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THE EARLY MODERN GREAT DIVERGENCE: WAGES, PRICES AND ECONOMIC DEVELOPMENT IN EUROPE AND ASIA, 1500-1800

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ABSTRACT

The Early Modern Great Divergence: Wages, Prices and Economic Development in Europe and Asia, 1500-1800*

Contrary to the claims of Pomeranz, Parthasarathi and other 'world historians', the prosperous parts of Asia between 1500 and 1800 look similar to the stagnating southern, central and eastern parts of Europe rather than the developing northwestern parts. In the advanced parts of India and China, grain wages were comparable to those in northwestern Europe, but silver wages, which conferred purchasing power over tradable goods and services, were substantially lower. The high silver wages of northwestern Europe were not simply a monetary phenomenon, but reflected high productivity in the tradable sector. The 'Great Divergence' between Europe and Asia was already well underway before 1800.

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Keywords: Asia, development, Europe, prices and wages

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I. INTRODUCTION

World historians such as Pomeranz (2000), Parthasarathi (1998; 2001) and Frank (1998) have recently claimed that the "Great Divergence" between Europe and Asia occurred only after 1800, and that before that date, the most advanced parts of Europe and Asia should be seen as on the same development level, with "multiples cores and shared constraints" (Pomeranz, 2000: 107). In this paper, we asses this influential argument in terms of its consistency with the available quantitative evidence and using some simple economic reasoning. On this basis, we argue that the most advanced parts of Asia in 1800 should be seen as on the same development level as the stagnating parts of the European periphery. Although it is possible to show that grain wages were still close to northwest European levels in the most advanced parts of Asia in 1800, silver wages were a fraction of northwest European levels. Furthermore, the geographical distribution of silver wages corresponds to the established pattern shown by other indicators of economic development, such as the urbanisation ratio.

Pomeranz (2000) argues that per capita food consumption and the purchasing power of wages measured in terms of calories was as high in the Yangzi delta region of China as in the most developed parts of Europe as late as the end of the eighteenth century. Similarly, Parthasarathi (1998, 2001) argues that during the eighteenth century, wages in southern India could purchase about the same amount of Indian grain as wages in Britain could purchase British grain. Parthasarathi (1998: 101-102), however, also emphasises the low purchasing power of Indian wages measured in grams of silver. He treats this as evidence of the low price of grain in southern India, which he sees as the result of high agricultural productivity. However, we need to be

careful here before we follow Pomeranz (2000) and Parthasarathi (1998) in regarding the Yangzi delta region of China, southern India and other parts of Asia as on the same development level as the most developed parts of Europe such as Britain and the Netherlands. For this pattern of high wages measured in terms of the amount of grain they could purchase, but low wages in terms of the silver content of the currency in which they were paid, was also a feature of the less developed parts of southern, central and eastern Europe during the early modern period. We argue, therefore, that by the eighteenth century the more economically advanced parts of Asia should be seen as on the same level as the more peripheral rather than the most developed parts of Europe.

We argue that the high silver wages of northwestern Europe were not simply a monetary phenomenon resulting from an inflow of New World bullion, but reflected high productivity in the traded goods sector. Although the bullion flowed in through Spain, prices rose by a similar amount in most European countries. Despite this, silver wage leadership passed from the south to the north, with England showing the most rapid growth. The gap between the "silver wage" and the "grain wage" can hence be used as an indicator of the level of development. This conforms with the well known tendency for both wages and prices to be higher in developed economies, so that international comparison of wages at the official exchange rate gives a misleading impression of the gap in living standards between developed and underdeveloped countries (Balassa, 1964; Samuelson, 1964). However, it also confirms, in the context of the Europe-Asia nexus, the early existence of some of the key features of the relationship between a developed and a less developed country (LDC): (1) Wages in the LDC meet the food needs of the population given the price of food in the LDC,

but would not purchase sufficient food in the developed country at developed country prices (2) Manufactures produced in the LDC are relatively expensive within the LDC (at local relative prices), but are competitive on world markets because of the low wages measured in developed country prices.

