ON THE COMPARATIVE CONDITIONS OF THE WORKING CLASSES IN BRITAIN AND GERMANY, 1871-1938

Stephen Broadberry
Department of Economics, University of Warwick, Coventry CV4 7AL, United Kingdom
Email: S.N.Broadberry@warwick.ac.uk

and

Carsten Burhop
Max Planck Institut zur Erforschung von Gemeinschaftsgütern, Kurt-Schumacher-Straße 10, 53113 Bonn, Germany
Email: burhop@coll.mpg.de

8 December 2008
File: SOLGerUK5

Abstract: Throughout the period, the average British worker was better off than the average German worker, but there were significant differences between major sectors. For the aggregate economy, the real wage gap was smaller than the labour productivity gap, indicating a more equal distribution of income in Germany. However, compared to their productivity, German industrial workers were poorly paid, whereas German agricultural and service sector employees were overpaid. This affected the competitiveness of the two countries in these sectors. There were also important differences in comparative real wages by skill level, affecting the extent of poverty.

JEL Classification: N 13, N 33, E 24
Keywords: Economic history, Britain, Germany, Real wages

Acknowledgements: We would like to thank seminar participants in Bonn, Munich, and Zurich for helpful comments. Carsten Burhop would like to thank the Deutsche Forschungsgemeinschaft for financial support as well as the University of Warwick's Department of Economics for its hospitality.

I. INTRODUCTION

In his famous account of the condition of the working class in England, Friedrich Engels [1845: 38] stated that before the onset of the industrial revolution "[…]workers vegetated throughout a passably comfortable existence, leading a righteous and peaceful life in all piety and probity; and their material position was far better than that of their successors. They did not need to overwork; they did no more than they chose to do, and yet earned what they needed". After the onset of the industrial revolution, there occurred according to Engels [1845: 42], "on the one hand, a rapid fall in price of all manufactured commodities, prosperity of commerce and manufacture, the conquest of nearly all the unprotected foreign markets, the sudden multiplication of capital and national wealth; on the other hand, a still more rapid multiplication of the proletariat, the destruction of all property-holding and of all security of employment for the working-class".

Despite Engels' negative view of England's industrial revolution, the development in England was seen on the continent as an economic miracle. For example, the German economist and politician Adolf Soetbeer calculated already in 1879 that the Prussian per capita income was substantially below the British level and concluded that significant improvements in the Prussian economy would be necessary to catch-up to the United Kingdom (Soetbeer, 1879). By the 1890s, following a spurt of German industrial growth, British observers such as Williams (1896) feared an overtaking of Britain by Germany, a view bolstered by a number of economic historians, including Alexander Gerschenkron (1962), David Landes (1969), and Alfred D. Chandler (1990). In contrast, historical national accounts show a pronounced backwardness of Germany's per capita income compared to Britain's throughout the late nineteenth century and into the early twentieth century (Maddison, 1995; 2001).

Broadberry (1997; 1998) provided a way of reconciling these two apparently conflicting views of British and German comparative economic performance, showing that German labour productivity converged to the British level in manufacturing by about 1900, but lagged substantially behind in agriculture and services. Consequently, per capita income remained substantially lower in Germany than in Britain, despite the productivity catch-up and even overtaking in industry. A similar picture of an equal labour productivity in manufacturing and backwardness in agriculture and services was drawn by Broadberry (1998) for the interwar period. Moreover, a recent debate over the comparative level of manufacturing labour productivity during the first half of the twentieth century has by and large confirmed these conclusions: Germany lagged behind in agriculture and services, but was at least as productive as Britain in industry (Broadberry and Burhop, 2007; 2008; Fremdling et al., 2007; Ritschl, 2008).

Most of the recent debate has compared income per capita or output per employee, neglecting the functional distribution of income and therefore the comparative level of real wages. By contrast, the evolution of real wages and the functional distribution of income have played a significant role in national debates over the standard of living, as illustrated by a number of controversies. In the British literature, the controversy over the development of real wages during the Industrial Revolution shows little sign of quietening down, while the extent of poverty in the first half of the twentieth century continues to be hotly debated (Feinstein, 1998; Clark, 2005; Allen, 2007; Gazeley and Newell, 2007; Bean and Boyer, 2008). On the other hand, there is no such controversy in Germany and it is generally accepted that German real wages increased substantially during the late nineteenth and early twentieth century (Abelshauser, 1982; Wiegand, 1982; Pierenkemper, 1987). However, in Germany, there has been a major debate over the extent to which real wages were too high comparative to labour productivity during the inter war period (Borchardt, 1979; Holtfrerich, 1984; Ritschl, 1990;

Broadberry and Ritschl, 1995). A full understanding of comparative standards of living therefore requires an analysis of both real wages and labour productivity within a common framework.

This paper provides this unified perspective on comparative living standards by offering an overview of the development of both real wages and labour productivity in Britain and Germany over the period 1871-1938. More specifically, we first calculate benchmarks of the comparative real wages in the two countries by comparing nominal incomes using purchasing power parities (PPPs) from the expenditure side for 1905 and 1937. We then project the comparative real wage of the two countries for the period 1871 to 1938 using national time series of wages and consumer prices. It turns out that for the economy as a whole, German real wages were around three quarters of the British level during the 1870s and remained at this level until the early 1890s, before then converging to around 83 per cent of the British level by 1913. The Great War and the following period of hyperinflation in Germany had disastrous effects on the comparative real wage position of Germany. German real wages fell back below three quarters of the British level during the first half of the 1920s, and although there was a recovery during the late 1920s, this was quickly followed by the Depression of the 1930s, which hit German workers much more severely than their British counterparts. During the Nazi period, the German real wage recovered to 83 per cent of the British level in 1937, the year of our second benchmark.

Throughout the period 1871-1938, then, the average British worker was substantially better off than the average German worker, but the scale of the British lead varied over time and across sectors. For the aggregate economy, the real wage gap was smaller than the labour productivity gap, indicating a more equal distribution of income in Germany. However, compared to their productivity, German industrial workers were poorly paid, while German

service sector workers were very well remunerated. This affected the competitiveness of the two countries in these sectors. In particular, the substantial rise of German industrial unit labour costs, i.e. the ratio between real wages and productivity, over the 1913-1925 period was heavily discussed during the Borchardt-controversy (Borchardt, 1979; Balderston, 1982; Holtfrerich, 1984; Ritschl, 1990; Broadberry and Ritschl, 1995). Our results show that comparative unit labour costs indeed increased substantially in Weimar Germany compared to the pre-war period. Nevertheless, German industrial workers were still poorly paid in an international perspective, given their relatively high productivity.

There were also differences in comparative real wages by skill level. Whilst most occupational groups were better paid in Britain, unskilled British industrial workers were as badly paid as their German counterparts before World War I, and this helps to explain the persistence of large pockets of poverty in Europe's highest wage economy at a time of full employment (Booth, 1903; Rowntree, 1902; Gazeley and Newell, 2007; Bean and Boyer, 2008). This changed with the improvement in the position of unskilled workers across World War I, although poverty remained a problem in interwar Britain because of a sharp increase in unemployment (Linsley and Linsley, 1993; Boyer, 2004).

The remaining parts of the paper are organised as follows. In Section 2, we present our estimates of the expenditure side PPPs and the resulting benchmark estimates for comparative real wages in 1905 and in 1937. In the following Section 3, we discuss the time series used for projection between the benchmarks and present the results of the time series projection for the aggregate economy and the three major sectors. In Section 4, we present evidence on the relationship between comparative real wages and comparative labour productivity for the aggregate economy and at the sectoral level. Section 5 discusses comparative real wages by occupation and the implications for poverty. The final Section 6 concludes the paper.

II. BENCHMARK ESTIMATES OF COMPARATIVE REAL WAGES

Our benchmark estimates for comparative real wages in 1905 and 1937 combine data from several sources. The main sources for the 1905 benchmark are enquiries of the British Board of Trade about the incomes and expenditures of working class households in Britain and Germany (Board of Trade, 1908a, 1908b). Similar sources have been used to calculate comparative real wage benchmarks for industry by Phelps Brown and Browne (1968: 46, 201) and Williamson (1995: 184, 190). The basic procedure is to compare money wages in the two countries by converting them to a common currency using a purchasing power parity (PPP), obtained by comparing the prices of goods and services in the two countries, weighted by their importance in consumer expenditure. This is necessary because the exchange rate cannot be assumed to be a perfect guide to differences in prices between two countries, particularly when there are non-traded goods and services (Balassa, 1964; Samuelson, 1964).

