*"When Did the Swiss Get so Rich?" Comparing Living Standards in Switzerland and Europe, 1800-1913**

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Switzerland is undoubtedly among the most affluent states in the world. What is much less clear, though, is when its economy became so successful and its people so wealthy – that is to date the so-called "Swiss miracle". This analysis concludes that while the Swiss economy as a whole improved early and was already among the most successful around 1900, its workers did up to World War I benefit considerably less from economic growth than their colleagues in many other European countries. The paper therefore suggests that, contrary to conventional wisdom, the rise of Swiss living standards to take a top position internationally was clearly a phenomenon of the short 20th century.

1. Explaining the 'Swiss miracle'

Switzerland is undoubtedly among the most affluent states in the world. For 2005, the World Bank ranked Switzerland, with an annual average per capita income of 55,320 US dollars, third out of 208 countries, and well ahead of the United States. When the high costs of living are considered, Switzerland is still fourth on the list.[1] And in its 2006 study on wage and price levels, one of the country's biggest banks

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[1] If the countries for which only approximations are available were included, Switzerland would be sixth. All information is available at the web-site: http://siteresources.worldbank.org/DATASTATISTICS/Resources/GNIPC.pdf.

concluded that the purchasing power in Zurich is unrivalled around the globe.[2]

What is much less clear, though, is *when* its economy became so successful and its people so wealthy – that is, to date the so-called 'Swiss miracle'. Although it might seem so at first sight, these two questions are not identical. To determine to what extent, how fast, and under what circumstances benefits from economic growth 'trickle down' to workers have, indeed, been among the most contentious issues in the debate about English living standards.[3] Consequently, in this paper – which sets itself the task of determining the relative wealth of the Swiss from 1800 to 1913 – these two measures of economic success, which are often not differentiated in the literature, will be distinguished and compared.

There is also widespread disagreement about the *reasons* for the Swiss success. This debate closely follows the one about the timing as the 'when' question is – partly due to a lack of clear evidence – often answered by the '*why*' question. Understandably a very popular position, especially in public discourse, for explaining the success story is to highlight the Swiss working ethic, education level, and entrepreneurship. As the argument contends, these characteristics have enabled Switzerland – a country poorly endowed with natural resources and in former times known as one of the 'sick men' in Europe – to rise to unexpected heights. Explanations along these lines are quite compatible with Max Weber's 'protestant ethic' explanation: Geneva and Zurich, the hometowns of Calvin and Zwingli, were at the very heart of the Reformation movement and became progressive and industrial centres of Switzerland. The logic of these narratives requires that the march of the Swiss to the top was a long and steady process, which started well before the Industrial Revolution.[4]

[2] The complete report can be downloaded from the following address: http://www.ubs.com/1/g/ubs_ch/wealth_mgmt_ch/research.

[3] For a good overview see Feinstein, 'Pessimism perpetuated'.

[4] For arguments along these lines, see for instance Keller and Nordmann, *Wohlstand aus dem Nichts*, or Stucki, *Das heimliche Imperium*. Both works are cited in Mario König's article, to which this thematic overview owes a lot. König, 'Wohlhabenheit'. Max Weber's classic text is titled *The Protestant ethic and the spirit of capitalism*.

Another line of argument identifies specific economic policies and institutional settings as the crucial growth factors. The free-trade policy of the export-orientated *small open economy* led in this view to increasing benefits in the globalisation process of the late nineteenth century. The Swiss strategy in the emerging world market, where they found themselves face to face with keen English competition, was to avoid direct confrontation and to resort to the production of various specialities or high-quality goods. But this did not hinder the Swiss from turning English colonial expansion to their own advantage without being obliged to bear any share of the costs involved: 'The small, land-locked country had set up a sort of "colonial system" without possessing a fleet, without maintaining any colonial administration, without having had to wage any wars, and without having been forced to resort to any kind of oppression'.[5] A vital role in this Swiss expansion during what is sometimes called the 'Second Industrial Revolution' is also assigned to another free-rider feature, namely the absence of a patent law until 1907. Denounced as 'practices of robber barons' and 'a system of parasitism' by foreign competitors, this institutional anomaly is believed to have facilitated the emergence of powerful food-processing, chemical, and engineering industries in the late nineteenth century, as Swiss entrepreneurs could adopt new technologies without having to bear any of the high development costs.[6]

A third line of reasoning sees today's affluence mainly as a dividend from political stability and neutrality in the twentieth century. At the heart of the attention in these narratives are financial institutions. Banks and insurance companies in most other European countries were constantly fighting the consequences of war and hyperinflation in the first few

[5] These are the words of the German economist Emminghaus from 1861, quoted in Fritsche, 'Switzerland', p. 139. For accounts of the integration of the Swiss economy into the international market: Bernegger, 'Die Schweiz und die Weltwirtschaft'; Veyrassat, 'La Suisse sur les marchés du monde'.

[6] For the importance of a missing patent system, see Schiff, *Industrialisation without national patents*. The quotes of angry German entrepreneurs are also taken from Schiff, p. 94. For a recent account on the 'Swiss miracle', where the globalisation of the late 19th century takes centre stage, see David and Ritzmann-Blickenstorfer, 'The gross national product'.

decades of the century. Switzerland managed to remain absent from both world wars, kept the exchange rate constant and guaranteed that the Swiss franc remained freely convertible throughout the whole period. Furthermore, the Swiss bankers – invigorated by banking secrecy secured by the Swiss law in 1934 – became known as trustworthy administrators who do not ask too many questions. All these factors made the Swiss franc one of the most attractive currencies and the Swiss banks the preferred resort for all kinds of money. This rise of a financial centre, achieved in the first half of the twentieth century and followed by constant expansion of Swiss financial institutions, is believed to have brought prosperity not only to an ever growing service sector, but, by its sheer size and its links to other sectors, to the Swiss economy as a whole.[7]

To present the sources of Swiss economic prosperity in the way I have just done, contrasting basically three sets of explanations is certainly an oversimplification. In many accounts the 'Swiss miracle' is described as a result of an interplay of sources, often including several of the aforementioned factors. Even though many assessments differ mainly in respect to the weighting of these features, there is widespread agreement – at least in the academic literature – that Swiss living standards were already among the highest within Europe before 1900, therefore asserting that the 'miracle' happened before the world wars.[8]

Therefore, the present arrangement of growth factors was chosen not only to entertain the reader, but because it serves best the purpose of showing how closely the arguments indeed link the sources of economic growth with crucial growth periods. And this nicely illustrates the potential gain from a sound comparison of Swiss living standards, which is the aim of this paper. Apart from determining the monetary condition of the people, which is, of course, a desirable outcome in itself, such an investigation can at the same time yield some new insights into the different explanations of the 'Swiss miracle'. The choice to cover the time period

[7] For a short overview: König, 'Wohlhabenheit', pp. 283-288. For the emergence of the banking sector: Cassis and Tanner, *Banken und Kredit in der Schweiz (1850-1930)*.
[8] The latest contribution on the matter supports this view; see David and Ritzmann-Blickenstorfer, 'The gross domestic product'.

from 1800 to 1913 in this exploration underlines the intention to obtain results that can have implications for Swiss historiography more generally. As this investigation starts well before the Industrial Revolution began in Switzerland[9], two of the three claims about when the Swiss became wealthier than their European neighbours can be tested directly, while the third stylised narrative is at least indirectly scrutinised. Did the Swiss economy improve early and steadily and did its people enjoy a relatively high living standard compared to their European neighbours before the country actually industrialised? Or did the Swiss overtake their neighbours during the free trade era in the decades prior to the first world war? Or are both these account erroneous, so that an interpretation, where the world wars take centre stage, suggests itself? Finally, how do the answers to these questions affect the interpretations of Swiss economic growth?

2. Aim and method

Motivated by the relevance of the topic and a shortage of research hitherto, the aim of this study is to provide new evidence on relative Swiss living standards in the form of two internationally comparable real wage series, and to compare these new findings with the existing evidence on this issue, which is exclusively drawn from aggregate macroeconomic estimates.

That such a narrow interpretation of the standard of living relating to real wages is used here – despite the growing sophistication of the debate on living standards and the application of much broader comparisons – has various reasons. Switzerland, as other countries, was in the nineteenth century still very much in a 'pre-statistical era', in the sense that systematic collection and publication of economic and social

[9] It is debatable when the 'take off' (this being in itself a contested notion) for Switzerland has to be set. Fritsche presents two schools of thought. The first, with a certain national pride, insists that Switzerland was the first industrialised country in continental Europe, 'taking off' around 1820. The second points out that 'the existence of a national market was a prerequisite of industrial development that was not fulfilled until after 1848' (Fritsche, 'Switzerland', p. 126).

variables was lacking, and only gradually started from the late nineteenth century onwards. However, the resulting shortage of data on socio-economic variables commonly used to measure living standards is more accentuated for Switzerland. This is because such topics have since attracted a lot less scholarly attention than they did in other European countries, while in particular international comparisons have hardly been attempted. As a consequence, there are only a few retrospective estimations of standard of living indicators currently available, while none of them has attempted to systematically compare the results internationally. While the situation is slightly better in the case of prices and wages, to include alternative or complementary indicators for nineteenth-century well-being such as health, height, life expectancy, housing, education level, or consumption level and patterns would require a much bigger effort. It is far beyond the scope of this study and must for now remain a task for future investigations.

In defence of the present approach it can be added that different indicators inevitably convey different aspects of the economic situation of a country and its citizens, so that the decision only to include real wages and to omit other indicators must not only be seen as a result of the availability of data and time, but also as a choice of focus. And this decision can by no means be called exceptional, as real wages are probably the dominant choice of indicator for measuring the economic well-being of people across countries for the time up to and including the nineteenth century. The other prominent indicator for living standards, which has in the twentieth century gained a pre-eminent position, is GDP per capita or per worker. And while an investigation comparing the level of Swiss real wages is still lacking, there is indeed not only one, but several comparative GDP estimates for Switzerland, covering the time periods from 1830-1975 (Bairoch), 1820-1998 (Maddison), and 1880-1990 (Prados de la Escosura) respectively.[10] Recent years, finally, have seen increasing usage of the

[10] Bairoch, 'Europe's national product', p. 286; Maddison, *The World Economy*, p. 185; Prados de la Escosura, 'International comparison', pp. 24-30. Prados de la Escosura also contrasts his figures with Bairoch's and Maddison's.

Human Development Index (HDI) as a standard of living indicator amongst economic historians, a measure which draws heavily upon GDP estimates but also includes longevity and education in the calculations. Switzerland does feature in these comparative historical studies, such as those of Crafts, which presents benchmarks reaching back to 1870.[11]

That the present real – wage comparison can nevertheless make a useful contribution about the timing and nature of the 'Swiss miracle' rests upon two qualifications concerning the GDP estimates and derivates therefrom – an empirical and a methodological one.

First, while the results of all of these GDP and HDI studies agree that living standards in Switzerland were already among the highest in Europe before World War I, the estimates differ substantially, not only for the nineteenth century, but also for the twentieth century.[12] This is hardly astonishing as Switzerland does not have a set of comprehensive (i.e. computed at a balance-of-payment) national economy financial statistic before 1983. Moreover, the further back in time the retrospective estimation reaches, the less reliable the results become as the available data becomes increasingly sparse. For the 'pre-statistical' time – before, say, 1880 – the results represent hardly more than informed guesswork, so that even the archpriest of the GDP method, Angus Maddison, concludes that, for Switzerland, the historical 'estimates are poor and weaker than for all other West European countries'.[13] Real wages, on the other hand, are a lot less problematic in this respect, as information on only a few variables is required – nominal wages and prices of consumer goods – variables that are furthermore among the ones most often recorded in past centuries.