The paper proceeds as follows. Section II establishes the pattern of an emerging silver wage leadership in northwestern Europe despite the absence of any clear grain wage leadership before the nineteenth century, and shows how this pattern is related to other indicators of development such as urbanisation. Section III addresses the problems that may be expected to arise in comparing wages and prices between Europe and Asia. Sections IV and V then shows how regions of India and China, respectively, look more like the stagnating parts of southern, eastern and central Europe than the modernising parts of northwestern Europe. Despite the high grain wages emphasised by world historians, the most advanced parts of Asia also had very low silver wages and low levels of urbanisation. Section VI demonstrates that the high silver wages of northwestern Europe cannot be dismissed as a purely monetary phenomenon, but reflected high productivity in the traded goods sector. Section VII concludes.

II. WAGES AND PRICES IN EUROPE

1. Silver wages and grain wages

Largely as a result of the pioneering work of the International Committee on Price History during the 1930s, it is possible to gather data on the daily wages of unskilled and skilled building workers in many European cities and regions between 1500 and 1800, and to compare them in terms of both the silver content of the local currencies

and the volume of grain that they could purchase (Beveridge, 1939: xlix-li). Following van Zanden (1999), the former is called the "silver wage" and the latter the "grain wage". The pattern of silver wages in Europe is shown in Table 1, taken from Allen (2001: 416), where the data are presented as averages over periods of fifty years to deal with problems of volatility and information gaps for particular years (van Zanden, 1999: 179).

The key findings are as follows: (1) Northwestern Europe saw substantial silver wage growth, with Britain overtaking the Netherlands during the eighteenth century. (2) In southern Europe there were considerable fluctuations but less trend growth in the silver wage, starting from about the same level as northwestern Europe in 1500. (3) In central and eastern Europe, as in southern Europe, there were substantial fluctuations in silver wages but only weak trend growth, starting from a significantly lower level than northwestern Europe in 1500. (4) The regional variation is broadly similar for skilled and unskilled workers, with a skill premium of around 50 per cent in northwestern Europe, but rising closer to 100 per cent in much of southern, central and eastern Europe.

The pattern of silver wages is therefore broadly in line with conventional views about the level of development in different parts of Europe, with northwestern Europe pulling ahead of the previously more developed south, and with central and eastern Europe continuing to lag behind. Indeed, van Zanden (1999: 181) notes a strong positive correlation between the silver wage by country and the urbanisation ratio by country.

Grain wages for the same cities and regions, where available, are presented in Table 2. Here, wages are compared in terms of the volume of wheat or rye that they could buy, given the local prices of grain. This was usually wheat in northwestern and southern Europe and rye in central and eastern Europe (apart from Vienna). In Holland, where both grains were widely available, rye sold for about two-thirds the price of wheat (van Zanden, 1999: 184). The grain wages in Table 2 show almost the mirror image of the silver wages in Table 1, with a negative trend in all regions, and with the highest level of grain wages in central and eastern Europe. This suggests that the high silver wages of the developing parts of Europe were not actually enabling people to buy more food.

2. Relative prices and real consumption wages

High and rising silver wages in northwestern Europe did not translate into high grain wages before the nineteenth century. However, real consumption wages may still have risen through increased consumption of non-agricultural goods and services, the prices of which were falling relative to the price of grain. In England, for example, we know that the price of farinaceous goods (including wheat, barley, rye, peas and potatoes) increased by a factor of nine between the mid-fifteenth century and the end of the eighteenth century, while the price of textiles increased only by a factor of three (Phelps Brown and Hopkins, 1981: 44-59).

Phelps Brown and Hopkins (1981) calculate price indices for each country based on non-food items as well as food, so that it is possible to examine trends in real consumption wages within individual countries, but not to compare real consumption wages between countries. Following Allen (2001), however, it is possible to compare

European real consumption wages across both space and time. The results in Table 3 compute the real consumption wage of unskilled building labourers in European countries over the period 1500-49 to 1800-49, using the data on silver wages from Table 1 together with Allen's (2001: 426) data on the price of a basket of commodities in each city in each period. The results have been reported here with London 1500-49 as the base.[1]

The real consumption wage data in Table 3 remove the most perplexing aspect of the real grain wage data in Table 2, the apparently higher living standards in central and eastern Europe. The real consumption wage data show the opening of a gap between northwestern Europe on the one hand and southern, central and eastern Europe on the other hand, as in the silver wage data of Table 1. This means that the high grain wages of central and eastern Europe, noted by van Zanden (1999) and shown here in Table 2, did not translate into high real consumption wages. As Allen (2001: 419-420) notes, urban wage earners purchased bread rather than grain and there were other non-grain items in the consumption basket.