The main difference between our estimate for 1905 and that of Phelps Brown and Browne (1968) is that they use only the expenditure shares of British households to estimate the PPP, whereas we use the geometric mean of British and German expenditure shares. The German expenditure shares are taken from a comprehensive survey of 852 households conducted in 1907 by Germany's Imperial Statistical Office (Kaiserliches Statistisches Amt, 1909: 20*) and the British expenditure shares are taken from the later detailed study of Prest (1954). In contrast, Williamson (1995: 187), who is interested in the global development of comparative real wages, uses the arithmetic average of the budget shares in seven countries to calculate a global basket of goods.[1]

[1] The countries are Britain, Germany, France, Belgium, Sweden, Italy, and Argentina.

For his 1927 benchmark, Williamson (1995) employs data from the International Labour Organisation (ILO) and calculates again world-wide consumer expenditure shares. Phelps Brown and Browne (1968) calculate a benchmark for 1931 and also use data from the ILO. These ILO data, however, only compare the cost of living of a typical worker at Ford in Detroit with the cost of living of similar workers in Manchester, Berlin, and Frankfurt. In contrast, our 1937 benchmark relies on national sources for Britain and Germany. For Britain, we employ price data and budget shares from Stone and Rowe (1954), both for 1937. The German data are taken from a 1937 household survey conducted by the Arbeitswissenschaftliches Institut der Deutschen Arbeitsfront (1940). Our reliance on comprehensive official surveys for the two countries should yield more accurate PPPs.

Tables 1 and 2 show the budget items included in our benchmark estimates of expenditure side PPPs, their prices in the two countries, and their budget weights. The first column in both tables gives a description of the item and the second column the unit of measurement. The third and fourth columns show the German price in Pfennig and the British price in pence, respectively. The fifth column gives the PPP for each specific product, while the last two columns display the budget shares of each item within the four main categories of food, fuel & light, alcohol & tobacco, and rent. The rows showing the four main categories give the PPPs for the sub-categories and the weights for each sub-category in total consumption.

An example from Table 2 might be helpful to illustrate the calculations. In 1937, one pint of beer cost 37.8 Pfennig (7.37 pence at the exchange rate) in Germany and 6.00 pence in Britain, yielding a PPP of £1 = RM 15.12. Since the exchange rate was £1 = RM 12.30, this means that beer was 23 per cent more expensive in Germany than in Britain. Within the category alcohol & tobacco, beer had an expenditure share of 57.0 per cent in Germany and

54.1 per cent in Britain. The geometric mean of the two is thus 55.5 per cent. Multiplying the three comparative prices of the goods in this category with their respective geometrically weighted budget shares gives the PPP for alcohol & tobacco of 12.64 in 1937. The overall PPP is then calculated as the weighted sum of the PPPs for the four expenditure categories.

The PPP for 1905 is M 20.62 per £, only about one percent higher than the official exchange rate and only slightly below Williamson's (1995: 184) estimate of M 21.05 per £. For 1937, however, our expenditure side PPP is RM 17.19 per £, or nearly 40 percent higher than the official exchange rate of RM 12.30 per £. This is in line with the findings of Fremdling et al. (2007), who estimated a single deflated output side PPP of RM 18.40 per £ in 1935/36 for the manufacturing sector. Williamson (1995: 190) also found an expenditure side PPP of RM 18.08 per £ for 1927.

We now convert German money wages into £s using the PPPs and compare them with money wages in Britain. The German nominal income data for the period 1871-1938 are taken from Hoffmann (1965: 492-495). He calculated these series – based on the income data collected by the compulsory accident insurance – for the aggregate economy, the three major sectors, and several sub-sectors.[2] Therefore, our data are comparable to the time series employed by Phelps Brown and Browne (1968), who use Desai's (1968) time series, which are also based on the accident insurance statistics. In contrast, Williamson (1995: 171) employs wages for unskilled workers in the building trades.

[2] Wiegand (1982) discusses the quality of the various nominal income series. All reliable data sets use the accident insurance statistics. The classic sources for nominal and real wage data, Kuczynski (1937; 1947), are ruled out by more recent research. In particular, Kuczynski's data for the pre-World War I period are based on a small sample of comparatively large firms and his inter-war data are based on standard wage rates, not on actual earnings. Bry (1960) uses Kuczynski's data, whereas Hoffmann (1965), Desai (1968), and Hohls (1995) use comprehensive data from the accident insurance statistics.

The British data for the period 1880-1913 are taken from Feinstein (1990) who gives information about the average annual full employment earnings in 1911 for the major sectors and branches of the economy as well as employment in 1911 in those branches. The benchmark estimate of money earnings in 1905 is obtained from Feinstein's 1911 benchmark, projected to 1905 using the wage index from Feinstein (1990). For the years 1871-1879 and 1913-1938, we use Feinstein's (1972) wage index, incorporating the minor adjustments presented in Feinstein (1995). The sectoral breakdown for the period 1920-1938 draws on Chapman (1953) as well as the nominal data in Feinstein (1995).

Table 3 shows the comparative wage income for Britain and Germany in the two benchmark years. For Germany, money wages for the aggregate economy were M 887 in 1905 and RM 1,850 in 1937. This compares to money wages in Britain of £54.64 and £126.29 in 1905 and 1937, respectively. Dividing the German money wages by the appropriate PPPs of M 20.62 per £ in 1905 and RM 17.19 per £ in 1937 and then by the British nominal incomes yields a comparative wage of 78.7 per cent in 1905 and 85.2 per cent in 1937 for a full-time equivalent employed worker.

Looking at the three sectors – agriculture, industry, and services – yields the results that German agricultural workers were comparatively poorly paid in 1905, whereas German service sector employees were comparatively well paid. Comparative wages in industry were about the same as comparative wages in the aggregate economy. The high comparative wages in the German service sector largely reflected pay differentials for civil servants, who received about 149 percent of the income of British civil servants in 1905. At 104 percent, the ratio was also quite high in transport and communications, a heavily regulated sector, but in trade and commerce it was only 65 percent. Thus, the comparatively high wages and salaries in services were mainly caused by generous remuneration of government employees and by

employees of state owned enterprises. By 1937, German real wages had increased compared with their British counterparts in industry and especially in services, where real wages were now higher than in Britain. However, comparative Germany/UK real wages had fallen back slightly in agriculture.

III. TIME SERIES PROJECTIONS OF COMPARATIVE REAL WAGES

In this section, we project forwards and backwards from the 1905 benchmark presented in Table 3, using national real wage indices for the aggregate economy and the three major sectors of agriculture, industry, and services. We begin by examining the evolution of the Germany/UK comparative real wage series for the whole economy during the period 1871-1938 displayed in Figure 1. Before discussing the results, we should note a couple of points concerning the data. First, some controversy surrounds the German consumer price index. We use Desai's (1968) consumer price index for the pre-1913 period and the official cost of living price index of the *Statistisches Reichsamt* for the period 1924-1938 (see Wiegand, 1982, for a discussion). The quality of the cost of living index for the Nazi period (1933-1938) was recently re-assessed by Steiner (2007). He shows that notwithstanding the price freezes enacted by the Nazi government, the price index reflects the level of the cost of living and its increase over the period 1933-38 very well. However, Steiner speculates that the quality of consumer goods declined substantially during this period. Second, note that the results would not be substantially altered by projecting back from the 1937 benchmark, rather than projecting forward from the 1905 benchmark, since there is a high degree of consistency between the benchmarks and the time series projections. Projecting forwards from the 1905 benchmark yields an estimate of the comparative Germany/UK real wage in 1937 of 83.1 percent, which is very close to the benchmark estimate of 85.2 per cent, yielding a discrepancy of just 2.4 percentage points, well within the margins of error in this type of work (Broadberry, 2003).

It is helpful to consider the trends in comparative real wages for the aggregate economy in three main periods. First, between 1871 and 1891, there was no tendency for Germany to catch-up on Britain in real wages, although there were significant cyclical fluctuations during this period. In particular, the *Gründerkrise* of the early 1870s had a sharp negative impact on the living standards of German workers. So also did the tariff on agricultural goods, which had a substantial impact on the cost of living. Between 1871 and 1891, money wages increased by 34 per cent in Germany, but only by 19 per cent in Britain. However, whereas the cost of living fell by 15 per cent in Britain, it stayed stable in Germany. It is difficult to avoid the conclusion that these divergent trends in the cost of living were related to the different reactions in Britain and Germany to the possibility of cheap grain imports from the United States (O'Rourke, 1997). For example, the price of bread remained constant in Germany from the early 1870s to World War I, whereas it declined by about one-third in Britain between the early 1870s and the early 1890s and remained constant thereafter.