Second, the relationship between total output per capita and the standard of living is indirect and subject to many qualifications. Most problematic in the present context probably is that measures of GDP per

[11] Crafts, 'The human development index'.
[12] For the latest news in this discussion, see David and Ritzmann-Blickenstorfer, 'The gross domestic product'. There, the authors conclude that both Maddison and Prados de la Escosura underestimate the Swiss GDP level prior to the first world war.
[13] Maddison, *Monitoring the World Economy*, p. 135.

capita neglect income distribution. One could therefore imagine, for example, that Switzerland already enjoyed a high level of GDP per capita before World War I, while the majority of its citizens did not share the benefits of this economic success and were still comparably worse off than their neighbours when looking at real wages.[14] Real wages, on the other hand, do not encompass the whole economy, but they are a direct measure of the monetary condition of a particular part of the country's workforce.[15]

The present real-wage approach for measuring living standard is afflicted with various flaws, however. It has been mentioned that real wages can only convey one aspect of the material well-being, however a very important one. In addition, wage data is never fully representative for all people's earnings, as it includes at best all employees and as these employees do have other sources of income as well. Due to a lack of information, the basis of comparison had to be further narrowed so that it is limited to skilled and unskilled workers in the building sector of different towns. Another source of inaccuracy arises from the fact that in the early nineteenth century workers' wages were often supplemented by payments in kind. Moreover, many families still grew a substantial amount of the food they consumed by themselves. All these problematic issues will now be addressed more thoroughly in a Swiss context.

3. Comparing Swiss real wages

For many countries the time before the twentieth century still is very much a 'pre-statistical era'. Encompassing real-wage comparisons which could be representative for whole economies are thus in most cases impossible to obtain as the necessary data is simply missing. Future research can possibly come ever closer to such a goal by reconstructing

[14] This seems all the more possible as Switzerland is notorious for its high level of inequality. Data for Zürich from 1934-87 is provided in König, 'Der Kanton Zürich', p. 400.
[15] For an extended discussion about how GDP and real wages have differed in Switzerland over the last two centuries, see Studer and Schuppli, 'Deflating Swiss Prices'. For reasons why per capita output and real wages might yield different conclusions about the people's living standards, see van Zanden, 'Rich and poor', pp. 16-19.

the missing information. For the time being, methods of simplification have to be used by which reasonable proxies can be constructed to attempt international comparisons of living standards nevertheless. Studies that applied a uniform approach to compare real wages over long periods and for various countries are not numerous, and it has been mentioned that none of these comparisons include Switzerland in their samples. Consequently, the choice about how an internationally comparable real wage series for Switzerland should be constructed – i.e. against what benchmark the Swiss situation shall be gauged – is rather narrow. Arguably the most suitable basis of comparison in the present context is Robert Allen's paper 'The great divergence in European wages and prices from the Middle Ages to the First World War', in which building labourers and building craftsmen are chosen to represent the wage level of unskilled and skilled labour in various towns across Europe. It will be argued that it is not only feasible to add Zurich to Allen's sample of towns, but that it is at the same time a reasonable simplification for making a first attempt to assess living standards of Swiss workers in the nineteenth century more generally. Although it is believed that following Allen's lead yields the most reliable results, an alternative procedure will be applied, which replicates Jeffrey Williamson's comparison in 'The Evolution of Global Labor Markets' for Switzerland and compares the resulting alternative real-wage series with his findings. Were the findings from both modes of comparisons to produce similar results, this would certainly enhance the credibility of the conclusions. The analysis commences with the comparison with Robert Allen's dataset, while the Williamson procedure will be discussed thereafter and rather briefly in order to cross-check the results previously obtained.

The prerequisites for a comparison to Allen's database – wage series and a consumer price index that are compatible with Allen's – were not available for Switzerland. Consequently, a substantial part of the next sections will be dealing with explaining how such time series have been constructed, what data has been used for doing so, and the quality of the newly obtained price and wage series. Only then can these new time series, as well as the resulting real wage series, be contrasted to the price and wage histories of other parts of Europe.

Nominal Wages

In his paper, Allen analysed daily wages of building craftsmen, as those wages are most frequently reported in price histories. Fortunately, the same is true for Switzerland, where the situation for obtaining wage data for the nineteenth century is least bad for men working in the building sector. However, consistent wage series for these kinds of workers were only obtainable for the period after 1890. But by using all the information supplied in the literature and by combining it with information from historical documents from the municipal departments of road construction and hydraulic engineering of Zurich, consistent and reliable annual wage series for both building craftsmen and building labourers of Zurich, which cover the whole time period from 1800 to 1913, could be obtained (*Figure 1*).[16]

The graph reveals that nominal wages of both masons and labourers remained fairly stable over the first four decades of the century and were only slightly higher in 1850 than they were in 1800. Thereafter, wages began to rise fast and steadily with the exception of two short time periods, from 1873 to 1880 and 1889/1890. It should be noted, however, that the decline in nominal wages from 1873 to 1880 might be caused, or at least be influenced, by the linking of two different wage series at that point.

Generally, the characteristics of the different sources used might to some extent determine the trends and levels. For instance, the obvious fluctuations in nominal wages of building labourers between 1814 and 1831 is identical with the period when the new data for workers in the private sector was used, while all the other wage information from 1800 to 1840 are for workers employed by public institutions. Over the whole period from 1800 to 1913, unskilled workers could catch up slightly, as labourers' wages rose by about 297%, while wages of craftsmen 'only' increased by about 242%.

Once wage series for the building sector are correctly established, several issues about their representativeness arise. The first question to

[16] Please consult Appendix I for a detailed description about the sources used for all wage and price series.

be asked is whether these wages are a good measure of these workers' earnings. In the nineteenth century, it was still widespread to compensate workers partly in money and partly in kind, so that money wages would actually only represent a share of these workers' income. Luckily, choosing building wages as representations of worker's earnings has – apart from the fact these wages are the ones most often reported – another significant advantage:

> These wage sources are all the more valuable as in the building sector, employees do not receive board and lodging as it is still common in other of the typical businesses ... so that if we include money values for 1 ½ pounds of bread and 1 gauge of wine per day ..., we have a money value which had to be sufficient to make a living at the time.[17]

In the few cases where the workers whose money wages were reported received some bread and wine in addition, the money values of these kinds have been added to the money wages. Consequently, the money wages utilised for all further calculations should represent total earnings from paid employment.

J.C. Symons' travel account from the late 1830s gives us an impression about a second source of possible inaccuracies when money wages are chosen to represent the condition of Swiss workers:

> The pecuniary amount of wages is at all times a fallacious index to the real condition of the labourers. In Switzerland it is peculiarly so, owing to the very great subdivision of land and the intermixture of agricultural and artisan occupations, a vast number of the working classes producing a portion of their own subsistence.[18]

This criticism cannot be wholly rebutted as reliable information about whether Symons' analysis might also have been true for building workers in Zurich is simply missing for most of the time period under scrutiny.[19]

[17] Notz, *Die säkulare Entwicklung*, p. 242. My translation.
[18] Symons, *Arts and artisans*, p. 59.
[19] See hereto Gruner, *Die Arbeiter in der Schweiz*, pp. 92-95.

It is assumed that subsistence farming played a minor role for town people as land was not as readily accessible. Moreover, as both construction and farming are occupations where work intensity is the greatest in summertime, it is hard to imagine that subsistence production was substantial among these workers. And contemporary accounts suggest that, while in rural regions it was indeed the agrarian subsidiary income which was crucial for the lower classes, the town proletariat often had to rely on pauper relief instead to cover household deficits. Clearly, including all subsidiary income, in particular child and female labour, which formed an essential element in the life of the lower classes, would render a more accurate indicator of the people's material well being.[20] An inquiry into the living conditions of workers in 1912, for instance, concluded that with a 60-hour a week job, an unskilled Swiss worker earned on average only about 61% of the family income, while his wife contributed about 11% and his children about 13%, while the rest came from additional sources like sideline jobs, telework, or charity.[21] But even if data on these sources of complementary income were available for Switzerland, to account for them would render the proposed comparison impracticable as, to date, no cross-national databases have included such measures.

Due to the claim to provide some insights into the relative economic condition of Swiss workers more generally, a third issue is whether building craftsmen and labourers are representative of skilled and unskilled workers. The building sector was by no means the most important industry within the secondary sector. It was the textile industry, which employed more than half of the workforce of the secondary sector in the middle of the nineteenth century. Construction accounted for only about 10 per cent at the same time. As the secondary sector employed about 33 per cent of the total workforce, only about 3.3 per cent of Swiss workers were employed in the building trade in 1850. This share increased in the second half of the century when the secondary sector replaced

[20] For such an approach and resulting discrepancies to 'men wage only' approaches, see Horrel and Humphries, 'Old questions'.
[21] Gruner, *Arbeiterschaft und Wirtschaft*, vol. 1, p. 371.

agriculture as the biggest sector and as urbanisation gained pace, so that by 1910, about 14 per cent of all workers were employed in the building trade. Still, it is obvious that the size of the building sector does not support the acceptance of building wages as a representation of workers' average wages.[22] To make things worse, wages paid in agriculture – which was for a good part of the nineteenth century still the dominant sector – were mostly far lower than any wages in industry.[23] However, these workers received a substantial part of their income in kind. For a partial justification of the simplification proposed, we have to look at the wages paid in different occupations in industry. *Figure 2* very clearly depicts that building wages[24] show, both in terms of level and trend, close similarities to average wages in other industries. Due to a lack of data and the knowledge about the exact evolution of the economy's structure, to obtain reliable approximations of average wages in industry or in the economy as a whole is so far not possible and probably never will be. But as the graph shows that wages in the biggest industry, the textile industry, were lower than in construction, building wages probably slightly overestimate average wages in the industrial sector. However, it seems acceptable to take building wages as a first indicator for average wages of Swiss workers, a procedure that has proved adequate for other countries as well.[25] This in spite of the fact that the building sector became the sector to employ the biggest share of foreign, especially Italian, workers – workers who subsequently quite often had to suffer public blame for allegedly putting downward pressure on wages, and hence for the dire living conditions of the working classes.[26]

A fourth qualification relates to working hours. Due to a shortage of reliable data up to 1870, it has been assumed that the days worked per

[22] For the figures see Gruner, *Die Arbeiter in der Schweiz*, p. 130; Bergier, *Wirtschaftsgeschichte der Schweiz*, p. 226; Siegenthaler, 'Die Schweiz', p. 467.
[23] Böhmert, *Arbeiterverhältnisse*, pp. 153-161.
[24] In this graph, simple arithmetic averages of craftsmen's and labourer's wages have been computed to represent average wages in the building sector.
[25] See Allen, 'The great divergence', pp. 414-415.
[26] See Gruner, *Arbeiterschaft und Wirtschaft*, vol. 1, p. 248.

year and the hours worked per week were equal among countries and remained constant from 1800 to 1913.

