Working Papers No. 123/09

Wages, Prices, and Living Standards in China, 1738-1925: in Comparison with Europe, Japan and India

Robert C. Allen, Jean-Pascal Bassino,
Debin Ma, Christine Moll-Murata, and
Jan Luiten van Zanden

July 2009

Department of Economic History
London School of Economics
Houghton Street
London, WC2A 2AE

Tel: +44 (0) 20 7955 7860
Fax: +44 (0) 20 7955 7730

Wages, Prices, and Living Standards in China, 1738-1925: in Comparison with Europe, Japan, and India[*]

Robert C. Allen, Jean-Pascal Bassino, Debin Ma[+], Christine Moll-Murata & Jan Luiten van Zanden

Abstract

This paper develops data on the history of wages and prices in Beijing, Canton, Suzhou/Shanghai in China from the eighteenth century to the twentieth and compare them with leading cities in Europe, Japan and India in terms of nominal wages, the cost of living, and the standard of living. In the eighteenth century, the real income of building workers in Asia was similar to that of workers in the backward parts of Europe but far behind that in the leading economies in north western Europe. Real wages declined in China in the eighteenth and early nineteenth centuries and rose slowly in the late nineteenth and early twentieth with little cumulative change for two hundred years. The income disparities of the early twentieth century were due to long run stagnation in China combined with industrialization in Japan and Europe.

[*] This paper is part of the NSF grant funded project "Global Prices and Income 1350-1950" headed by Peter Lindert, the Spinoza premium project on Global Economic History funded by NWO (The Netherlands), and the Team for Advanced Research on Globalization, Education, and Technology funded by the Social Sciences and Humanities Research Council of Canada. We wish to express our thanks to Peter Lindert for suggestions and encouragements at every stage of this paper, as well as to Kariin Sundsback for collecting the VOC data. Our paper also benefited from the lively discussion at the 43rd Cliometrics Conference June 2005, the Global Economic History Network (GEHN) Conference at Utrecht in June 2005, seminars at University of Warwick, Paris School of Economics, Tsinghua University, University of Tuebinger, University of Tokyo, Yale University, in particular from Jörg Baten, Steve Broadberry, Kent Deng, Bishnupriya Gupta, Timothy Guinnane, Patrick O'Brien, Kenneth Pomeranz, Jean-Laurent Rosenthal, Tirthankar Roy, Osamu Saito and R. Bin Wong. Our thanks also go to the three anonymous referees of this Journal and to the editor, Jane Humphries. The underlying price and wage data in this study are available in excel format at http://www.iisg.nl/hpw/data.php#china and http://gpih.ucdavis.edu/Datafilelist.htm.

[+] Corresponding author: Debin Ma, Economic History Department, London School of Economics, London, WC2A 2AE. Email: d.ma1@lse.ac.uk.

> "The difference between the money price of labour in China and Europe is still greater than that between the money price of subsistence; because the real recompense of labour is higher in Europe than in China."
>
> Adam Smith, *Wealth of Nations*, 1776, p. 189.

The comparative standard of living of Asians and Europeans on the eve of the Industrial Revolution has become a controversial question in economic history. The classical economists and many modern scholars have claimed that European living standards exceeded those in Asia long before the Industrial Revolution. Recently, this consensus has been questioned by revisionists,[1] who have suggested that Asian living standards were on a par with those of Europe in the eighteenth century and who have disputed the demographic and agrarian assumptions that underpin the traditional view. The revisionists have not convinced everyone, however.[2]

One thing is clear about this debate, and that is the fragility of the evidence that has been brought to the issue. Most of the comparative studies relied on indirect comparisons based on scattered output, consumption, or demographic data. The few that attempted comparisons of direct income were largely based on scattered information about wages and prices in Asia.[3] Our knowledge of real incomes in Europe is broad and deep because scholars since the mid-nineteenth century have been compiling data bases of wages and prices for European cities from the late Middle Ages into the nineteenth century when official statistics begin.

---

[1] For instance, Pomeranz, *Great Divergence*; Parthasarathi, 'Rethinking Wages'; Wong, *China Transformed*; Lee and Wang, *One Quarter of Humanity*; Li Bozhong, *Agricultural Development*; Allen, 'Agricultural Productivity'; Allen, 'Mr. Lockyer'; Allen, 'Real Wages in Europe and Asia'; Allen, Bengtsson, and Dribe (eds.), *Living Standards in the Past*.

[2] For instance, Broadberry and Gupta, 'Early Modern Great Divergence'; Allen, 'India in the Great Divergence'.

This article, by assembling and constructing systematic data on wages and prices from Imperial ministry records, merchant account books and local gazetteers, is an attempt to fill that gap for China in the eighteenth and nineteenth centuries. These wage series, deflated by appropriate cost of living indices using reconstructed consumption baskets, are then compared to the Japanese, Indian, and European evidence to assess the relative levels of wage earners' real income at the two ends of Eurasia. The comparisons paint a less optimistic picture of Asian performance than the revisionists suggest.

Taking the hypothesis of Adam Smith at the head of this paper as a point of departure, the present study compares the 'money price' of labour in China and Europe. For this purpose, wage rates are expressed in grams of silver earned per day in the two regions. Un-minted silver measured in tael (of 37 grams)[4] was a universal medium of exchange in China in this period. The terms on which silver coins exchanged defined the market exchange rate of European and Asian moneys. Next, the 'money price of subsistence' is compared. This is a more complicated problem since the subsistence foods were different in China and Europe.

Approaching the problem in several ways turns out to imply similar relative price levels. Once they are measured, the differences between European and Chinese money wages and costs of subsistence and the implications of those differences for the 'real recompense of labour' can be perceived.

The rest of the paper is divided into five sections with a conclusion. The first two sections review a variety of Chinese wage data to establish the history of nominal wages from the eighteenth to the twentieth

---

[3] Pomeranz, *Great Divergence*; Lee and Wang, *One Quarter of Humanity*.

[4] The present study applies this average value; variation for the four most important units ranged between 36.54 and 37.58 grams. See Peng, *Monetary History of China*, p. 669, fn. 4-7.

centuries. The focus is set on the histories of Canton, Beijing, and the nearby cities of Suzhou and Shanghai in the Yangzi delta, because fullest information is available for these cities, and because they are comparable to the large cities in Europe and Japan for which we have similar information. In section 3, nominal wages in China and Europe are compared to see if Smith was correct about the 'money price of labour'. Section 4 turns to the 'price of subsistence' and develops consumer prices indices to compare the cost of living across Eurasia. In section 5, the authors compare Smithian price indices to Fisher Ideal Indices for broader consumer bundles and show that they yield similar results in a comparison of London and Beijing. In section 6, the real wage income in Canton, Beijing, and Suzhou/Shanghai from the mid-eighteenth century to the 1920s is estimated. Smith's belief about the 'real recompense of labour' is tested by comparing real wage income in these Chinese cities to their counterpart in other countries. For Japan, Chinese urban incomes are compared to a composite picture of Kyoto and Edo (modern Tokyo) in the eighteenth and early nineteenth centuries, and Tokyo for the late nineteenth and early twentieth century, based on Bassino and Ma's study 'Japanese unskilled wages'. Real wages in China are compared to those in India using the results in Allen's 'India in the great divergence'. The perspective on Asian performance is broadened by contrasting living standards there to London, Amsterdam, Leipzig and Milan, as worked out by Allen in 'Great divergence in European wages'. The study concludes with a discussion of the significance of its findings for Adam Smith and the great divergence debate.

I. Wage Levels in Eighteenth- and Nineteenth-Century China

Before comparing living standards, the level and trend of nominal wages in China must be established. Since most European wages are recorded for urban labourers in the building industry, the present study concentrates on unskilled male workers in three large Chinese cities. No single source covers the whole period from the eighteenth century to the twentieth, so the wage history of China must be pieced together by combining disparate information.[5]

For Beijing, some wages for labourers on eighteenth-century government building projects are known, and wages for similar workers from the 1860s to the 1920s can be found. For Canton, wage data of unskilled port labour hired by European trading companies in the eighteenth century are available. For Suzhou, the daily earnings of men engaged as calenderers pressing cloth in the textile industry can be estimated. This series can be linked to the wages of spinners in cotton textile mills in Shanghai in the twentieth century. Indeed, a more complete picture of labour incomes in the Yangzi delta can be developed by also assessing the earnings of male farm labourers, rural women spinning and weaving cotton cloth, and peasant households as a whole. By matching eighteenth-century wages for specific unskilled occupations in China with corresponding wages for the early twentieth century, the long-term history of Chinese wages can be reconstructed for comparison with European wages.

This wage survey begins with three sets of wage data for the eighteenth century that are reasonably continuous and well defined. The first set are the piece wage rates of the cotton calenderers inscribed on steles for crafts and commerce in Suzhou, the largest industrial and

[5] For a survey of existing studies on wages and prices, see Kishimoto, *Shindai chūgoku*.

trading city in the Yangzi delta during the eighteenth and nineteenth centuries. The case of cotton calenderers and their wage disputes have been the subject of numerous studies.[6] The calenderers' job was 'to soften and polish cotton cloth after it had been pressed and rubbed'.[7] The inscribed data give us the guild-negotiated piece wage rates for the years of 1670, 1693, 1701, 1715, 1730, 1772 and 1795. As these are piece wages quoted in silver taels, there are no ambiguities about copper-silver exchange rates or additional food allowance. The major issue is the conversion of piece rates into daily wages, for which Xu Xinwu's study for the early twentieth century was used, as explained in Appendix I A. Overall, the daily wages thus derived come to 0.09944 and 0.1144 silver taels in 1730 and 1772 respectively.

In the eighteenth century, the calenderers were mostly migrants to Suzhou from the impoverished provinces of northern Jiangsu and Anhui. They 'had to be strong men, considering the especially tiring nature of their job: using their arms as levers on wooden supports while balancing, they had to rock a huge forked stone with a ground base onto cotton cloth wrapped around a wooden roller which rotated in a groove in the base of the stone'.[8] Calenderers were only a little above unskilled building labourers in the skill and pay distribution.

Our second source for private sector wages is the archives of the Dutch East Indies Company (VOC). Many VOC ships docked at Canton, which was the city where Europeans were allowed to trade with China in the eighteenth century. The VOC hired many Chinese workers to repair ships and move cargo. A recent study by Paul Van Dyke offers a detailed description on the workings of the provisioning system in Canton. From

[6] Quan, 'Qingdai Suzhou de chuaibuye'; Terada, 'Sōshū tampogyō no kei'ei keitai'; Santangelo, 'Urban Society in Late Imperial Suzhou'; Xu, *Jiangnan tubu shi.*
[7] Santangelo, 'Urban Society in Late Imperial Suzhou', p. 109.
[8] Ibid., p. 109.

the VOC archives, 63 wage quotations spanning the eighteenth century can be obtained.[9] The wages fluctuated, but they clustered between 0.08 and 0.1 taels per day with no additional food allowances.

The third set of wage data comes from diverse sources. We begin with two government regulations. The first is the *Wuliao jiazhi zeli* ('Regulations and precedents on the prices of materials') of 1769, which is a very detailed and systematic government report on the prices of buildings materials and the wages paid at construction projects, and an attempt to set these prices and wages for the future. According to the editorial introduction, it contained information about 1,557 administrative units described in a compilation of 220 chapters. The original compilation has not been preserved, but the editions for 15 provinces covering 945 districts are extant. Most of them contain the daily wages of unskilled and skilled craftsmen for each district; a few are more detailed and present wages for occupations such as master sawyers, carpenters, stonemasons, paint-makers and painters, tailors, plasterers, canopy makers, paperhangers, and cleaners (in Zhili). Occasionally additional food provisions and their monetary value are recorded, so that the total wage value can be calculated. Where no food provisions are mentioned, probably no food allowance was given, as these wage regulations were supposed to cover the entire labour cost of these public building projects.[10]

---

[9] See Van Dyke, *Canton Trade*, and Jörg, *Porcelain*, pp. 21-73, for the details of the organization of the VOC in Canton. We specifically used the files in the National Archives The Hague, Archives VOC, no. 4373, 4376, 4378, 4381, 4382, 4386, 4388, 4390, 4392, 4395-4401, 4403, 4405, 4408, 4409.

[10] The introductory memorial to these regulations states that market prices and wages were investigated in the regions, and that the prices and wages quoted in these volumes were near to market prices at low market activity; see 'Wuliao jiazhi zonglue', http://www.uni-tuebingen.de/uni/ans/project/shp/zeli/zonglue.htm. The provincial editions for Zhili, Henan, Shandong, Shanxi, Shaanxi, Gansu, Jiangsu, Zhejiang, Guangdong, and Yunnan all carry the same introductory memorial dated 1769. Other editions have no preface, such as those for Hunan, which is a fragment, and 'Manchuria' (Shengjing/Jilin/Heilongjiang). The 1791 Sichuan and the 1795 Rehe

A virtue of the *Wuliao jiazhi zeli* is its comprehensive regional coverage of Chinese wages. For each province we calculated the un-weighted average of the wage norms for labourers in all districts. Table 1 presents the results of these calculations for 21 regions. Zhili is divided into a number of sub-regions because of the large wage differences within this province. The total population of these regions in 1776 was about 214.5 millions or 73 per cent of the total population of China of about 293 millions.[11]

Insert Table 1 here

The pattern that emerges from the *Wuliao jiazhi zeli* is that daily wages in parts of Manchuria (Heilongjiang and Jilin), the home territory of the ruling Manchu dynasty, and the sparsely populated north-western frontier of Xinjiang, stand out as the highest, followed by areas in and near the capital city of Beijing. Average daily wages in the rest of China seemed to have been fairly uniform, with the coastal Fujian province fetching the lowest 0.030 taels for unskilled labourers.

