

Globalisation, inequality and Swedish catch up in the late
nineteenth century

Williamson's real wage comparisons under scrutiny

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Globalisation, inequality and Swedish catch up in the late nineteenth century. Williamson's real wage comparisons under scrutiny *

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Abstract: The idea of rapid factor price convergence in the latter half of the nineteenth century stems from an article from 1995 by Jeffrey Williamson. That article presented real wage comparisons of unskilled urban workers for seventeen countries. Sweden, along with the rest of Scandinavia, appeared to be an influential case in accounting for much of the alleged factor price convergence taking place. This paper takes a closer look at all the three steps that have to be accomplished in order to establish real wage comparisons focusing on Sweden in relation to the US and the UK. The most important finding is twofold. First, that the US-Sweden wage gap is considerably smaller for industrial than for building workers, and second, that the rate at which Sweden's real wages approached the American and the British has been overestimated. Swedish real wages did grow rapidly, but not as rapidly as Williamson's comparison will have us to believe, because his real wage series does not constitute a representative account of the Swedish real wage experience. I argue that as we suffer from a serious paucity of data for narrow and thereby comparable selections of unskilled workers resorting to encompassing wage measures is a more viable option.

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1. 1. Introduction

Within the field of economic history during the past twenty years, a great deal of the literature has concerned the words convergence and globalisation. Perhaps the unabated interest in our current era of Globalisation has made history-oriented scholars more apt to turn to previous Globalisation eras to throw light on contested issues. In retrospect it seems the appearance of Jeffrey G. Williamson's (1995) article *The Evolution of the Global Labour Markets since 1850: Background Evidence and Hypotheses* marked a turning point by providing input for new ways of thinking about converging and diverging forces in the Atlantic economy.¹ His was the first work to present real wage levels adjusted for purchasing power parities for a large sample of countries, making it possible to answer old questions and ask new ones about international labour market integration. One of the most important pieces of evidence, prevalent throughout much of the literature on this theme since and aptly summarised in the book *Globalization and History* (O'Rourke & Williamson 1999), pointed in the direction of a general income convergence in the Atlantic economy, manifested by decreasing annual standard deviations in real wages in the sample as a whole. Thus convergence was not only a post-World War II feature. The other piece of evidence well worth receiving our attention was the diminishing income gap between the Old and the New World; the labour-abundant Old World caught up with the labour-scarce New World and the prime mover of contraction was mass emigration. The US is the prime example of a New World country, with an unexploited frontier, a low labour to land ratio and high relative real wages. Declining transport costs, the advent of *laissez-faire*, and unexploited real wage gaps in the mid-nineteenth century created opportunities for European labour to seek out employment in the US and elsewhere in the New World. The mass migration that followed brought about a factor price convergence, as labour became a scarcer factor in Europe and a more abundant one in the US (O'Rourke, et al 1996). Williamson's article changed the focus of concern from domestic factors along the lines of Gerschenkron (1962), Abramovitz (1986), and Baumol (1986) that had imbued writings up to then to external ones, such as trade and migration. It also substituted, as a yardstick of performance, real wages and other factor prices for GDP records, capital accumulation, and structural transformation.

¹ Williamson and his collaborators have elaborated the idea of factor price convergence in more than fifty articles McInnis (2000).

Although some of the articles and books that followed on this theme approached the Atlantic economy as a whole, it appeared visibly clear that the Scandinavian countries played a decisive part in the model, accounting for much of the factor price convergence found in the sample (see figure 1). The grand Globalisation tale seemed to progress without France, Germany, and Britain, three of the most affluent and industrialized European countries at the time (Ljungberg 1996; Grant 2003). Scandinavia's outstanding achievement was therefore subject to further elaboration in two excellent articles in Scandinavian economic history review (O'Rourke & Williamson 1995, 1995a) and the rest of the periphery was dealt with in O'Rourke & Williamson (1997).

Series of real wages for so-called urban unskilled workers are an important aspect in discussions concerning the impact of migration on the evolution of an integrated global labour market. My point of departure is therefore that it matters the way these relative real wage measures are constructed. This paper documents that the real wage series used for Sweden is unrepresentative and does not constitute an accurate account of Swedish real wage experience. In Williamson (1995) and its successors the Swedish real wage growth has been significantly overestimated, which in turn has caused an upward bias as to the magnitude of convergence taking place between the Old and the New World. Furthermore, this paper offers new benchmarks for Swedish wage levels relative to the US and the UK along with modified real wage comparisons between 1860 and 1913.

2. Real wage benchmarks

Williamson (1995) deals with the years 1830 to 1988 divided into three sub periods: before World War I (1830-1913); the interwar-years (1914-45); and the post World War II-era (1946-88).² Each sub period contains a benchmark year that establishes the real wage levels in relation to the UK for all the countries in the sample. The sub periods are covered by national real wage series linked to respective benchmarks. An appendix presents data sources and methods. The first part presents national series of real wages for all countries covering the entire period; the second establishes real wage benchmarks for each sub-period; and the third part links the national wage series with respective benchmark in each sub-period. The exception is the UK series that are left unaltered, set equal to 100 in 1905.

² Since Williamson's publication in 1995 the data set has been revised twice. The correct British series is set out in Williamson (1995a). In O'Rourke & Williamson (1997) further revisions include Portugal, Spain, Norway and the Netherlands.

Thus all series are expressed in relation to the UK allowing for cross-country comparisons. The method partly avoids the problems inherent in historical comparisons of GDP provided by Bairoch (1976) and Maddison (1995), whose series only in practice – not in theory – admits comparisons far off the reference point (Prados de la Escosura 2000). A quick glance at a country's relative standing in 1835 in Williamson's data set is thus a real wage ratio 70 years off the reference point, which is to be compared with what Angus Maddison offers in terms of a GDP ratio 165 years away from its benchmark.

2.1. New Purchasing Power Parities

The Purchasing Power Parities (PPP) in Williamson (1995) transform different currencies into pounds. The basket of goods consists of food items and data for housing (rent). The large sample of countries in Williamson's study made for an upper limit of 13 as to the number of items included in the household budget. The food items and rent are weighed by their relative importance in a typical household budget, and the weights are average budget shares for the USA, the UK, Sweden, Germany, France, Belgium, and Italy. The average budget weights represent a pattern of consumption for a typical urban consumer living in a quite affluent society at the beginning of the twentieth century. They are probably not representative of less affluent countries such as Brazil, Spain and Portugal. What we have learned from the extensive literature on international comparisons is that using the exchange rates for converting different currencies into a single unit of pay inevitably overestimates income gaps between rich and poor countries (Hansson 1988, 1991; Heston & Summers 1980). Stephan Broadberry (1994) has documented American levels of output per worker in the manufacturing sector as twice as high as the British, indicating a potential for high relative wages in the US. Most of the manufacturing sector in the US was exposed to the world market in providing for tradable goods. Rapid growth rates of wages followed in traded-goods industries but workers' mobility between sectors also made for raising wages in nontraded-goods industries and service sectors. Nontraded-goods industries and service sectors could however not substitute capital for labour in harmony with changing relative factor prices. Instead rapid growth rates of wages entailed higher prices. The known and certain fact of high wage levels in the US should lead us to suspect that the higher prices in sectors other than the ones oriented towards the world market raised cost-of-living in the US relative to other countries' (Phelps Brown & Browne 1968). Thus US-Sweden wage ratios calculated by dint of a PPP should come out more