This is wrong, as annual working hours decreased over this period all over Europe, hence implying that a certain amount of real-wage gain will remain unaccounted for in the present calculations. The other simplification, which disregards differences across countries and is potentially far more damaging for this comparative analysis, appears not to be a very problematic simplification in the face of Micheal Huberman's recent contribution on working hours. For the time from 1870 to 1899, Huberman presents working hours in construction that show only minor differences among the countries included in the present study. Weekly working hours in Switzerland were about 62 hours, which had to be performed on about 300 days or during 48.9 weeks per year. The corresponding weekly working hours (weeks of work per year in brackets) for the other countries are: France 62.7 (48), Netherlands 64 (50.4), Belgium 65.9 (48.3), Germany 62.1 (48.6), Spain 61.3 (45.9), and Great Britain 53 (48.4). For the late nineteenth century, consequently, taking hourly wages instead of daily wages as benchmarks would drive English wages up and Dutch and Belgian wages down. However, if Huberman's figures were used to calculate annual wages from the daily wages used, Dutch purchasing power would now be increased and Spanish decreased relative to other countries. It can be noted that in both cases Switzerland covers middle ground, so that any of the two adjustments would change Swiss income relative to that in another country at the most by about 5%.[27]

A last issue related to the representativeness of the new wage series is the choice of the city: Zurich's case was perhaps special so that the results obtained are not representative for Swiss cities more generally. The comparison of building wages in Zurich with building wages in

[27] The notable exception is Great Britain. Given its low figure for weekly working hours, taking hourly wages as benchmarks would lead to a substantial increase in their relative income, which, to anticipate a result, is already far higher than in any other place even when comparing daily wages. For the late nineteenth-century working hours, see Huberman, 'Working hours', pp. 970-1, 978.

Basel, provided by a follow-up study by Pascal Schuppli, clearly suggest otherwise. Including Basel in the sample instead of Zurich would produce nearly congruent results, as both wage levels and trends are nearly identical in these two towns over the nineteenth century.[28]

After considering potential and real shortcomings, the reconstructed series of building wages have been converted into grams of silver so that they can be compared with building wages in other European cities.[29] The results obtained are presented in *Figures 3* and *4*.

A striking feature of these wage histories is the similarity of both long-term trends and short-term fluctuations. In all cities included in the sample, wages remain nearly stable, or increase only slightly, throughout the first half of the nineteenth century. In this first phase, nominal wages for both labourers and craftsmen were the lowest in Germany and by far the highest in England. English nominal wages were nearly twice as high as in France and the Low Countries in 1800, while Swiss workers were paid only about a third the wage of their English colleagues.

During a second phase from about 1850 to 1885, wages rose moderately in all countries, but wage dispersion decreased, so that Swiss and German wages were more or less on par with Dutch and Belgian wages. A third phase from around 1885 to 1910 was characterised by rapid but uneven wage increases leading to another divergence.[30] Wage increases in Switzerland were extraordinary during this period, far higher than, for instance, in France, Belgium, or the Netherlands. They were only topped by the increases in Germany. Thus, on the eve of first world war, Switzerland was no longer the low-wage country it had been in the first decades of the nineteenth century. Noteworthy is also the uneven

[28] Schuppli, 'Between a brick and a hard place'. The wage series for Zurich and Basel are compared in Studer and Schuppli, 'Deflating Swiss Prices'.

[29] Swiss conversion from Körner, 'Währungsbewertung'; all other conversions from Allen, 'The great divergence'.

[30] It should be noted that, when using the silver method to compare nominal wages across countries, the wage increases are overstated for the late 19th century, as there was a pronounced depreciation of silver after 1873. The franc, for instance, had a silver content of 4.5 g in 1873, which rose to 9.92 g in 1913. The same, of course, also applies to consumer prices – this is also the reason why this blurring effect disappears for real wages.

wage growth of skilled and unskilled labour in Switzerland – nominal wages of skilled labour rose considerably less.

Consumer Price Index

Nominal wages alone are not good indicators of living standards but have to be seen in the context of local price levels. Wages therefore need to be deflated with a consumer price index representing the workers' annual expenditure. As mentioned above, Robert Allen's approach has been chosen as a basis of comparison so that we need to see how he deflates nominal wages and how appropriate his procedure is for nineteenth-century Zurich. Allen's index is a Laspeyres index, which means that the annual 'quantity of each good is specified and then the price level computed by valuing those quantities at the prices prevailing in each time and place'[31]. His consumer basket, which also needs to be used to deflate Swiss nominal wages, is presented in Table 1. The items included and their respective quantities remain constant over the whole period, while the prices in the example below are for Zurich in 1830.

The consumer price index depicted in Table 1 excludes consumer goods (such as rent, milk, potatoes, and various clothing items) included in previous consumer baskets for Switzerland by other authors. On the other hand it included goods which were represented in no previous study (soap, lamp oil, candles), mainly because of missing data. The present index also ranges further back in time than all previous baskets for Switzerland, while its computation, whenever possible, is based on retail prices for Zurich. Apart from the literature and nineteenth-century statistics journals, it was the annual account books of Zurich hospital and the local prison, which served as a main source for new data.

As various price series were available and could be checked against each other for many goods – also for the goods which dominate expenditure (bread, meat, and wine) – it is believed that the new price series and thus the whole consumer price index are fairly reliable. There

[31] Allen, 'The great divergence', p. 420.

is one exception, however, as the price series for clothing is afflicted with uncertainties. Consistent prices for raw linen drapery, used by Allen to circumvent the problem of rapidly falling cotton prices, were not found.[32] But also in the case for cotton drapery, the available sources were confusing, as different widths were sometimes indicated and sometimes width was not indicated at all.[33] It finally seemed best to take a reliable base value for cotton drapery for 1914 and to calculate the rest of the prices using a cotton price index printed in *Historical Statistics*.[34] For exact indications of all sources used for the price series, please consult Appendix I.

Determined by the availability of data and by the fact that Allen's paper covers the whole time span from 1500 to 1913, his basket is still very much a pre-modern basket. Bread dominates the budget, while the consumer goods introduced from the New World like sugar, coffee, potatoes, and tea are not represented. He also had to exclude rent, which is probably the most significant shortcoming of this index. Moreover, the assumption of a constant basket raises some general problems surrounding wealth accounting. Surely, a constant basket is misleading for the nineteenth century, as this period was in most European places characterised by real-wage gains. Periods of rising real wages are, in turn, generally accompanied by a falling share of expenditure on food, while expenses for new commodities and other goods like leisure are increasing. However, if changes in consumer patterns were to be included, this would not only be a difficult chain index problem to handle but a good deal of the rise in living standards would remain unaccounted for, as changing consumer patterns represent improvements in themselves. Similar general problems surrounding the quantification

[32] See Allen, 'The great divergence', p. 422. For the discussion about why cotton prices, which fell faster than textile prices in general, are no adequate measures of the evolution of expenditure on clothing, see: Lindert and Williamson, 'English worker's living standards'; Crafts, 'English worker's real wages'; Lindert and Williamson, 'English worker's real wages: a reply to Crafts'.

[33] Allen's data suffered from the same shortage of information, which did not make the task easier.

[34] Although I could find linen prices in the account books of Zurich hospital, they were for 'raw' bed sheets, and not by the metre.

of living standards are that consumer patterns are never identical across countries and that taking changes in the quality of the goods consumed into account is extremely difficult. It has to be accepted that living standards are hardly fully quantifiable, let alone perfectly comparable, and that not only this indicator but each single indicator for itself will only yield an incomplete and in some ways incorrect measurement.[35]

Nevertheless, it still makes sense to question the accuracy of a simplification. The selection of goods to be included in the index was predetermined by the aim of international comparability and was not the outcome of a detailed budget analysis of Swiss workers. As has been done for wages above, it therefore has to be asked whether the representativeness of the present consumer basket has not been entirely sacrificed for the sake of comparing the purchasing power over time and between places. Again, for this purpose, the new measure shall be contrasted to studies that exclusively tried to give as accurate as possible a picture for Switzerland. Two consumer price indices for Switzerland, which cover a good part of the time under scrutiny, are obtainable from the literature. In *Figure 5* they are contrasted to the newly constructed index.

The graph is reassuring. The new index shows a very similar trend to the one Siegenthaler constructed in the 1960s, and which is probably still the most reliable for the time from 1840 to 1890.[36] Both these indices show an overall increase in the price level in the course of the century, while this increase was neither dramatic nor steady. Prices were only about 10 per cent higher after the turn of the twentieth century than they had been a century before, while the cost of living from 1820 to 1850 was temporarily about 20-30 per cent lower than at the beginning of the century. Other than Siegenthaler's index, which is not based on annual data, the new index also very clearly illustrates the consequences of some crises on price levels. Prices for instance skyrocketed during the (climatic)

[35] For a methodological discussion of consumer indices, see Studer and Schuppli, 'Deflating Swiss Prices'.
[36] Siegenthaler, 'Zum Lebensstandard', pp. 426-431.

events of 1816/1817 and the (political) events of 1847. Furthermore, the fact that Siegenthaler included rents in his calculations points out that omitting rent in the new calculations does not change the trend substantially.

What the graph also conveys is that the consumer price index published in *Historical Statistics* matches considerably less well with the new index for the period before 1890, and especially before 1850. These discrepancies are not necessarily bad news. The index published in *Historical Statistics* covering the years from 1890 to 1913 was the result of a very detailed study done by Thomas Gross and others.[37] That the new index moves nearly hand in hand with Gross's index is certainly good news. In *Historical Statistics*, however, Gross's index was linked with a less reliable index covering the years from 1851 to 1890. In order to arrive at a deflator for the first half of the century, these consumer price indices, which are averages for the German-speaking part of Switzerland, were then linked with the only available index ranging so far back in time, which happened to be a wholesale index.[38] Thus the present index, showing a far smaller fall in prices over the first four decades of the nineteenth century than the wholesale index used in *Historical Statistics*, is believed to convey a more accurate trend of consumer prices.

As in the case of building wages, also the newly constructed consumer basket seems to be an acceptable representation of the Swiss worker's economic condition, despite all the simplifications that had to be made.

Once annual expenditure is again converted into grams of silver, levels and trends of annual expenditure in Zurich can be put in an international context.

Trends and fluctuations of prices in Zurich were very similar to the ones in other European towns. The overall price level, though, rose in

[37] Gross *et al, Reallöhne schweizerischer Industriearbeiter von 1890-1921*. His and all the other results from consumer price calculations are printed in Ritzmann-Blickenstorfer, *Historische Statistik*, chapter H., tables 1-25, especially table 17. For comments concerning the tables see *ibid.* pages 437-442.

[38] This wholesale index was the result of a Masters dissertation at the University of Zurich. Projer, Die Schweizerischen Grosshandelspreise 1806 bis 1928'.

Zurich compared to those in most other towns over the period from 1800 to 1913. During the first half of the century, prices were nearly identical to the ones in Amsterdam, slightly lower than in Strasbourg, but still substantially lower than in London. In the second half of the nineteenth century, Swiss prices began to rise faster than in most other places. Already by the turn of the century, prices in Zurich were among the highest in Europe, far higher than in Antwerp or Amsterdam, and comparable with the ones in Paris and London. This comparative rise in annual expenditure is all the more astonishing as Switzerland pursued a relatively liberal trade policy in this period and was before World War I the country whose grain imports in proportion to its consumption was the highest in Europe.[39] But bread *did* become substantially cheaper in the era of free trade, whilst the rising prices of animal products (meat, butter, cheese, eggs) and wine thwarted the prospect of substantially falling costs of living. These animal products were still predominantly supplied by domestic production[40], and the prices of these goods could become relatively more expensive in Switzerland because from the 1880s protection was stepped up to shield the less productive domestic production from cheap imports. The tariffs for pork and beef stood at around 7% in 1910, while the other good that loomed large on annual expenditure, wine, was taxed even more heavily: 28% of the value of each barrel that crossed the borders was levied by the authorities, even though 57% of total domestic wine consumption was covered by imports.[41]

[39] From 1909 to 1913, Switzerland imported 78 per cent of the grain consumed. The corresponding figure for the United Kingdom is 62 per cent, while for Germany it was only 16 per cent. Bairoch, 'Population urbaine', p. 313.