A second government source is the so-called *Gongbu junqi zeli* (Regulations and precedents on weapons and military equipment by the Ministry of Public Works) of 1813, which contains more government wage regulations on an empire-wide scale. The *Gongbu junqi zeli* contains wages for master artisans and unskilled labour that produced military equipment. Our data base includes information for skilled and unskilled labourers.[12] This source shows again that, with the exception of Zhili where Beijing is situated, the norm for average daily wages of unskilled

---

editions are later compilations. No special edition was ever compiled for Xinjiang, but a few Xinjiang data are mentioned in the Gansu, Sichuan, and Rehe editions. Digitalized datasets for the provinces Gansu, Zhili, Yunnan, Hunan, and Shanxi are available online in the 'Databases on materials, wages, and transport costs in public construction in the Qianlong era' (www.uni-tuebingen.de/sinologie/project/shp/databases.html). See also Song and Moll-Murata, 'Notes on Qing dynasty handicraft regulations'.

[11] Wang, *Land Taxation*, p. 87.

labourers in most provinces in 1813 was about 0.04 taels, very close to that in the 1769 regulations.

Extreme caution should be exercised in the interpretation of these government data. The *Wuliao jiazhi zeli* wage data collected at the county level often show identical wages across a vast number of counties within one province, with little distinction between the more and less urbanized ones. This poses the question whether these data reflect actual market conditions or rather government policies, which tended to favour the capital region as well as Manchuria, the home territory of the Qing rulers.[13]

To tackle the question of how accurately these government regulated wages approximate wages in the private sector of the economy, we place these wage series against a broader data set of 264 scattered wage quotations from many sources and for different parts of China. The problem with these disparate wages from the private sector is a lack of the kind of detail information available for the Suzhou calenderers and Canton VOC labourers. Also, there is a general lack of comparability due to the multiplicity of labour contracts, payment systems, and currency units. Employment contracts could last for a day, a month, or a year, and careful attention must be given to the number of days worked in a month or a year to reduce the payment information to a consistent daily rate. There are many cases for which food allowances were given in addition to cash payments. Possibly the most difficult issue of all was the quotation of wages in different currency units (copper coins, silver taels) with exchange values that were both highly localized and fluctuating over time. Studies not taking full cognizance of these problems can be very

[12] See You, 'Lun junqi zeli', p. 314. Wages of skilled craftsmen were 0.020 or 0.010 taels higher.

[13] Qing restricted the migration of Han Chinese to the land and resource rich, but labour-scarce region of Manchuria until the mid-nineteenth century.

misleading.[14]

The most important official source for private wages consulted in the present study is the records of the imperial Ministry of Justice, which summarized judicial cases dealing with wage payment. A sample of 188 manufacturing and handicraft wages was obtained from Peng Zeyi's compilation on craft history, which is based on judicial records from ca 1740 to 1820.[15] They are contained in the archival documents of the Ministry of Justice, *Qingdai xingbu chao'an* (Copies of archival materials from the Qing Ministry of Justice).[16] This represents a wide-spread sample which includes scattered wage data for different occupations, in different regions, using different means of payment (silver taels or copper coins), covering different time periods (per day, month or year), and spread over a long period. The Ministry of Justice records also contain samples of agricultural wages. These are available in the work of Wei Jinyu and Wu Liangkai. For the present study, these wages (mostly in copper cash) were converted to silver tael based on Vogel's exchanges rates.[17]

The resulting large, if disparate, sample of wages covers many provinces, industries, and types of employment in eighteenth-century China. To extract basic patterns from this information, a wage function was estimated using all of the collected wages, including the VOC and

[14] Vogel, 'Chinese central monetary policy' contains the most comprehensive collection of market exchange rates for various provinces in China for the seventeenth to nineteenth centuries. But these exchange rates do not apply to the case of the co-circulation of multiple versions of silver and copper cash within the same locality, an issue pointed out in Kuroda's recent study 'Copper coins'. For a case of neglecting these complicated currency problems in the study of nominal and grain wages, see Chao, *Man and land.*

[15] Peng, *Zhongguo jindai shougongye*, vol. 1, pp. 396-414.

[16] Peng, *Zhongguo jindai shougongye*, vol. 1, p. 397, note 2.

[17] A few additional governmental wage data from *Suzhou zizhao ju zhi* (Treatise on the Suzhou weaving offices) for 1686, included in Peng, *Zhongguo jindai shougongye*, pp. 90-92 were also consulted, as well as wage data from *Da Qing huidian shili*, chap. 952,

government regulation wages. All wages were converted to daily wages in silver tael by means of Vogel's regional dataset of silver-copper conversion ratios.[18]

The following independent variables were defined:

- Regions, based on *Wuliao jiazhi zeli*: Manchuria, Zhili, the north (Shanxi, Shaanxi, Gansu, Shandong), the Yangzi delta (Jiangsu and Zhejiang), the 'middle' and the south (see Table 1 for the other regions); Canton was also distinguished.
- Branches: agriculture, coal mining, iron industry, construction, textiles, and other industries;
- a time-trend with 1700 as the base year;
- Skill: a dummy for skilled labour was used; unskilled labourers were all agricultural workers, the unskilled labourers in construction and the 'helpers' in other industries;
- Regulation: data drawn from the two government documents *Wuliao jiazhi zeli* (1769) and *Gongbu junqi zeli* (1813) were identified by a dummy for 'regulation'.

We also include a few additional government regulation data from *Suzhou zizhao ju zhi* (1686) and *Da Qing huidian shili* (for 1723 and 1736) (see footnote 17 for references).

The total number of observations was 327, relatively equally spread over the different regions and branches. There are only four observations for the late seventeenth century. Most observations cluster

---

fol. 4b-5a, pp. 16640-16641. The complete wage dataset used in this study can be found (in excel format) at http://www.iisg.nl/hpw/data.php#china.

[18] Another problem was how to convert monthly and annual wages into daily wages; a few observations of both daily and monthly or annual wages suggests conversion factors of about 15 (days/month) and 60 (days/year). The next step was to use these conversion factors and estimate dummies for monthly and annual wages in the wage regression. The dummies became close to zero when somewhat different conversion factors were used, namely 13 and 90. We used these conversion factors in the

between the 1740s and the 1810s; no observations after 1820 were included.

Insert Table 2 here

Table 2 presents the results of the wage regression. All independent variables except the time trend are dummies for regions, branches etc.; the standard for comparison is the market wage of a construction labourer in the Yangzi delta in 1700. The constant in the equation is his wage, which is estimated as 0.0456 taels. The regional pattern mirrors the results from the analysis of the *Wuliao jiazhi zeli*: wages in Manchuria and Zhili were (much) higher than in the rest of the country, whereas the differences between the Yangzi delta and the rest of the rice region were very small. Most industry dummies were insignificant. Finally, the dummy for skill premium is significant; its level in regression is 63% of the wage of an unskilled labourer in the Yangzi delta.

To get a perspective on our wage regression, we plotted in figure 1 the wage rates of Suzhou and Canton against the predicted wages from our regression. Figure 1 shows that the baseline predicted wages, set as the constant plus the time trend in the wage regression (the rate equivalent to that of an unskilled labourer in the Yangzi delta), is about half the level of Suzhou and Canton wages. While VOC and calenderers' wages were rising gently, wages in China in general were declining slowly, as indicated by the wage equation. This difference in trend is not significant for our purpose. Figure 1 also plots the predicted wages of Beijing which uses the dummy coefficients for Zhili from the wage regression.

Insert Figure 1 here

---

estimation of wage levels in the wage regressions shown in table 1; therefore, the dummies for monthly and annual wages have not been included.

These results make sense: large cities in Europe, the counterparts of Canton, Suzhou and Beijing, had higher wages than small towns and rural districts in part because the cost of living was higher in the large cities and also because they had to recruit population from the countryside. This conjecture is in agreement with Pomeranz's description of the earnings of a Yangzi delta farm worker employed by the year in the mid-eighteenth century. Pomeranz reckoned that the cash component of these earnings was two to five taels, and that the food allowance over a full year was perhaps five *shi* of rice worth 8.4 taels, so the total earnings over the year were 10.4 to 13.4 taels. Dividing by 360 implies daily earnings of 0.035 to 0.045 taels per day, very close to the baseline wage level from our regression result.[19]

As the wage regression contains some wage data that might include additional food allowances, we have experimented with alternative regressions by adding 0.024 taels – roughly the cost of one kilogram of rice in Canton or millet in Beijing in the middle of the eighteenth century – to the daily earnings of those workers earning less than 6 taels per year (0.5 taels per month). The alternative regression leads to little changes of significance to the coefficients of most significance for this study.

[19] Pomeranz, *Great Divergence*, pp. 319-320. The average of agriculture wages on daily contracts collected in our sample was 0.045 taels. Wages on daily contract were likely to be higher as usually day labourers were more often employed during the planting and harvest seasons. It is unclear whether additional food was provided. A national level survey conducted by Chen Zhengmo in the 1930s, *Gesheng nonggong*, reveals the existence of both types of payment arrangements for daily wages, either with or without food payment, the latter being higher. But in cases where there was food payment, the portion amounted to about 33 per cent of the total cash wage, much less than for the eighteenth and nineteenth century agricultural wages on annual contracts (Chen, *Gesheng nonggong*, p. 9). Li, *Agricultural Development*, p. 94, also seems to indicate that seventeenth-century nominal wage levels may not be far apart from those of the eighteenth to nineteenth century. He discusses wage levels in agriculture and silk production in the Yangzi delta, and estimates the average wage in rice cultivation at 0.06 taels per day, adding 'the official standard was 0.04 taels a day which is a bit low compared to the wages in some farms in Huzhou, Zhejiang province'.

The level of our base line wage in Figure 1 matches the empire-wide averages in the *Wuliao jiazhi zeli* and *Gongbu junqi zeli* in the official regulation data. This leads us to believe that the government regulation wages may have been set as a wage floor for the market wages, which the government used for purpose of cost-accounting. Both these sources also reveal higher wage levels for the capital region than the national average, which may be a reflection of possible governmental discrimination. If carefully interpreted, the regulated wage is more useful as a benchmark for a national wage floor than as an indication of regional wage patterns. For the subsequent analysis, the wage level for Beijing and Canton was set in 1700, based on the predicted values in the regression of 0.0897 and 0.0835 taels respectively, equal to the constant coefficients plus dummy coefficients for Zhili and Canton respectively. For Suzhou, 0.09 taels for 1700 were used, very close to the 0.0968 taels for the calenderers' wages. The national trend level was used for all these three series in the international comparison. Clearly, we view our wage series is more reliable as indications of long-term trend than short-term fluctuations.

Somewhat contrary to the claims of Lower Yangzi as having the highest living standards, our dataset collected at this stage do not reveal a higher nominal wage for unskilled labourers in that region. While the implications of possible regional wage difference will be discussed later (in particular, see footnote 47), the rest of this study focuses on cross-national comparison of average wage income for the unskilled labourers between China and Europe. On the assumption that these wages are complete payments for unskilled labourers in the three major urban centres, they represent, in most likelihood, the upper bound estimates of our larger dataset. Thus, if the average level turns out to

be lower than our nominal wages, then actual Chinese living standards would be even lower.

II. Wage Levels in Nineteenth- and Twentieth-Century China

Jumping forward in time, the best available information on wages in Beijing, Canton, and Shanghai is for the early twentieth century. Our wage series for Beijing is anchored on the work of Sidney Gamble (1890-1968). Gamble was an American sociologist who lived in China in the 1920s and 1930s. He conducted a survey of workers in Beijing in 1921. This provided the weights for a consumer price index for Chinese capital for 1900-1924, and that index, in turn, was used in a study of real wages for the period. Gamble and his associates also recorded wage series for unskilled construction workers in Beijing for 1862-1925 using the records of the Beijing guilds for construction workers. This is our source for unskilled wages in the capital.[20]

Gamble carried out another important study based on the account books of a fuel store in the rural area of Beijing. The information runs from 1807 to 1902 and is possibly the only consistent wage series for nineteenth-century China. The nineteenth-century wage payments were recorded in copper cash and were broken around the mid-nineteenth century due to the monetary debasement in the period of the Taiping rebellion. Gamble does provide vital information on copper-silver rates in that area from which we derive a silver-based wage series for 1807-1902 as shown in Appendix I B. The level of the wage rates seems very low and is difficult to interpret in its own right as Gamble indicated that

[20] This series is composed of two parts. The first part is the 1870-1900 copper cash wages (inclusive of food money) in Gamble (1943, p. 66), converted to silver wages using copper-silver rates from Peng (p. 548). The second series is the 1900-1924 series by Meng and Gamble 'Wages, prices, and the standard of living' (p. 100).

workers received unrecorded food allowances.[21] We apply the trend (not the levels) of these silver wages to fill in the 1820-1862 gap for the light it throws on the Taiping Rebellion and its aftermath.

Information on Cantonese wages is less comprehensive than that for Beijing. As noted above, estimates of wages in the eighteenth century have been derived mainly from VOC records and summarized in the wage regression. For the early twentieth century, simple average of six series of union-regulated show wage rates for unskilled labourers in the construction sector from 1912 to 1927.[22] For the nineteenth century, various plausible wage data exist, but were not included in the analysis as they were incomplete and scattered.

Similarly, no systematic wage series for Suzhou in the nineteenth century was available. From the middle of the nineteenth century, Shanghai was emerging as China's predominant trading and industrial city under the treaty port system imposed by Western imperialism. Setting out from wage notations for female cotton spinners in Shanghai between 1910 and 1934, we have calculated the wage levels of male unskilled labourers based on a wage survey of the 1930s.[23]

III. Wage Patterns in Europe and China

Adam Smith thought that the 'money price of labour' was higher in Europe than in China. To test that, Chinese and European wages must be compared. Building on our earlier studies of European daily wage

[21] Gamble, 'Daily wages', p. 4.
[22] Department of Peasantry and Labour, Kwangtung Government, *Reports of Statistics*, vol. 3, 'The wage indexes of labourers in Canton'. Our wage series is the simple average of five types of unskilled labourers in the construction sector.
[23] We make use of the series by Rawski, *Economic growth*, p. 301, and The Bureau of Social Affairs, *Cost of living,* pp iii-iv. According to Yang, 'Shanghai gongren shenghuo', p. 250, female workers in 1927-28 were paid about 80 per cent of the level of male workers.

rates earned by labourers in the building industry,[24] we have been careful to exclude wage quotations where the earnings included food or other payment in kind that could not be valued and added to the money wage. As with China, we have converted the European wages to grams of silver per day by using the market price (in units of account) at which silver coins of known weight and fineness could be purchased.