favourably for Swedish workers than ratios calculated on an exchange rate basis. The mismatching of sample years in Williamson (1995) obstructs however any evaluation of estimated price relations and subsequent benchmarks. Data used for establishing the Swedish and Argentinean PPPs refer to 1914 and US data from 1909, but for all the other countries to 1905.³ To establish new PPPs I simply change the sample year from 1914 to 1909 and 1905 to render the prices of consumables directly comparable with the US and UK respectively. Ljungberg (1990) complemented by Myrdal (1933) provides prices for the same products as the ones appearing in Board of Trade⁴ in the UK (1908) and in the US (1911), the same sources as the ones used by Williamson. The Swedish prices refer to country averages, as the prices in Board of Trade. I have established pairwise comparisons, which means that budget weights used for the Sweden-UK PPP in 1905 refer to averages of Swedish and British budget weights.⁵

The estimated PPP:s and the official exchange rates in table 1 bear out what has just been outlined on expected incongruities between PPP and exchange rate. The average Swedish-US price relation of typical consumer goods is 20 percent lower than the official exchange rate, and the corresponding disparity for Sweden-UK ratios is 10. Thus it sets in relief high relative cost-of-living in the US, an important factor to account for when assessing relative real wage levels.

2.2 *Workers underlying real wage benchmarks*

The workers underlying the wage benchmarks in Williamson (1995) are so-called unskilled and skilled urban workers, classified in accordance with a standard outlined by Board of Trade. They belong to the building and engineering trade. The approach follows a long tradition of comparing wages of artisans or construction workers (Phelps Brown & Hopkins 1956; Allen 2001). A paucity of data for workers belonging to sectors other than construction may motivate this choice; otherwise, a more inclusive measure should be preferable. Resorting to only construction workers will imply a strong US wage level bias as

³ This conspicuous incongruence will distort comparisons only if the movement of relative money wages and cost-of-living does not reflect movements of the selection of wages and the prices of the items in the PPPs. After all, the benchmark is simply a way to transform money wage to real wage. At least for Sweden different sample years do not seem to impact significantly on estimated wage relatives (see table 3).

⁴ Report of an inquiry by the Board of Trade into Working Class Rents, Housing and Retail Prices together with the rates of wages in certain occupations in the principal industrial towns of the United Kingdom and United States of America.

⁵ I am currently trying to establish an earlier and more encompassing PPP by using British and US prices from Ward, M. & J. Devereux (2003) and Swedish prices from Ljungberg (1990) and Myrdal (1933). The problem to be fixed is the Swedish budget weights.

the US construction workers appear to have been very well-paid in relation to their European peers. The selection of this narrow definition of workers in studies intending to assess wage gaps between Europe and the US has overestimated the wage distance between the two labour markets (Shergold 1982). Extremely high wages were paid to a skilled minority of American workers but more modest wages to the unskilled majority (Allen 1994). High skilled artisans fared very well in relation to their remaining peers in Europe but in fact unskilled US workers did not do any better than the British did until the years ensuing 1906 (Phelps Brown 1977). In the US skills of the kind represented by engineering and building workers were probably in short supply, while in Scandinavia for instance many (landless) people had gained knowledge of handicraft production because of the short season for traditional agricultural works (Gadd 2005). It is doubtful whether we at all can assign to any workers in the construction sectors the notion of being typically unskilled. The lion part of the workers in this sector possessed enough skills to independently carry out many different and complicated tasks. The mixture of both skilled and unskilled workers in Williamson's benchmarks is, in the first place, surprising as the explicit intention of his was to compare only unskilled wages; and, the construction sector is not the place to look at to find typically unskilled workers. Moreover, craft and construction workers produced mostly for local markets in which unionisation prevailed and competition was less harsh. Firms operating within the manufacturing industry were more likely to meet stiff competition from abroad, which set apart their workers' wage conditions from the rest of the economy (Rosenbloom 1996).

Williamson matches US and UK wages from Board of Trade with nominal wages for skilled-unskilled municipal workers given in Bagge, et al (1933). Swedish municipal workers at this time – however making up an incoherent body of occupations – belonged mostly to the building trade. Bagge et al (1933) give no details about the sample underlying the general index but I have tried as far as possible to assemble the scattered evidence about the selection of occupations. Table 2 epitomizes matched and mismatched occupations relative to Board of Trade's sample indicating a worrisome lack of correspondence; in sum, like has not been compared with like. Perhaps when lumped together the discrepancy does not matter a great deal since wages for different occupations in the building trade may have been so evenly distributed as to render any selection of occupations unimportant (Allen 1994). Be that as it may, a more serious objection is the use of weekly money wages instead of average hourly wage rates as a base for comparison. Weekly earnings lead astray as

weekly working hours are not uniformly distributed among countries. Different weekly working hours distort an index intending to measure the price of work. After all, one way of taking the gains in real hourly earning is in the form of shorter workweeks; the other, needless to say, is to take it in increased consumption of goods and services. Attitudes toward leisure and welfare differ by income levels and living standards over time. Average working hours per week for municipal workers were around 59 in Sweden in 1909, while in the US, according to Board of Trade, weekly working hours were 47 (Bagge et al 1933 p. 15; US Board of Trade 1911 p. xix). This difference disfavours the Swedish wage level. Dividing the weekly wage rates by working hours brings forth a US-Swedish wage ratio of 234, in contrast to Williamson's ratio of 179. The US construction workers happened to belong to the lucky ones who enjoyed relatively short working hours around the first decade of the twentieth century (Shergold 1982), while in Sweden municipal workers devoted as many hours of work as the average Swedish worker. According to a Swedish investigation from 1911 weekly working hours in 1905 were on average 58,9 (Arbetsstatistik 1911) which is only slightly shorter than the working week found for the UK labour market in 1850 (Bienefeld 1972).

Wage ratios differ by sectors, which is yet another potential flaw when pinning down wage relatives for different countries. Table 3 elucidates the problem by exemplifying PPP adjusted real wage ratios for a small sample of industries and agriculture. The UK-Sweden ratios range from 89 for the engineering industry to 142 for the mining industry, and the US-Sweden ratios from 121 for the saw industry to 288 for skilled construction workers. There are of course many potential sources of inaccuracy in nearly all of these comparisons; for instance wages for the Swedish textile industry refer to cotton and wool industries while for England they only cover cotton industries. The coefficients of variation mark larger wage dispersion in the US-Swedish wage ratio than in the UK-Swedish one, but only six UK-Sweden wage ratios render it rather hazardous to attach too much importance to this observation.