[40] Domestic production covered 75.9% of the domestic consumption of beef and pork. Brugger, *Die schweizerische Landwirtschaft*, p. 223. The extent of meat consumption was, until the dietary revolution of the 20th century always a proxy for the wealth of consumers. It is therefore rather telling that average meat consumption per head among the Swiss working classes, at about 23 kg, was still at a very low level on the eve of World War I. German workers for instance consumed at the same time about 20% more meat. Gruner, *Arbeiterschaft und Wirtschaft*, vol. 1, p. 387.

[41] Meanwhile, the consumption of wine per head slightly increased over this period, however, much less so than for beer. Wine was, however, still the main alcoholic beverage. Brugger, *Die schweizerische Landwirtschaft*, pp. 38, 156, 364.

Real Wages

Real wages are obtained by the simple division of nominal wages by the price level. As both the new nominal wage series and the consumer price index did not differ substantially from previous studies on Switzerland, it comes as no surprise that the real-wage trends show close similarities to older findings. As depicted in *Figure 7*, real wages more than doubled over the nineteenth century, while most of the increase was achieved after 1860.

When the newly obtained real-wage series are compared with Allen's data for other European cities, the European real-wage series for labourers (*Fig. 8*) and craftsmen (*Fig. 9*) are obtained – and all of a sudden, the picture looks less flattering for the Swiss economy.

In 1800, real wages of both labourers and craftsmen were lower in Zurich than in any other of the sample cities. Real wages just next to the Swiss border in Strasbourg were also substantially higher, due to the high prices prevailing in Zurich. When prices fell in the 1820s, Swiss real wages could catch up with the next lowest real-wages, being the German and Spanish ones, and slightly surpassed the real-wages of Strasbourg. During the next few decades, real wages across Europe converged, resulting in quite narrow gaps between real-wage levels in Zurich, Leipzig, and Amsterdam around 1870. The odd one out was London, whose workers enjoyed far higher real wages than anybody on the continent.

After this period of convergence, the period from 1870 to 1913 was again characterised by diverging real wages. Although Madrid showed the worst performance, Swiss living standards again lost ground relative to those in neighbouring countries during this time. Although nominal wages in Zurich kept pace with wage levels in other European cities, it was the extraordinary price inflation that lowered Swiss purchasing power relative to other places in Europe. This 'falling behind' was not identical for labourers and craftsmen. As mentioned in the discussion of nominal wages, Swiss labourers did comparably better so that their real wages in 1910 were no longer much lower than those of their colleagues in other parts of Europe. However, although the real wage gap between Zurich and other European cities narrowed from 1800 to 1913, living standards in Zurich could still not compete with those ones in European capitals

before the first world war. *Table 2* summarises the development of prices and wages discussed in this chapter.

4. Cross-checking the results

So far, all the comparisons have been based solely on both Robert Allen's methodology (choice of workers for nominal wages, consumer goods to include in consumer basket, kind of basket) as well as on his data and results. And although it is believed that following Allen's lead yields the most reliable results, an alternative procedure, which replicates Jeffrey Williamson's international real wage comparison presented in 'The evolution of global labor markets', will be applied to cross-check the results obtained above. Such an exercise enables us to talk about an issue that has so far been omitted and it can improve the reliability of the Swiss real-wage comparison in at least three ways. First, it can test whether the patterns of relative wealth determined above also hold when using a more 'modern' consumer basket instead of the pre-modern basket used by Allen. Second, Williamson's inclusion of rent should remove the prime shortcoming of the Allen method; however it turns out that the Williamson database appears doubtful in this respect. Third, the geographical coverage is broadened, as instead of examining one city per country only, average prices and wages of the principal industrial towns in each country serve as proxies for a nation's living conditions. Therefore, instead of Zurich, it is now the German-speaking towns of Zurich, Basel, and Bern that represent the Swiss data base. This broadening is, however, only possible because the comparative price and wage analysis for the pre-firts world war era is limited to one benchmark comparison. Once the relative situation of prices and wages has been estimated for 1905, national real wage indices are used to project relative real wages across countries backwards in time until 1830. This total neglect of different comparative wage and price trends prior to 1905 is certainly the most important drawback of the Williamson method and makes the Allen method the more reliable means for international comparisons for the nineteenth century. Another problem is that no alcoholic beverages are included, while in reality

this commodity loomed large on workers expenditure. Furthermore, a number of uncertainties with the data seem to exist in Williamson's data base, one of which we encounter when looking at the benchmark comparison of prices and wages for the year 1905 (*Table 3*).

The comparison for 1905 based on Jeffrey Williamson's method is reassuring and all in all confirms quite nicely the results obtained when applying Robert Allen's approach. On the price side, Switzerland is once more revealed as a costly place for consumers: Animal products are, with the exception of milk, expensive; bread on the other hand is reasonably cheap. And while the price level of food is already higher than in any other European country included in the sample, nominal wages are only mediocre. They are comparable to French wages, but lower than German ones and substantially lower than in Great Britain. As mentioned above, a data problem seems to exist when it comes to rents. There are in my view two ways of explaining the fact that Swiss rents are more than three times the amount paid in any other country. The first is to accept that, in the explosive phase of urbanisation from the 1880s onwards, rents in Switzerland put much more strain on the workers expenditure than elsewhere.

When looking at *Table 3*, we can see that an unskilled building labourer had to spend about 40% of his weekly earning for the rent of a three-bedroom flat; his skilled superior slightly less than 30%. Such figures, which are broadly based, are by no means exceptional figures for early twentieth-century Switzerland. Inquiries into the conditions of the working classes, indeed, regularly confirmed that the lower classes in towns had to spend between one-third of male income and one-third of total family income (including female, child, and subsidiary work) on rent; a budget overview of a building labourer in the town of Basel, for instance, states that in 1909, some 360 francs of his annual earnings of 1228 Swiss Francs had to be used for renting a three-bedroom flat for his family.

However, the fact that all members of the family – husband and wife and their nine children – crammed into a small flat did not prevent them from running a household deficit, which was eventually met by a local poor house or charitable institution. Given the massive financial

burden posed by rents, it is hardly astonishing that the topic frequently fuelled social dissatisfaction and formed a political issue of prime importance.[42]

There is, however, another way of explaining the extraordinary high Swiss rents; namely that Williamson's numbers for the other countries are too low. This suggests itself when assessing from Table 3 the shares of income that had to be spent on rent. In Great Britain, an unskilled labourer, according to these figures, had to spend a mere 7.5% of his own income for renting three rooms, his colleagues in France about 9.4%, while in Belgium it was a low as 5.2%. As these figure, indeed, appear doubtful, rents have been excluded from further calculations, in which the benchmark constructed above was linked to the real-wage index to include Switzerland in Williamson's database, the result of which is presented in *Figure 10.*

Using Williamson's approach of backward projection generates an all-European picture, which bears many resemblances with Allen's comparative picture depicted in Figure 8. However, in a Swiss perspective, the results look much worse, as the real wages in Switzerland are shown for much of the nineteenth century to lag substantially behind the ones in any other country included in the sample. A good part of this aggravation compared to the previous comparison can be explained away when looking at *Figure 6.* The fact that international price levels were now only compared in one benchmark year (1905), which happens to be a time when Swiss prices reached their maximum in comparative terms while wages were more slack, necessarily results in underestimating Swiss purchasing in backwards projections. The situation is more realistic towards the end of the nineteenth century; it then pictures a similar overtaking of Spanish real wages and a conversion with French wages already reported. But again, no sign of very wealthy Swiss citizens are yet to be seen on the horizon.

[42] Three-bedroom flats in Zürich and Bern were even more expensive, as average annual costs in 1908 were 499 and 554 francs respectively. The figures used for Table 5 are for 1905, which were slightly lower. All information on rents are taken from Gruner, *Arbeiterschaft und Wirtschaft*, vol. 1, pp. 366, 380, 403.

5. Comparative discussion and conclusions

At the outset of this article, the 'Swiss miracle' was pictured in three diverging ways. It is now time to return to these narratives and to comment on how well they fit the real-wage evidence just presented.

The *first* stylised narrative, which stated that the Swiss economy improved early, so that its people enjoyed relatively high living standards when compared to their European neighbours well before the country industrialised, is largely discredited. Our analysis reveals that in 1800, real wages of both building labourers and craftsmen were substantially lower in Zurich than in any other city included in the comparison, being Amsterdam, Antwerp, London, Madrid, and Strasbourg. This gloomy situation was ameliorated in the 1820s as consumer prices in Zurich declined more sharply than elsewhere. Over the next few decades, real wages across Europe converged, resulting in minor differences in real wage levels between Zurich, Leipzig, and Amsterdam around 1870. Using Williamson's approach of backward projection points to an even more gloomy picture, where until well into the 1880s Swiss real wages were by far the lowest in the sample.

In the *second* account discussed at the beginning, it was argued that the 'small open economy' was catching up during the globalisation process in the decades preceding the first world war. With regard to real wages, this view it not confirmed by the new results. On the contrary, while real wages in Zurich were catching up prior to, say, 1870, relative purchasing power actually declined thereafter due to a surpassing price inflation. As a consequence, Zurich was already on the eve of the first world war the expensive place it is known as today, while the prevailing real wages could still not compete with the ones in European capitals. Looking again at the alternative comparison suggests that a certain catch-up may have happened with respect to France and the Netherlands, while the differences to the real-wage leaders was as pronounced as a hundred years earlier.

That leaves us with the *third* line of reasoning that sees today's affluence mainly as a dividend from political stability and neutrality in the twentieth century and where the rise of the financial sector takes

centre stage. Although that claim could not be tested directly, it is confirmed indirectly. As the present real-wage comparison concludes that Swiss workers had not been among the wealthiest in Europe – let alone in the world – before the world wars, and as the contrary is undoubtedly the case today, Swiss real wages must have overtaken English, Dutch, Belgian, or German real wages in the course of the twentieth century.

In the face of all the qualifications regarding methodology and data, which had to be made in the course of this analysis, it is important to note that the results obtained should not be interpreted as exact measurements, but rather as rough indicators of living standards. Nonetheless, all the indicators are consistent with a reinterpretation of the 'Swiss miracle' in such a way that this miracle was for a good share of the country's workforce for a long time not so miraculous at all. Switzerland's leading role within Europe in terms of real wages, for which the country is so notorious these days, was far from being achieved by World War I. It must, furthermore, be stressed that the present results not only discredit some stylised tales about the 'Swiss miracle', but also beliefs about Swiss wealth widely accepted in the academic literature.[43]

As mentioned before, the conventional wisdom in the academic literature – based on GDP estimates – has been to rank Switzerland among the wealthiest nations in Europe already towards the end of the nineteenth century. From these results it was furthermore inferred that Swiss living standards were among the highest. However, *Table 4* reveals that equalling living standards with real-wages rather than GDP per head or a HDI alters such a conclusion rather drastically. In this new approach – and it has been argued that this approach is believed to render much more reliable results for the nineteenth century – Switzerland's relative position is substantially worse.