In contrast to the stagnating comparative real wage, the trend in Germany/UK comparative GDP per capita was more clearly positive between the early 1870s and the early 1890s. This can be explained partly by the diverging trends of the price ratio of agricultural and industrial goods in Germany (see Jacobs and Richter, 1934, for the price indices). Between 1871 and 1891, the price index for agricultural goods increased by about eight percent, whereas the price index for industrial goods decreased by about 26 percent. This led to downward pressure on real wages compared to real GDP per capita since agricultural goods have a higher weight in a consumer price index compared to the national product deflator. Moreover, diverging trends in labour force participation also play a part in explaining the gap between real wages and GDP per capita, since real GDP per capita can be calculated as the product of the real wage per employee and the rate of labour force participation. Thus a high

comparative real wage in Germany compared to Britain is consistent with a low comparative real per capita GDP so long as labour force participation is also lower in Germany. Indeed, labour force participation was much higher in Britain than in Germany during the 1870s and 1880s, but both countries converged to similar levels over time. More specifically, British labour force participation decreased from 52.9 percent in 1871 to 48.6 percent in 1891, whereas German labour force participation increased from 42.3 percent in 1871 to 45.2 percent in 1891. Therefore, the gap in labour force participation declined from 10.6 percentage points in 1871 to only 2.9 percentage points in 1891. Furthermore, the fact that comparative real wages were higher than comparative GDP per capita implies that comparative real profits were substantially lower in Germany. However, Burhop and Wolff (2005) and Ritschl and Spoerer (1995) showed that the Hoffmann (1965) estimates underlying Maddison's (2001) data set systematically underestimate capital income. Consequently, incorporating recent findings about Germany's national historical accounts to produce a revised series of comparative GDP per capita, as in Figure 2, removes much of the level discrepancy between comparative real wages and comparative per capita GDP.[3]

Between 1891 and 1913, there was a clear upward trend in the ratio of German to British real wages, from 72.1 percent to 83.3 percent of the British level. Although the cost of living rose more rapidly in Germany than in Britain during this period, money wages increased even more rapidly in Germany compared with Britain. Thus we confirm the hypothesis of a German catch-up to Britain during the Edwardian period.

There was a period of disorder between 1913 and 1925, during which German real wages suffered a major setback. We find that the comparative real income position of a

[3] The NNP per capita series calculated by Burhop and Wolff (2005) for the pre-1913 period and Ritschl and Spoerer (1995) for the interwar period were divided by Hoffmann's (1965) output series and the resulting correction factor was multiplied with Maddison's (2001) estimate of German GDP in 1990 USD.

German worker in 1925 had fallen back to 76.0 percent of the British level, compared with 83.3 per cent in 1913. The war and hyperinflation exacted a heavy price from German workers. This was followed by a period of recovery during the second half of the 1920s, with the comparative position of 1913 being restored by 1928. During the 1930s, the Great Depression hit Germany much more severely than Britain, leading to a decline of the Germany/UK comparative real wage level, followed by strong recovery during the Nazi period.

The time series projection assumes a similar ratio of taxes, unemployment, and working hours in the two countries. Turning first to hours worked, Huberman and Minns (2007: 548) suggest that Germans worked longer hours than Britons before World War I, but shorter hours between the wars. In the United Kingdom, hours worked declined from 2,755 hours per year in 1870 to 2,656 hours in 1913, and further to 2,200 hours in 1938. The comparable figures for Germany are 3,284 hours in 1870, 2,723 hours in 1913 and 2,187 hours in 1938. According to these figures, German employees worked about 19 per cent more than their British counterparts in 1870, about 2.2 percent more in 1913, but about 1 per cent less in 1938. The 1913 and 1938 figures suggest that accounting for differences in hours worked would have little effect on comparative living standards, but the scale of the difference is more substantial in 1870. However, it should be noted that Huberman's (2004) study, on which these estimates for the earlier years are based, does not cover agriculture, which accounted for around half of all employment in Germany, compared with little more than 20 per cent in Britain (Broadberry, 2006: 25). This could make a substantial difference, because seasonal factors prevented such long hours in agriculture. Furthermore, Huberman's study covers very few service occupations, with relatively well treated civil servants being a notable omission.

Changes in income tax rates and social security contributions affected the standard of living in both countries, since the wage indices are based on gross earnings. In Germany, the average social security contributions remained constant across World War I, with blue collar and white collar employees contributing 3.0 and 4.8 percent, respectively, in 1913 as well as in 1924. Thereafter, social security contributions of both groups increased to about eight percent in 1929, and finally to about nine percent from 1933 (Müller, 1954: 132). In addition, income taxes were substantially higher during the interwar period. Most employees paid no income taxes during the pre-1913 period, whereas the income tax rate for a married worker with two children and average income was about 4.5 percent in 1924 and 2-3 percent from 1925 until 1938. Thus, in Germany, taxes and social security contributions doubled from about five percent in 1913 to about ten percent during the interwar period.[4] In Britain, the shares of income taxes and national insurance contributions were somewhat lower than in Germany, both before and after World War I. In 1913, people earning less than £160 per year (around twice the average wage) paid no income tax (Mallet, 1913: 484). Social security contributions were only introduced with the National Insurance Act of 1911, which applied to just 2.3 million largely skilled workers by 1914 (Thane, 1996: 88). Furthermore, rates were low, working out at just 1.89 per cent of income for someone on £150 per year (Harris, 1972: 380). In 1937, those with incomes below £250 per year (again around twice the average wage) paid 2.7 per cent in all direct taxes, including income tax and national insurance contributions (Barna, 1945: 127, 135).

The impact of comparative real wages on welfare is also affected by the extent of unemployment. In both countries, unemployment rates were very low during the pre-1914

[4] Scholz (1986: 298-299) calculates average income tax and social security contributions for skilled and unskilled German workers in 1913 and 1925. In 1913 (1924) skilled workers had deductions of 6.2 (10.3) percent, whereas unskilled workers had deductions of 5.0 (9.7) percent. Hachtmann (1988) presents time series of average income tax and social security contributions for the period 1928-1944. He shows that average deductions increased from 11.5 percent in 1928 to 14.0 percent in 1938.

period. According to Pierenkemper (1987: 58), unemployment averaged about 4.0 percent in Germany between 1900 and 1913. In Britain, average unemployment was 4.4 percent during these years (Feinstein, 1972: T125-T126).[5] For the interwar period, however, large differences emerged between the two countries. Between 1924 and 1938, the unemployment rate averaged 17.6 percent in Germany, fluctuating strongly (Petzina, 1987: 242). In Britain, average unemployment was much higher than before the war, at 10.1 percent, but substantially lower than in Germany, particularly during the early 1930s (Feinstein, 1972: T125). German workers were therefore more strongly affected by unemployment than British workers during the interwar period.

Jointly and severally, hours worked, tax rates, social security contributions, and unemployment rates are not critical in an assessment of the comparative conditions of the working classes in Britain and Germany for the pre-1914 period. For although German workers did pay higher taxes and social security contributions and worked longer hours before 1914, the magnitudes were relatively small. For the interwar period, however, tax rates, social security contributions, and unemployment all became more significant in both countries and impacted more negatively on German workers than their British counterparts. Consequently, our calculations based on the gross earnings of full time equivalent workers may overstate slightly the true welfare of German workers.

IV. REAL WAGES AND LABOUR PRODUCTIVITY BY SECTOR

So far, we have used the annual time series projections to provide annual estimates of comparative real wages for the economy as a whole. In fact, it is possible to do this at the level of the three main sectors, and the annual data are provided in the Appendix, Table A-1 and charted in Figure 3. The sectoral analysis adds some important additional information to

[5] Boyer and Hatton (2002), using a larger sample of industries, suggest a slightly higher average rate of 6.2 per cent for these years, but with less volatility.

the aggregate picture analysed in Figures 1 and 2. We use the sectoral real wage data to analyse the relationship between comparative real wages and comparative labour productivity in Table 4. The first part of Table 4 sets out the data on Germany/UK comparative labour productivity for a number of years between 1871 and 1937, taken from Broadberry (2006). German labour productivity had converged to the British level in industry by the end of the nineteenth century, but Germany's overall labour productivity remained substantially lower because of a substantial productivity gap in agriculture and services. This sectoral pattern of comparative productivity performance persisted across World War I and throughout the interwar period. Combining this comparative productivity data with the information on comparative real wages from Table A-1 yields the data on the ratio of comparative real wages to comparative labour productivity (i.e., approximately unit labour costs) in the second part of Table 4. The ratio was constantly above 100 for the aggregate economy, indicating that, on average, German workers were remunerated above their comparative productivity level.

