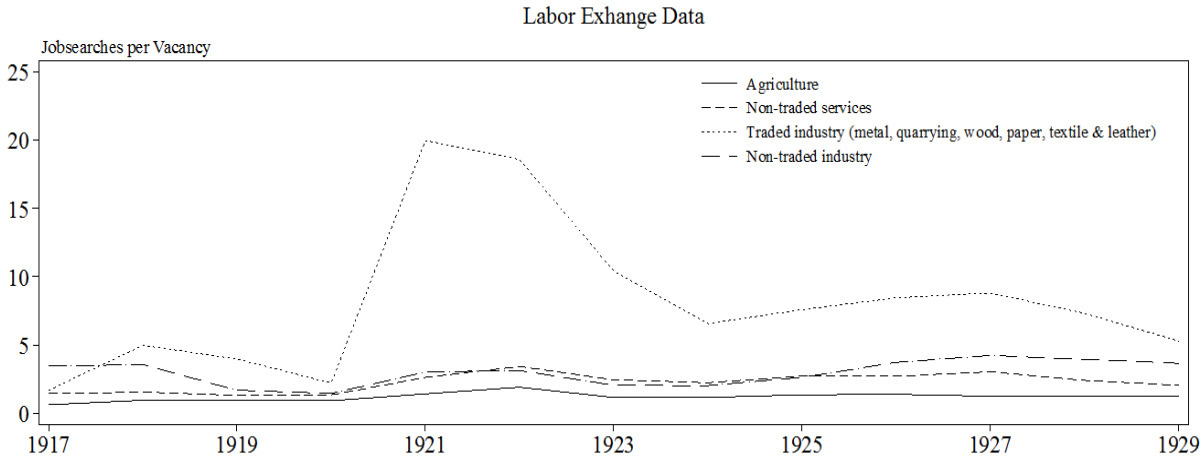
We have also calculated real product wages – nominal wages deflated by output prices – and the picture is very similar with these instead of the consumption wages.

Figure 2: Index of Employment, 1917 = 100



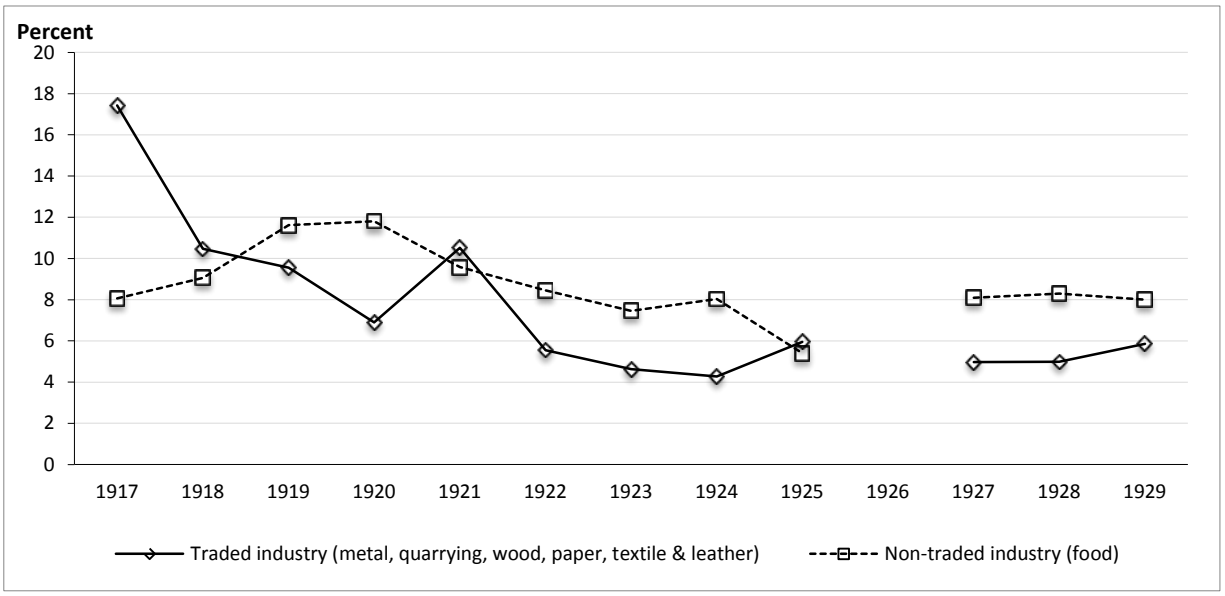
Note: Traded and non-traded industry, blue-collar employment from industry statistics. Non-traded services and agriculture, total employment from Edvinsson (2005)