How can such discrepancies in the relative positions of countries between the 'old' view based on historical national accounting and the revisionism based on real-wages be explained? It has been discussed that

[43] See for instance König, 'Wohlhabenheit', p. 276; Fischer, 'Wirtschaft und Gesellschaft', p. 112; Bairoch, 'Europe's gross national product', p. 286.

both the GDP and the present real wage approach are subject to a substantial margin of error. So do all these differences simply arise from measurement inaccuracies and other errors? Hardly. There are, indeed, good reasons to believe that both views are correct. First, estimates of GDP are comprehensive and can measure the state of an economy as a whole. But it might be misleading to take GDP per capita for measuring living standards, as 'the relationship between total output per capita and the standard of living is indirect and subject to many qualifications'.[44] Real wages, on the other hand, are a direct measure of the people's material well-being. Second, the GDP and the wage deflator differ. This difference is expected to play a bigger role in the nineteenth century, as commodity markets were less integrated and as workers still heavily consumed commodities that are resource-intensive (e.g. food and housing) and expensive to move internationally.[45] Third, differences in income distributions among countries may play an important role for explaining the observed discrepancies. Unfortunately, there are no historical investigations into income distribution and inequality available for Switzerland, and this field certainly deserves to be explored in depth. Also, as the discrepancies between living standards and GDP estimates pose a new problem for historiography, fresh analyses of Switzerland's growth in the twentieth century, being a contested issue, are warranted to reconcile the two measurements of economic success.

For the time being, this analysis concludes that while the Swiss economy as a whole improved early and was already among the most successful around 1900, up to the first world war its workers benefited considerably less from economic growth than their colleagues in many other European countries. The rise of Swiss living standards to take a top position internationally was clearly a phenomenon of the short twentieth century. Consequently, claims about a nineteenth-century 'Swiss miracle' need to be qualified, as in terms of living standards, no such miracle was on the alpine horizon yet.

[44] Van Zanden, 'Rich and poor', p. 2.
[45] Williamson, 'The evolution', p. 143. On differences of Swiss GDP and real-wage trends from 1800-2006, see Studer and Schuppli, 'Deflating Swiss Prices'.

REFERENCES

Archival Sources

STAATSARCHIV ZÜRICH, RR II. 10: 'Rechnungen des Strassendepartements', vols. 1814-1831.

———, RR II. 14: 'Rechnungen des Wasserbauamtes', vol. 1835.

———, RR II: $120b_1$: 'Spitalrechnungen', vols. 1800-1910.

———, RR II: 141: 'Rechnung des Zuchthauses', vols. 1800-1820.

Printed Sources

BERTSCHINGER, HEINRICH, 'Lebensmittelpreise in Zürich von 1800 bis 1872', *Zeitschrift für schweizerische Statistik*, 9 (1873), pp. 125-128.

BÖHMERT, VICTOR, *Arbeiterverhältnisse und Fabrikeinrichtungen in der Schweiz*, (Zurich 1873).

BRUGGER, HANS, *Statistisches Handbuch der schweizerischen Landwirtschaft*, (Berne 1968).

CHATALANAT, L., 'Lebensvertheuerung und Staatsdienerbesoldungen in der Schweiz', *Schweizerische Statistische Zeitschrift*, 1 (1873).

DÜRST, ELISABETH, *Die wirtschaftlichen und sozialen Verhältnisse des Glarnerlandes an der Wende vom 18. zum 19. Jahrhundert*, (Glarus 1951).

GROSS, THOMAS *et al.*, *Reallöhne schweizerischer Industriearbeiter von 1890 bis 1921*, Nationalfondsprojekt, vols.1-3, (Zürich 1982).

HAAS-ZÜMBÜHL, F., 'Die Kernenpreise und Brotpreise in Luzern von 1601 bis 1900', *Zeitschrift für schweizerische Statistik*, 39 (1903), pp. 369-374.

———, 'Die Fleischpreise in Luzern von 1501 bis 1900', *Zeitschrift für schweizerische Statistik*, 39 (1903), pp. 375-377.

———, 'Die Milchpreise in Luzern ausgemessen von 1553 bis 1903', *Zeitschrift für schweizerische Statistik*, 39 (1903), pp. 375-377.

MÜHLEMANN, C., 'Einfluss der wichtigsten Nahrungsmittelpreise auf die Bewegung der Bevölkerung im Kanton Bern während dem 100jährigen Zeitraum 1782-1881', *Zeitschrift für schweizerische Statistik*, 18 (1882), pp. 59-70.

NOTZ, EMIL, *Die säkulare Entwicklung der Kaufkraft des Geldes. Für Basel in den Perioden 1800-1833 und 1892-1923 nebst internationalen Vergleichen dargestellt*, (Jena 1925).

PFISTER, CHRISTIAN, *Bernhist*, unpublished source collection, (Berne 1989).

PROJER, ERICH, Die Schweizerischen Grosshandelspreise 1806 bis 1928, (Zurich University master dissertation, 1987).

RITZMANN-BLICKENSDORFER, HEINER, (ed.), *Historische Statistik der Schweiz*, (Zurich 1996).

SCHINDLER, R., 'Übersicht der Kornpreise', *Zeitschrift für schweizerische Statistik*, 9 (1865), pp. 156-57.

SIEGENTHALER, HANSJÖRG, 'Zur Entwicklung des schweizerischen Lebensstandards im 19. und 20. Jahrhundert', *Schweizer Monatshefte*, 46 (1966), pp. 230-242.

SYMONS, JELINGER COOKSON, *Arts and artisans at home and abroad: with sketches of the progress of foreign manufactures*, (Edinburgh 1839).

Secondary Sources

ALLEN, ROBERT C., 'The great divergence in European wages and prices from the Middle Ages to the First World War', *Explorations in Economic History*, 38 (2001), pp. 411-447.

BAIROCH, P., 'Europe's national product 1800-1975', *Journal of European Economic History*, 5 (1976), pp. 273-303.

———, 'Population urbaine et taille des villes en Europe de 1600 à 1970', *Revue d'histoire économique et sociale*, 54 (1976), pp. 304-335.

BERGIER, JEAN-FRANCOIS, *Die Wirtschaftsgeschichte der Schweiz. Von den Anfängen bis zur Gegenwart*, (Zürich 1990).

BERNEGGER, MICHAEL, 'Die Schweiz und die Weltwirtschaft. Etappen der Integration im 19. und 20. Jahrhundert', in Paul Bairoch und Martin Körner (eds.), *Die Schweiz in der Weltwirtschaft*, (Zurich and Geneva 1990), pp. 429-464.

BRUGGER, HANS, *Die schweizerische Landwirtschaft 1850 bis 1914*, (Zürich 1975).

CASSIS, YOUSSEF and JAKOB TANNER (eds.), *Banken und Kredit in der Schweiz (1850-1930)*, (Zürich 1993).

CRAFTS, NICHOLAS, 'English workers' real wages during the Industrial Revolution: Some remaining problems', *Journal of Economic History*, 45 (1985), pp. 139-144.

———, 'The human development index, 1870-1999: Some revised estimates', *European Review of Economic History*, 6 (2002), pp. 395-405.

DAVID, THOMAS and HEINER RITZMANN-BLICKENSTORFER, 'The Gross Domestic Product of Switzerland 1891-1950', Working paper (University of Lausanne, 2003)

FEINSTEIN, CHARLES, 'Pessimism perpetuated: Real wages and the standard of living in Britain during and after the Industrial Revolution', *Journal of Economic History*, 58 (1998), pp. 625-658.

FISCHER, WOLFRAM, 'Wirtschaft und Gesellschaft Europas 1850-1914', in Wolfram Fischer and Hermann Kellenbenz (eds.), *Handbuch der europäischen Wirtschafts- und Sozialgeschichte*, vol. V, (Stuttgart, 1985), pp. 1-208.

FRITZSCHE, BRUNO, 'Switzerland', in Teich, Michulas and Roy Porter (eds.), *The Industrial Revolution in national context. Europe and the USA*, (Cambridge, 1996).

GRUNER, ERICH, *Die Arbeiter in der Schweiz im 19. Jahrhundert*, (Berne 1968).

———, *Arbeiterschaft und Wirtschaft in der Schweiz 1880-1914*, vol.1, (Zurich 1987).

HORREL, SARAH and JANE HUMPHRIES, 'Old questions, new data, and alternative perspectives: Living standards in the Industrial Revolution', *Journal of Economic History*, 52 (1992), pp. 849-880.

HUBERMAN, MICHAEL, 'Working hours of the world unite? New international evidence of worktime, 1870-1913', *Journal of Economic History*, 64, 4 (2004).

KELLER, PAUL and ROGER NORDMANN, *Wohlstand aus dem Nichts. Das Abenteuer der Schweizer Wirtschaft*, (Berne 1973).

KÖNIG, MARIO, 'Der Kanton Zürich seit 1945', in Flüeler, Niklaus and Marianne Flüeler-Grauwiler (eds.), *Geschichte des Kantons Zürich*, vol. 3, (Zürich 1994).

———, 'Wohlhabenheit. Vom Erfolg einer kleinen offenen Volkswirtschaft', in Hettling, Manfred *et. al.* (eds.), *Eine kleine Geschichte der Schweiz* ,(Frankfurt a.M. 1998), pp. 265-289.

KÖRNER, MARTIN, 'Währungsbewertung. 19. und 20. Jahrhundert' in *Historisches Lexikon der Schweiz (HLS)*, online version, accessed 21/05/2007, URL: http://hls-dhs-dss.ch/textes/d/D13659-1-3.php.

LINDERT, PETER and JEFFREY WILLIAMSON, 'English workers' living standards during the Industrial Revolution: A new look', *Economic History Review*, 36 (1983), pp. 1-25.

———, 'English workers' real wages: Reply to Crafts', *Journal of Economic History*, 45 (1985), pp. 145-153.

MADDISON, ANGUS, *Monitoring the World Economy*, (Paris 1995).

———, *The World Economy: A millenial perspective* (New York, 2001).

MILT, B., 'Geschichte des Züricher Spitals', in Regierungsrat des Kantons Zürich (eds.), *Züricher Spitalgeschichte*, (Zurich 1951), pp. 1-136.

PRADOS DE LA ESCOSURA, LEANDRO, 'International comparisions of Real product, 1820-1990: An alternative data set', *Explorations in Economic History*, 3 (2000), pp. 1-41.

SCHIFF, ERIC, *Industrialisation without national patents: The Netherlands, 1869-1912; Switzerland, 1850-1907*, (Princeton 1971).

SCHUPPLI, PASCAL, 'Between a brick and a hard place'. Masters dissertation, (Bern University 2005).

SIEGENTHALER, HANSJÖRG, 'Zum Lebensstandard schweizerischer Arbeiter im 19. Jahrhundert', *Schweizerische Zeitschrift für Volkswirtschaft und Statistik*, 101 (1965), pp. 423-444.

———, 'Die Schweiz 1850-1914', in Wolfram Fischer and Hermann Kellenbenz (eds.), *Handbuch der europäischen Wirtschafts- und Sozialgeschichte*, vol. V, (Stuttgart 1985), pp. 443-473.

STUCKI, LORENZ, *Das heimliche Imperium. Wie die Schweiz reich wurde*, (Frauenfeld 1981).

STUDER, ROMAN and SCHUPPLI, PASCAL, 'Deflating Swiss Prices over the Last Five Centuries', *Historical Methods*, 41, 3 (2008), pp. 137-156.