It is interesting, however, to consider the ratio in the three main sectors. To the extent that comparative real wages were higher than comparative labour productivity, a sector was likely to have difficulty competing internationally.[6] This seems to have been the case for German agriculture throughout the period, which is consistent with what we know about tariffs and high food prices in Germany. For example, Webb (1982) estimates that German consumers subsidised German agricultural producers by about three percent of the annual NNP in 1907. However, it was even more strongly the case for services, where we have already noted the comparatively high levels of remuneration in Germany, as a result of civil service pay levels. The economic effects of this were far reaching, since high service sector wages meant that Germany was internationally uncompetitive in private services, which remained a comparatively small part of the German economy (Broadberry, 2004). Britain, by

[6] On average, Germany had a balance of trade deficit between 1880 and 1938 (Hoffmann, 1965: 817-819).

contrast, had a large, internationally competitive service sector throughout this period. In industry, however, the situation was exactly the opposite of that in services, with German workers poorly paid compared to their labour productivity. This resulted in difficulties for British industry, facing a strong competitive threat from German industry already during the "Made in Germany" scare of the 1890s (Williams, 1896).

Unit labour costs play a central role in the "Borchardt-controversy". Borchardt (1979) hypothesised that hourly industrial wages were higher in interwar Germany than in pre-war Germany, whereas labour productivity was lower. As a consequence of high unit labour costs, investment was low and unemployment high in Weimar Germany. Thus, high unit labour costs contributed to the downfall of Weimar Germany. In the ensuing debate, Holtfrerich (1984: 131, 137) challenged Borchardt's hypothesis, claiming that industrial unit labour costs were higher than in 1913 only in 1928/29. Nonetheless, the share of labour income in the aggregate economy increased during the Weimar years, as a result of the rising share of overpaid service sector employees. In contrast to Holtfrerich, Ritschl (1990) shows that the available data confirm Borchardt's hypothesis and that unit labour costs in industry as well as in the aggregate economy were substantially higher during the "Golden Twenties" than in 1913.

Placing the debate in an international comparative framework, Balderston (1982) claimed that the increase of unit labour costs compared to 1913 was – until 1927 – lower in Germany than in Britain and the United States, whereas the increase of German unit labour costs was higher during 1928/30. However, our data show that unit labour costs grew faster in Germany than in Britain between 1911 and 1925 as well as between 1925 and 1929. This development was driven by two sectors, agriculture and industry, whereas comparative unit labour costs declined slightly in the service sector. But it must be remembered that services

was the least competitive sector, so that shifting labour from agriculture and industry into services contributed to the overall decline of German competitiveness. In addition, the industrial sector experienced the sharpest increase of unit labour costs of the three sectors between 1911 and 1925 and this can explain the concerns over competitiveness which Borchardt (1979) highlighted. However, German industrial unit labour costs were – in 1925 and in 1929 – substantially below British industrial unit labour costs. Therefore, German industry lost some of the advantage of cheap labour, but remained a low wage country for industry compared to Britain.

Figure 4 compares our estimate of comparative Germany/UK real wages in industry with the earlier estimates of other writers. Our estimates are between those of Phelps Brown and Browne (1968) and Williamson (1995). Note that Williamson's (1995) estimates are based only on unskilled wages, and show a somewhat higher comparative Germany/UK real wage, on average. This suggests that unskilled workers were comparatively well remunerated in Germany, an issue which we now investigate in more depth.

V. COMPARATIVE REAL WAGES BY OCCUPATION

The Board of Trade (1908b) conducted an enquiry into wages and the cost of living in Germany in 1905, and made a direct comparison between Britain and Germany in that year. The money wages were converted at the exchange rate and then adjusted for PPP by comparing prices converted at the exchange rate. Table 5 sets out the weekly money wages for a number of industrial trades. It is interesting to note that the ratio of German to British wages was higher amongst the unskilled than amongst the skilled occupations. Indeed, amongst unskilled engineering labourers, the weekly money wage was the same in the two countries. For example, Pierenkemper (1983) provides evidence for a declining skill premium of white-collar employees during the late nineteenth and early twentieth century, while

Holtfrerich and Forstmann (1983) present similar evidence for railway employees from the 1850s to the 1870s. Moreover, Scholz (1986: 298-299) shows that average wages of skilled workers declined by 18 percent between 1913 and 1925, whereas average wages of unskilled workers declined by only ten percent.

We now consider the implications of a high skill premium for the existence of poverty in Britain, which became a major political issue in the early twentieth century, following the social surveys of Booth (1903) and Rowntree (1902). Both investigators found around 30 per cent of the working class population living in either primary or secondary poverty at the beginning of the twentieth century. Furthermore, Rowntree found low wages to be a major cause of poverty, explaining nearly half of all primary poverty (Boyer, 2004: 301). Most work on the standard of living is not conducted within an international comparative framework, but once this approach is adopted, the existence of so much poverty in Britain, which was the highest wage economy in Europe at the time, becomes very surprising. If 30 per cent of the British working class lived in poverty around 1900, how much worse must the situation have been in Germany, let alone the less developed parts of Europe? Comparative studies on poverty are, however, in short supply (see Hennock, 2007: 39-49, for a discussion). The only available study investigates pauperism in Britain and Germany in 1885. It turns out that 6.6 percent of the British population were counted as paupers, whereas only 3.4 percent of the German population belonged to this category (Hennock, 2007: 46-47). The main reason for being poor in Germany during the 1880s was illness or death of the breadwinner, whereas unemployment was comparatively unimportant: only 5 to 10 percent of poverty was related to unemployment, whereas illness accounted for about 45 percent of poverty cases (Frohmann, 2008: 106).

The evidence on comparative wages by occupational groups allows us to reconcile Rowntree's and Booth's findings of high levels of poverty in Britain around 1900 with the fact that Britain was the highest wage economy in Europe at the time. For unskilled workers in Britain were not any better remunerated than their German counterparts at this time. Rowntree (1902; 1941) identified the causes of primary poverty in York in 1899 and again in 1936, and his findings are reproduced in Table 6, taken from Boyer (2004: 301, 304). In 1899, nearly half of those living in primary poverty were in families where the chief wage earner was in full work but paid low wages. Low wages were similarly implicated in the extent of primary poverty in other pre-World War I social surveys, including Northampton, Warrington, Reading, Stanley and Bolton (Bowley and Burnett-Hurst, 1915; 1920; Bowley and Hogg, 1925). These were the unskilled industrial workers, who were paid no more than their German counterparts, while (Davies (1909) painted a similar picture amongst agricultural labourers in Corsley, Wiltshire.

As Bean and Boyer (2008) point out, one result of the Trade Boards Act of 1909, which introduced minimum wages in a number of trades, was to raise the pay of unskilled workers comparative to skilled workers, thus eliminating the main cause of primary poverty in the pre-World War I period. However, this did not have the effect of eliminating poverty in interwar Britain, because of the rise of mass unemployment (Broadberry, 1986; 1990). In Table 6, we see that low wages was the chief cause in just 9.2 per cent of cases of primary poverty in York in 1936, compared with unemployment of the chief wage earner in 44.5 per cent of cases. Unemployment was the main cause of primary poverty in many other interwar social surveys, including Northamption, Warrington, Reading, Stanley and Bolton (Bowley and Hogg, 1925), London (Smith, 1930-1935), Merseyside (Jones, 1934), Southampton (Ford, 1934), Sheffield (Owen, 1933) and Bristol (Tout, 1938).

VI. CONCLUSION

This paper provides a comparative perspective on living standards in Britain and Germany over the period 1871-1938. For the economy as a whole, German real wages were slightly less than three-quarters of the British level in the early 1870s. Between 1871 and 1891, real wages grew at a similar rate in both countries, so that there was no catching-up. After 1891, however, real wages grew more rapidly in Germany, with German real wages converging to around 83 percent of the British level on the eve of World War I. Following the war and postwar hyperinflation, German real wages fell back to about three-quarters of the British level by 1924, and had recovered only to 83 percent of the British level on the eve of World War II. On average, then, British workers were better off than their German counterparts throughout the period.