However, Allen's real consumption wage data do not remove altogether the pessimistic view of declining living standards in Europe between 1500 and 1800, previously suggested by Abel (1980), Braudel and Spooner (1967) and van Zanden (1999). They suggest, rather, that the divergence between living standards in the developed parts of northwestern Europe and the less developed parts of southern,

[1] Allen (2001: 428) reports his results in the form of "welfare ratios". Assuming a working year of 250 days, on the basis of a 5-day working week for 50 weeks, Allen (2001: 424-431) computes an annual income for a building labourer and compares it to a notional poverty line for a family consisting of a man, a woman and two children consuming a few basic products. The poverty line is calculated taking account of some important differences in national climate and cuisine, and allowing for local prices.

central and eastern Europe occurred as a result of constant real wages in the northwest and collapsing real wages in the other regions. This finding is, however, based on the assumption of a constant number of days worked per year, so that daily wage rates can be taken as representative of annual earnings. This assumption can be criticised on the grounds that it neglects to take account of the "Industrious Revolution" (de Vries, 1994).

The Industrious Revolution was proposed by de Vries (1993: 107) as a solution to the conundrum that despite the apparent constancy of real daily wage rates in Europe during the early modern period, the evidence from probate inventories and direct consumption measures reveals "an ever-multiplying world of goods, a richly varied and expanding material culture, with origins going back to the seventeenth century and exhibiting a social range extending far down the hierarchy". For de Vries (1994: 257), the Industrious Revolution consisted of a new strategy of household utility maximisation, involving a reduction of leisure time and a reallocation of labour from non-market to market activities, so as to allow increased consumption of market-supplied goods. He sees the process as containing a demand-side element through changing tastes, and not simply as a response to commercial incentives such as changing relative prices and reduced transactions costs (de Vries, 1994: 256).

Allowing for the Industrious Revolution would produce a modest trend rise of the real wage in northwestern Europe. For example, in London we might allow for an increase in the number of days worked per year from 250 to 300 between 1750-99 and 1850-49 in line with Voth's (1998) evidence on the decline of "St. Monday". We

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The resulting "welfare ratio" of earnings relative to the poverty line, can be thought of as "a peculiarly

might also allow for an increase in the number of days worked per year from 200 to 250 between 1500-49 and 1550-99, in line with the evidence of de Vries (1993: 110-111) on the large reduction in the number of feast days following the Reformation. This would produce an increase in the real consumption wages of unskilled labourers in London of 0.13 per cent per annum over the 300 years following 1500-49, and still by only 0.19 per cent per annum over the 200 years following 1600-49.

3. Structural change and urbanisation

Another way in which the daily wage data could be seen as consistent with an upward trend in real living standards would be if there was substantial structural change, with a shift from low paid agricultural jobs in rural areas to higher paying industrial employment in urban areas. Since Crafts and Harley (1992) estimate that per capita income in Britain grew at an annual rate of 0.32 per cent per annum between 1700 and 1830, rising to 0.5 per cent per annum between 1800 and 1830, there would be plenty of room for effects arising from an Industrious Revolution and structural change.

To see the extent of structural change with economic development, we can chart the patterns of urban population shares in Table 4, derived from de Vries (1984). The urban share of the population is based here on cities of more than 10,000 inhabitants.[2] During the Middle Ages, the most developed parts of Europe were in the Mediterranean region, centered particularly on Spain and northern Italy, and there was

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scaled real wage index" (Allen, 2001: 427).

[2] Bairoch (1976) provides alternative urbanisation ratios for cities of more than 5,000 inhabitants, but inhabitants of smaller cities are added to the large cities in constant proportion, a procedure criticised strongly by de Vries (1984: 347). Bairoch's figures are used by Allen (2000: 8-9), and suggest some different trends in individual countries, but not for Europe as a whole. The agreement between de Vries

a further centre of development based on Belgium and the Netherlands in northwestern Europe. Urban development lagged behind in central and eastern Europe. During the seventeenth and eighteenth centuries, urban and non-agricultural activity stagnated in Spain and Italy, so that the centre of gravity moved to northwestern Europe, with England emerging as the most dynamic region of urban and non-agricultural development. Urban development continued to lag behind in central and eastern Europe.