VAN ZANDEN, J.L., 'Rich and poor before the Industrial Revolution: a comparison between Java and the Netherlands at the beginning of the 19th century', *Explorations in Economic History*, 40 (2003), pp. 1-23.

VEYRASSAT, BÉATRICE, 'La Suisse sur les marchés du monde. Exportations globales et répartition géographique au XIX siècle', in Bairoch, Paul and Martin Körner (eds.), *Die Schweiz in der Weltwirtschaft*, (Zurich and Geneva 1990), pp. 287-315.

WEBER, MAX, *The Protestant ethic and the spirit of capitalism*, (London 1992).

WILLIAMSON, JEFFREY, 'The evolution of global labor markets since 1830: Background evidence and hypothesis', *Explorations in Economic History*, 32 (1995), pp. 141-196.

Appendix

"When Did the Swiss Get so Rich?".
Comparing Living Standards in Switzerland and Europe,
1800-1913

APPENDIX I: Sources of data

SWITZERLAND

Allen Method (data for Zurich)

Wages

Building labourers, 1800-1802: Dürst (1951, p. 54). 1803-1813: Notz (1925, pp. 214, 221-222). 1814-1831: Staatsarchiv Zürich (RR II. 10: 'Rechnungen des Strassendepartements', vols. 1814-1831). 1835: Staatsarchiv Zürich (RR II. 14: 'Rechnungen des Wasserbauamtes', vol. 1835). 1841-1873: Böhmert (1873, pp. 139-142). 1880-1905: Ritzmann-Blickenstorfer (1996, table G. 3, p. 447). 1906-1913: Ritzmann-Blickenstorfer (1996, table G. 6, p. 452).

Building craftsmen, 1800-1802: Dürst (1951, p. 54). 1803-1832: Notz (1925, pp. 214, 221-222). 1835: Staatsarchiv Zürich (RR II. 14: 'Rechnungen des Wasserbauamtes', vol. 1835). 1841-1873: Böhmert (1873, pp. 139-142). 1880-1905: Ritzmann-Blickenstorfer (1996, table G. 3, p. 447). 1906-1913: Ritzmann-Blickenstorfer (1996, table G. 6, p. 452).

Prices

Beans, 1800-1913: Pfister (1989).

Bread, 1800-1872: Bertschinger (1873, pp. 127-128). 1873-1889: Zumbühl (1903, pp. 373-374). 1890-1913: Ritzmann-Blickenstorfer (1996, table H. 26, p. 509).

Butter, 1800-1805: Zumbühl (1903, pp. 185-186), the price for 1800 was extrapolated using the price of cheese. 1806-1871: Bertschinger (1873, pp. 127-128). 1872-1913: Ritzmann-Blickenstorfer (1996, table H. 2, 25, 26, pp. 481, 508, 509).

Candles, 1800-1910: Staatsarchiv Zürich (RR II: $120b_1$: 'Spitalrechnungen', vols. 1800-1910). 1914: Ritzmann-Blickenstorfer (1996, table H. 14, p. 498).

Cheese, 1800-1860: Pfister (1989). 1861-1913: Ritzmann-Blickenstorfer (1996, table H. 1, 25, 26, pp. 480, 508, 509).

Drapery, 1800-1913: Ritzmann-Blickenstorfer (1996, table H. 6, 15, pp. 488, 500).

Eggs, 1834-1913: Ritzmann-Blickenstorfer (1996, table H. 2, p. 481). Earlier prices extrapolated backward based on the price of meat.

Firewood, 1800-1801: Staatsarchiv Zürich (RR II: 141: 'Rechnung des Zuchthauses', vols. 1800-1801). 1805-1840: Staatsarchiv Zürich (RR II: $120b_1$: 'Spitalrechnungen', vols. 1805-1840). 1845-1913: Siegenthaler (1966, p. 231).

Lamp oil, 1800-1910: Staatsarchiv Zürich (RR II: $120b_1$: 'Spitalrechnungen', vols. 1800-1910). 1910-1913: Ritzmann-Blickenstorfer (1996, table H. 4, 14, pp. 483, 493).

Meat, 1800-1860: Bertschinger (1873, pp. 127-128). 1861-1913: Ritzmann-Blickenstorfer (1996, table H. 2, 25, 26, pp. 481, 508, 509).

Soap, 1814-1910: Staatsarchiv Zürich (RR II: $120b_1$: 'Spitalrechnungen', vols. 1814-

1910). 1911-1913: Ritzmann-Blickenstorfer (1996, table H. 4, 14, pp. 483, 493). Prices prior to 1814 extrapolated backwards using the price of candles.

Wine, 1800-1859: Brugger (1968, pp. 300-301). 1860-1913: Ritzmann-Blickenstorfer (1996, table H. 1, 25, 26, pp. 480, 508, 509).

Williamson Method (averages for Zurich, Basel, and Bern)

Nominal wages for benchmark year (1905): Ritzmann-Blickensdorfer, *Historische Statistik der Schweiz*, Tables G.3, F.24, and F.25.

Real-wage index 1830-1913: my own, see Figure 7 and Appendix II.

Benchmark price comparison (average price for Zurich, Bern, Basel for 1905 if not stated otherwise).

Price of coffee: Ritzmann-Blickensdorfer, *Historische Statistik der Schweiz*, Table H.27 (1909 price for Zurich).

Sugar: Ritzmann-Blickensdorfer, *Historische Statistik der Schweiz*, Table H.26.

Bacon: Ritzmann-Blickensdorfer, *Historische Statistik der Schweiz*, Table H.27 (1909 price for Zurich).

Beef and veal: Ritzmann-Blickensdorfer, *Historische Statistik der Schweiz*, Tables H.26 and H.27.

Pork: Ritzmann-Blickensdorfer, *Historische Statistik der Schweiz*, Table H.26.

Lamb and mutton: No data available; pork prices served as stand-ins.

Cheese: Ritzmann-Blickensdorfer, *Historische Statistik der Schweiz*, Table H.26.

Butter and margarine: Ritzmann-Blickensdorfer, *Historische Statistik der Schweiz*, Table H.26.

Potatoes: Ritzmann-Blickensdorfer, *Historische Statistik der Schweiz*, Table H.26.

Flour: Ritzmann-Blickensdorfer, *Historische Statistik der Schweiz*, Table H.27 (1909 figure for Zurich).

Bread: Ritzmann-Blickensdorfer, *Historische Statistik der Schweiz*, Table H.26.

Milk: Ritzmann-Blickensdorfer, *Historische Statistik der Schweiz*, Table H.26.

Rent: Gruner, *Arbeiterschaft und Wirtschaft*, vol.1, p. 403.

OTHER COUNTRIES

Allen Method

Wages and prices, 1800-1913: Allen, 'The great divergence'; data available at http://www.econ.ox.ac.uk/Members/robert.allen/WagesPrices.htm

Williamson Method

Wages and benchmark price comparisons: Williamson, 'The evolution of global labor markets since 1830', Appendices 1-3.

APPENDIX II

New time series of Swiss wages and prices

	Nominal Wages (Swiss Francs per day)		Consumer price index (1900=100)	Real wage indices (1900=100)	
	Building Labourers	Building Craftsmen		Building Labourers	Building Craftsmen
1800	1.31	1.96	110	32	37
1801	1.31	1.96	88	40	46
1802	1.31	1.96	91	39	45
1803	1.42	1.92	89	43	45
1804	1.42	1.92	81	48	50
1805	1.42	1.92	87	44	46
1806	1.42	1.92	89	43	45
1807	1.42	1.92	80	48	50
1808	1.42	1.92	72	53	56
1809	1.42	1.92	70	55	57
1810	1.42	1.92	75	51	54
1811	1.42	1.92	75	51	53
1812	1.42	1.92	90	43	44
1813	1.42	1.92	84	46	47
1814	1.40	1.92	80	47	50
1815	1.60	1.92	88	49	45
1816	1.34	1.92	109	33	37
1817	1.50	1.92	146	28	27
1818	1.38	1.92	94	40	43
1819	1.53	1.92	71	58	56
1820	1.17	1.92	65	49	61
1821	1.23	1.92	68	49	59
1822	1.38	1.92	65	57	61
1823	1.40	1.92	59	64	67
1824	1.41	1.92	62	62	65
1825	1.26	1.92	63	54	64
1826	1.55	1.92	61	69	66
1827	1.58	1.92	59	72	68
1828	1.24	1.92	65	52	62
1829	1.43	1.92	64	60	62
1830	1.25	1.92	68	50	59
1831	1.46	1.92	76	52	53
1832	1.41	1.92	84	45	48
1833	1.36	1.95	67	55	60
1834	1.31	1.97	64	55	64
1835	1.26	2.00	60	56	69

continues

continued

1836	1.34	1.99	62	58	66
1837	1.42	1.98	63	61	66
1838	1.49	1.98	70	57	59
1839	1.57	1.97	69	62	60
1840	1.65	1.96	68	66	60
1841	1.73	1.95	70	67	58
1842	1.73	1.95	70	67	58
1843	1.73	1.95	73	64	55
1844	1.73	1.95	77	60	53
1845	1.73	1.95	76	61	53
1846	1.74	1.98	89	53	46
1847	1.76	2.00	98	49	43
1848	1.77	2.03	70	69	61
1849	1.79	2.05	63	77	68
1850	1.80	2.08	63	78	69
1851	1.77	2.09	69	69	62
1852	1.74	2.10	76	62	58
1853	1.71	2.11	84	55	52
1854	1.68	2.12	108	42	41
1855	1.65	2.13	96	47	46
1856	1.72	2.19	88	53	52
1857	1.79	2.26	87	56	54
1858	1.86	2.32	75	67	65
1859	1.93	2.39	81	65	62
1860	2.00	2.45	93	58	55
1861	2.04	2.54	102	54	52
1862	2.08	2.63	92	61	60
1863	2.12	2.72	90	64	63
1864	2.16	2.81	89	65	65
1865	2.20	2.90	88	67	69
1866	2.26	2.94	92	67	67
1867	2.32	2.98	102	61	61
1868	2.38	3.02	102	63	62
1869	2.44	3.06	96	69	67
1870	2.50	3.10	99	68	65
1871	2.80	3.55	108	70	69
1872	3.10	4.00	114	73	73

continues

continued

1872	3.10	4.00	114	73	73
1873	3.40	4.45	126	73	73
1874	3.29	4.38	115	77	79
1875	3.18	4.30	109	79	82
1876	3.08	4.22	113	74	78
1877	2.97	4.14	113	71	76
1878	2.86	4.06	108	72	78
1879	2.75	3.99	107	70	78
1880	2.64	3.91	108	66	75
1881	2.71	3.93	106	69	77
1882	2.78	3.96	105	72	79
1883	2.85	3.98	105	73	79
1884	2.92	4.00	105	75	79
1885	2.99	4.03	95	85	88
1886	3.19	4.23	91	95	97
1887	3.39	4.43	93	98	99
1888	3.59	4.63	94	103	103
1889	3.80	4.83	97	105	103
1890	3.68	4.62	98	102	98
1891	3.68	4.64	103	96	93
1892	3.68	4.66	101	98	96
1893	3.68	4.67	95	104	102
1894	3.69	4.69	94	106	104
1895	3.69	4.71	92	108	106
1896	3.69	4.73	93	107	106
1897	3.69	4.75	97	102	101
1898	3.70	4.76	104	95	95
1899	3.70	4.78	104	96	95
1900	3.70	4.80	100	100	100
1901	3.76	4.88	99	102	102
1902	3.82	4.96	99	104	104
1903	3.88	5.04	100	105	105
1904	3.94	5.12	102	105	105
1905	4.00	5.20	103	105	105
1906	4.00	6.00	103	105	121
1907	4.70	6.10	108	117	117
1908	4.70	6.30	111	114	118
1909	4.90	6.40	112	118	119
1910	5.00	6.50	111	121	121
1911	5.00	6.70	117	115	119
1912	5.00	6.70	121	112	115
1913	5.00	6.70	121	112	115