For the aggregate economy, comparative real wages were higher than comparative labour productivity, indicating a more equal distribution of income in Germany. However, there were significant differences across sectors and skill levels. Compared to their productivity, German industrial workers were poorly paid, whereas German workers in agriculture and services were well remunerated. As a result, Germany was highly competitive internationally in industry, but had a comparatively small service sector which was not internationally competitive. Germany's agricultural sector was kept artificially large only through substantial protection. By contrast, Britain's industrial sector had difficulty competing with Germany, but Britain had a very strong position in internationally tradable services. Britain was also reluctant to forego the benefits of free trade in agricultural goods.

There were also important differences in comparative real wages across skill levels. Most occupational groups were substantially better paid in Britain than in Germany, but this did not apply to unskilled workers. Since unskilled workers in Britain received real wages as

low as their German counterparts in the pre-World War I period, this helps to explain the persistence of large pockets of poverty in Europe's highest wage economy at a time of full employment. Although unskilled wages rose relative to skilled wages in Britain after World War I, this did not eliminate poverty because of the emergence of the problem of mass unemployment.

TABLE 1: Expenditure side PPP for 1905

Item	Unit	Price in Germany (Pfennig)	Price in Britain (Pence)	PPP (M per £)	German basket weights (%)	British basket weights (%)
Flour	7 lb	107.5	9.00	28.66	2.2	2.1
Bread	4 lb	47.9	5.00	22.99	18.8	17.6
Beef	lb	70.2	6.93	24.31	16.6	11.7
Lamb	lb	65.5	8.25	19.05	7.5	1.3
Pork & bacon	lb	84.1	8.00	25.23	5.3	22.3
Eggs	dozen	82.8	13.91	14.29	5.4	4.2
Milk	quart	22.4	3.50	15.36	11.5	8.5
Butter	lb	118.2	13.00	21.82	9.8	11.5
Cheese	lb	63.8	7.00	21.87	2.8	2.3
Margarine	lb	70.2	7.25	23.24	1.7	4.9
Potatoes	lb	22.4	3.00	17.92	5.5	5.6
Sugar	lb	20.3	2.00	24.36	6.8	2.6
Tea	lb	231.0	18.00	30.80	0.6	4.0
Coffee	lb	93.6	18.20	12.34	5.5	1.4
FOOD				*21.92*	*55.9*	*56.2*
Coal	cwt	113.9	10.75	25.43	70.6	87.0
Kerosene	gallon	86.2	8.86	23.35	29.4	13.0
FUEL & LIGHT				*24.90*	*4.9*	*6.6*
Beer	pint	17.5	2.57	16.34		
ALCOHOL & TOBACCO				*16.34*	*17.3*	*17.4*
RENT PER ROOM PER WEEK		*140.5*	*16.50*	*20.43*	*21.9*	*19.8*
TOTAL PPP				**20.62**		

Sources: Board of Trade (1908a; 1908b), Kaiserliches Statistisches Amt (1909).
Exchange rate: M 20.43 per £.

TABLE 2: Expenditure side PPP for 1937

Item	Unit	Price in Germany (Pfennig)	Price in Britain (Pence)	PPP (RM per £)	German basket weights (%)	British basket weights (%)
Flour	7 lb	143.3	16.00	21.50	4.1	3.6
Bread	4 lb	56.6	9.50	14.30	19.0	10.1
Beef	lb	88.3	10.55	20.09	7.3	16.5
Lamb	lb	101.3	14.15	17.18	0.4	9.0
Pork	lb	86.7	11.80	17.63	7.6	3.2
Bacon	lb	100.5	15.20	15.87	3.6	10.2
Eggs	dozen	126.0	24.00	12.60	3.3	8.3
Milk	quart	26.0	6.50	9.60	15.2	14.5
Butter	lb	141.7	15.20	22.37	11.1	10.1
Cheese	lb	42.2	10.60	9.55	3.3	2.3
Margarine	lb	66.3	6.40	24.86	8.0	1.1
Potatoes	lb	3.0	4.20	1.71	6.9	0.5
Sugar	lb	35.7	2.50	34.27	7.0	3.5
Tea	lb	462.7	26.00	42.71	0.4	6.6
Coffee	lb	213.2	26.30	19.46	3.0	0.7
FOOD				*17.74*	*66.9*	*52.6*
Coal	cwt	161.5	27.00	14.36	27.9	58.9
Gas	1,000 ft³	567.4	42.00	32.42	32.9	23.3
Electricity	kw/h	40.9	1.54	63.74	39.2	17.8
FUEL & LIGHT				*32.95*	*7.6*	*7.9*
Beer	pint	37.8	6.00	15.12	57.0	54.1
Cigarettes	ten	22.1	4.99	10.63	20.3	37.2
Tobacco	ounze	26.7	9.36	6.85	26.7	8.7
ALCOHOL & TOBACCO				*12.64*	*5.9*	*19.6*
RENT PER ROOM PER WEEK		*169.3*	*33.08*	*12.28*	*19.6*	*19.9*
TOTAL PPP				***17.19***		

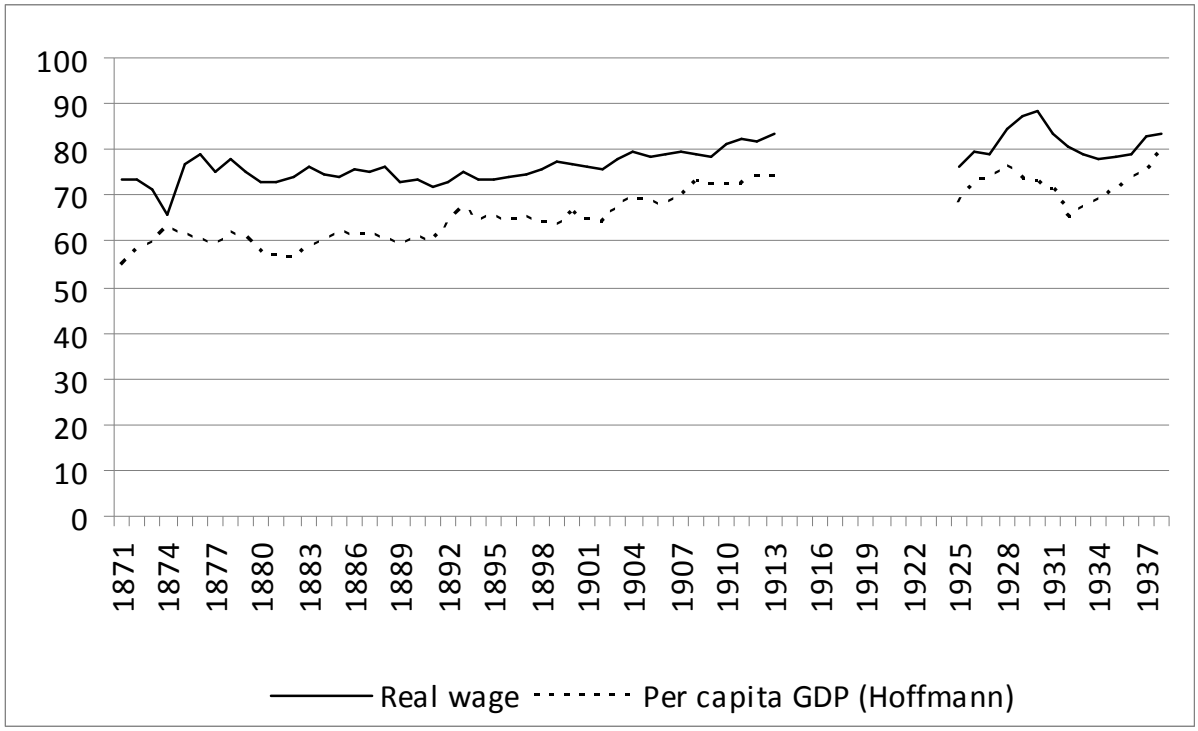
Sources: Prest (1954), Stone and Rowe (1954), Arbeitswissenschaftliches Institut der Deutschen Arbeitsfront (1940).Exchange rate: RM 12.30 per £.