2.3. New real wage benchmarks for manufacturing workers

Wage ratios for workers in the manufacturing sector will probably indicate a rather moderate US wage advantage, or at least an advantage more in line with existing evidence on GDP per capita. The average wage level for the manufacturing sector is readily available for the three countries. Feinstein (1995) reports British weekly wage rates for all manual

workers but they have to be converted to an average hourly rate. Bienefeld (1972) provides the denominator by reporting that weekly working hours for the manufacturing sector were on average 53.3. My new UK-Sweden benchmark of 108 is not decidedly different from that Williamson drew on, 112, although it might be a mere coincidence that his benchmark tallies so well with mine. My UK-Sweden benchmark suggests at any rate that the Swedish real wage level on average was not far from being on a par with the British at the turn of the century, a result that indirectly highlights rapid Swedish growth rates of output and productivity. That in turn made it possible for industrial workers to improve their somewhat wretched lot at the initial stages of industrialisation.

For the US-Swedish wage ratio matters are a bit trickier. Douglas (1930) and Rees (1961) present two completely different pictures of average wage *levels* for the US manufacturing sector. By using different sample methods they arrive at very different results. The present author passes this contested issue partly by, but not without pointing out that the wide difference between the estimated levels makes it hard to establish reliable international comparisons. Using Douglas data for the manufacturing sector as a whole gives a US-Sweden benchmark of 192, but after exchanging Rees for Douglas the gap narrows to no more than 142! Thus two separate benchmarks must be worked out but we are still left uninformed as to Sweden's standing relative to the US – clearly an unsatisfactory situation. Rees claims that Douglas' wage levels are too high because of his reliance on union rates and a small sample of peculiar payroll industries.

None the less, it is perhaps possible to derive indirectly the US-Sweden wage gap by drawing on the thorough investigations undertaken by Shergold (1982) and Phelps Brown & Browne (1968). They conclude that at the beginning of the twentieth century the majority of US workers enjoyed a real income lead by no more than around twenty per cent in relation to the British. If we further assume a safe ground for the UK-Sweden comparison, which showed a less than ten percent British advantage, we will be more inclined to believe that Rees' estimated level is more representative than Douglas' is.

Comparative level of labour productivity in the manufacturing sector is another indicator of wage gaps. A relative level of labour productivity far off the relative wage level may indicate that distributional consideration plays an important part. Yet it is important to remember – recalling the discussion on PPP in relation to official exchange rates – that estimates of comparative labour productivity do not reflect relative prices of nontraded-goods industries and service sectors. We should not expect parity between relative real

wage and labour productivity levels, especially not when the US turns out to be the opponent. In another paper of mine, (Larsson 2003), I have estimated comparative levels of labour productivity for Sweden, the UK and the US. As the earliest benchmarks refer to 1907/09 they might help us to discriminate between the two different US-Sweden wage relatives in table 3. The US/Sweden productivity benchmark for 1909 was 201, which indicates that if anything the wage level computed by Rees is quite low. The same large gap between relative productivity and real wage appears when comparing the US with the UK. The labour productivity benchmark established by Broadberry (1994), as mentioned above, which showed that the American labour productivity was twice the British level in 1907, is a great deal different from the US wage lead of around 20 percent as indicated by Shergold (1982). The UK/Sweden benchmark of labour productivity does not puzzle a great deal as it arrives at 118, quite close to the relative real wage level presented in table 3.

In sum, as Douglas' estimated real wage level for the US is difficult to reconcile with what the literature unfolds concerning American wage and labour productivity levels in relation to British it is my conjecture that Rees' estimate is more useful. Whether manifest inequality or high cost-of-living in the US is responsible for the gap between relative wages and productivity levels could perhaps be the subject of further research.

3. Real wage series and movement of inequality

To assess relative real wage movement it is necessary to link benchmarks and time series of real wages in 1860 to 1913 together. The choice of wage data and cost of living influences any comparison of real wage levels far off the reference point, as do interpretations of relative movements. For the years 1860 to 1913 Williamson (1995) uses Swedish information from Bagge et al (1933) as I do. Bagge et al (1933) appeared in two volumes in 1933 and in fact no such comprehensive and detailed study of the development of Swedish wages has been carried out since. Authors have expressed doubts about the reliability of the main results in Bagge et al (1933). Berglund (1982), Cornell (1982) and Johansson (1988) question the methods used to find representative workers and claim, on the basis of local studies, that levels and growth rates of wages for engineering and saw mill industries presented in Bagge et al (1933) are inaccurate. Gustafsson (1965, 1996) points to the absence of temporary workers – the investigation does not include any employment shorter than eleven months – which makes the investigation less useful. Permanently employed workers made up an insignificant proportion to account for the general trend of

money wages. In a recent attempt to construct regional series of real wages Lundh et al (2004) present support for the general picture in Bagge et al (1933). We have at any rate to rely on Bagge et al (1933) as long as no new overall picture emerges.

The Swedish real wage series in Williamson (1995) refers to a “real unskilled industrial wage index” from Bagge et al (1933). Bagge et al present series of nominal wage rates for various skilled and unskilled workers but no *separate* skilled and unskilled series for the manufacturing sector as a whole. Williamson’s unskilled wage series is constructed from four separate series: unskilled workers in iron, wood pulp, sugar and engineering industries.⁶ However, before 1888 his unskilled series includes only the series of unskilled iron workers. The series of unskilled Swedish workers used in Williamson (1995) will in the following be compared to the only series for the manufacturing sector as a whole (skilled and unskilled) found in Bagge et al (1933), a series of which can be said to capture our present stage of knowledge about Swedish wage behaviour for industrial workers in the nineteenth century. Figure 2 puts the two series together indicating a significant discrepancy pre-1892. The series of iron workers causes this deviant pattern; after 1888, when the series consists of more occupations, the disagreement gradually disappears. Williamson’s series starts from a lower level, attains Bagge’s series in 1892 and they accompany each other in the ensuing years. The computed growth rate for Williamson’s series, if the starting point is 1870, is more rapid, suggesting that the unskilled workers’ wages increased more rapidly than the average manufacturing worker between 1870 and 1913. This point deserves further emphasis: 1870 is the first year from which real wage data are available for all the countries in Williamson’s sample. Results from general equilibrium (CGE) models refer, therefore – for the sake of comparability – to the years 1870-1910.⁷

3.1. Movement of Swedish inequality

One way of checking this alleged divergence of the skilled-unskilled pay ratio is to construct an index of all skilled-unskilled wage ratios presented in Bagge et al (1933). Only one of the 6 series of pay ratios displayed in figure 3 covers all years, but in order to fill up as long a span of time as possible I have constructed a combined series by splicing the different indices and adjusting the level to a benchmark of 1903. Figure 4 presents the three years moving average of the combined series. Only the series of iron workers and

⁶ This information cannot be found in the appendix of Williamson (1995) but I have received the missing link from the author.

⁷ See O’Rourke and Williamson (1995a; 1995b; 1997)

municipal workers in Stockholm cover the years before 1887, making it provisional in the extreme to tell anything about movement of pay relatives before that year. These two series are poles apart yielding a combined series that remains stationary. The estimated trend coefficient for the Swedish series of the skilled-unskilled wage ratio in figure 4 fails to capture any significant movement in neither direction.