Figures 2 and 3 graph the daily wage rates of unskilled workers in London, Amsterdam, Leipzig, Milan, Beijing, and Kyoto/Tokyo from the eighteenth century to the twentieth. Figure 2 shows the series from 1738 to 1870. For this period, Adam Smith was half right. Wages were, indeed, highest in London and lowest in Beijing, but the other series show that the world was more complex than Smith thought. The silver wage in Milan or Leipzig was not appreciably higher than the wage in Beijing, Canton or Suzhou throughout the eighteenth century.[25] The statistics of other European and Chinese cities show that this similarity was general. Figures 2 and 3 here

Amsterdam occupies a peculiar position in Figure 2. Nominal wages there were remarkably constant for a century and a half. At the outset the Amsterdam wage was similar to the London wage. The same was true of Antwerp. Indeed, the Low Countries and the London region stand out from the rest of Europe for their high wages in the seventeenth and eighteenth centuries. These high wages were probably due to the active involvement of these regions in inter-continental commerce.

But this pattern changed as the nineteenth century advanced. The Industrial Revolution raised British wages above Dutch levels. Indeed, the

[24] Van Zanden, 'Wages and the Standard of Living'; Allen, 'Great Divergence in European Wages'.

[25] As indicated earlier in section I and in figure 1, the silver wages we used for Beijing, Canton and Suzhou/Shanghai are broadly equal. For reasons of easy visibility, we only plot the silver wage for Beijing series on figures 2 and 3. Complete price and wage

early industrialization of Germany is seen in Figure 2 as a rise in the Leipzig wage.

These developments intensified after 1870 as shown in Figure 3. British wages continued to increase. By the First World War, German wages had caught up with the British level, and Dutch wages closed the gap as well. Italian wages were also growing, but the increase was muted compared to the industrial core of Europe. Outside Europe, Japanese wages before 1870 stayed largely flat, in keeping with the low Italian level. After 1890, Japanese wages, spurred by the industrialization drive in the Meiji era, began to rise but continued to stay substantially below the rising trend of early twentieth-century European wages.

Chinese wages, in contrast, changed little over the entire period. There was some increase in the silver wage after 1870, but Figure 3 emphasizes that the gain was of little importance from a global perspective. By the First World War, nominal wages in China were very much lower than wages in Europe generally. Taken at face value, Adam Smith's generalization about Chinese and European wages was more accurate at the time of the First World War than when he penned it in 1776.

IV. Price Indices

What of Adam Smith's second generalization? He remarked that 'the difference between the price of subsistence in China and in Europe is very great'.[26] This generalization can be tested by computing price indices. We have tried many formulae and sets of weights, and the

series for figures 2 through 6 can be downloaded from the websites at http://www.iisg.nl/hpw/data.php and http://gpih.ucdavis.edu/Datafilelist.htm.

[26] Smith, *Wealth of Nations*, p. 189.

reassuring result is that our conclusions about relative real wages do not depend in any important way on the choice of price index.

The index number problem is a difficult one since diet and life style were radically different in different parts of Eurasia. How precisely does the real income of an English worker who consumed beef, bread, and beer compare to that of a Chinese labourer who ate rice and fish?

The approach considered in this section takes Adam Smith's comment as its point of departure. His generalization about price levels is expressed in terms of the 'price of subsistence'. We operationalize that by defining consumption baskets that represent the 'bare bones' minimum for survival (see Tables 2-3). The baskets provide 1940 calories per day mainly from the cheapest available carbohydrate. In Shanghai, Canton, Japan, and Bengal that was rice, in Beijing, it was sorghum, in Milan it was polenta, and in north-western Europe it was oats. The diet includes some beans and small quantities of meat or fish and butter or oil. Their quantities were suggested by Japanese consumption surveys of the 1920s and by the Chinese rural consumption survey in the 1930s carried out by the National Agricultural Research Bureau (NARB).[27] Despite relying on the cheapest carbohydrates, these baskets provide at least the recommended daily intake of protein, although the amount varies from basket to basket. Polenta (closely followed by rice) is the least nutritious source of calories in this regard. Non fuel items include some cloth and fuel. The magnitudes of the non-food items were also suggested by the Japanese and Chinese consumption surveys of the inter war period. It would have been hard for a man to survive on less than the cost of one of these baskets.

Insert Tables 3-4 here

[27] Department of Crop Reporting, 'Crop reports', VI, 10, pp. 115-117. Rōdō undō shiryō iinkai (1959), p. 568. Alternative baskets constructed based these surveys can also be found in our earlier working paper Allen et al, 'Wages, Prices, and Living Standards'.

Having specified the consumption 'baskets' in Tables 3-4, time series of the prices of the items shown are necessary, so that the cost of the baskets can be calculated across the eighteenth, nineteenth, and twentieth centuries. For Europe, the prices described in Allen, 'Great divergence' can be applied.[28] New data bases were compiled for the Chinese cities under observation. For Beijing, we extended Gamble's retail prices for 1900-1924 back to 1738. Food prices were extended using wholesale agricultural prices for Zhili province compiled by Lillian Li (2000). The implicit assumption in these extrapolations was that the ratio of retail to wholesale prices remained constant. The details and the procedures for cloth and fuel are explained in Appendix II. For Shanghai and Canton, twentieth century retail prices were extracted from official sources.[29] For the eighteenth century, Yeh-Chien Wang's Yangzi delta rice price series was used for Suzhou and Chun-sheng Chen's series for Guangdong. These are probably wholesale rather than retail prices. No allowance was made for retail mark-ups–a procedure which is again biased against our conclusions, for if rice prices in China were higher then living standards would have been even lower. The prices of other foods and fuel were taken from the costs incurred by European trading companies in provisioning their ships in Canton. These prices have been compared to the estimated prices for Beijing, and the agreement is close. For most of the eighteenth century, competition was intense in supplying these ships.[30]

The cost of the basket is Adam Smith's 'money price of subsistence' and its history is plotted in Figure 4 for leading cities in

[28] The data are available on-line at http://www.nuffield.ox.ac.uk.

[29] The Canton data is based on *The reports of statistics* compiled by the Department of Peasantry and Labour, Kwangtung Government in 1928; it covers the period of 1911 to 1927. The Shanghai price is from Bureau of Social Affairs, The City Government of Greater Shanghai, *The cost of living index numbers of labourers, greater* Shanghai (January 1926 - December 1931, 1932).

China and Europe in the eighteenth and nineteenth centuries. The findings would have surprised Smith, for it contradicts his claim that China had cheaper subsistence than Europe. The silver cost of a bare bones basket in Beijing or Suzhou was in the middle of the European range. A corollary is that the silver prices of grains, which dominate the cost of these indices, were similar across Eurasia. Another casualty of Figure 4 is Smith's generalization that 'rice in China is much cheaper than wheat is anywhere in Europe'.[31]

Another feature of Figure 4 is worth highlighting. The figure shows very little difference between the two consumer price indices for both Beijing and Suzhou/Shanghai (or Canton not shown in the figure) for the eighteenth century. These two cities represent the two agrarian halves of China – the northern small grain region and the southern rice region. However, from beginning of the eighteenth century, rice prices began a secular rise over those of sorghum, which led to a somewhat more expensive basket for the unskilled labourers in the South than in the North. While the implication of this finding needs further research, this difference matters little for our purpose of international comparison. Overall, as seen in Figure 4, price gaps between Europe and China really opened up from about the mid-nineteenth century.

Insert Figure 4 here

V. A Look at Other Index Numbers

Before considering the implications of the cost of the baskets for comparative living standards, the results of indexing prices in other ways can be briefly summarized.

---

[30] see Van Dyke, *Canton Trade*.
[31] Smith, *Wealth of Nations*, p. 189.

In modern theory, the index number problem unfolds like this: Suppose an individual or family receives a particular income and faces particular prices. The income and prices determine the maximum level of utility (highest indifference curve) that the individual can reach. Now suppose that prices change. What proportional change in income would allow the individual to reach the original indifference curve in the new price situation? The price index is supposed to answer that question. Comparing the actual change in income to the index shows whether consumer welfare has risen or fallen.

There are no insuperable difficulties in applying the theory to real income changes over time in either Europe or Asia, provided full information about wages, consumer prices, and spending patterns is available. Yet how can living standards between Europe and Asia be compared? The pattern of goods – particularly foods – consumed in the two regions was radically different. The standard theory of consumer welfare assumes that all of the goods are available in both regions and that there is a 'representative agent' who would voluntarily choose to consume rice, fish, and sake when confronted with Asian prices and bread, beef, and beer when confronted with English prices. In fact, all goods were not available everywhere, and, moreover, it is unlikely that there were people flexible enough to voluntarily shift their consumption between the European and the Asian patterns in response to the difference in prices. This is the reason why we approached the problem in terms of Adam Smith's 'cost of subsistence'. By building on the results of these calculations, the outcome of a more orthodox approach can be approximated. During the comparative process, the associated data problems come sharply into focus. We concentrate on a comparison of Beijing and London because the Beijing diet was based on small grains that were more comparable than rice to English grains.

We first approach the question from the point of view of a Beijing resident and ask how much it would have cost to live the 'bare bones' Beijing lifestyle in London. This is the pertinent question, for the typical labourer could not afford to buy anything more. The difficulty is that we cannot cost out the Beijing basket in London, for sorghum was not sold in London. However, oats was the counterpart of sorghum in Britain–it was the least cost, most inferior grain–and if we take oats and sorghum to be equivalent, we realize that we have already answered the question by comparing the cost of the bare bones baskets.

We can also ask how much the London lifestyle would have cost in Beijing. That lifestyle is specified by 'respectable' consumption basket in Table 5, which summarizes the spending in north-western Europe.[32] The diet is late medieval in inspiration in that it does not contain new commodities like sugar and potatoes introduced into Europe after the voyages of discovery.

Insert Table 5 here

The basket in Table 5 contains important items for which we lack prices in China. Bread is the most important, and we estimated what bread would have sold for, had it been produced commercially, from Allen's 'bread equation'.[33] This is a statistical relationship between bread prices, wheat prices, and wage rates prevailing in many cities in Europe. Since we have time series of wages and wheat prices for Zhili province, which includes Beijing, the price at which bread would have been supplied had it been produced in the European manner can be calculated. Likewise, the price of beer is unknown. For it, we substituted the quantity of rice wine (*sake*) that contained the same quantity of alcohol.[34]

[32] Allen, 'Great Divergence in European Wages'.
[33] Allen, 'Great Divergence in European Wages', p. 418.
[34] 182 litres of beer at 4.5% alcohol contain as much as alcohol as 41 litres of sake at 20%.

We estimated the price of rice wine using the Japanese relationship between the retail price of sake and the wholesale price of rice. In this way we proxied the missing prices needed to cost out a European basket in Beijing.

The European and Beijing baskets define Paasche and Laspeyres price indices. The final step in comparing the cost of living in London and Beijing is to compute the geometric average of the two, which is a Fisher Ideal Price index. This is a 'superlative' price index, which corresponds to a generalized Leontief expenditure function.[35] That representation of consumer preferences has the property that indifference curves are tangent to prices at both consumption patterns. In other words, the representative consumer whose behaviour is summarized by the price index would shift from an English to a Chinese spending pattern as prices shifted from the London to the Chinese configuration. Using this index number imposes the assumptions of modern theory on the reality of eighteenth century behaviour – certainly a debatable procedure.

How does the Fisher Ideal Price index compare to the bare bones indices? In fact, they are very similar. The relative cost of the European basket in London and Beijing was always close to the relative cost of the bare bones baskets which are equal to ratios of 1.12 and 1.17 respectively in Table 5. Hence, their geometric average is also similar. Consequently, a superlative index number, in this case, gives the same result as a comparison of Smith's 'cost of subsistence'. Since the latter has so many intuitive interpretations, we use it as the axis of our

[35] Diewert, 'Exact and superlative index numbers', pp. 115-45. The use of alternative consumption baskets for Canton and Japan based on comparable calories and proteins contents also confirm the findings here, see Allen et al 'Wages, Prices, and Living Standards'.

discussion with the confidence that it is not misleading us when the index number problem is considered from other perspectives.

VI. Comparison of Living Standards

The purchasing power of wages is usually measured by the ratio of the wage to the consumer price index. Our procedure elaborates that approach. In constructing the consumer price index, a notional budget was specified that represented the least cost way to survive. (Tables 3 and 4, however, do not include housing costs, so we increase them now by 5%, which is a minimal allowance for rent.) The budget was an annual budget for an adult male. If the man supported a family, the expenditures would have been higher, so that the cost of the budget (augmented 5% for rent) was multiplied by three to represent the annual budget of a family. This increase is roughly in line with the calorie norms for a man, a woman, and two young children.[36] On the income side, our income measure is the annual earnings that a worker could have gained if he worked full time for a year. We assume that one year's work consisted of 250 days – roughly full time work allowing for holidays, illness, and slack periods. The earnings from full time work provide a useful benchmark for comparing Europe and Asia and for defining the economic strategies of families. The ratio of estimated full time earnings to the annual cost of the family budget is a real wage index.

Our real wage index has a particular interpretation since it answers a specific question, namely, whether a man working full time could support a family at the 'bare bones' level of consumption. Real wage indices of this sort are called 'welfare ratios'. When the welfare ratio

[36] Precisely, two children aged 1-3 and 4-6 respectively. For a discussion of food requirements for a notional family of four, see Allen, 'Great divergence in European wages', p. 426.

equalled one, an unskilled labourer working full time could earn just enough to support his family at subsistence income. Higher values indicate some surplus, while values below one mean either that the family size had to be reduced or work effort had to be increased since there was little scope for reducing expenditure.