TABLE 3: BENCHMARK ESTIMATES OF COMPARATIVE WAGES

	German nominal wage (Marks)	British nominal wage (£)	German wage as % of British wage at PPP (£1=M20.62)	German nominal wage (RM)	British nominal wage (£)	German wage as % of British wage at PPP (£1=RM17.19)
	1905			1937		
Agriculture	551	37.64	71.0	1,030	86.32	69.4
Mining, Industry, Construction	981	61.45	77.4	1,871	131.23	82.9
Services (without Military)	1,106	61.35	87.4	2,356	127.46	107.5
Aggregate economy	887	54.64	78.7	1,850	126.29	85.2

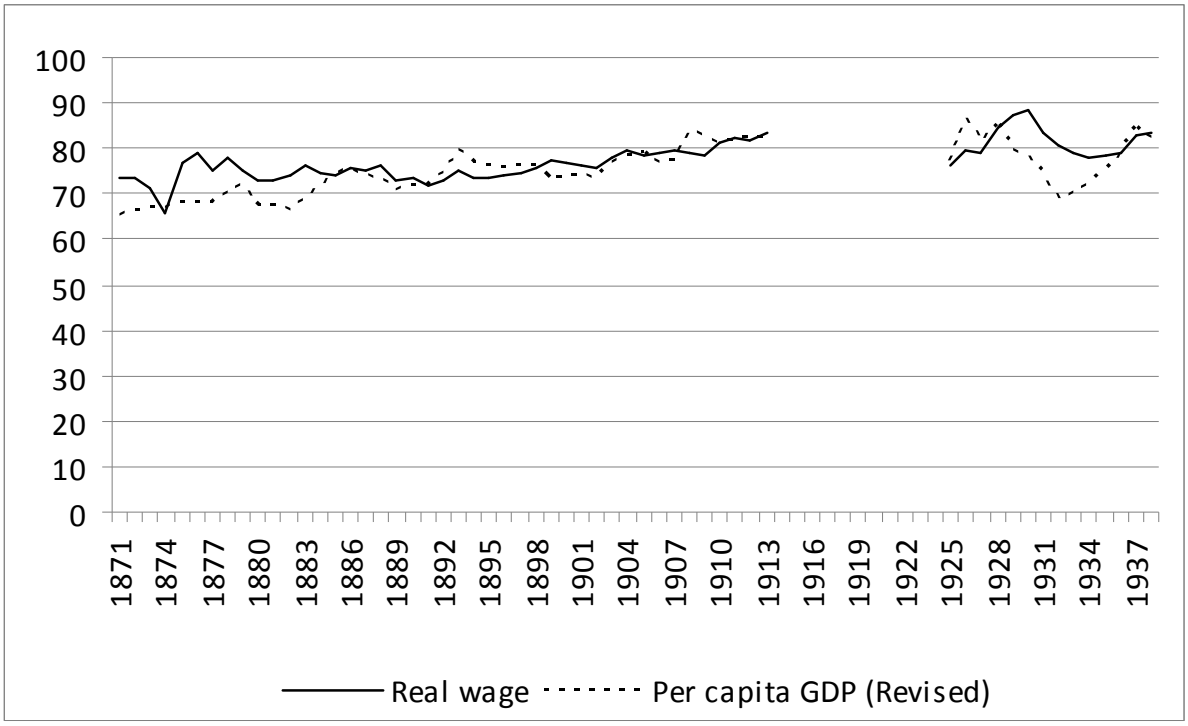
Sources: Feinstein (1972, 1990), Hoffmann (1995), own calculations, see Text.

FIGURE 1: Comparative Germany/UK real wage and per capita GDP, with German GDP data from Hoffmann (UK=100).



Sources: Comparative real wage: own calculations, see text. Comparative per capita GDP: Maddison (2001).

FIGURE 2: Comparative Germany/UK real wage and per capita income, with revised German GDP data (UK=100)



Sources: Comparative real wage: own calculations, see text. Comparative per cpaita GDP: Maddison (2001), corrected for Burhop and Wolff (2005) and Ritschl and Spoerer (1995) re-estimation.

FIGURE 3: Comparative Germany/UK real wage by sector (UK=100)

Source; Appendix, Table A-1.

Figure 4: Comparative Germany/UK real wage in industry (UK=100)

Sources: Appendix, Table A-1; Phelps Brown and Browne (1968); Williamson (1995).

TABLE 4: Real wages and labour productivity

	Germany/UK comparative labour productivity				Ratio of comparative real wages to comparative labour productivity (approx. unit labour costs)			
	Agriculture	Industry	Services	Aggregate Economy	Agriculture	Industry	Services	Aggregate Economy
1881	54.7	93.7	61.3	57.3	133.3	79.8	141.4	127.2
1891	53.7	99.3	64.4	60.5	114.0	67.3	125.9	119.2
1901	67.2	105.0	71.9	68.4	103.4	67.9	121.8	111.3
1911	67.3	127.7	73.4	75.5	117.2	67.3	133.9	109.3
1925	53.8	92.3	76.5	69.0	125.1	87.3	128.8	110.1
1929	56.9	97.1	82.3	74.1	135.1	91.8	131.5	117.5
1935	57.2	99.1	85.7	75.7	117.7	77.7	119.0	104.0
1937	59.0	96.9	89.4	79.2	117.6	85.6	120.2	104.9

Sources: Labour productivity from Broadberry (2006: 21); own calculations.

TABLE 5: Predominant weekly money wages in British and German Industry, 1905

	German wage converterd at exchange rate (s./d.)	British wage (s./d.)	Ratio of mean predominant wage (Britain = 100)
Building trades			
Bricklayers	26s. 11d. to 31s. 3d.	37s. 6d. to 40s. 6d.	75
Masons	26s. 11d. to 31s. 3d.	37s. 2d. to 39s. 4d.	75
Carpenters	26s. 11d. to 31s. 3d.	36s. 2d. to 39s. 4d.	77
Plumbers	24s. to 28s. 6d.	35s. 4d. to 39s. 9d.	70
Painters	24s. to 29s. 8d	31s. 6d. to 37s. 6d.	78
Labourers	19s. 6d. to 24s.	23s. 6d. to 27s.	86
Engineering trades			
Fitters	26s. to 32s.	32s. to 36s.	85
Turners	27s. to 33s.	32s. to 36s.	88
Smiths	28s. 6d. to 33s.	32s. to 36s.	90
Patternmakers	25s. 6d. to 35s.	34s. to 38s.	77
Labourers	18s. to 22s.	18s. to 22s.	100
Printing trade			
Compositors	24s. 9d. to 25s. 11d.	28s. to 33s.	83
All the above trades (average)			83

Source: Board of Trade (1908b: xlix).

TABLE 6: Causes of primary poverty in Britain (%)

	York 1899	York 1936
Chief wage earner:		
dead or absent	27.5	9.0
ill or old	10.0	23.5
out of work	2.6	44.5
Irregularly employed	3.5	5.9
In full work but:		
low wages	43.7	9.2
more than 3 children	12.8	8.0

Sources: Boyer (2004: 301, 304), derived from Rowntree (1902; 1941).

APPENDIX: TIME SERIES OF GERMAN-BRITISH COMPARATIVE REAL WAGES, 1871-1938 (UK=100).