Estimated trend coefficients of the series of pay ratios in figure 4:

Swedish pay ratio= $57.34+0.115*\text{TIME}$ (t-value: 0.832)

US pay ratio= $-512.61+0.738*\text{TIME}$ (t-value: 7.884)

Furthermore, in a local study of Bredsjö ironworks Larsson (1986) confirms the tendency of a narrowing gap between skilled and unskilled iron workers in the 1870's and 1880's. This tendency coincides with a turning point with respect to the way workers received their incomes. A rigid wage policy gave gradually way to more market based principles in which productivity and market conditions came to be more important. Less skilled workers benefited more from this transition than their masters did, perhaps as a result of a larger weight given to piece work and higher productivity. As for the fortune of unskilled workers in branches other than iron, we simply know next to nothing.

Day rates for a male agricultural worker are another indicator of the relative price of unskilled workers. The series of agricultural workers in figure 5, displayed along with the average manufacturing worker, discloses a somewhat different picture compared to the unskilled series in figure 2. It starts at a higher level than the series of manufacturing workers and instead of falling further behind at the beginning of the 1870's, like the unskilled series, the series of agricultural wages shot up as a result of the agricultural boom in the mid 1870's (Jörberg 1972 vol II p. 345). Apart from this deviation, growth rates of return on agricultural work stick quite closely around rates in the manufacturing sector. Thus, for assessing the long-term movement of the Swedish real wages from the second half of the nineteenth century until the First World War, it *should* be unimportant whether the wage series consists of skilled or unskilled workers, although this conclusion rests on scanty evidence.

Admittedly Swedish mass migration, by diminishing the supply of unskilled workers, is a plausible reason for narrowing pay ratios. Widening pay ratios are however an equally persuasive hypothesis as the era coincides with the end of around 150 years of very rapid

land reclamation in the country side, which abruptly diminished working opportunities for landless rural workers, thus augmenting the labour supply. The issue of pay ratio movements in one direction or another is after all empirical, and certain answers must therefore await future research. Until then the safest option at hand is to stick to the series for manufacturing wages as a whole. Most of these workers underlying the series were unskilled manual workers living in urban areas anyway.

3.2. Movement of American inequality

Williamson's motivation for basing comparisons on male urban unskilled workers only, instead of a more encompassing wage measure, is that the great bulk of emigrants from the Old World were unskilled. However, the argument that the choice of workers matters depends on the assumption of pay ratio movement in one direction or another, depending on the country under review. For instance, if mass migration over the Atlantic made the US unskilled workers worse off while it benefited the unskilled workers remaining in the Old World, changing pay ratios must have followed suit – unless levelling forces set in with strength enough to revert the trend.⁸ It is therefore worth digressing from the subject under investigation into existing evidence on income inequality in the first Globalisation era, an issue that has been at stake in some recent articles (Anderson 2001; Williamson 1997; Betrán & Pons 2004). Among external forces migration seems to have mattered, in line with what Habakkuk concluded in his seminal work already in 1962. The mass of unskilled immigrants entering the US at the end of the nineteenth century may well have contributed to expand the wage gap between skilled and unskilled workers. Figure 4 displays Williamson & Lindert's (1980) evidence of skill premium movements in the US. The estimated trend coefficient above significantly points out that unskilled workers lost ground from the mid 1890's until World War I. Perhaps at that time the number of unskilled immigrants from Southern and Eastern Europe looking for working opportunities was large enough to set a deep mark in the pay ratio record, although Lindert & Williamson (1980 pp. 233-237) tend to favour technological imbalances and different sectoral growth rates of total factor productivity instead of labour supply explanations. Other studies belie their pay ratio evidence, for instance Shergold (1977), who actually presents narrowing pay ratios 1899-1914.

⁸ International capital flows were such an offsetting force. Sweden and the US were net importers of capital while the UK was a net exporter. Imports of capital served to raise growth rates of unskilled wages (O'Rourke & Williamson 1999)

3.3. The Kuznets U-curve

Much of the discussion of income inequality has been centred on domestic explanations and the hunt for tracing the Kuznets U-curve (Kuznets 1955). Following Kaelble & Thomas (1991) the literature about Kuznets' hypothesis follows three lines of thinking. Firstly, the classical approach focusing on the functional distribution of income, or distribution of power among social classes. Secondly, studies of income differences between traditional and modern sectors, or differences between urban and rural areas.⁹ The last and for this paper most relevant interpretation, taken by Williamson and others, is the study of pay ratios between skilled and unskilled labour. The theory behind is that rapid industrialisation brings about increased demand for skills, which in turn affects the skill premium. Skilled labour is a complement to capital, and falling prices of capital lead therefore to increased demand for skill. The inelastic supply of skill leads to changes in the structure of pay; the skilled-unskilled wage gap expands and inequality follows in its wake. The skilled-unskilled pay ratio declines in due course of time when the supply of skills is more in harmony with demand and so inequality reverts to its initial position.

Most eager to prove the existence of an inverted U-curve has been Jeffrey G. Williamson, either himself or in joint efforts with Peter Lindert. Particularly in two books, the first on the US, (Williamson & Lindert 1980), and the second on the UK, (Williamson 1985), appears the contour of an inverted U-curve in the movement of pay ratios during phases of rapid industrialisation. These British and American stories of changing pay ratios attributed to wrenching and levelling forces during rapid industrialisation has not passed by unnoticed, however. As they challenge long held views on restrained movement of skill differentials (Phelps Brown 1977; Soltow 1968) authors were not slow to respond and come out strongly in defence. Jackson (1987) and Feinstein (1988) point to the lack of robustness as incomes for lawyers and doctors account for nearly all the inequality, let alone that those incomes are mismeasured. Grosse (1982), and especially Margo & Villaflor (1987), challenge the American part by using different wage data showing that there was no antebellum surge in the wage differentials. Crafts (1989) summarises the British debate by concluding that the data set has to be augmented making it possible for any future claim on pay ratio movements to rest more firmly on ample evidence.

⁹ A Swedish study using this approach is found in Söderberg (1991).

To sum up, no agreement has been reached on the existence of an up-turn of the inverted U-curve associated with Simon Kuznets, at least not so if we look at pay ratios between skilled and unskilled workers in the nineteenth century.¹⁰ The unsettled debate surrounding inequality in the late nineteenth century cautions not to attach any significant importance to real wage series of unskilled workers behaving markedly differently from series of wages for workers as a whole.