Figure 5 shows welfare ratios for unskilled male workers from 1738 to 1923 in the European cities we discussed and the Yangzi delta cities. Several features stand out:

Insert Figure 5 here

1) The Yangzi delta is reputed to have the most advanced economy of any Chinese province, but the real wage there was not noticeably higher than the real wage in Beijing or Canton, as we will see.

2) The Chinese cities were in a tie for last place with the Italian cities, which had the lowest standard of living in Europe, so an optimistic assessment of China's performance is difficult.

3) The existing information about Beijing wages in the nineteenth century indicates that the real wage continued to slide until the Taiping Rebellion in mid-century when it reached a life-threateningly low level. After authority was restored, living standards improved slowly into the early twentieth century.

4) The most striking feature of Figure 5 is the great lead in living standards enjoyed by workers in the rapidly growing parts of western Europe. The standard of living of workers in London was always much higher than that of workers in Beijing or the Yangzi delta. After the middle of the nineteenth century, London living standards began an upward trajectory and increased the lead over China. While workers in Amsterdam in the eighteenth century also lived better than their

counterparts in Beijing, the Dutch economy faltered in the early nineteenth century.[37] By mid-century, however, growth resumed and real wages were climbing to new heights. At the same time, the rapid growth of the German economy was translating into rising real wages for workers in Leipzig. By the First World War, the standard of living of workers in the industrial core of western Europe had greatly increased over their counterparts in Beijing and Suzhou. The standard of living in China remained low and on a par with the regions of Europe untouched by the Industrial Revolution.

5) The workers in north-western Europe with welfare ratios of four or more did not eat four times as much oatmeal as their 'bare bones' diet presupposes. Instead, they ate higher quality food – beef, beer, and bread – that was a more expensive source of calories. In addition, they bought a wide range of non-food items. In the eighteenth century, these included the Asian imports and novel manufactures that comprised the 'consumer revolution' of that era. By the same token, the workers in north-western Europe could afford the basket of goods shown in Table 5, while workers in Asia could not and had to subsist on the 'bare bones' baskets. After all, in regions of settled agriculture, the least expensive way to get calories is to boil the cheapest grain into a gruel or porridge. In northern Britain, the poorest people ate oat porridge; in the Yangzi delta, they ate wheat gruel.[38]

Insert Figure 6 here

Figure 6 tests the generality of these conclusions by including all of the Asian welfare ratios for comparison. There was variation in experience, but that variety does not qualify the conclusion that Asian living standards were at the low end of the European range. The history

[37] Van Zanden and van Riel, *The Strictures*, pp. 121ff, pp. 188ff.
[38] Li, *Agricultural Development*, p. 207, fn. 25.

of living standards in Japan, India, and Canton was very similar to Beijing's or Suzhou's. Real wages in Istanbul as shown in Özmucur and Pamuk were at a level as low as China's, so it may have characterized much of the non-industrializing world in the eighteenth century.[39] There is evidence of rising living standards across Asia after 1870, but the gains were not enough to catch up to the standard of mid-eighteenth century London or Amsterdam let alone the much higher standard of living enjoyed by workers in those cities in the early twentieth century.

Figure 6 broadens our comparison by inserting the welfare ratio of Oxford with the view that London may be exceptional in terms of real wages among English towns. Indeed, real wages in Oxford were always lower than in London, although the gap narrowed from the late eighteenth century.[40] Nonetheless, at a welfare ratio between 2.5 and 3.0 during the eighteenth century, Oxford still seemed far more prosperous than Beijing. London (capital and major port) and other big cities were chosen because they are comparable to Beijing (capital) and Canton (major port), which are likely to be at the top of the wage scale in their country or region. Oxford, meanwhile, ranked much lower on the urban hierarchies compared with the cities in our study. Thus, the inclusion of Oxford as a robustness check assured us that our finding is not driven by the relative position of London.

A more important question is how representative wages are of labour incomes in China in general. Our knowledge of labour market conditions and the extent of regional migration seem to substantiate the view that wage rates may serve as a reasonable proxy for the average earnings of a particular socio-economic group as well as the marginal productivity of labour in the economy as a whole. The existence of a

[39] Özmucur and Pamuk, 'Real Wages and Standards of Living'.
[40] For welfare ratios in Oxford and other towns in England, see Allen, 'Great Divergence in European Wages', pp. 415-6.

vibrant and active labour market particularly for short-term or day labour in early modern China (and Japan) is well documented, although the precise proportion for the early modern era remains elusive.[41] For the early twentieth century which bore much of the institutional and economic continuities of the eighteenth and nineteenth centuries, large scale household surveys reveal, for example, that between 30 and 50 per cent of rural households in the 1930s Wuxi county in the Yangzi delta region hired day labourers during peak season whereas the long-term labour market was extremely thin. Furthermore, those households whose main income derived from farm labour fetched an average income 20 per cent below the mean per capita income of all the Wuxi households. This income distance of 20 per cent from the mean shows that agricultural day labourers were at the lower end – but not a marginal fringe – of the income ladder.[42]

Secondly, at least for the commercialized regions near the major urban centres, evidence of a relatively high degree of integration of labour markets between urban and rural areas can be perceived. As noted earlier, calenderers in Suzhou largely consisted of migrant workers from the relatively impoverished rural Northern Jiangsu. Similarly for the Beijing wage series, Gamble's detailed study reminds us of the close linkage between urban and rural wages in the nineteenth century.

---

[41] The literature on the prevalence of labour employment and contracts in Ming and Qing China is voluminous. Examples of this literature can be seen in Pomeranz, *Great Divergence,* pp. 81-82, and Huang, *The Peasant Economy,* pp. 62-62. Wei, *Ming-Qing*, documents in detail the improved legal status of labourers towards the eighteenth century.

[42] For information on labour market in North China and the Yangzi delta, see Huang, *The Peasant Economy,* p. 110. The Wuxi survey summary can be found in Kung, Lee and Bai, 'Human capital', Tables 1 and 2. For a nationwide survey of labour market in the 1930s, see Chen, *Gesheng.* Similar labour market and income distribution can also be found in Tokugawa Japan. Bassino, Ma and Saito, 'Levels of real wages' calculates that the welfare ratios of the wage earnings of farm labourers were roughly equivalent to those of tenant cultivators who, in turn, were about 20 per cent below those of the median class.

Indeed, if labour market and regional labour migration in eighteenth century China were as flexible as claimed by the revisionists,[43] there is all the more reason to believe that the wage rates for unskilled labourers we measure are representative of labour earnings for a substantial part of the population at the relatively low end of income distribution.

Our notional wage income can be directly compared with the labour income data cited by Pomeranz and Li when they in fact argue the reverse case, namely, that labouring people in the Yangzi delta had a high standard of living. Pomeranz, for instance, estimates that a male agricultural labourer employed full time over the course of a year would have realized about 12 taels. Using average prices for 1745-54, the 'bare bones' cost of maintaining a family was 22.59 taels, so the labourer was only earning 53 per cent of subsistence; in other words, the welfare ratio was 0.53. He could barely support himself, let alone a wife and children. A woman spinning and weaving cotton for 200 days per year, which Li and Pomeranz both reckon was about the maximum possible, could earn 14.61 taels, a bit more than a man.[44] Again, this was less than the cost of maintaining a family. Husband and wife together, however, would have earned 26.61 taels, which was 1.18 times the cost of maintaining a family. A family could survive on that, so long as nothing went wrong, but the standard of living was far behind that in London or Amsterdam where the labourers earned four times the cost of a bare bones standard of living in the middle of the eighteenth century.

So far, this comparison focused on the wage income of unskilled labourers. However, the wage regression and the twentieth-century

[43] For linkage between urban and rural wages, see Gamble, 'Daily Wages', p. 67. See Pomeranz, *Great Divergence*, chapter 2 for an argument on the flexibility of product and factor markets and labour migration in early modern China.

[44] Li, *Agricultural Development*, pp. 149, 152. Pomeranz, *Great Divergence*, pp. 318-9, offers two calculations pointing to slightly lower earnings. Li's calculation assumes the

wages summarized by Gamble for Beijing all indicate that the ratio of skilled to unskilled wages was about the same in China as in north-western Europe. While future research is needed, this evidence suggests that our conclusions about comparative living standards could still hold true if the comparison was broadened to include all kinds of wage earners.[45]

VII. Conclusion

Our investigation of Asian and European wages and prices shows that the situation differed somewhat from Adam Smith's impressions. Money wages were in accord with his view: In China, they were certainly lower than wages in the advanced parts of western Europe in the eighteenth century and similar to those in the lagging parts of Europe. By the twentieth century, however, wages in all parts of Europe were higher than in China. Contrary to Smith, the cost of living was similar in China and in Europe.

The upshot of the wage and price comparisons is that living standards were low in China. In the eighteenth century, advanced cities like London and Amsterdam had a higher standard of living than Suzhou, Beijing or Canton. The standard of living in the Chinese cities we have studied was on a par with the lagging parts of Europe, the Ottoman Empire, India, and Japan. By the twentieth century, enough progress had occurred in even the backward parts of Europe that their standards of living were beginning to creep above those in China. Wages seemed to have slipped in China in the eighteenth century. Still, most of the difference between Europe and China in 1913 was due to European advance rather than Chinese decline.

---

woman received 0.19 shi per bolt of cloth; Pomeranz's is slightly higher. They do not use precisely the same prices. We use average values for 1745-54.

[45] Van Zanden, 'The Skill Premium and the Great Divergence'.

In spite of the above, a major surprise is our finding that unskilled labourers in major cities of China and Japan – poor as they were – had roughly the same standard of living as their counterparts in central and southern Europe for the larger part of the eighteenth century. This calls into question the fundamental tenet of the large 'rise of the west' literature that sees western Europe – as a whole – surpassing the rest of the world in the early modern era. Our paper suggests that it was only England and the Low Countries that pulled ahead of the rest. The rest, in this context, includes not only Asia but also much of Europe.[46]

In this regard, Adam Smith neglected regional variation and, thereby, over-generalized the comparison of Europe and China. But our findings also dispute the revisionists' claim that the advanced parts of China such as the Yangzi delta were on a par with England on the eve of the Industrial Revolution, for we find real wages for unskilled labourers in the Yangzi delta to have been no higher than those in Beijing or Canton. Clearly, our database on China could be greatly improved and we do not claim to have given the final answer to this question. But newly discovered data would have to be very different from what is currently at hand to convince us that pre-industrial Chinese living standards were similar to those in the leading regions of Europe.[47] In this regard, Adam

[46] For a coverage of welfare ratios of unskilled workers across 16 major urban centres of continental Europe in the early modern period, see Allen, 'Great Divergence in European Wages'.

[47] For the argument of a higher living standards in the Yangzi delta, see Pomeranz, *Great Divergence,* and Li, *Agricultural Development.* Philip Huang's comparative regional study also makes a strong case that the Yangzi delta overall have higher productivity levels and income than north China, see *The Peasant Family.* Our findings of roughly comparable nominal and real wage levels in the three major Chinese urban centres do not necessarily preclude the possibility that broader measures of per capita income and living standards could still be higher in the Yangzi delta. A recent study by Ma 'Economic Growth' shows that the per capita income of the two provinces in the Yangzi delta in the 1930s were 55 per cent higher than the Chinese national average. There is good reason to believe the regional income gap in China in the 1930s would be larger than in the eighteenth century. While future empirical research is needed to construct a comprehensive regional wage profile for eighteenth- and

Smith's pessimism looks closer to the truth than the revisionists' optimism. Of course, establishing the case of an income gap between north-western Europe and China in the early modern era only takes us halfway towards the resolution of the great divergence debate. The search for a causal explanation of the great divergence still looms large as a future research agenda.

nineteenth-century China, the magnitude of regional variation within China as discussed in these other studies pales in comparison with the gaps in average real wages in urban centres between China and England.

Appendix I: Notes on the Sources for Chinese Wages, 1686–1902

A. Cotton Calenderers' Wages

In the seventeenth to nineteenth centuries, the calenderers in Suzhou usually consisted of migrant workers from impoverished regions in Northern Jiangsu or Anhui. They usually worked under a contract system renting capital and working place from cotton cloth merchants. Although not allowed to form their own guilds by the government, they often went on strike for higher wages, hence the documentation of these negotiated wage rates in the stele records.

Information on the daily productivity quoted in Xu Xinwu's study can be applied for converting the piece rates into daily wages. According to Xu, a calenderer could do one bolt of cloth in about 40 minutes.[48] For a day with about 11 working hours, he could press about 12 bolts of cloths. For conversion, we use 11 bolts of cloth pressed per day to adjust it roughly to a ten hour working day. However, the calenderers would have to hand in 20 per cent as payment for rental and other expenses. Deducting the 20 per cent from the final wage, we converted the piece wage of 0.0113 taels (in 1730) and 0.013 taels (in 1772 and 1795) per bolt of cloth into 0.0994 and 0.1144 taels per day respectively. The daily productivity data in Xu's study are based on suburban Shanghai in the early twentieth century, but Xu explicitly stated that both technology and organization changed little from the early modern period.[49]

B. The Nineteenth-Century Wage Series by Gamble

The wage series in Gamble, 'Daily Wages' which spans almost the entire nineteenth century, was derived from detailed account books of a fuel store in rural Beijing. Gamble presented three series of average wages for the months of May through August, April through September and January through December respectively (p. 61). His careful study reveals the highly seasonal nature in the annual wage patterns which corresponded with the agricultural harvest season. We chose the annual average wage series (January through December) which is the lowest of the three as it includes the rates for the winter slack period. This wage series in copper cash is in the first column of the Appendix Table I below.