TABLE A-1: Germany/UK comparative real wages, 1871-1938

Year	Agriculture	Industry	Services	Aggregate Economy
1871				73.4
1872				73.6
1873				71.2
1874				65.9
1875				76.8
1876				79.1
1877				75.4
1878				78.0
1879				75.3
1880	73.8	74.9	88.7	72.8
1881	72.9	74.8	86.7	72.9
1882	73.4	76.1	89.1	73.9
1883	74.4	79.1	92.8	76.2
1884	69.8	75.5	87.2	74.7
1885	65.8	73.4	83.4	73.9
1886	66.1	75.0	82.9	75.5
1887	64.0	73.0	80.4	74.9
1888	64.2	74.6	81.3	76.3
1889	61.2	70.8	78.3	72.7
1890	62.7	66.7	82.2	73.5
1891	61.2	66.8	81.1	72.1
1892	62.5	67.4	83.0	73.1
1893	63.0	67.6	83.5	74.9
1894	61.7	64.3	79.9	73.4
1895	61.1	62.8	78.5	73.4
1896	61.4	63.5	79.3	74.2
1897	63.4	65.5	81.0	74.8
1898	66.5	68.1	83.2	75.9
1899	67.4	68.9	85.9	77.6
1900	70.6	72.7	87.7	77.1

TABLE A-1: Germany/UK comparative real wages, 1871-1938 (continued)

Year	Agriculture	Industry	Services	Aggregate Economy
1901	69.5	71.3	87.6	76.1
1902	69.4	72.3	86.0	75.7
1903	71.5	76.1	88.7	78.1
1904	71.7	77.6	89.2	79.5
1905	71.0	77.4	87.4	78.7
1906	71.2	78.3	86.9	79.2
1907	72.7	79.7	89.6	79.7
1908	73.8	80.1	90.6	79.0
1909	74.5	79.8	90.3	78.5
1910	77.6	84.7	95.8	81.2
1911	78.9	85.9	98.3	82.5
1912	80.6	88.0	99.9	82.0
1913	82.8	89.6	102.3	83.3
1925	67.3	80.6	98.5	76.0
1926	70.8	82.2	100.8	79.4
1927	70.2	81.9	100.8	79.1
1928	72.9	86.1	107.2	84.3
1929	76.8	89.1	108.2	87.1
1930	80.1	88.6	110.0	88.3
1931	77.4	82.5	104.5	83.5
1932	71.2	77.5	105.8	80.8
1933	67.7	74.2	105.0	78.8
1934	67.2	75.0	101.9	77.8
1935	67.3	77.0	102.0	78.7
1936	66.8	78.4	102.2	79.1
1937	69.4	82.9	107.5	83.1
1938	66.5	83.6	107.8	83.2

Sources: See text.

REFERENCES

Abelshauser, W. (1982), "Lebensstandard im Industrialisierungsprozeß: Britische Debatte und deutsche Verhältnisse", *Scripta Mercaturae,* 16, 71-92.

Allen, R.C. (2007), "Pessimism Preserved: Real Wages in the British Industrial Revolution", Oxford University Department of Economics Working Paper 314.

Arbeitswissenschaftliches Institut der Deutschen Arbeitsfront (1940), *Beiträge zur Statistik der Lebenshaltung des deutschen Arbeiters. Vorläufige Teilergebnisse einer Erhebung von Wirtschaftsrechnungen in Arbeiterhaushalten*, Berlin: Verlag der Deutschen Arbeitsfront.

Balassa, B. (1964), "The Purchasing-Power Parity Doctrine: A Reappraisal", *Journal of Political Economy,* 76, 584-96.

Balderston, T. (1982) "The Origins of Economic Instability in Germany 1924-1930: Market Forces versus Economic Policy", *Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte,* 69, 488-514.

Barna, T. (1945), *Redistribution of Incomes through Public Finance in 1937*, Oxford: Clarendon Press.

Bean, J.S. and Boyer, G. (2008), "The Trade Boards Act of 1909 and the Alleviation of Household Poverty", Sixth World Congress of Cliometrics, Edinburgh.

Board of Trade (1908a), *Report of an Enquiry by the Board of Trade into Working Class Rents, Housing and Retail Prices together with the Standard Rates of Wages Prevailing in Certain Occupations in the Principal Industrial Towns of the United Kingdom*, (Cd 3864), London: HMSO.

Board of Trade (1908b), *Report of an Enquiry by the Board of Trade into Working Class Rents, Housing and Retail Prices together with the Standard Rates of Wages Prevailing in Certain Occupations in the Principal Industrial Towns of the German Empire*, (Cd. 4032), London: HMSO.

Booth, C. (1903), *Life and Labour of the People in London*, London: Macmillan.

Borchardt, K. (1979), "Zwangslagen und Handlungspielräume in der große Wirtschaftskrise der frühen dreißiger Jahre", *Jahrbuch der Bayerischen Akademie der Wissenschaften*, 85-132.

Bowley, A.L. and Burnett-Hurst, A.R. (1915), *Livelihood and Poverty: A Study in the Economic Conditions of Working-class Households in Northamption, Warrington, Stanley and Reading*, London: Bell.

Bowley, A.L. and Burnett-Hurst, A.R. (1920), *Economic Conditions of Working-class Households in Bolton, 1914: Supplementary Chapter to ‚Livelihood and Poverty'*, London: Bell.

Bowley, A.L. and Hogg, M.H. (1925), *Has Poverty Diminished? A Sequel to Livelihood and Poverty*, London: King.

Boyer, G.R. (2004), "Living Standards, 1860-1939", in Floud, R. and Johnson, P. (eds.), *The Cambridge Economic History of Modern Britain, Volume II: Economic Maturity, 1860-1939*, Cambridge: Cambridge University Press, 280-313.

Boyer, G.R. and Hatton, T.J. (2002), "New Estimates of British Unemployment, 1870-1913", *Journal of Economic History*, 62, 643-675.

Broadberry, S.N. (1986), *The British Economy Between the Wars: A Macroeconomic Survey*, Oxford: Blackwell.

Broadberry, S.N. (1990), "The Emergence of Mass Unemployment: Explaining Macroeconomic Trends in Britain during the Trans-World War I Period", *Economic History Review*, 43, 271-282.

Broadberry, S.N. (1997), *The Productivity Race: British Manufacturing in International Perspective, 1850-1990*, Cambridge: Cambridge University Press.

Broadberry, S.N. (1998), "How did the United States and Germany Overtake Britain? A Sectoral Analysis of Comparative Productivity Levels, 1870-1990", *Journal of Economic History*, 58, 375-407.

Broadberry, S.N. (2003), "Relative per capita Income Levels in the United Kingdom and the United States since 1870: Reconciling Time-Series Projections and Direct Benchmark Estimates", *Journal of Economic History,* 63, 852-863.

Broadberry, S.N. (2004), "Explaining Anglo-German Productivity Differences in Services Since 1870", *European Review of Economic History*, 8, 229-262.

Broadberry, S.N. (2006), *Market Services and the Productivity Race, 1850-2000: British Performance in International Perspective*, Cambridge: Cambridge University Press.

Broadberry, S.N. and Burhop, C. (2007), "Comparative Productivity in British and German Manufacturing before World War II: Reconciling Direct Benchmark Estimates and Time Series Projections", *Journal of Economic History*, 67, 315-349.

Broadberry, S.N. and Burhop, C. (2008), "Resolving the Anglo-German Industrial Productivity Puzzle: A Reply to Professor Ritschl", *Journal of Economic History*, 68, 930-934.

Broadberry, S.N. and Ritschl, A. (1995), "Real Wages, Productivity, and Unemployment in Britain and Germany during the 1920s", *Explorations in Economic History*, 32, 327-349.

Burhop, C. and Wolff, G.B. (2005), "A Compromise Estimate of German Net National Product, 1851-1913, and its Implications for Growth and the Business Cycle", *Journal of Economic History,* 65, 613-657.

Bry, G. (1960), *Wages in Germany 1871-1945*, Princeton: Princeton University Press.

Chandler , A.D.(1990), *Scale and Scope: The Dynamics of Industrial Capitalism*, Cambridge, Mass: Harvard University Press.

Chapman, A.L. (1953), *Wages and Salaries in the United Kingdom, 1920-1938*, Cambridge: Cambridge University Press.

Clark, G. (2005), "The Condition of the Working Class in England, 1209-2004", *Journal of Political Economy*, 113, 1307-1340.

Davies, M.F. (1909), *Life in an English Village: An Economic and Historical Survey of the Parish of Corsley in Wiltshire*, London: Unwin.

Desai, A. V. (1968), *Real Wages in Germany 1871-1913*, Oxford: Clarendon Press.

Engels, F. [1845] (1969), *The Condition of the Working Class in England*, St Albans: Panther.

Feinstein, C.H. (1972), *National Income, Expenditure and Output of the United Kingdom, 1855-1965*, Cambridge: Cambridge University Press.

Feinstein, C.H. (1990), "New Estimates of Average Earnings in the United Kingdom, 1880-1913", *Economic History Review*, 43, 595-632.

Feinstein, C.H. (1995), "Changes in Nominal Wages, the Cost of Living and Real Wages in the United Kingdom Over Two Centuries, 1780-1990", in Scholliers, P. and Zamagni, V. (eds.), *Labour's Reward. Real Wages and Economic Change in 19th- and 20th-Century Europe*, Aldershot: Edward Elgar, 3-36 and 258-266.

Feinstein, C.H. (1998), "Pessimism Perpetuated: Real Wages and the Standard of Living in Britain during and after the Industrial Revolution", *Journal of Economic History*, 58, 625-658.