Figure 3. Number of Job Searches per Vacancy, 1917–1929



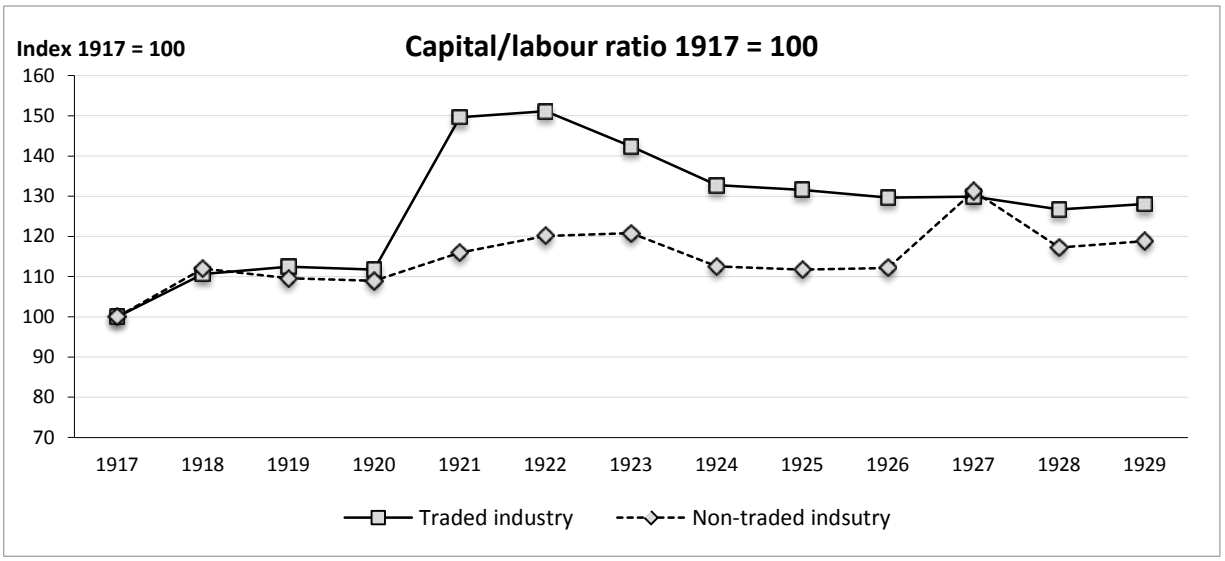
Note. Non-traded services is the aggregate of building and construction, transport and communication and circulation.

Figure 4. Return on Capital in Industry, 1917–1929.



Note. Profits as return on own capital: profits compared to value of capital in the sector. See appendix B for a full description. For 1917–1925 the data is from the official investigation 'Balance sheets of Swedish limited companies the years 1911–1925' (SOU 1929:4) and for 1927–1929 from Dahmén (1950).

Figure 5. Index of Capital/Labour Ratio, 1917 = 100



Note: Labour is total hours worked by blue-collar workers. Capital is amount of horsepower used. Productivity is value added per blue collar hour. Source: official wage and industrial statistics.

Appendix A: Hours worked and hourly wages

We have estimated working hours in 1917, 1919 and 1920, using the data on gross working hours per day as reported in OI 1917 and OI 1925. OI 1925 only reports net working hours per week, defined as gross working hours less unpaid breaks. The gross figure in OI 1917 includes paid breaks, making these figures the most comparable.

To calculate hourly wages, the mean yearly wage has been divided by the estimate of mean total hours worked. Since the yearly wage refers to total payment throughout the year, the estimate of hours worked has been calculated from the number of days worked implicit in the wage statistics (yearly wage/daily wage) multiplied by the estimate of ordinary hours worked per day. Since the number of days worked in the wage statistics refers to full working day equivalents a Saturday with less working hours is not counted as a full day. The calculation was therefore done in the following way:

$$hWt = yWt/(yDt * dHt)$$

Where hWt is the mean hourly wage, yWt is the yearly wage, yDt is the mean number of days worked from the wage statistics and dHt is the estimated number of hours worked per normal day. For 1919 and 1920 only weekly net working hours are reported, the number of hours worked on Saturdays has therefore been assumed to equal that of 1917; hence, the number of working hours per ordinary week day has been estimated by subtracting from the number of hours worked each week the number of hours worked on Saturdays and dividing by five.

Appendix B: Profits

To calculate the profit rate in the non-traded and traded industries, we have used two sources. For 1917–1925, the data are drawn from the official investigation 'Balance sheets of Swedish limited companies the years 1911–1925' (SOU 1929:4) and for 1927–1929 from Dahmén (1950). Both datasets refer to profits as share of the companies' own capital and is drawn from the balance sheets of publicly traded companies. The Dahmén data does not contain information on the amount of own capital however, so the weighting of sub-industries 1927–1929 has been done using data on horsepower (capital stocks).

For the period 1927–1929, mining and metal is a horsepower weighted average of the profit rate in iron and steel, iron and steel manufacturing, metal manufacturing and the machinery and equipment industry. For the horsepower data, the remaining part of mining and metal is reported as other manufacturing, while the profits data are more detailed. Therefore, we have first weighted the profits in these remaining sectors by the number of firms to create an 'Other mining and metal' category also for profits. We have then included 'Other manufacturing' in the overall profit calculation by weighting the profit rate by horsepower. Quarrying is a weighted average of the cement industry, brickyards and porcelain and ceramic industry. Wood is a weighted average of saw and planning mills and furniture, carpentry and manufacturing of the interior decoration industry. Paper and pulp is a weighted average of the pulp industry, paper and paperboard works. Textile and clothing is a weighted average of the cotton industry, wool industry and knitted fabrics industry. The leather industry is a weighted average of the glove leather and fur industries and the shoe industry. To calculate the profit rate in traded industry as a whole, we have weighted the profit rate (as calculated in the first step) in each subindustry.

In non-traded industry, the profit rate is a weighted average of chocolate and candy factories, margarine and lard factories, tallow refineries and the canning industry.