Although some writers have tried to cast doubt on the link between international variations in the rate of urbanisation and comparative levels of economic development in the medieval and early modern periods, the idea has remained widely accepted (Britnell, 1991; Persson, 1993). Furthermore, the link has been strengthened by recent work in economic geography and development, which has placed considerable emphasis on external economies of scale associated with urbanisation as well as localisation. Economies of localisation refer to the benefits derived by a producer from the proximity of other producers in the same industry, and can be linked to the work of Marshall [1920], who stressed the flows of specialised information, the availability of a skilled labour supply and specialised machine builders, and thick markets for other inputs and outputs. However, the formation of "industrial districts" to reap economies of localisation does not necessarily imply large-scale urbanisation, and may be quite consistent with proto-industrialisation (Mendels, 1972). Jacobs (1969), however, emphasises the benefits derived by a producer from the wider infrastructure associated with the spatial concentration of a diverse range of industries. Such benefits cannot, by definition, be realised in a proto-

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and Bairoch at the level of Europe as a whole appears to be due to an error in Bairoch's total

industrial setting. The recent literature of writers such as Glaeser et al. (1992) and Henderson et al. (1995) is thus consistent with the sceptical view of proto-industrialisation as a stage on the road to modern economic growth expressed by writers such as Coleman (1983) and Clarkson (1985). Rural peasants supplementing their agricultural incomes with some industrial production should not be confused with specialised industrial production in highly urbanised economies. Note, further, that high productivity in the traded goods sector in northwestern Europe may be seen as arising through merchant distribution and finance as much as through production. The service sector can thus be seen as playing a crucial role in economic growth during the early modern period, as in the modern period (Broadberry, 1998; Broadberry and Ghosal, 2002; 2005).

4. Distribution and relative prices

If living standards of northwest Europeans increased through the falling relative price of manufactured goods rather than through increased consumption of basic foodstuffs such as grain, it is likely that the fruits of early modern development were spread unevenly. Clearly, the wages of skilled labourers in Tables 1 and 2 yielded a larger surplus over basic food needs than the wages of unskilled labourers. And if wages only covered basic needs, there was little scope to benefit from the falling relative price of manufactures. Hoffman et al. (2002: 334) show that during the early modern period, the relative price of luxuries was declining, so that the gains were greatest of all for the top 20 per cent of the income distribution.

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population estimates which offsets the error in the urban population estimates.

To summarise the situation in Europe, we see the following patterns: (1) During the Middle Ages, the highest silver wages were recorded in southern Europe, but during the seventeenth and eighteenth centuries silver wage leadership passed to northwestern Europe. (2) These developments were closely linked to urban and non-agricultural development, with stagnation in southern Europe and dynamic growth in northwestern Europe, particularly England. (3) These silver wage patterns are not reflected in the grain wage; people moving to the towns with economic development were not able to buy more food, and any gain in overall living standards for labourers in northwestern Europe was modest before the early nineteenth century.

To understand the "Great Divergence" between Europe and Asia, we need to know if the more advanced parts of Asia looked more like northwestern Europe (high silver wages but modest grain wages for the mass of labourers) or more like southern, central and eastern Europe (low silver wages as well as modest grain wages). Before we turn to an examination of wages and prices in India and China, however, we must discuss some general issues concerning the comparability of wage and price data between Europe and Asia.

III. COMPARING WAGES AND PRICES BETWEEN EUROPE AND ASIA

The European data on wages and prices are of very high quality, as a result of the enormous amount of work carried out by previous generations of scholarship. This work received a tremendous boost in 1929 with the establishment of an International Scientific Committee on Price History, which led to the collection of a large amount of material for a number of European countries on a comparable basis (Beveridge, 1939: xlix-li). Building on this and other work for individual countries, the data were

explicitly presented on a comparative basis by writers such as Abel (1935; 1966) and Braudel and Spooner (1967). Further refinement of data for individual countries and extension of the country coverage has stimulated the recent reworking of the Europe-wide data by van Zanden (1999) and Allen (2001).

This long-standing data-gathering exercise has led to the widespread availability of data on the wages of both unskilled and skilled building labourers, together with the prices of grains and other products. This has made it possible to construct accurate estimates of comparative grain wages and silver wages on a daily basis, and also to make rough estimates of comparative real consumption wages (Allen, 2001).