4. New US-Sweden real wage comparison

The selection of workers matters when assessing the movement of the US-Sweden real wage ratio. Figure 6 throws light on the magnitude of change for the US-Sweden real wage comparison when substituting, as a denominator, the real wage series of manufacturing workers in Bagge et al (1933) for the series of unskilled workers in Williamson (1995). It may at first glance seem a modest difference – overall, the two series move *pari passu*, which offers no reason to alter or modify established facts – but one feature merits special treatment. The startling contraction in the US-Swedish real wage ratio in the 1870's has now slipped away. If we take the first reference point in 1870 and the last year of the series, 1914, as the second, Williamson's index drops 253 percentage points, from 410 to 157, while the new series declines more moderately, from 274 to 194, or 80 percentage points.¹¹ Much of the alleged magnitude of the US-Sweden wage contraction has now been modified. A more encompassing index – one that mirrors workers in the manufacturing sector as a whole – will probably show a less clear cut US-Sweden real wage convergence in this era. Clarence D. Long (1960) and Albert Rees (1961) provide the necessary input for verifying that proposition from 1860 to 1914. A spliced index of Long's series for 1860-1890, and Rees' series for 1890-1914, should be the most appropriate companion to the Swedish real wage series of manufacturing workers. Different ways of estimating average hourly earnings make the two American indices less suitable for studying cyclical behaviour. Long's series is based on average hourly earnings derived from daily wages, whereas Rees derived his average hourly earnings from annual earnings.¹² Figure 6 also includes Hanes' (1992) recent attempt to construct a series allowing for straightforward

¹⁰ It is less controversial to say that income convergence and economic growth went hand in hand in the twentieth century (Fogel 2000)

¹¹ O'Rourke and Williamson sometimes use a three-year centred moving average but it only partly irons out the disparity between the two indices, see for instance O'Rourke and Williamson (1997)

¹² See Hanes (1992) for a brief introduction to the US wage sources referred to by Long, Douglas and Rees.

comparability across periods. Although his series does not cover the entire period it represents a way of verifying the combined Long-Rees series. Furthermore, I link the Long-Rees and Hanes' series to the new US-Sweden benchmark (table 3).¹³ Figure 6 depicts what turns out to be a trend pointing modestly downwards; in the course of fifty-four years the Swedish catch up with the US wage level is not so impressive. The “Long-Rees” index falls from 200 in 1860 to 146 in 1914, but most of that catch up was due to a collapsing wage gap during the US civil war. Hanes' series, although showing more favourable American growth rates during the civil war, offers no reason for rejecting the Long-Rees index. Looking at the global labour market from this new angle, furnished with more encompassing wage series, it seems a bit doubtful the claims made by Williamson and his collaborators of an “impressive” real wage convergence in this era.

It is easy to side with Williamson's intention of comparing wage series of unskilled workers as two-thirds of male blue-collar workers in the US manufacturing industry were either operatives or labourers, whereas only one-third was craftsmen, foremen, or other more skilled workers (Rosenbloom (1996). However, the large discrepancy between the series of American unskilled workers and the series of American manufacturing workers as a whole is somewhat surprising. Williamson's series of unskilled American workers did not represent the gains made by the average industrial worker.

The conclusion of a “collapsing” US-Sweden wage gap, appearing in Williamson (1995) and reiterated in the vast quantity of literature that followed in its wake, has crept into the language of Swedish economic history. In fact, it holds a prominent position in the most influential book on the economic history of Sweden, namely Lennart Schön's *En modern svensk ekonomisk historia*. Schön uses the Swedish unskilled real wages series from Williamson (1995) in illustration of the thesis that Swedish mass emigration to the US drove a wedge into the development of wages and GDP in 1870-1910 (see table 4). The growth rates of wages outperformed by far growth rates of GDP – unskilled wages grew 2.8 percent annually while GDP-capita grew 1.7 – confirming the conjecture that international forces changed relative factor prices in Sweden in favour of labour. Computed growth rates of real wages for manufacturing workers as a whole in relation to

¹³ The series is linked to the US-Sweden benchmark based on Rees' estimated US wage level. The wage gap would have been a great deal larger if it was linked to the benchmark based on Douglas' estimated American wage level. It would however not have altered the trend of the series.

growth rates of GDP-capita reveals a less conspicuous picture; wages grew at an annual rate of 2.04, which narrows the gap to GDP growth rates considerably.

5. New UK-Sweden real wage comparison

We have reasons to believe that the selection of workers will matter in a UK-Sweden comparison too, but perhaps less so than in the US-Sweden comparison. I have proceeded in a similar fashion with the UK-Sweden comparison so figure 6 shows the three different series of UK-Sweden wage ratios that will be considered below. Williamson's series ("Evolution") of UK-Sweden ratios indicate that at the beginning of the 1870's the UK wage level was around twice the Swedish. The series has a volatile nature until the mid-1880, which is a pattern we remember well from the US-Sweden comparison. The UK real wage series in Williamson (1995) is made up by wages for bricklayer's labourers, and since the series of Swedish unskilled workers pre-1888 consists of iron workers like has not been compared with like.¹⁴ When substituting the real wage series of Swedish manufacturing workers in Bagge et al (1933) for the series of Swedish unskilled workers in Williamson (1995) the surging wage gaps pre-1885 disappear; instead, the revised series sticks more closely around a British lead of around 50 percent until the lasting decade of the century. The outset of the 1890's marks the beginning of a trend towards unity, which brought about convergence, and finally reversed roles, in the eve of the World War I.

How should wage ratios based on British wages for the manufacturing sector as a whole be evaluated? Feinstein (1995) provides a series based on manual workers from five broad sectors: agriculture, building, coal mining, cotton textiles, and engineering (including shipbuilding and vehicles). His series may be a good opponent to the Swedish series of manufacturing workers as a whole. For two reasons though, Feinstein's series is not comparable to the Swedish one. First, the Swedish series does not include agriculture and building trade. This objection is perhaps less important as it is not entirely unlikely that growth rates of wages for different occupations have increased at a broadly similar pattern. A more serious blow to the comparison is that money wages in Sweden are measured by hourly wage rates and in the UK by weekly earnings. We know that considerable reductions of working hours took place in the UK in the course of the nineteenth century. Much of this reduction took the form of heavy interferences at certain points in time and not by

¹⁴ The UK sample was originally collected by the Board of Trade (1908), remained unpublished, but was dredged up by (Boyer, Hatton et al. 1993).

degrees, as one perhaps is prone to believe (Bienefeld 1972). There is no similar information about Swedish working hours before the turn of the century but it is hard to imagine that any significant revision took place since such a proposition would have it that the normal working week greatly exceeded sixty hours. That said, figure 7 shows that, when comparing the two aggregate measures adjusted to the new UK-Sweden benchmark (table 3), no markedly different picture emerges. The new comparison indicates that the unskilled British workers represented in Williamson's series earned about as much as the average manual worker in this era. Tellingly, the two British series convey a message of agreement; that sets to the fore large wage dispersion and subsequent measurement problems as distinguishing American features, making it difficult to establish an authoritative picture of wages in the US vs. wages elsewhere.