The original wage series are all quoted in copper cash. Since Gamble was mainly interested in constructing wage indices, he presented nominal and copper wage indices in Table 6 of his article without explicitly giving the copper-silver conversion rates. Moreover, due to a major debasement around 1860 and a corresponding change of

[48] Xu, *Jiangnan tubu shi*, p. 378.
[49] Xu, *Jiangnan tubu shi*, p. 375.

monetary account in the fuel store account books, Gamble broke his silver and copper wage indices at 1860, setting 1845 as a base 100 for the pre- and post-1860s respectively. Thus, it is possible to derive the index – not the actual rate – of copper-silver exchange from his copper and silver wage indices.

On p. 44 and 69, Gamble did mention the actual silver-copper conversion rates in numbers of *tiao* (strings of copper cash) per silver tael for selected years of 1807, 1827, 1862, 1884 and so on. Our procedure for arriving at a consistent series of copper-silver exchange rates for the nineteenth century is to combine these benchmark rates with the derived copper-silver exchange indices.

Yet, a major hurdle is to interpret the value of one *tiao*, which usually contained 1,000 copper coins but could vary by regions. On p. 44, Gamble remarked that one *tiao* in that location was equal to 500 copper cash before 1860 and 100 copper cash after 1860. In other words, the copper cash before 1860 circulated in that locality was only half of the value of the official cash. This seems to be corroborated by Yan Zhongping and associates' study of prices and exchange rates.[50] These authors derived the exchange rate series (1807-50) from the account books of a merchant store located in Daliu zhen of Ningjin County in Hebei province, about three hundred kilometres from Beijing. In a footnote to their exchange rate table (Table 31 on p. 38), the authors pointed out that the value of two copper cash was counted as one. A comparison of the copper-silver exchange series of the Yan series and our implicit Gamble series shows that their trends are nearly identical.

Despite their footnote, Yan and associates derived their copper-silver series based on the standard rate of one *tiao* equal to 1,000 cash. Our copper-silver exchange rate series in the second column is similarly derived with the standard of one *tiao* equal to 1,000 cash. In order to derive the accurate wage rate in silver tale, the third column of our Appendix is silver wage converted from the first two volumes further divided by two. The wage rate thus derived seems extraordinarily low. However, as indicated by Gamble on p. 41, workers were also given additional food. As shown above, we use only the trend (not the level) for this study.

[50] Yan Zhongping et al., *Zhongguo jindai jingjishi.*

Appendix Table I. The Gamble Rural Beijing Wage Series in Copper Cash and Silver Taels, 1807-1902

Year	Copper wages in cash (*wen*)	Copper cash per silver tael	Silver wages in taels (=col.1/(col.2x2)	Year	Copper wages in cash (*wen*)	Copper cash per silver tael	Silver wages in taels (=col.1/(col.2 x2)
1807	81	979	0.041	1860	255		
1808	83	1,020	0.041	1865	265	5,180	0.026
1812	81	1,078	0.038	1870	287	5,576	0.026
1813	80	1,067	0.037	1871	333	5,892	0.028
1816	87	1,129	0.039	1872	355	6,170	0.029
1817	80	1,123	0.036	1873	382	6,383	0.03
1818	89	1,106	0.04	1874	388	6,611	0.029
1819	87	1,183	0.037	1875	389	6,681	0.029
1820	95	1,159	0.041	1876	370	7,446	0.025
1822	99	1,203	0.041	1877	368	8,325	0.022
1824	83	1,208	0.034	1878	348	8,314	0.021
1825	88	1,192	0.037	1879	375	8,342	0.022
1827	88	1,265	0.035	1880	410	8,510	0.024
1829	95	1,294	0.037	1881	401	8,341	0.024
1830	96	1,329	0.036	1883	387	7,154	0.027
1831	92	1,346	0.034	1884	356	6,722	0.026
1832	89	1,347	0.033	1885	395	7,573	0.026
1835	94	1,251	0.038	1886	402	6,950	0.029
1836	85	1,378	0.031	1887	395	7,024	0.028
1837	96	1,488	0.032	1888	361	7,883	0.023
1838	91	1,553	0.029	1889	421	7,314	0.029
1841	98	1,382	0.035	1890	393	7,254	0.027
1842	100	1,439	0.035	1891	390	7,627	0.026
1845	86	1,823	0.024	1892	372	7,651	0.024
1846	96	2,010	0.024	1893	410	7,212	0.028
1847	87	2,013	0.022	1894	443	6,722	0.033
1848	68	2,049	0.017	1896	448	6,501	0.034
1849	80	2,046	0.02	1900	422	5,312	0.04
1850	94	1,997	0.024	1901	462	5,758	0.04
1852	93	2,018	0.023	1902	470	6,079	0.039
1853	93	2,205	0.021				
1854	90	2,723	0.017				
1856	110	4,970	0.011				
1857	105	3,935	0.013				
1858	130	4,970	0.013				

Appendix II. Notes on the Sources for Chinese Prices

Our series of prices for Beijing begin with Meng and Gamble's study of wages and prices in Beijing between 1900 and 1924. For that period they collected the retail prices of most elements of our basket detailed in Table 4. We abstracted the following series[51]: wheat flour, *lao mi* (old, blackened rice), bean flour, millet, corn flour, pork, sweet oil, peanut oil, foreign cloth and coal balls. 'Sweet oil' was treated as 'edible oil' in our scheme and 'peanut oil' as 'lamp oil'. Coal balls were two thirds coal dust and one third earth, and the price was converted to an energy basis by rating one kilogram of coal balls at two thirds of the energy content of coal, which was itself rated at 27,533 BTU per kilogram.

To estimate the price of soybeans for 1900-08, we increased the wholesale price per kilogram of black beans by 50 per cent to allow for trade mark-ups and quality differences. The wholesale price was derived from Lillian Li, 'Grain Prices'. For 1909 onwards, when the Li series ends, the 1908 price was extrapolated on the basis of Meng and Gamble's price series for bean flour.

Since no information on the price of candles was available, we assumed their price per kg to be the same as that of one litre of lamp oil. Based on European precedents, we estimated the price of soap at half of the price of lamp oil.

The next problem was to extend these series back to the pre-industrial period. It should be noted that in several important respects, Meng and Gamble's data were ideal: they were retail prices of goods that consumers actually bought. In contrast, many historical price series are wholesale prices of intermediate goods. For instance, Meng and Gamble recorded the price of wheat flour in a shop, while historians usually must make do with the price of unprocessed wheat in wholesale markets.

Taking advantage of these ideal features of Meng and Gamble's data, we applied Lillian Li's study of wholesale grain prices in Zhili province, which includes Beijing. From the graphs in her paper, we could read off the prices of wheat, millet, sorghum from 1738 to 1908 as well as the relative price of black beans to wheat. These are five-year moving averages, so annual fluctuations are suppressed, but that is of little consequence for the present study.[52] On the basis of these series, the retail prices of wheat flour, millet, corn flour, bean flour, and soybeans were extrapolated back to 1738. The resulting extrapolated series are linked using the average of 1901-04 as the base period. This procedure

[51] Meng and Gamble, 'Wages, Prices, and the Standard of Living', pp. 28, 38-9, 51, 59.
[52] Professor Li kindly supplied us with some of the underlying series, which we used in preference to the graphed data.

assumes that the ratio of the retail price of the consumer good to the wholesale price of the unprocessed good remained constant.

The retail prices of other products were extrapolated back to 1738 as follows: for meat, edible oil, lamp oil, candles, the price of wheat flour was applied, based on the benchmark period of 1901-04 for meat (the average price of pork and mutton), and 1902 for the rest. For corn flour, the price of sorghum based on 1901-04 benchmark was used, and for rice (*lao mi*, old or blackened rice), the price of rice in the Yangzi delta[53], based on the 1901-04 benchmark.

Two things can be said in favour of these extrapolations. First, most of the long term agricultural time series inflate at the same rate, so the values projected back into the eighteenth century do not depend critically on which price series is used for the extrapolation. Second, the extrapolations can be checked by comparing the values we obtain in the eighteenth century for prices recorded in the VOC records for Canton. Since the extrapolated prices are similar to prices paid then, this gives us some confidence in the procedure.

The price series of cotton cloth is based on several sources. First, the Beijing retail price of foreign cloth was projected back to 1871 using Albert Feuerwerker's series of the price of cotton cloth imported into China.[54] Imported cloth was measured in pieces which were usually 40 yards long by one yard wide (360 square feet). Meng and Gamble's price was the price per 100 feet. We interpret that to mean 100 linear feet from a bolt of cloth, which we assume was three feet wide – a typical width. On those assumptions, the retail price per square foot of foreign cloth in Beijing was about 50 per cent more than the price at which it was landed. This is not an unreasonable mark-up.

In his detailed discussion of eighteenth-century cloth prices and weaving incomes, Pomeranz estimated the price of cloth in a low price scenario at 0.5 taels per bolt.[55] On this assumption 300 square feet of cloth were worth 4.59 taels, and we interpret this as the eighteenth-century counterpart to Meng and Gamble's price for a 100 foot length of a piece of cloth three feet wide. Following Pomeranz, we assume that cloth prices remained constant over the eighteenth century.[56]

For the years between 1800 and 1870 we were guided by the history of cloth prices in Indonesia. A series of the price paid for cotton cloth on Java from 1815 to 1871 shows that from 1815 to 1824, the price

---

[53] Wang, 'Secular trends', pp. 40-47.

[54] Feuerwerker, *Handicraft and Manufactured Cotton*, p. 344.

[55] Pomeranz in *Great Divergence*, p. 319 decided that a cloth of 16 *chi* length cost 0.4 taels. According to Li, *Agricultural Development*, p. xvii, a bolt of 20 *chi* had 3.63 square yards. Hence, the price of cloth was 0.5 taels per bolt.

[56] Pomeranz, *Great Divergence*, p. 323.

was 4.89 grams of silver per square meter, which compares to a Chinese price of 5.12 grams per square meter for the eighteenth century. This correspondence is reassuring since cotton cloth was traded across Asia, so we would not expect extreme differences in its price. Starting in the1830s, the price in Java dropped fairly quickly to a value of about 2.5 grams of silver per square meter and stayed at that level until 1871.[57] That low price is like the value of cloth imported into China – 2.36 grams of silver per square meter in 1871. On the assumption that cloth prices in China followed the same temporal pattern as those in Java, the eighteenth-century price derived from Pomeranz was continued to 1830, and then interpolated linearly between 1830 and 1871.

The price of energy was also combined from diverse sources. For 1739-69, we used the data implied by charcoal prices in Zhili province in the 1769 *Wuliao jiazhi zeli*, and for 1816, the price implied by the price of coal in Beijing given by Timkovski.[58] From 1900 onwards, the cost of energy was based on the price of coal balls. One of the striking features of this scattered information is that they should give a fairly constant price of energy. In view of that constancy, the values for the missing years were interpolated.

Since no Chinese alcohol prices were available, the present study used the Japanese data which show that one litre of sake equalled 1.31 kg of rice (based on Mitsui Bunko). This ratio is applied to Beijing and Canton, assuming that the technology for processing rice wine was similar in China and Japan.

[57] See W.L. Korthals Altes, “Prices (non-rice)” for Java cloth price.
[58] Timkovski, *Voyage à Péking*, p. 200.

Appendix Table II. Caloric and Protein Contents

	Unit (metric)	Calories per unit	Grams of protein per unit
Bread	kg	2450	100
Beans/peas (Europe)	litre	1125	71
Beans (Asia)	kg	3383	213
Meat	kg	2500	200
Butter	kg	7268	7
Cheese	kg	3750	214
Eggs	kg	79	6,25
Beer	litre	426	3
Soy beans	kg	4160	365
Rice	kg	3620	75
Wheat flour	kg	3390	137
Barley	kg	3450	105
Millet	kg	3780	110
Buckwheat	kg	3430	133
Corn flour	kg	3610	69
Fresh fish	kg	1301	192
Edible oil	litre	8840	1
Alcohol (20°)	litre	1340	5

Sources: The caloric and protein content are based on Allen, 'Great divergence in European wages' for bread, beans/peas consumed in Europe (fresh with pods, measured in litres), meat, butter, cheese, eggs, and beer. For other items, we relied on US Department of Agriculture (USDA) National Nutrient Database for Standard Reference, http://www.nal.usda.gov/fnic/foodcomp/cgi-bin/list_nut_edit.pl.

References:

Allen, R. 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.

Allen, R. C. (2003) 'Agricultural Productivity and Rural Incomes in England and the Yangtze Delta, c. 1620 – c. 1820' [WWW document]. URL http://www.economics.ox.ac.uk/Members/robert.allen/Papers/chineseag.pdf [accessed on 10 June 2009].

Allen, R. C. (2004) 'Mr. Lockyer Meets the Index Number Problem: the Standard of Living of Unskilled Workers in Canton and London in 1704' [WWW document]. URL http://www.economics.ox.ac.uk/Members/robert.allen/Papers/Lockyer.pdf [accessed on 10 June 2009].

Allen, R. C., 'Real Wages in Europe and Asia: a First Look at the Long-Term Patterns', in R. C. Allen, T. Bengtsson, and M. Dribe, eds., *Living Standards in the Past: New Perspectives on Well-Being in Asia and Europe* (Oxford, 2005), pp. 111-131.

Allen, R. C., Bengtsson, T., and Dribe, M., eds., *Living standards in the Past: New Perspectives on Well-Being in Asia and Europe* (Oxford, 2005).

Allen, R. C., Jean-Pascal Bassino, Debin Ma, Christine Moll-Murata, and Jan Luiten van Zanden. 'Wages, Prices, and Living Standards in China, Japan, and Europe, 1738-1925'. GPIH Working Paper No. 1 at http://gpih.ucdavis.edu/Papers.htm#1. 2005.

Allen, R. C., 'India in the great divergence', in T. J. Hatton, K. H. O'Rourke, and A. M. Taylor, eds., *The New Comparative Economic History: Essays in Honor of Jeffrey G. Williamson* (Cambridge, MA, 2007), pp. 9-32.