It must be recognised at the outset that the wage and price data that are available for Asia are not of the same high quality as the European data. Nevertheless, we think it is important to press ahead with a systematic analysis of the existing data, for the following reasons. First, whatever the limitations of the data that we have been able to mobilise for this study, it allows us to make long run comparisons between Europe and Asia. These data are much more comprehensive than those used by Parthasarathi (1998) and Pomeranz (2000) in their Europe-Asia comparisons. Second, as we shall see, the scale of the silver wage differences between Britain and Asia during the seventeenth and eighteenth centuries was so large that it is difficult to imagine how it could possibly be overturned by any conceivable correction.

For India, data on money wages and grain prices expressed in silver content are readily available from a number of sources. The starting point is Mughal India

under Akbar, for which we have surprisingly detailed information on wages and prices from Abū 'l-Fazl's [1595] remarkable document, *The Ā' īn–i-Akbarī*. This provides information on the day wages of unskilled and skilled workers in northern India in 1595. For the seventeenth and eighteenth centuries the main sources are the records of the English and Dutch East India Companies. For the nineteenth century the data come from statistical records produced by government. A number of studies have attempted to compare the purchasing power of the wages of unskilled labourers between 1595 and the late nineteenth and early twentieth centuries (Desai, 1972; 1978; Moosvi, 1973; 1977; Heston, 1977). However, these studies have little to say about what happened in the 17th and 18th centuries. Nor do they place the Indian experience in an international context.

We will focus on the comparison between unskilled workers in India and Britain. For northern India, the data are largely daily rates for peons or other unskilled labourers, which are broadly comparable to the British data. For southern India, however, we have had to rely in some years on data for unskilled and skilled weavers. Although the data have been compiled from a variety of sources and refer to different regions, the magnitudes are comparable. Further the silver wages in southern India are not very different from what we find for northern India at a given point of time. Therefore, these data allow us to speculate with some confidence about changes over time. For example, it is possible to show that the wage differences of weavers between Lancashire and South India were of the same order of magnitude whatever the data source (Broadberry and Gupta, 2004; Brennig, 1986: 348-349; Arasaratnam, 1980: 269; Mitra, 1978: 128-129; Gilboy, 1934: 280-287; Wadsworth and Mann, 1931; 401-402; Wood, 1910; 112, 127).

For China, detailed data on grain prices are readily available for Qing dynasty China (1644-1911), as a result of a system of price reports recording the highest and lowest prices in each prefecture during each lunar month (Wang, 1972; 1992; Chuan and Kraus, 1975: 1-16). However, there is no equivalent of the systematic money wage data available in Europe, due to the fact that money wages were typically supplemented by substantial food allowances (Pomeranz, 2000: 319-320). Even in late nineteenth century Beijing, Gamble (1943: 66) finds food money exceeding money wages for unskilled men working with the carpenters' and masons' guilds. Scattered estimates of the total wage (including food) paid to hired labourers in Chinese agriculture are available, however, and we shall make use of these.

Although Gamble (1943) provides daily money wages for unskilled urban labourers for the period 1807-1902, he makes no allowance for payments in food, so that these estimates are far too low. As a result, we are forced to rely on estimates of earnings of Chinese agricultural labourers, including food payments, which have to be converted onto a daily wage basis. However, it should be noted that we have taken these estimates from the work of Pomeranz (2000) and Li (1998), who view living standards in the Yangzi delta region as being on a par with living standards in Britain as late as the end of the eighteenth century. Therefore, it is more likely that these estimates overstate rather than understate the level of unskilled wages in China. Although Li (1998) provides estimated wages on a daily basis, it is necessary to convert Pomeranz's (2000) estimates from an annual to a daily basis.

IV. WAGES AND PRICES IN INDIA

1. Silver wages and grain wages

We now turn to establishing the level of silver wages and grain wages in India at a number of points between 1595 and 1874 in units that will facilitate a comparison with Europe. Table 5 presents data on daily wages of unskilled and skilled labourers in terms of both their silver content and the amount of grain that they could purchase. Part A provides data for northern and western India, based on the cities of Agra and Surat. Wages in rupees are converted to grams of silver using information from Habib (1982) and Chaudhuri (1978). The broad trend is for the silver wage to rise, with the skilled wage about double the unskilled wage, as in the peripheral rather than core northwestern parts of Europe. The rising silver wage is consistent with the constancy of the money wage expressed in copper dams per day, since the price of silver depreciated relative to copper (Habib, 1982: 370).