Ford, P. (1934), *Work and Wealth in a Modern Port: An Economic Survey of Southampton*, London: Allen & Unwin.

Fremdling,R., de Jong, H. and Timmer, M. (2007), "Censuses Compared: A New Benchmark for British and German Manufacturing 1935/36", *Journal of Economic History*, 67, 350-378.

Frohmann, L. (2008), *Poor Relief and Welfare in Germany from the Reformation to World War I,* Cambridge: Cambridge University Press.

Gazeley, I. and Newell, A. (2007), "Poverty in Britain in 1904: An Early Social Survey Rediscovered", IZA Discussion Paper No. 3046.

Gerschenkron, A. (1962), *Economic Backwardness in Historical Perspective*, Cambridge, Mass: Harvard University Press.

Hachtmann, R. (1988), "Lebenshaltungskosten und Reallöhne während des 'Dritten Reiches'", *Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte,* 75, 32-73.

Harris, J. (1972), *Unemployment and Politics: A Study in English Social Policy, 1886-1914*, Oxford: Clarendon.

Hennock, E.P. (2007), *The Origin of the Welfare State in England and Germany, 1850-1914: Social Policies Compared,* Cambridge: Cambridge University Press.

Hoffmann, W.G. (1965), *Das Wachstum der deutschen Wirtschaft seit der Mitte des 19. Jahrhunderts*, Berlin: Springer Verlag.

Hohls, R. (1995), "The Sectoral Structure of Earnings in Germany, 1885-1985", in Scholliers, P. and Zamagni, V. (eds.), *Labour's Reward. Real Wages and Economic Change in 19th- and 20th-Century Europe*, Aldershot: Edward Elgar, 37-60 and 210-230.

Holtfrerich, C.-L. (1984), "Zu höhe Löhne in der Weomarer Republik? Bemerkungen zur Borchardt-These", *Geschichte und Gesellschaft*, 10, 122-141.

Holtfrerich, C.-L. and Forstmann, W. (1983), "Zur Entwicklung der Einkommensdifferenzen in den ersten Jahrzehnten der deutschen Industrialisierung: Eine Auswertung der Eisenbahnstatistik", *Historical Social Research,* 8, 38-62.

Huberman, M. (2004), "Working Hours of the World Unite? New International Evidence of Worktime, 1870-1913", *Journal of Economic History*, 64, 964-1001.

Huberman, M. and Minns, C. (2007), "The Times They are Not 'Changin': Days and Hours of Work in Old and New Worlds, 1870-2000", *Explorations in Economic History*, 44, 538-567.

Jacobs, A. and Richter, H. (1935), *Die Grosshandelspreise in Deutschland von 1792 bis 1934,* Berlin: Hanseatische Verlagsanstalt.

Jones, D. Caradog (1934), *The Social Survey of Merseyside*, Liverpool: Liverpool University Press.

Kaiserliches Statistisches Amt (1909), *Erhebung von Wirtschaftsrechnungen minderbemittelter Familien im Deutschen Reich*, Berlin: Carl Heymann.

Kuczynski, J. (1937), *Löhne und Ernährungskosten in Deutschland 1820 bis 1937*, Libau.

Kuczynski, J. (1947), *Die Geschichte der Lage der Arbeiter in Deutschland von 1800 bis in die Gegenwart, Vol. I, 1880-1932*, (3rd edition), Berlin.

Landes, D.S. (1969), *The Unbound Prometheus: Technological Change and Industrial Development in Western Europe from 1750 to the Present*, Cambridge: Cambridge University Press.

Linsley, C.A. and Linsley, C.L. (1993), "Booth, Rowntree and Llewellyn Smith: A Reassessment of Interwar Poverty", *Economic History Review*, 46: 88-104.

Maddison, A. (1995), *Monitoring the World Economy, 1820-1992*, Paris: Organisation for Economic Co-operation and Development.

Maddison, A. (2001), *The World Economy: A Millennial Perspective*, Paris: Organisation for Economic Co-operation and Development.

Mallet, B. (1913), *British Budgets, 1887-88 to 1912-13*, London: Macmillan.

Müller, J.H. (1954), *Nivellierung und Differenzierung der Arbeitseinkommen in Deutschland seit 1925,* Berlin: Duncker & Humblot.

O'Rourke, K. (1997), "The European Grain Invasion, 1870-1913", *Journal of Economic History*, 57, 775-801.

Owen, A.D.K. (1933), *A Survey of the Standard of Living in Sheffield*, Sheffield: Sheffield Social Survey Committee.

Petzina, D. (1987), "Arbeitslosigkeit und Sozialstaat", in: Abelshauser, W. (ed.), *Die Weimarer Republik als Wohlfahrtsstaat,* Stuttgart: Steiner, 239-259.

Phelps Brown, E.H. and M.H. Browne (1968), *A Century of Pay: The Course of Pay and Production in France, Germany, Sweden, the United Kingdom and the United States of America, 1860-1960*, London: Macmillan.

Pierenkemper, T. (1983), "Die Einkommensentwicklung der Angestellten in Deutschland", *Historical Social Research,* 8, 69-92.

Pierenkemper, T. (1987), "The Standard of Living and Employment in Germany, 1850-1980: An Overview", *Journal of European Economic History,* 16, 51-73.

Prest, A.R. (1954), *Consumers' Expenditure in the United Kingdom, 1900-1919*, Cambridge: Cambridge University Press.

Ritschl, A. (1990), "Zu hohe Löhne in der Weimarer Republik? Eine Auseinandersetzung mit Holtfrerichs Berechnungen zur Lohnposition der Arbeiterschaft 1925-1932", *Geschichte und Gesellschaft,* 16, 375-402.

Ritschl, A. (2008), "The Anglo-German Industrial Productivity Paradox, 1895-1938: A Restatement and a Possible Resolution", *Journal of Economic History*, 68, 535-565.

Ritschl, A. and M. Spoerer (1995), "Das Bruttosozialprodukt in Deutschland nach den amtlichen Volkseinkommens- und Sozialproduktsstatistiken, 1901-1995", *Jahrbuch für Wirtschaftsgeschichte,* 1997 / 2, 27-54.

Rowntree, B.S. (1902), *Poverty: A Study of Town Life*, London: Macmillan.

Rowntree, B.S. (1941), *Poverty and Progress: A Second Social Survey of York*, London: Longmans.

Samuelson, P.A. (1964), "Theoretical Notes on Trade Problems", *Review of Economics and Statistics,* 46, 145-54.

Scholz, R. (1986), "Lohn und Beschäftigung als Indikatoren für die soziale Lage der Arbeiterschaft in der Inflation", in Feldman, G.D. and Ambrosius, G. (eds.), *Die Anpassung an die Inflation,* Berlin: de Gruyter.

Smith, H. Llewellyn (1931-1935), *The New Survey of London Life and Labour*, 9 volumes, London: King.

Soetbeer, A. (1879), *Umfang und Vertheilung des Volks-Einkommens im Preußischen Staate 1872-1878*, Leipzig: Duncker & Humblot.

Steiner, A. (2007), "Zur Neuschätzung des Lebenshaltungskostenindex für die Vorkriegszeit des Nationalsozialismus", *Jahrbuch für Wirtschaftsgeschichte*, 2007/2, 129-152.

Stone, R. and Rowe, D.A. (1954), *The Measurement of Consumers' Expenditure in the United Kingdom, 1920-1938, Volume I*, Cambridge: Cambridge University Press.

Thane, P. (1996), *Foundations of the Welfare State*, (second edition), London: Longman.

Tout, H. (1938), *The Standard of Living in Bristol,* Bristol: Arrowsmith.

Webb, S.B. (1982), "Agricultural Protection in Wilhelmian Germany: Forging an Empire with Pork and Rye", *Journal of Economic History,* 42, 309-326.

Wiegand, E. (1982), "Zur historischen Entwicklung der Löhne und Lebenshaltungskosten in Deutschland", in Wiegand, E. and Zapf, W. (eds.), *Wandel der Lebensbedingungen in Deutschland. Wohlfahrtsentwicklung seit der Industrialisierung*, Frankfurt/Main: Campus, 69-153.

Williams, E. (1896), *Made in Germany*, London: Heinemann.

Williamson, J.G. (1995), "The Evolution of Global Labor Markets Since 1830: Background Evidence and Hypotheses", *Explorations in Economic History*, 32, 141-196.