Bassino, J.-P., and Ma, D., 'Japanese Unskilled Wages in International Perspective, 1741-1913', *Research in Economic History,* 23 (2005).

Bassino, J.-P., Ma, D., Saito, O., 'Level of Real Wages in Historic China, Japan and Southern Europe, 1700-1920: A Review of Evidence', *Economic Research (Keizai Kenkyu)*, 56(4), (2005), pp. 348-369.

Broadberry, S., and Gupta, B., 'The Early Modern Great Divergence: Wages, Prices and Economic Development in Europe and Asia, 1500-1800', *Economic History Review*, LIX, 1 (2006), pp. 2-31.

Bureau of Social Affairs, The City Government of Greater Shanghai, *The Cost of Living Index Numbers of Labourers, Greater Shanghai* (January 1926 - December 1931, 1932).

Chao, K., *Man and land in Chinese History: An Economic Analysis* (Stanford, 1986).

Chen, C., *Shichang jizhi yu shehui bianqian: Shiba shiji Guangdong mijia fenxi* (Market Mechanism and Social Change – An Analysis of Rice Prices in Eighteenth-Century Guangdong) (Guangzhou, 1992).

Chen, Z., *Gesheng nonggong guyong xiguan ji xugong zhuangkuang* (Employment Practice and Conditions of Supply and Demand for Agricultural Labourers in Various Provinces) (Nanjing, 1935).

The Chinese Repository, 'Diet of the Chinese', 3(10), (Feb. 1835), pp. 457-446.

Chuan, H-S., and Wang, Y.-C., 'Jindai Sichuan Hejiang xian wujia yu gongzi de biandong qushi' (Price and Wage Trends in Modern Hejiang County, Sichuan), *Zhongyang yanjiuyuan lishi yuyan yanjiusuo jikan* (Bulletin of the Institute of History and Philology, Academia Sinica, Taiwan), 34 (1962), pp. 265-274.

Da Qing huidian shili (Collected Statutes of the Great Qing Dynasty, with Factual Precedents) (Taibei, 1963, reprinted from 1899).

'Data files of Historical Prices and Wages' [WWW document]. URL

http://www.iisg.nl/hpw/data.php [accessed on 6 June 2009].

'Databases on Materials, Wages, and Transport Costs in Public Construction in the Qianlong era' [WWW document]. URL http://www.uni-tuebingen.de/sinologie/project/shp/databases.html [accessed on 6 June 2009].

Department of Crop Reporting, Division of Agricultural Economics, The National Agricultural Research Bureau (NARB), China, *Crop Reports*, 5, issues 7 and 8 (Nanjing, 1937).

Department of Peasantry and Labour, Kwangtung Government, China, *The Reports of Statistics*, Vol. 3, *The Wage Indexes of Labourers in Canton, China*, 1912-1927 (June 1928).

Diewert, W.E., 'Exact and Superlative Index Numbers', *Journal of Econometrics*, 4(2), (1976), pp. 115-45.

Fang, X., Jing, J., and Wei, J., *Zhongguo jingji tongshi. Qingdai jingji juan* (General Economic History of China. Volume on the Qing period) (Beijing, 3 vols., 2000).

Feuerwerker, A., 'Handicraft and Manufactured Cotton Textiles in China, 1871-1910', *Journal of Economic History*, 30(2), (1970), pp. 338-378.

Gamble, S. D., 'Daily Wages of Unskilled Chinese Labourers, 1807-1902', *The Far Eastern Quarterly*, 3(1), (1943), pp. 41-73.

Huang, P., *The Peasant Family and Rural Development in the Yangzi Delta, 1350-1988* (Stanford, 1990).

Imperial Maritime Customs, ed., I. Statistical Series, 6, *Decennial Reports on the Trade, Navigation, Industries etc. of the Ports Open to Foreign Commerce in China and Corea […] , 1882-1891* (Shanghai: Inspector General of Customs, 1896).

Jörg, C. J. A., *Porcelain and the Dutch China Trade* (The Hague).

Kishimoto, M., *Shindai Chūgoku no bukka to keizai hendō* (Prices and

Economic Change in Qing Dynasty China) (Tokyo, 1997).

Korthals Altes, W.L. “Prices (non-rice)”, in P. Creutzeberg et.el., *Changing Economy in Indonesia, XV*. The Hague, Nijhoff, 1994.

Kung, J., Lee, Y-F., and Bai, N., ‘Human Capital, Migration, and “Vent” for Surplus Rural Labour in 1930s’ China: The Case of the Lower Yangzi’ (unpublished paper).

Kuroda, A., ‘Copper Coins Chosen and Silver Differentiated: Another Aspect of the “Silver Century” in East Asia’, *Acta Asiatica* (2005), pp. 65-86.

Lee, J. Z., and Wang, F., *One Quarter of Humanity: Malthusian Mythology and Chinese Realities, 1700-2000* (Cambridge, MA, 1999).

Li, B., *Agricultural Development in Jiangnan, 1620-1850* (New York, 1998).

Li, L. M., ‘Grain Prices in Zhili Province, 1736-1911: A Preliminary Study’, in T. G. Rawski and L. M. Li, eds., *Chinese History in Economic Perspective* (Berkeley, 1992), pp. 70-100.

Li, L. M., ‘Integration and Disintegration in North China’s Grain Markets, 1738-1911’, *Journal of Economic History*, 60/3 (Sept. 2000), pp. 665-699.

Li, W., Wei, J., and Jing, J., eds., *Ming Qing shidai de nongye ziben zhuyi mengya wenti* (The Issue of the ‘Sprouts of Capitalism’ in the Ming and Qing periods) (Beijing, 1983).

Ma, D., ‘Economic Growth in the Lower Yangzi Region of China in 1911-1937: a Quantitative and Historical Perspective’, *The Journal of Economic History*, 68(2), (June 2008), pp. 385-392.

Meng, T.-P., and Gamble, S. D., ‘Wages, Prices, and the Standard of Living in Peking, 1900-1924’, *The Chinese Social and Political Science Review*, 20 (1926), pp. 1-113.

Ohkawa, K., Noda, T., Takamatsu, N., Yamada, S., Kumazaki, M., Shionoya, Y., and Ryoshin, M., *Nihon chōki keizai tōkei* (Estimates of Long-Term Economic Statistics (LTES) of Japan Since 1868), 8 (Tokyo, 1967).

Özmucur, S., and Pamuk, Ş., 'Real Wages and Standards of Living in the Ottoman Empire, 1489-1914', *Journal of Economic History*, 62 (2002), pp. 293-321.

Parthasarathi, P., 'Rethinking Wages and Competitiveness in the Eighteenth Century: Britain and South India', *Past & Present*, 158 (1998), pp. 79-109.

Peng, X., *Zhongguo huobi shi* (A Monetary History of China) (Shanghai, 1954), transl. as *A Monetary History of China* by E. H. Kaplan (Bellingham, 1993).

Peng, Z., *Zhongguo jindai shougongye shi ziliao 1840–1949* (Materials for Early Modern Chinese Craft History, 1840–1949), 4 vols. (Beijing, 1962/1984).

Pomeranz, K., *The Great Divergence: China, Europe, and the Making of the Modern World Economy* (Princeton, 2000).

Quan, H., 'Qingdai Suzhou de chuaibuye' (Cotton Calendering in Qing Suzhou), *Xin Ya xuebao*, 13 (1975), pp. 424-26.

Rawski, T., *Economic Growth in Pre-War China* (Berkeley, 1989).

Rōdō undō shiryō iinkai (Commission for Historical Documentation of the Labour Movement), *Nihon rōdō undō shiryō* (Historical Documents on the Japanese Labour Movement), 10 (Tokyo, 1959).

Saito, O., 'Wages, Inequality, and Pre-Industrial Growth in Japan, 1727-1894', in R. C. Allen, T. Bengtsson, and M. Dribe, eds., *Living Standards in the Past*, pp. 77-97.

Santangelo, P., 'Urban Society in Late Imperial Suzhou', in L. Cooke Johnson, ed., *Cities of Jiangnan in Late Imperial China* (New York,

1993), pp. 81-116.

Smith, A., *An Inquiry into the Nature and Causes of the Wealth of Nations* (1776), edited by E. Cannan (New York, 1937).

Song, J., and Moll-Murata, C., 'Notes on Qing Dynasty Handicraft Regulations and Precedents (*jiangzuo zeli*), with Special Focus on Regulations on Materials, Working Time, Prices, and Wages', *Late Imperial China*, 23:2 (2002), pp. 87–126.

Terada, T., 'Sōshū tampogyō no kei'ei keitai' (Management Systems in Suzhou Calendering) *Tōhōku daigaku bungakubu kenkyū nenpō*, 18 (1967), pp. 121-173.

Timkovski, G., *Voyage à Péking* (Paris, 1827).

United Nations, Food and Agricultural Organization. *Food Balance Sheets* (Rome, 1984-86).

Van Dyke, P. A., *The Canton Trade. Life and Enterprise on the China Coast, 1700-1845* (Hong Kong, 2005).

Van Zanden, J. L., 'Wages and the Standards of Living in Europe, 1500-1800', *European Review of Economic History*, 3 (1999), pp. 175-98.

Van Zanden, J. L., 'The Skill Premium and the Great Divergence', paper presented at the conference 'Towards a Global History of Prices and Wages' (Utrecht, August 19-21, 2004). [WWW document]. URL http://www.iisg.nl/hpw/papers/vanzanden.pdf [accessed on 10 June 2009].

Van Zanden, J. L., and van Riel, A., *The Strictures of Inheritance. The Dutch economy in the Nineteenth Century* (Princeton, 2004).

Vogel, H. U., 'Chinese Central Monetary Policy, 1644-1800', *Late Imperial China*, 8.2 (1987), pp. 1-52.

Wang, Y.-C., *Land Taxation in Imperial China, 1750-1911* (Cambridge, MA, 1973).

Wang, Y.-C., ‘Secular Trends of Rice Prices in the Yangzi Delta, 1638-1935’, in T. G. Rawski and L. M. Li, eds., *Chinese History in Economic Perspective* (Berkeley, 1992), pp. 35-68.

Wei, J., ‘Ming-Qing shidai nongye zhong dengjixing guyong laodong xiang feidengjixing guyong laodong de guodu’ (The Transition From Hierarchical to Non-Hierarchical Agricultural Labour Employment During the Ming and Qing Periods), in Li, Wei, and Jing, eds., *Ming Qing shidai de nongye ziben zhuyi mengya wenti* (Beijing, 1983).

Wong, R. B., *China Transformed: Historical Change and the Limits of European Experience* (Ithaca, 1997).

Wu, L., ‘Qing qianqi nongye gugong de gongzi’ (Wages of Hired Agricultural Labourers in the Early Qing), *Zhongguo shehui jingjishi yanjiu* (Journal of Chinese Social and Economic History), 2 (1983).

Xu, X., ed., *Jiangnan tubu shi* (History of Native Cloth in Jiangnan) (Shanghai, 1989).

Yan, Z. et al., eds., *Zhongguo jindai jingjishi tongji ziliao xuanji* (Selected Statistical Materials on Modern Chinese Economic History) (Beijing, 1955).

Yang, X., ‘Shanghai gongren shenghuo chengdu de yige yanjiu’ (A study on the Living Standards of Shanghai Workers), in W. Li, ed., *Minguo shiqi shehui diaocha congbian. Chengshi (laogong) shenghuo bian* (A collection of Survey Research in Republican China. Volume on the Living Conditions of the Urban Working Class), 1 (Fuzhou, 2005), pp. 243-336.

You, Z., ‘Lun junqi zeli’ (A Study of Regulations and Precedents on Weapons and Military Equipment), in C. Moll-Murata, J. Song, and H. U. Vogel, eds., *Chinese Handicraft Regulations of the Qing Dynasty* (München, 2005), pp. 307-324.

Zhao, G., Liu, Y., Wu, H. et al., *Qingdai liangshi muchanliang yanjiu* (Research on Grain Yields in the Qing period) (Beijing, 1995).

Table 1. Nominal Wages of Workers in Public Construction, 1769-95, and in Arms Manufacture, 1813 (in taels per day)

	Construction unskilled	Construction skilled	N=	Arms manufacture (unskilled)	Population (millions in 1787)
Manchuria and the north-western frontier					
Heilongjiang	0.100	0.191	2/6		
Jilin	0.095	0.160	6		1.0***
Shengjing	0.057	0.100	13		
Xinjiang	0.097	0.110	3		0.5
North					
Rehe*	0.066	0.120	7		
Beijing*	0.077	0.141	24		
Tianjin/Baoding*	0.071	0.112	34		23.0****
Residual Zhili*	0.054	0.081	82	Zhili 0.060	
Gansu	0.044	0.054	48		15.2
Shanxi	0.054	0.073	85	0.040	13.2
Shaanxi	0.044	0.050	74	0.040	8.4
Shandong	0.045	0.061	50	0.040	22.6
Middle					
Henan	0.037	0.039	106	0.040	21.0
Jiangsu**	0.040	0.051	63	0.040	31.4
Zhejiang**	0.040	0.060	63	0.040	21.7
Hunan	0.039	0.050	10	0.040	16.2
Hubei				0.040	
Jiangxi				0.030	
Guizhou				0.040	
Sichuan	0.048	0.062	47	0.040	8.6
Yunnan	0.048	0.068	84	0.030	3.5
South					
Fujian (including Taiwan)	0.030	0.050	9	0.040	12.0
Guangdong	0.040	0.050	89	0.040	16.0
Guangxi				0.040	
Average (unweighted)	0.053	0.081			
Average (weighted by N)	0.047	0.065	901/905		
Average (weighted by population)	0.044	0.060			214.5

* part of the province of Zhili
** Yangzi delta

*** entire Manchuria
**** entire Zhili
N number of districts for which data are available
Sources for wages: see Appendix I; for population data, Wang, *Land taxation*, p. 87.