6. Conclusions

Sweden represents the largest country in Scandinavia, a peripheral region that appears to have been an over achiever in the late nineteenth century catch up with the core. Much of what has written about “spectacular” factor price equalisation in the first era of globalisation relies on real wage comparisons of so-called unskilled workers. Constructing international comparisons of real wages is a three stage procedure. First, finding relative price levels for a basket of consumer goods, then, establishing a benchmark of relative wage levels and, last, linking to the benchmarks real wage series of representative workers. This paper documents that Jeffrey Williamson, in his article *The Evolution of the Global Labour Markets since 1850: Background Evidence and Hypotheses* (1995) exaggerated the Swedish wage gap in relation to the US by using wages for *both* skilled and unskilled building workers. American building workers, especially the skilled, appear to have been much better paid than the European ones at the turn of the century, while the wage distance narrows if we consider instead most manufacturing workers. Moreover, the Swedish catch up with the US and the UK, especially in 1870-1913, has also been overestimated because of reliance on merely a single Swedish wage series of unskilled iron workers. This wage series of iron workers behave markedly differently from what we know – at least with some certainty – about Swedish wage behaviour. When substituting a real wage series of Swedish manufacturing workers as a whole for the series of Swedish unskilled workers used by Williamson the enormous wage gaps relative to the UK and US pre-1885 disappear, but rapid Swedish catch up with the US still remains a salient feature. The discussion then goes

on to make clear the problematic nature of basing international real wage comparisons on only a few narrowly defined occupations, especially when the wage performances of these occupations differ widely from a more general wage measure. The motivation for basing international comparisons of real wages on unskilled wages only, instead of manufacturing workers as a whole, turns on the assumption of pay ratio movements. The scanty evidence of any pay ratio movements in Sweden points however to stability, which indicates that it is unjustifiable to present Swedish unskilled wages as outpacing wages for manufacturing wages as a whole. American pay ratio movements, especially in the 1890's, play a decisive role, although the literature on the subject is inconclusive. A comparison based on an American real wage series of workers as a whole shows that between 1860 and 1913 the US-Sweden wage gap declined modestly. In the UK-Sweden comparison the switch to a more encompassing British real wage series does not alter the picture substantially, which provides evidence that movement of British inequality does not play a part.

Although it is important to consider carefully effects on earnings of potential labour heterogeneity in a more inclusive wage comparison, it is more likely that errors in one direction or the other in a more comprehensive sample will cancel each other out. The new real wage comparisons presented in this paper modify Williamson and his collaborators' claim on rapid factor price equalisation between The Old and The New World in the latter half of the nineteenth century.

Tables and figuresTABLE 1 *Estimated PPP:s for Sweden-UK 1905 and Sweden-US 1909*

	Sweden-UK 1905			Sweden-US 1909		
	Sweden	UK	Kr per Pound	Sweden	US	Kr per Dollar
Tea and coffee	0.04	0.07	6.28	0.04	0.07	1.48
Sugar	0.08	0.06	33.91	0.08	0.05	4.87
Bacon and sausage	0.04	0.06	14.23	0.04	0.05	2.72
Beef and veal	0.06	0.18	11.37	0.06	0.20	2.98
Pork	0.04	0.02	12.94	0.04	0.06	3.45
Lamb and mutton	0.00	0.06	12.55	0.00	0.04	3.34
Cheese	0.03	0.03	21.17	0.03	0.02	3.12
Butter and margarine	0.19	0.13	12.53	0.19	0.11	2.13
Potatoes	0.04	0.06	14.32	0.04	0.07	1.27
Flour and meal	0.09	0.06	16.33	0.09	0.08	2.78
Bread	0.13	0.14	22.95	0.13	0.08	2.39
Milk	0.20	0.08	9.19	0.20	0.09	1.67
Egg	0.06	0.06	13.80	0.06	0.09	2.72
Total food	0.75	0.80	20.3492	0.75	0.73	3.134
Rent per three room	0.26	0.20		0.26	0.27	
New PPP			16.46			2.979
Official exchange rate			18.18			3.74

Sources: see text

TABLE 2 *Correspondence between Board of Trade's sample of construction workers and the sample of Swedish municipal workers*

American and British sample	Swedish sample
Skilled building	
Bricklayers	X
Masons	
Carpenters	X
Stonemasons	
Joiners	X
Cabinet makers	
Plumbers	
Plasterers	
Iron workers	
Stucco workers	
Painters	
Blacksmith	X
Pipe layers	X
Pavers	X
Blasters	X
Unskilled building	
Bricklayers' labourers	
Masons' labourers	
Plasterer's labourers	
Other labourers	
Concrete workers	X
Stonemasons	X
Asphalt workers	X

Sources: For the US: Board of Trade (1911); for the UK: Board of Trade (1908); and for Sweden: Bagge et al (1933)

TABLE 3 *UK-Sweden (1905) and US-Sweden (1909) PPP adjusted wage ratios, for a selection of occupations and manufacturing as a whole, skilled as well as unskilled workers*

Occupation	UK-Sweden, 1905		US-Sweden, 1909	
Agriculture	106		171	
Engineering	89			
Textile	141		141	
Miner	142		183	
Building, skilled	109		288	
Building, unskilled	95		223	
Saw mills			121	
Food			160	
Wood pulp			126	
Metal			190	
Coefficient of variation	20		29	
All manufacturing industries	108	Feinstein	142	Rees
			192	Douglas
Williamson, construction workers	112		179	

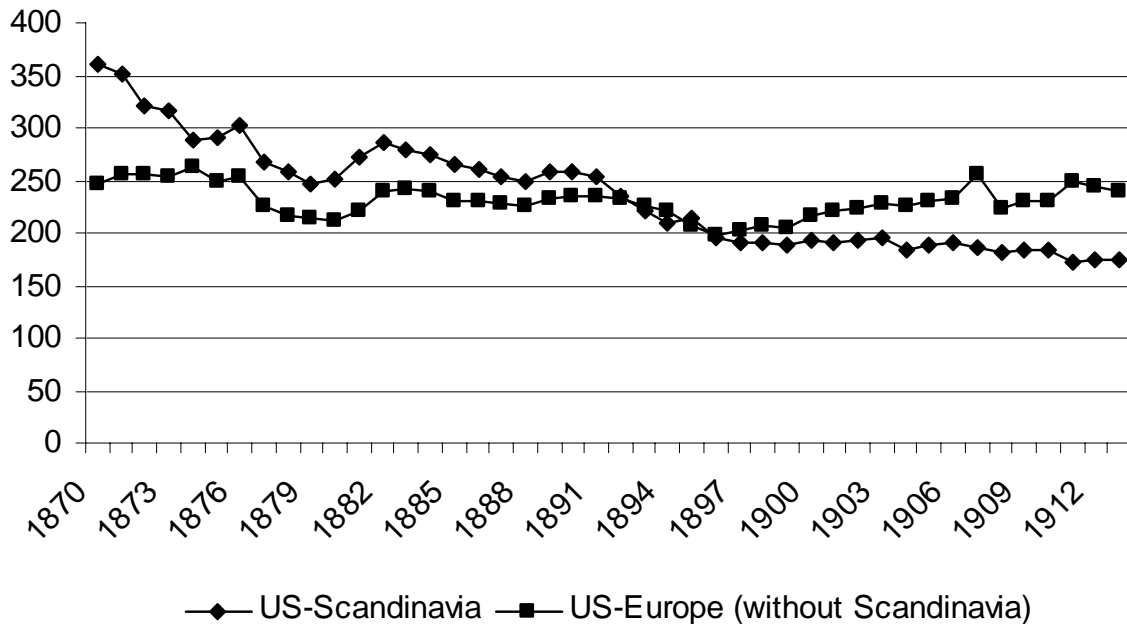
Sources: For the UK: Feinstein (1995); for the US: Douglas (1930), Rees (1961); and for Sweden: Bagge et al (1933 vol. 1-2)