FIGURE 1. Builders' wages, 1800-1913

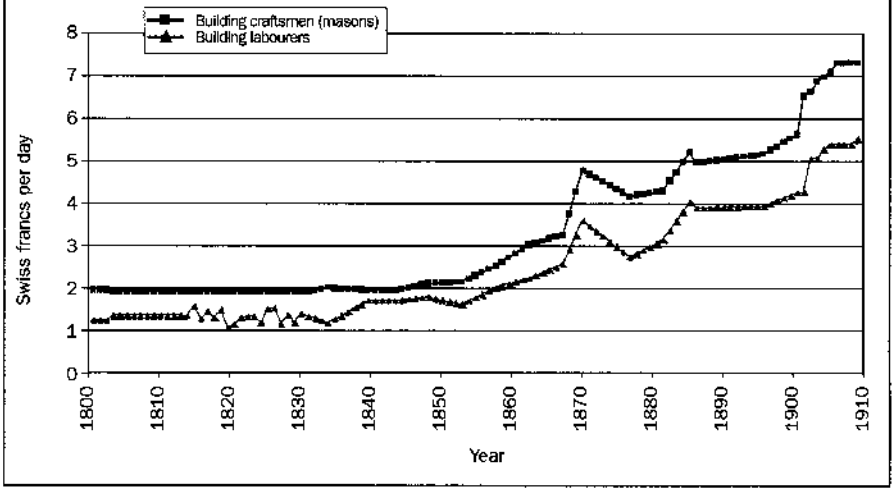
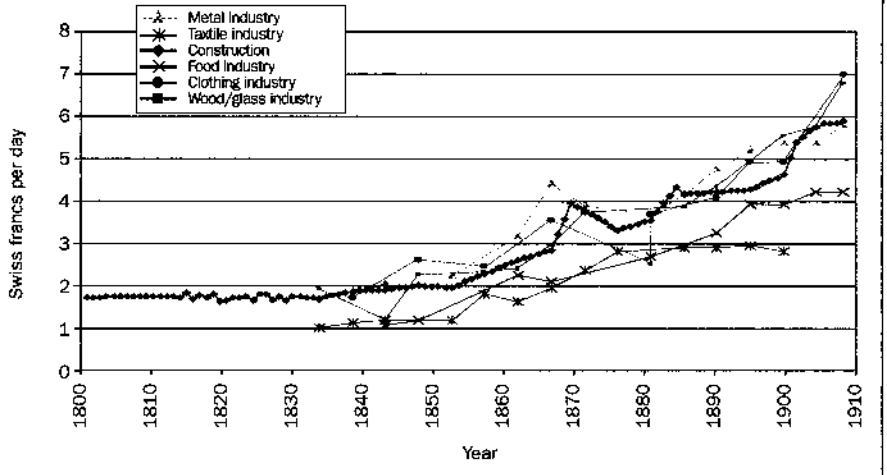


FIGURE 2. Nominal wages in industry, 1800-1913



Source for non-construction wages: Siegenthaler, 'Zum Lebensstandard', p. 432.

FIGURE 3. Craftsmen's nominal wages, 1800-1913

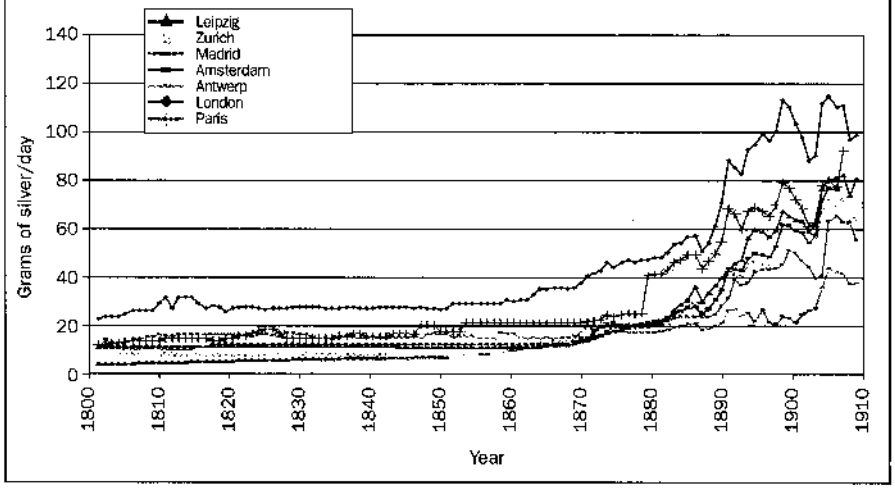


FIGURE 4. Labourers' nominal wages, 1800-1913

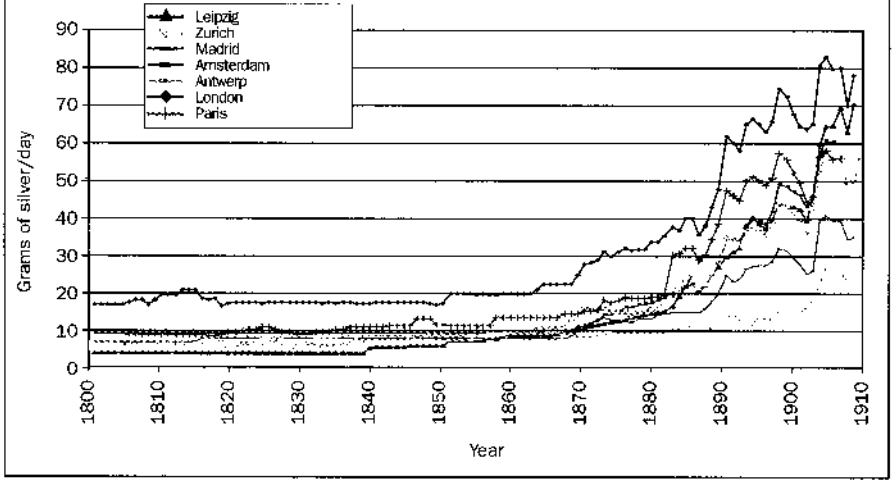


TABLE 1. Consumer Price Index: Basket of Goods and Price of Basket, 1830

	Quantity per person per year	Price in Swiss Francs per unit	Annual Spending in SFr.	Spending Share in %
Beans	52 litre	0.22	11.19	7.4
Bread	182 kg	0.32	58.24	38.7
Butter	5.2 kg	1.37	7.12	4.7
Candles	2.6 kg	1.60	4.16	2.8
Cheese	5.2 kg	1.12	5.82	3.8
Drapery	5 m	2.73	13.69	9.1
Eggs	52 pieces	0.039	2.05	1.7
Fuel	5.0 M BTU	0.88	4.41	2.9
Lamp Oil	2.6 litre	1.82	4.73	3.1
Meat	26 kg	0.58	15.08	10.0
Soap	2.6 kg	1.10	2.87	1.9
Wine	68.25 litre	0.31	20.86	13.9
			150.22	**100**

BTU is a common calorific standard, so that prices of different sorts of fuel can be compared. See Allen, 'The great convergence', p. 418. Conversions were obtained from: http://www.holzenergie.ch/downloads.