Table 2. Wage Regressions for Eighteenth-Century China, Standardized on the Daily Wage of an Unskilled Construction Labourer in the Yangzi Delta in 1769 (in Taels)

	Coefficient	T-value
Constant	0.0456	4.00
Trend	-0.0000351	-0.348
Manchuria	0.0902	6.73
Zhili (incl.Beijing)	0.0441	4.36
North	0.0132	1.397
Middle	-0.0022	-0.026
South	-0.000593	-0.056
Canton	0.0379	3.55
Skilled	0.0295	4.79
Regulated	-0.0171	-2.21
Iron Industry	0.0092	1.12
Coal mining	-0.0093	-0.83
Agriculture	-0.0072	-0.744
Textiles	0.0403	3.22
Other	-0.0147	-1.93
R^2	0.408	
F (14,312)	15.34**	
N	327	

** Significant at 1 per cent.

Table 3. Subsistence Lifestyle: Baskets of Goods in China

	Suzhou/Canton			Beijing		
	Quantity per person per year (kg)	Nutrients/day		Quantity per person per year	Nutrients/day	
		Calories	Grams of protein		Calories	Grams of protein
Rice	171	1677	47			
Sorghum				179 kg	1667	55
Polenta						
Beans/peas	20	187	14	20	187	14
Meat/fish	3	8	2	3	21	2
Butter						
Oil	3	67	0	3	67	0
Soap	1.3			1.3		
Cotton	3 m			3 m		
Candles	1.3			1.3		
Lamp oil	1.3			1.3		
Fuel	3 M BTU			3 M BTU		
Total		1939	63		1942	71

For conversion of calories and proteins, see Appendix Table II.

Table 4. Subsistence Incomes: Baskets of Goods in Europe

	Northern Europe			Milan		
	Quantity per person per year (kg)	Nutrients/day		Quantity per person per year	Nutrients/day	
		Calories	Grams of protein		Calories	Grams of protein
Rice	155	1657	72			
Sorghum						
Polenta				165	1655	43
Beans/peas	20	187	14	20	187	14
Meat	5	34	3	5	34	3
Butter	3	60	0	3	60	0
Oil						
Soap	1.3			1.3		
Linen /cotton	3 m			3 m		
Candles	1.3			1.3		
Lamp oil	1.3			1.3		
Fuel	3 M BTU			3 M BTU		
Total		1938	89		1936	60

Table 5. Comparison of Different Basket Costs Around 1750

	Barebone basket		Respectable basket		London prices (in grams of Silver)	Beijing prices (in grams of Silver)
	Europe	North China	Europe	North China		
Oats/Sorghum	155 kg	179 kg			0.76	0.48
Bread			182 kg	182 kg	1.28	0.95
Beans			40 kg	40 kg	0.5	0.84
Meat/Fish	5 kg	3 kg	26 kg	31 kg	3.19	2.04
Cheese			5.2 kg		2.07	
Eggs			52 pc	52 pc	0.37	0.074
Butter	3 kg		5.2 kg		6.45	
Beer/Rice Wine			182 l	49 l	0.39	1.98
Soap	1.3 kg	1.3 kg	2.6 kg	2.6 kg	6.36	1.65
Linen/Cotton	3 m	3 m	5 m	5 m	4.87	6.14
Candles	1.3 kg	1.3 kg	2.6 kg	2.6 kg	5.4	3.3
Lamp Oil	1.3 kg	1.3 kg	2.6 kg	2.6 kg	2.8	3.3
Fuel (M BTU)	3	3	5	5	5.59	11.2
Total basket cost (grams of silver)	213	182.6	558.6	499.3		
Europe/Beijing ratio	Barebone basket		Respectable basket		Geometric average	
	1.17		1.12		1.14	

Sources: see the text.

Figure 1: Nominal Wages in Beijing, Suzhou and Canton (in Silver Taels)

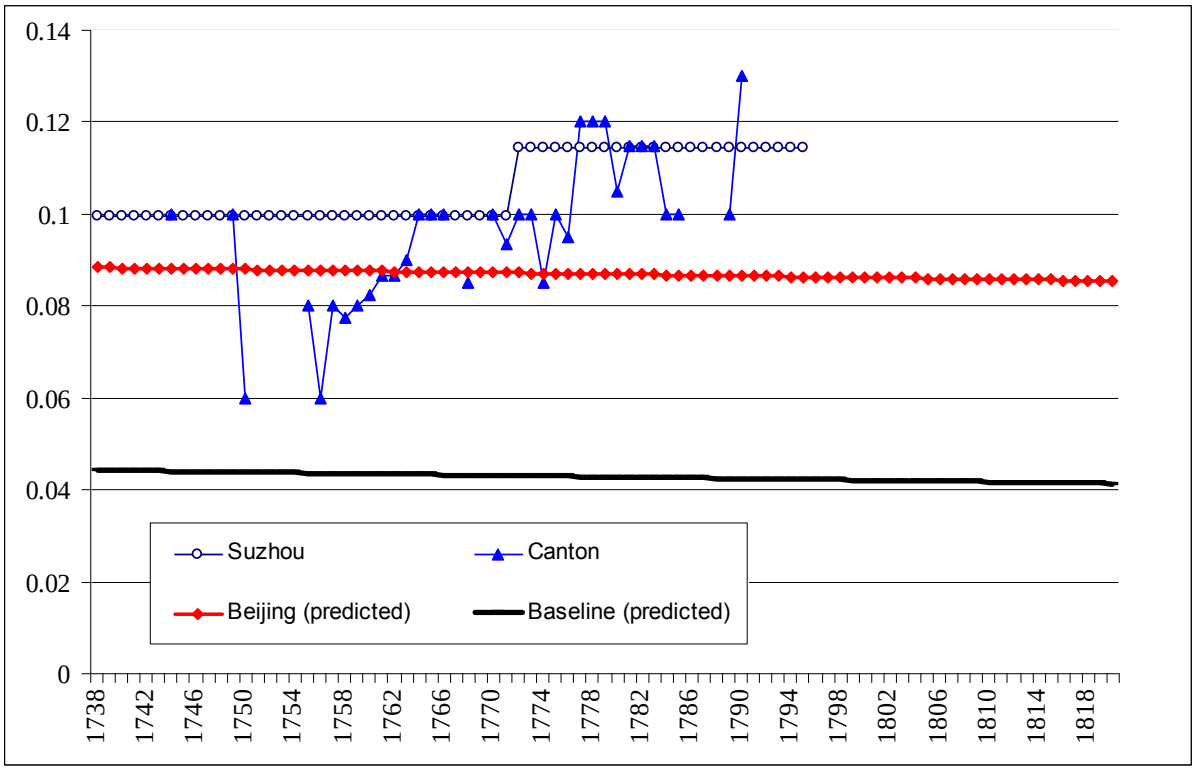
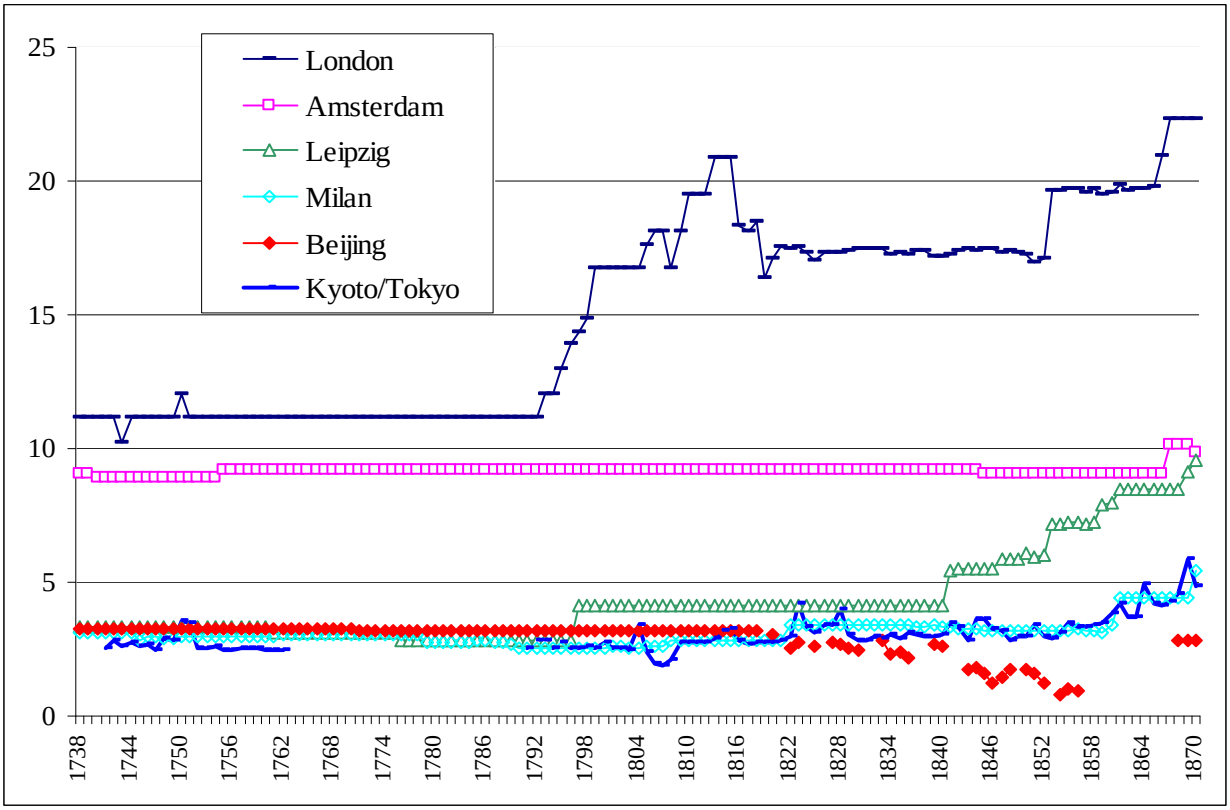
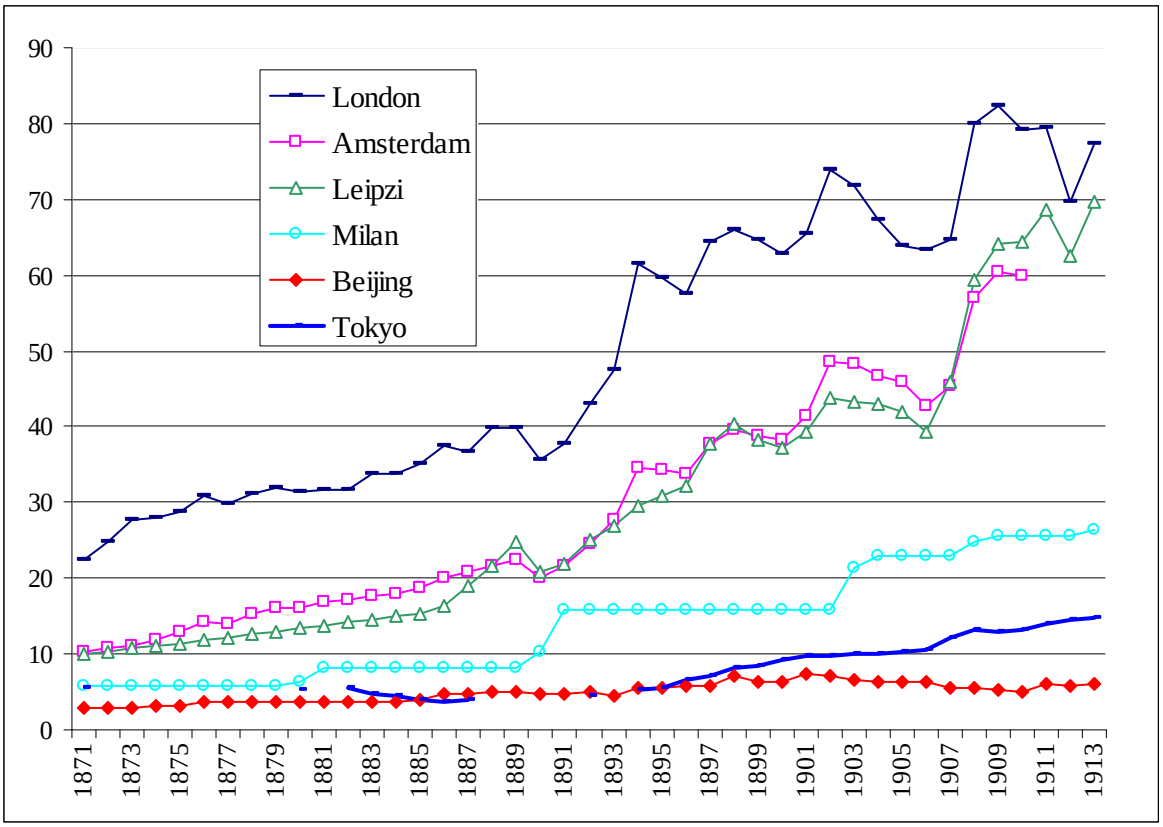


Figure 2: Daily Wages in Grams of Silver, 1738-1870



Sources: for wages in Kyoto/Tokyo, see Bassino and Ma, 'Japanese Unskilled Wages'; for the rest, see section III, fn. 28.

Figure 3: Daily Wages in Grams of Silver, 1870-1914



Sources: as for figure 1.