TABLE 4 *Annual Swedish growth rates for real wages, GDP per capita and GDP, 1860-1913*

	Schön's estimates based on Williamson (1995)	Estimates based on manufacturing worker as a whole	
	1870-1910	1860/65-1908/13	1870/75-1908/13
Real wage	2.8	2.09	2.04
GDP per capita	1.7	1.79	1.74
GDP		2.50	2.44

Source: Schön (2000 p. 225); Bagge et al (1933 vol. I table 26); GDP and population from Krantz (2001)

FIGURE 1 *American-European real wage ratios, 1870-1913*



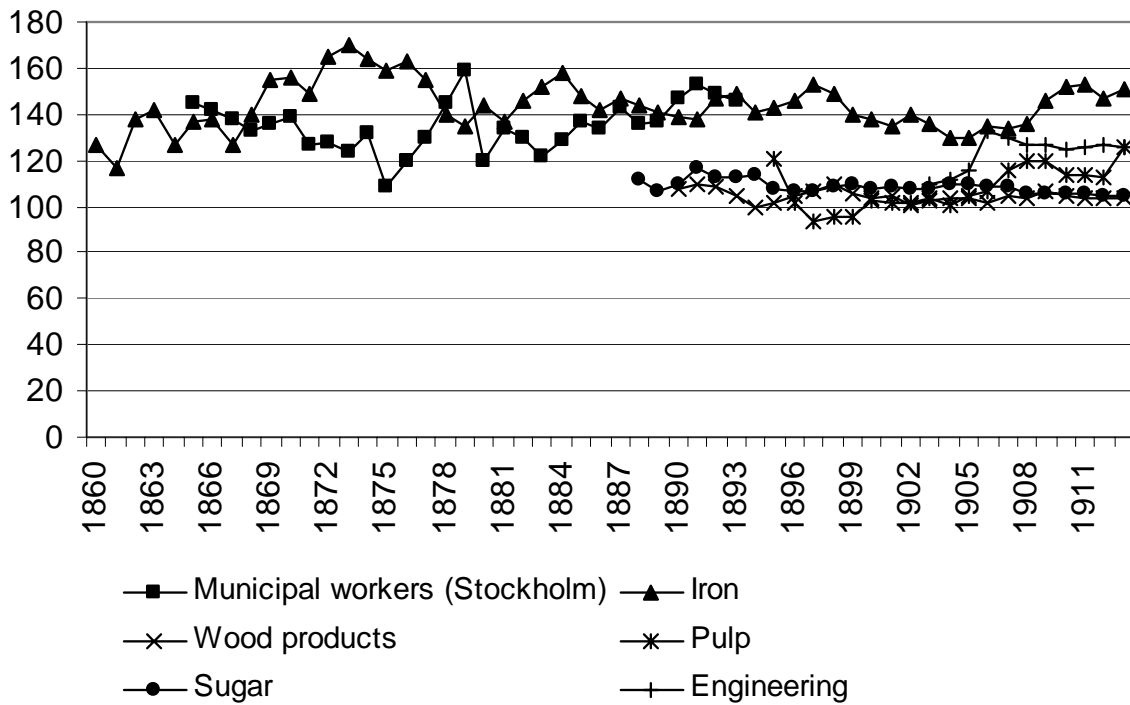
Source: An augmented and revised data set, based on Williamson (1995 table A2.1) with some revisions made in O'Rourke & Williamson (1997).

FIGURE 2 *Different Swedish real wage indices, 1860-1914, 1900=100*



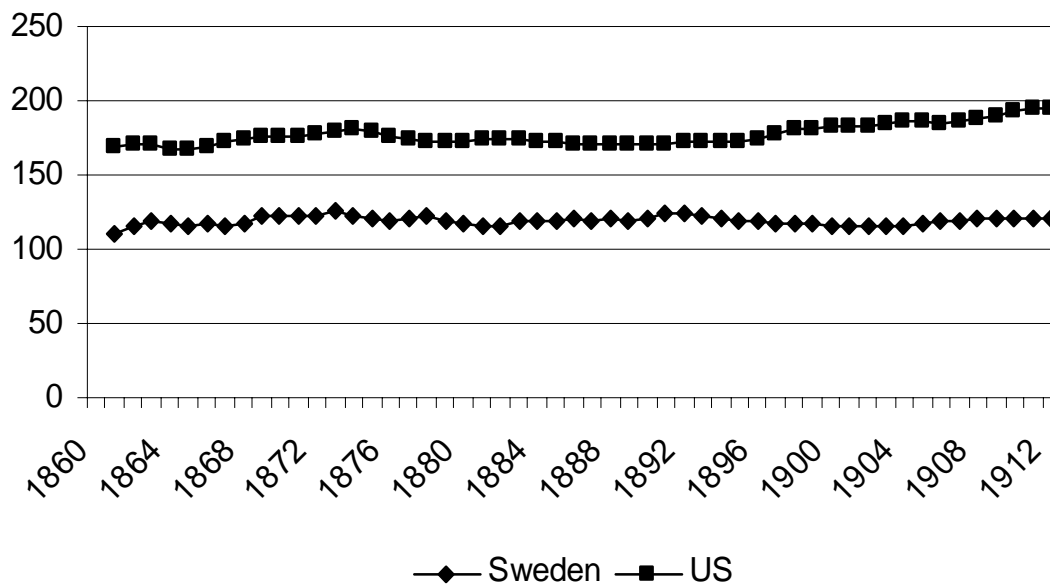
Source: Williamson (1995 table A1.1) and Bagge et al (1933 vol. I table 26)

FIGURE 3 *Swedish skilled to unskilled wage ratios for a selection of workers 1860-1914*