We then use the price of grain to convert the money wages into grain wages. The data are presented in terms of both wheat and rice, and for both unskilled and skilled workers. In contrast to the rising trend in silver wages, grain wages trended downwards in northern and western India, as money wages failed to keep up with the rising trend in grain prices, particularly during the early seventeenth century. Brennig (1986: 349) argues that subsistence consumption for a household of six was 3.1 kg of rice per day. Taking the wheat/rice ratio of calories per lb from Parthasarathi (1998: 83) yields a subsistence consumption of 4.7 kg of wheat per day for a family of six. On this basis, grain wages were always above subsistence for skilled workers, but fell below the subsistence level for unskilled workers during the early seventeenth century.

In southern India, money wage rates are usually available in units of the pagoda, a gold coin. These pagoda rates are converted to silver rupees using East India Company standard rates from Chaudhuri (1978: 471). Although the bulk of the figures for southern India appear to fit quite well with the figures for northern and western India, the figures for 1750 stand out as substantially higher. These figures are taken from Parthasarathi (1998) and are placed in parentheses because we think they are unrepresentative and therefore misleading as a guide to overall wage levels in southern India.

Parthasarathi (1998: 84, 97) argues that a relatively unskilled weaver could earn 5 pagodas in two months, which would allow a weekly purchase of 65 lb of rice. This is consistent with the standard data on the price of rice in southern India in the mid-eighteenth century from Arasaratnam (1980: 270) at 105 lb per pagoda (or 33 lb per rupee). However, the wage rate is roughly twice the average from other sources, including unskilled wage rates from Arasaratnam (1980: 343) for the same occupation in the same area at around the same time. Parthasarathi (1998: 84, fn20) claims that his high grain wage estimates are supported by the figures of Brennig (1986). However, Brennig (1986: 349) actually works with standard low monthly earnings of unskilled weavers (1 pagoda), and obtains his estimates of a high grain wage by using an exceptionally low rice price (400 lb per pagoda). Neither Parthasarathi's high money wage nor Brennig's low grain price fits into the wider picture of trends over time and across regions.

2. Regional issues

Parthasarathi (1998: 102) suggests that the high grain wages which he claims for southern India were the result of the high productivity of rice-growing agriculture. This is of particular interest because the part of China that Pomeranz (2000) claims had living standards on a par with Britain in the eighteenth century, the Yangzi delta, is also a rice-growing area. Furthermore, Mukerjee's (1967: 44, 49) figures for Bengal in the eighteenth century are also consistent with high grain wages despite low silver wages, due to the cheap price of rice. One way of explaining the high standard of living being claimed for parts of Asia in the eighteenth century, then, may simply be to see it as a result of the naturally high yield of grain in rice-growing areas. The reduced need for shelter, fuel and clothing in a warm climate may be seen as further reinforcing this effect. But this is clearly not the message that "world historians" would wish to draw, and Parthasarathi (2001: 43-53) claims that the high productivity of southern Indian agriculture was the result not of geographical factors, but of high levels of investment during the seventeenth and eighteenth centuries.

Parthasarathi's explanation of how the investment in southern Indian agriculture came about and how it led to both high levels of economic development and low silver wages raises a number of serious logical difficulties. In the developing parts of northwestern Europe, institutional change is usually seen as bringing about investment in agriculture, leading in turn to high agricultural labour productivity. However, this higher agricultural labour productivity did not lead to an abundance of grain and low food prices, because labour moved out of agriculture into industry and services. Rising living standards came from increasing consumption of cheaper industrial goods, together with relatively constant consumption of food. In Parthasarthi's (2001: 43-53) view of southern India, however, investment in

agriculture was the result of rulers competing to attract and fix mobile labour. This investment is then seen as leading to an abundance of grain, and low food prices. Given the low price of food, it was then possible to pay low money wages to labourers in industry, and Indian industrial goods were highly competitive on world markets.

However, this raises more questions than it answers: (1) Why did competition between Indian rulers for labourers take the form of investment in land improvements rather than direct payments to labourers? (2) Why did rising productivity in Indian agriculture lead to an abundance of grain rather than a reallocation of labour to industry and services? (3) Why did the relative abundance of grain lead to a low overall price level rather than just a low relative price of grain (or high relative price of other goods)? (4) Suppose the absolute price level did start out low, making Indian textiles cheap on world markets. That should have caused an inflow of bullion, which should have raised the Indian price level. How could such equilibrating forces have been offset for two centuries?