Figure 4: Costs of the Baskets in Grams of Silver Per Person Per Year

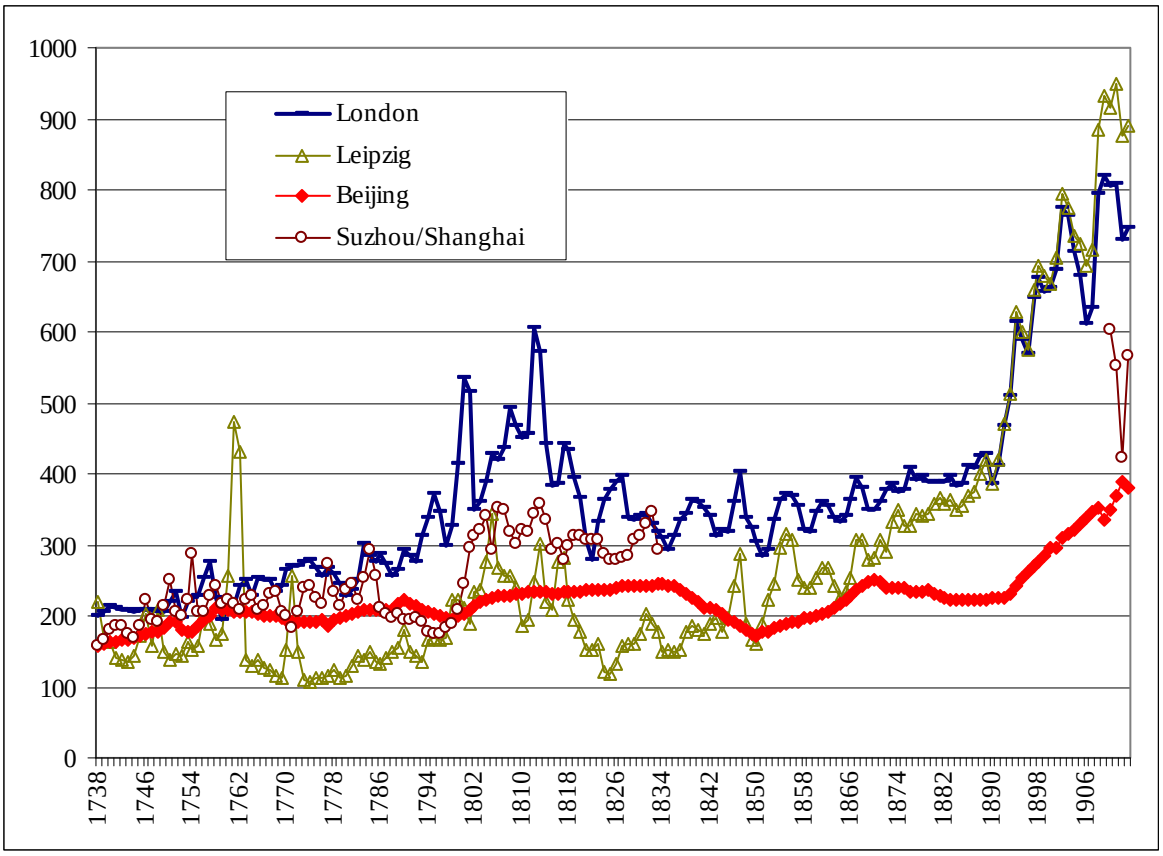


Figure 5: Welfare Ratios

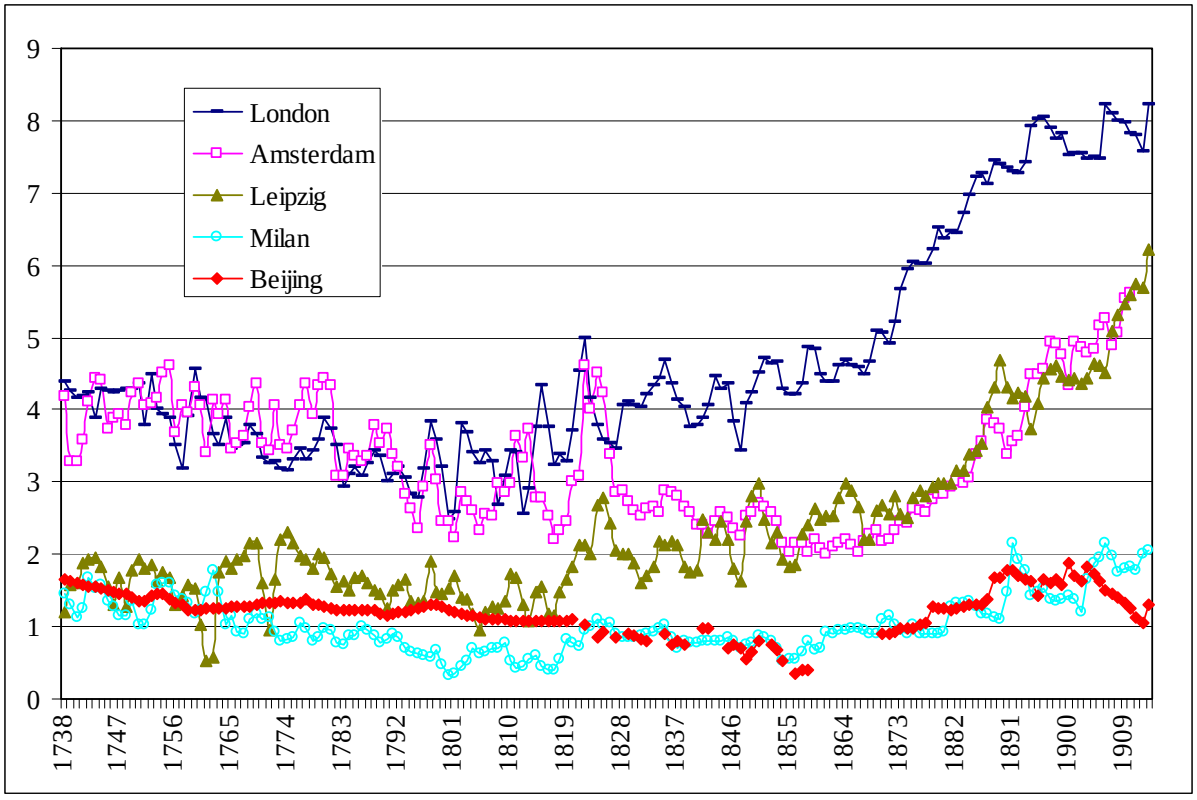
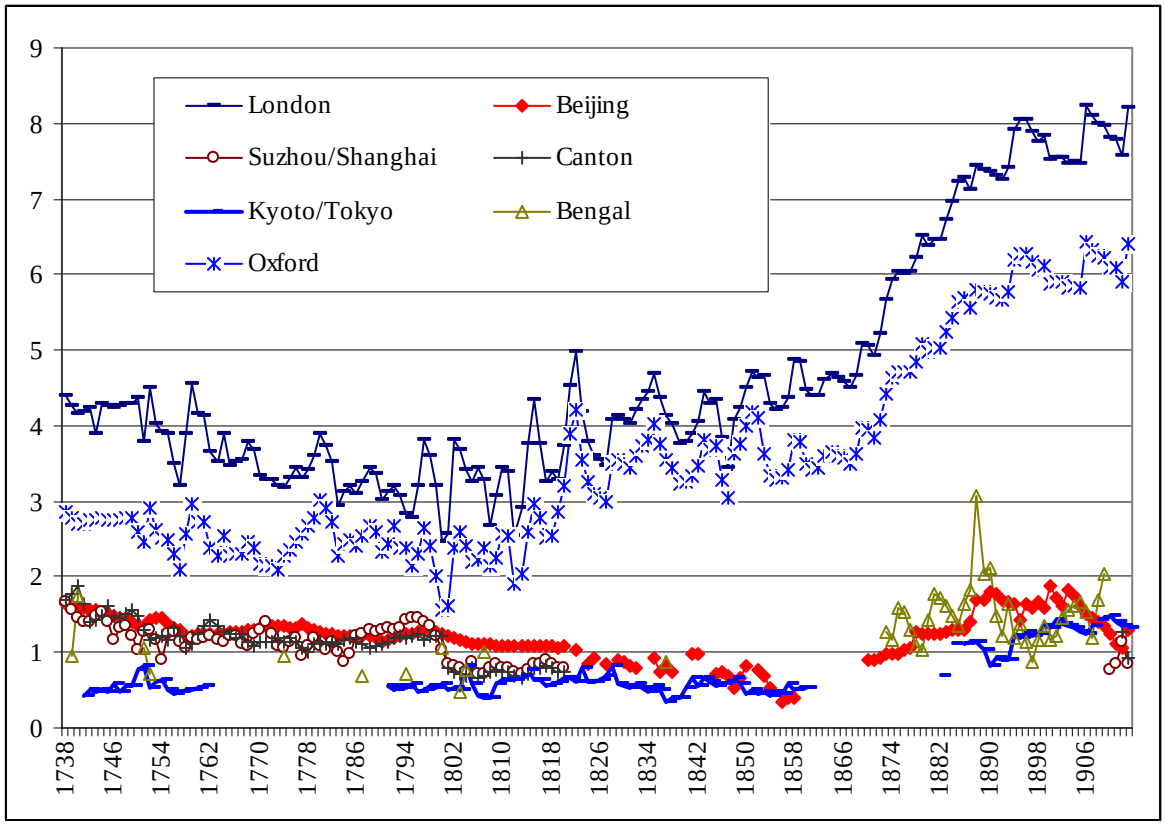


Figure 6: Welfare ratios in Asia



Sources: for Bengal welfare ratios, see Allen, 'India in the Great Divergence'.

LONDON SCHOOL OF ECONOMICS
ECONOMIC HISTORY DEPARTMENT WORKING PAPERS
(from 2006 onwards) For a full list of titles visit our webpage at http://www.lse.ac.uk/

2006

WP93 Harbingers of Dissolution? Grain Prices, Borders and Nationalism in the Hapsburg Economy before the First World War
Max-Stephan Schulze and Nikolaus Wolf

WP94 Rodney Hilton, Marxism and the Transition from Feudalism to Capitalism
S. R. Epstein
Forthcoming in C. Dyer, P. Cross, C. Wickham (eds.)
Rodney Hilton's Middle Ages, 400-1600 **Cambridge UP 2007**

WP95 Mercantilist Institutions for the Pursuit of Power with Profit. The Management of Britain's National Debt, 1756-1815
Patrick Karl O'Brien

WP96 Gresham on Horseback: The Monetary Roots of Spanish American Political Fragmentation in the Nineteenth Century
Maria Alejandra Irigoin

2007

WP97 An Historical Analysis of the Expansion of Compulsory Schooling in Europe after the Second World War
Martina Viarengo

WP98 Universal Banking Failure? An Analysis of the Contrasting Responses of the Amsterdamsche Bank and the Rotterdamsche Bankvereeniging to the Dutch Financial Crisis of the 1920s
Christopher Louis Colvin

WP99 The Triumph and Denouement of the British Fiscal State: Taxation for the Wars against Revolutionary and Napoleonic France, 1793-1815.
Patrick Karl O'Brien

WP100 Origins of Catch-up Failure: Comparative Productivity Growth in the Hapsburg Empire, 1870-1910
Max-Stephan Schulze

WP101 Was Dick Whittington Taller Than Those He Left Behind? Anthropometric Measures, Migration and the Quality of life in Early Nineteenth Century London
Jane Humphries and Tim Leunig

WP102 The Evolution of Entertainment Consumption and the Emergence of Cinema, 1890-1940
Gerben Bakker

WP103 Is Social Capital Persistent? Comparative Measurement in the Nineteenth and Twentieth Centuries
Marta Felis Rota

WP104 Structural Change and the Growth Contribution of Services: How Motion Pictures Industrialized US Spectator Entertainment
Gerben Bakker

WP105 The Jesuits as Knowledge Brokers Between Europe and China (1582-1773): Shaping European Views of the Middle Kingdom
Ashley E. Millar

WP106 Regional Income Dispersion and Market Potential in the Late Nineteenth Century Habsburg Empire
Max-Stephan Schulze

2008

WP107 'The Big Problem of the Petty Coins', and how it could be solved in the late Middle Ages
Oliver Volckart

WP108 The Anglo-German Industrial Productivity Puzzle, 1895-1935: A Restatement and a Possible Resolution
Albrecht Ritschl

WP109 The History, Nature and Economic Significance of an Exceptional Fiscal State for the Growth of the British Economy, 1453-1815
Patrick O'Brien

WP110 The Economic History of Sovereignty: Communal Responsibility, the Extended Family, and the Firm
Lars Boerner and Albrecht Ritschl

WP111 A Stakeholder Empire: The Political Economy of Spanish Imperial Rule in America
Regina Grafe and Alejandra Irigoin

WP112 The U.S. Business Cycle, 1867-1995: Dynamic Factor Analysis vs. Reconstructed National Accounts
Albrecht Ritschl, Samad Sarferaz and Martin Uebele

WP113 Understanding West German Economic Growth in the 1950s
Barry Eichengreen and Albrecht Ritschl

2009

WP114 War and Wealth: Economic Opportunity Before and After the Civil War, 1850-1870
Taylor Jaworski

WP115 Business Cycles and Economic Policy, 1914-1945: A Survey
Albrecht Ritschl and Tobias Straumann

WP116 The Impact of School Provision on Pupil Attendance: Evidence From the Early 20th Century
Mary MacKinnon and Chris Minns

WP117 Why Easter Island Collapsed: An Answer for an Enduring Question
Barzin Pakandam

WP118 Rules and Reality: Quantifying the Practice of Apprenticeship in Early Modern Europe
Chris Minns and Patrick Wallis

WP119 Time and Productivity Growth in Services: How Motion Pictures Industrialized Entertainment
Gerben Bakker

WP120 The Pattern of Trade in Seventeenth-Century Mughal India: Towards An Economic Explanation
Jagjeet Lally

WP121 Bairoch Revisited. Tariff Structure and Growth in the Late 19th Century
Antonio Tena-Junguito

WP122 Evolution of Living Standards and Human Capital in China in 18-20th Centuries: Evidences from Real Wage and Anthropometrics
Joerg Baten, Debin Ma, Stephen Morgan and Qing Wang

WP123 Wages, Prices, and Living Standards in China, 1738-1925: in Comparison with Europe, Japan, and India
Robert C. Allen, Jean-Pascal Bassino, Debin Ma, Christine Moll-Murata, Jan Luiten van Zanden