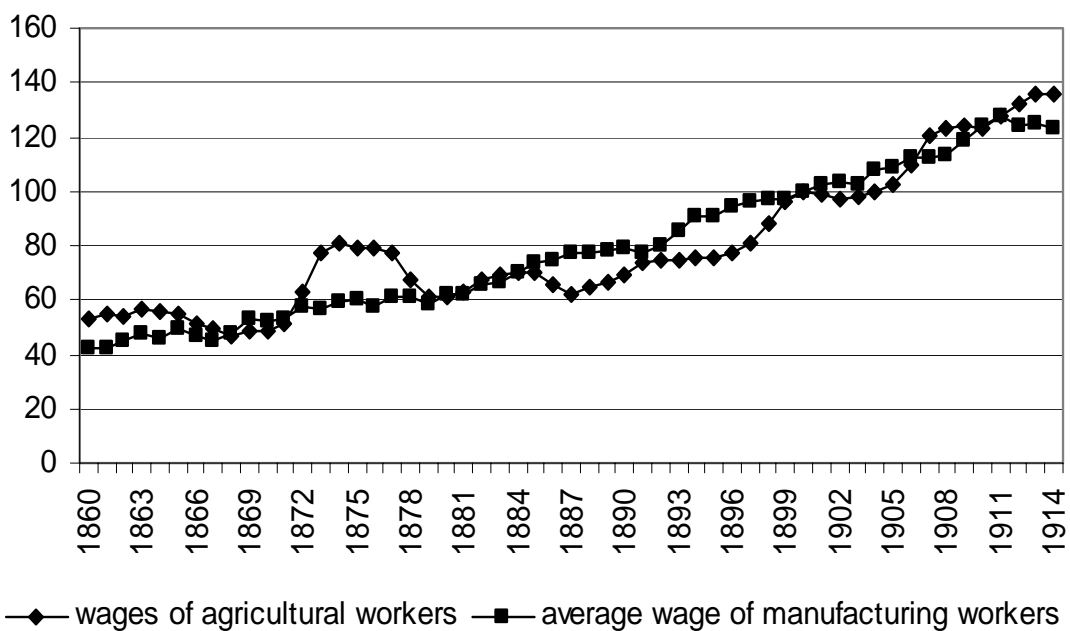
Sources: Quotients derived from Bagge et al (1933 vol.1-2)

FIGURE 4 *Movement of skilled-unskilled wage ratios in Sweden and the US 1860-1913*



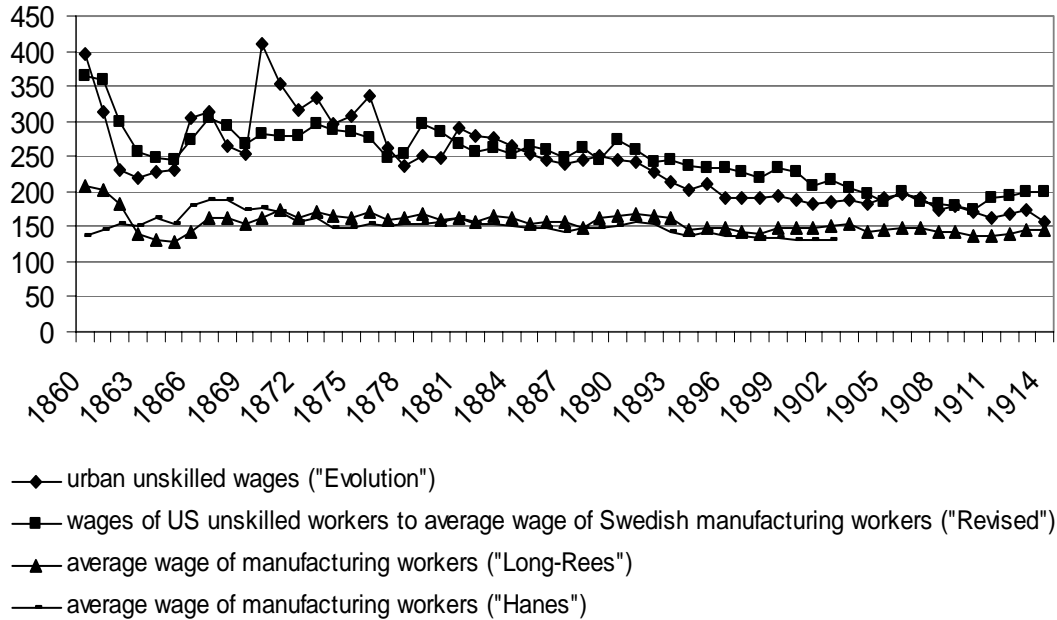
Sources: US: Williamson & Lindert (1980 p. 307); Sweden: spliced index of the series in figure 3

FIGURE 5 *Real wage indices of Swedish agricultural and manufacturing workers, 1900=100*



Sources: Bagge et al (1933 vol. I table 26) and Jörberg (1972 vol. I p. 713-714)

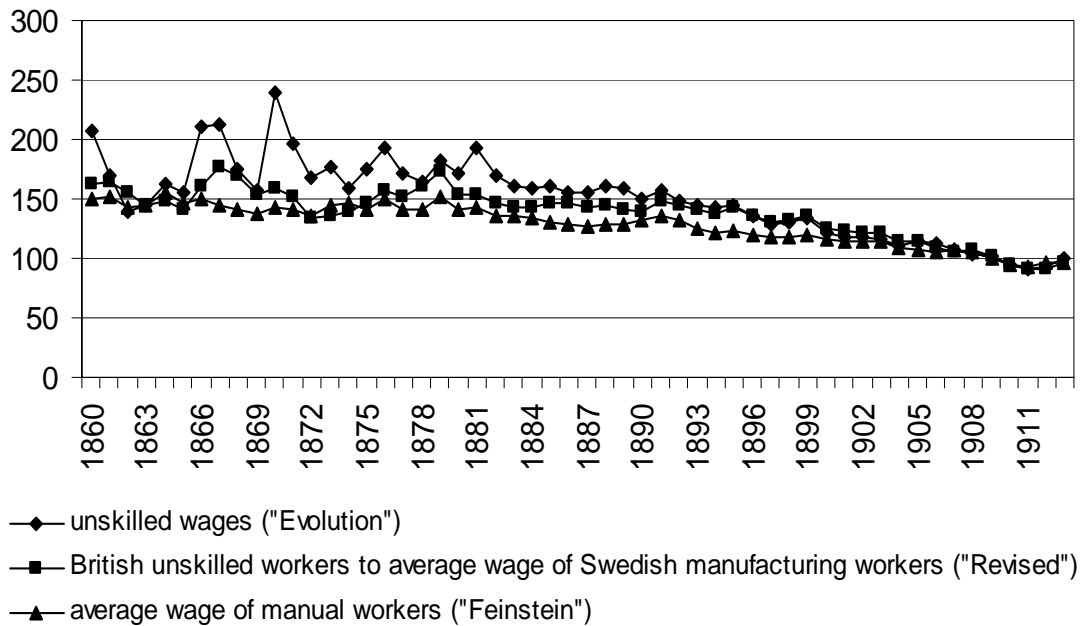
FIGURE 6 *Different series of the US-Sweden real-wage ratios, PPP-adjusted, 1860-1914*



Note: The series called "Evolution" and "Revised" are linked to a real wage benchmark from Williamson (1995). The series called "Long-Rees" and "Hanes" are linked to my new real wage benchmark (see table 3).

Sources: Real and nominal wages: Williamson (1995 table A2.1); Hanes (1992 table 3); Long (1960 table A-11); Rees (1961 table 1). Bagge et al (1933 vol. I table 26). Cost of living: David & Solar (1977 table B.1)

FIGURE 7 *Different series of the UK-Sweden real-wage ratios, PPP-adjusted, 1860-1914*



Note: The series called "Evolution" and "Revised" are linked to a real wage benchmark from Williamson (1995). The series called "Feinstein" is linked to my new real wage benchmark (see table 3).

Sources: Williamson (1995 table A2.1); Williamson (1995b); Bagge et al (1933 part I table 26); and Feinstein (1995 table A.24)

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