FIGURE 5. Swiss consumer prices, 1800-1913

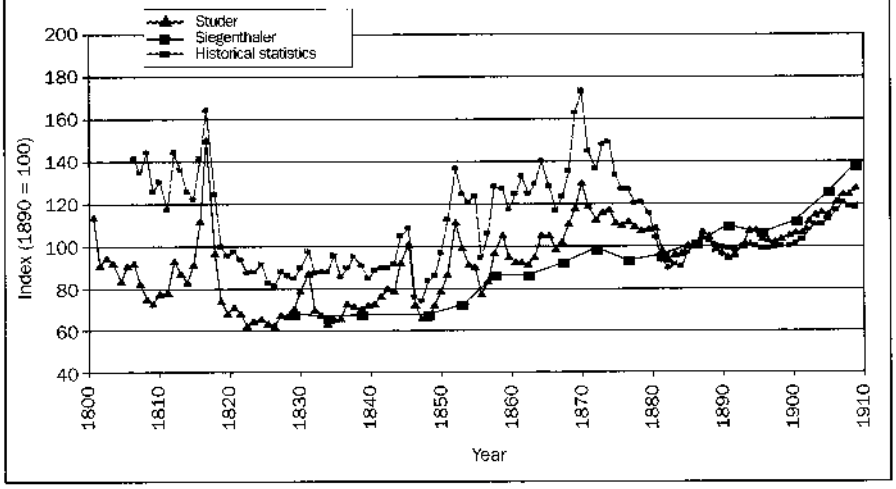


FIGURE 6. Cost of annual expenditure, 1800-1913

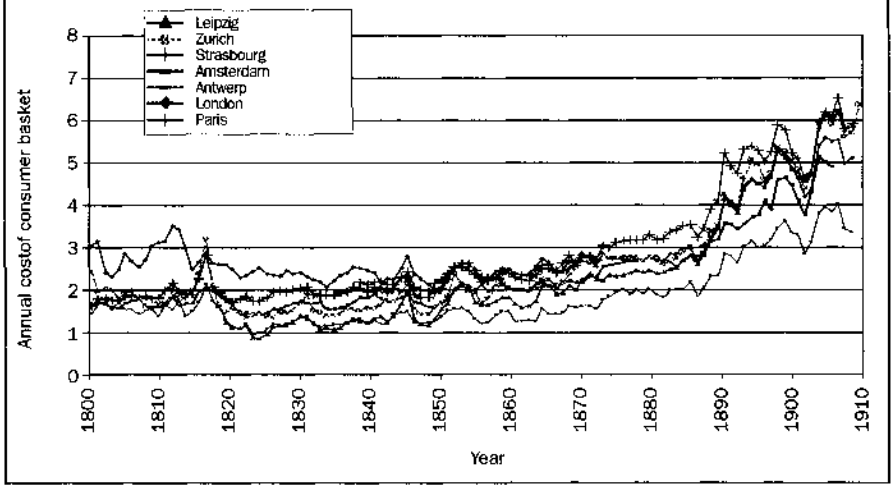


FIGURE 7. Comparison of real wage series, 1800-1913

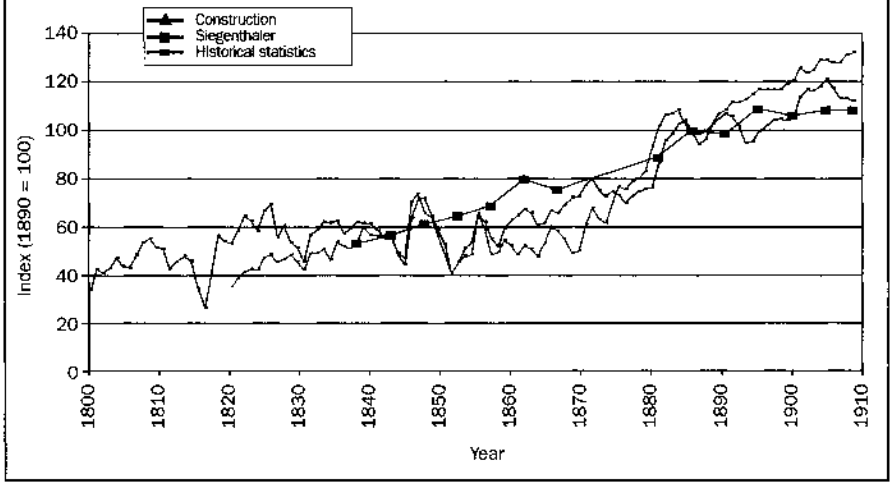


FIGURE 8. Labourers' real wages, 1800-1913

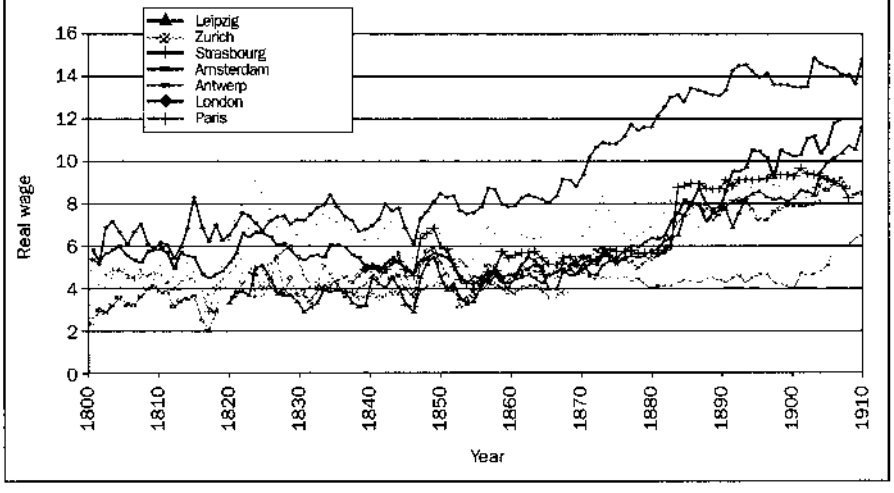


FIGURE 9. Craftmen's real wages, 1800-1913

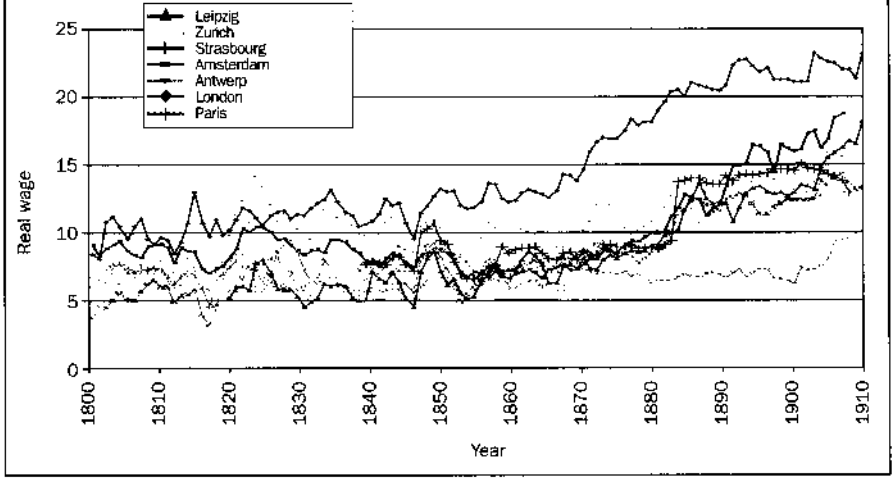


TABLE 2. Nominal wages, cost of living, and real wages in Europe, 1800-1910

	Nominal wages		Prices	Real wages	
1800	Craftsmen	Labourers		Craftsmen	Labourers
Zurich	100	100	100	100	100
Leipzig	57	70			
Amsterdam	137	157	65	210	242
Strasbourg	127	145	73	173	215
London	273	284	127	215	224
Antwerp	130	118	58	224	203
Madrid	138	104	94	147	111
1850	**Nominal wages**		**Prices**	**Real wages**	
	Craftsmen	Labourers		Craftsmen	Labourers
Zurich	100	100	100	100	100
Leipzig	89	74	79	113	94
Amsterdam	128	112	115	111	97
Paris	232	164	140	166	117
London	309	212	155	199	137
Antwerp	143	98	86	167	114
Madrid	190	110	112	170	98
1910	**Nominal wages**		**Prices**	**Real wages**	
	Craftsmen	Labourers		Craftsmen	Labourers
Zurich	100	100	100	100	100
Leipzig	117	116	102	115	114
Amsterdam	109	107	83	131	129
Paris	111	100	104	111	96
London	158	144	93	170	154
Antwerp	94	71	65	147	109
Madrid	61	47	71	86	66

(Zurich = 100)

TABLE 3. European price levels and real wages, 1905

country / Food Prices / year	SWI 1905	GB 1905	GER 1905	FRA 1905	BEL 1905	ITA 1905	Budget Shares
currency	d	d	d	d	d	d	
Tea and coffee (lb)	11.848	18.000	11.000	19.250	7.625	19.242	0.053
Sugar (lb)	2.456	2.000	2.375	2.875	3.000	6.430	0.044
Bacon and sausage (lb)	21.758	8.000	9.525	9.611	7.875	0.905	0.064
Beef and veal (lb)	8.053	8.000	8.250	8.438	7.938	8.199	0.139
Pork (lb)	8.488	8.000	10.000	9.250	8.500	7.248	0.052
Lamb and mutton (lb)	8.488	8.250	9.750	8.375	7.000	5.906	0.054
Cheese (lb)	8.574	7.000	7.500	8.831	8.500	5.612	0.027
Butter and margarine (lb)	14.088	13.000	13.875	12.500	13.000	12.080	0.117
Potatoes (7 lb)	3.317	3.000	2.625	3.000	2.750	3.624	0.057
Flour and meal (7 lb)	15.681	9.000	12.625	13.750	9.625	11.471	0.060
Bread (4 lb)	4.998	5.000	5.625	5.750	4.750	6.211	0.187
Milk (qt)	2.158	3.500	2.625	2.500	2.250	2.159	0.091
Eggs (doz)	10.557	12.000	9.842	12.000	11.077	11.994	0.054
Total Food	**8.858**	**7.850**	**8.046**	**8.516**	**7.139**	**7.661**	**1.000**
Rent (3 rooms/week)	84.268	23.250	24.500	19.083	10.417	-	
Exchange rates (per £)	SFr	£	Mark	Fr	Fr	Lira	
£	25.23	1.00	20.43	25.23	25.23	25.23	
Price Levels							
PF	113	100	102	108	91	98	0.820
PR	362	100	105	82	45	-	0.180
P	158	100	103	104	83	98	1.000
Nominal Wages	s/wk	s/wk	s/wk	s/wk	s/wk	s/wk	
Skilled building	26.49	37.69	28.54	26.15	22.35	14.00	
Unskilled building	19.39	25.64	21.75	17.83	16.50	9.00	
Real Wage Index							
Skilled building	0.45	1.00	0.74	0.67	0.72	-	
Unskilled building	0.48	1.00	0.82	0.67	0.78	-	
(excluding rents)							
Skilled building	0.62	1.00	0.74	0.64	0.65	0.38	
Unskilled building	0.67	1.00	0.83	0.64	0.71	0.36	

SWI = Switzerland, GB = Great Britain, GER = Germany, FRA = France, BEL = Belgium, ITA = Italy.
1£ = 20s = 240d

FIGURE 10. International real-wages of unskilled building labourers, 1800-1913

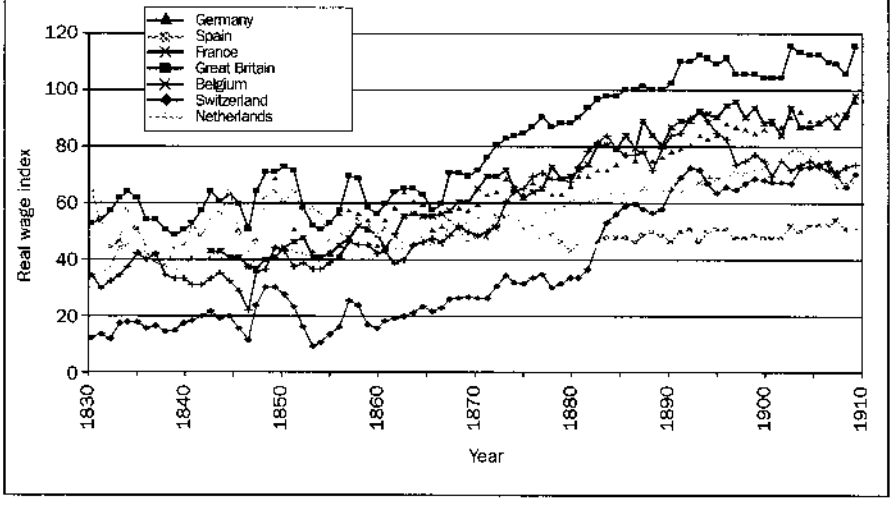


TABLE 4. Relative HDI and GDP per head and relative real wage levels in 1900

Real wages of unskilled labourers				GDP per head			
Allen Method		Williamson Method		Bairoch		Maddison	
1 United Kingdom (London)	1.79	1 Great Britain	1.59	1 United Kingdom	1,12	1 United Kingdom	1.20
2 France (Paris)	1.24	2 Belgium	1.45	2 Switzerland	1,00	2 Belgium	1,12
3 Netherlands (Amsterdam)	1.21	3 Germany	1.32	3 Belgium	0,92	3 Switzerland	1,00
3 Belgium (Antwerp)	1.18	3 Netherlands	1.13	4 Germany	0,81	4 Netherlands	0,98
5 Germany (Leipzig)	1.08	5 France (Paris)	1.08	5 Netherlands	0,78	5 Germany	0,88
6 Switzerland (Zurich)	1.00	6 Switzerland (Zurich)	1.00	6 France	0,77	6 France	0,78
7 Spain (Madrid)	0.56	7 Spain (Madrid)	0.75	7 Spain	0,45	7 Spain	0,58

Real wages of unskilled labourers				GDP per head		HDI (1913 figures)	
Allen Method		Williamson Method		Prados de la Escosura		Crafts	
1 United Kingdom (London)	2.18	1 Great Britain	1.72	1 United Kingdom	1,24	1 Netherlands	1.01
2 Belgium (Antwerp)	1.51	2 Belgium	1.26	2 Belgium	1,04	2 United Kingdom	1.00
3 France (Paris)	1.33	2 Germany	1.26	3 France	1,04	3 Switzerland	1.00
3 Germany (Leipzig)	1.32	4 France (Paris)	1.01	4 Germany	1,02	4 Germany	0.95
5 Netherlands (Amsterdam)	1.23	5 Switzerland (Zurich)	1.00	5 Switzerland	1,00	5 France	0.94
6 Switzerland (Zurich)	1.00			6 Netherlands	0,96	6 Belgium	0.92
7 Spain (Madrid)	0.75			7 Spain	0,70	7 Spain	0.65

(Switzerland = 1)
Source for levels of GDP per head: Prados de la Escosura, 'International comparisons', p. 26. For HDI figures: Crafts, 'The human development index, p. 396; For sources of real wages consult appendix I.

Notes