A more plausible view is that southern India did have an abundance of rice arising from natural geographical factors, together with a high proportion of the labour force engaged in agriculture. However, the cloth export industry was but a small part of a larger economy that produced at low levels of average labour productivity. This more traditional view of southern India would also be consistent with the evidence on urbanisation, which sees the north as more urban than the south

(Hambly and Stein, 1978; Blake, 1987).[3] In this view, southern India would be more akin to Poland than Britain in the eighteenth century, with high grain wages reflecting an abundance of grain and low silver wages reflecting low levels of overall development.

3. An Anglo-Indian comparison

Table 6 allows a direct Anglo-Indian comparison of silver wages and grain wages for unskilled workers. The Indian silver wage for unskilled labourers was little more than a fifth of its English counterpart at the end of the sixteenth century, and it fell to little more than one-seventh of the English level during the eighteenth century. We have excluded Parthasarathi's (1998) estimates from this table since we think they exaggerate the Indian level of wages in the mid-eighteenth century. But even if these estimates were included, they would merely show Indian silver wages temporarily shooting up to about 40 per cent of the British level in the first half of the eighteenth century. The silver wage data suggest unambiguously, then, that the Great Divergence was already well established in the sixteenth century.

Although the Indian grain wage remained close to the English level until the end of the seventeenth century, our data indicate a sharp divergence during the eighteenth century. This divergence occurred partly as a result of a rise in the English grain wage, but also partly as a result of a decline in the Indian grain wage. This means that India looks rather more like the peripheral parts of southern, central and eastern Europe than the developing parts of northwestern Europe. In short, India was

[3] The urban population in India during Akbar's reign has been estimated at 15 per cent, made up of 120 big cities and 3,200 townships, although the latter includes settlements of less than 10,000 inhabitants. The urbanisation ratio declined in the nineteenth century, and the sixteenth century ratio was not attained again until the second half of the twentieth century (Habib, 1999: 84-85).

not on the same development level as Britain during the seventeenth and eighteenth centuries.

V. WAGES AND PRICES IN CHINA

1. Silver wages and grain wages

We shall focus on the Yangzi delta region, since it has been claimed by Pomeranz (2000) that this was not only the most advanced part of China throughout the period under consideration, but was also as economically developed as the most advanced parts of northwestern Europe. As noted earlier, we are forced to rely on the wages of agricultural labourers, from the work of Li (1998) and Pomeranz (2000). The data in Table 7 show a small drop in Yangzi delta money wages between the Late Ming and Mid Qing periods. Converting the money wage in taels into grams of silver enables us to make a comparison with the silver wage in Europe and India. The unskilled silver wage in China was about the same as the unskilled silver wage in India, and a small fraction of the silver wage in northwestern Europe. With the price of rice increasing between the Late Ming and Mid Qing periods, grain wages declined sharply. Grain wages in the Yangzi delta were of the same order of magnitude as in India.

The declining grain wage is easier to reconcile with the picture of Yangzi delta agriculture in the work of Huang (1990; 2002) and Brenner and Isett (2002) than with the more optimistic picture in Pomeranz (2000) and Li (1998). Huang (1990) uses the term involution to describe Yangzi delta agriculture, and Chinese agriculture more generally. As the size of peasant farms declined with population growth, average farm size became too small to support a peasant household through agricultural production, and household incomes were maintained by participation in low productivity textile

production. By contrast, Li (1998) argues for rising agricultural labour productivity in the Yangzi delta between the Late Ming and Mid Qing periods. Although at first sight Li (1998) appears to provide quantitative evidence to support his view, it must be emphasised that he has merely constructed stylised examples based on Chinese agricultural handbooks of the time. Furthermore, these examples are based on the assumption that the original yield data in the agricultural handbooks are always reported in terms of husked rice rather than unhusked paddy. This makes quite a difference, because 1 shi of paddy yields just 0.5 shi of husked rice (Li, 1998: xvii). If the original yield data refer sometimes to unhusked paddy, as suggested by Perkins (1969: 318-319), labour productivity levels and trends could be substantially altered.

The Chinese wage data show the same basic patterns as the Indian wage data. The Anglo-Chinese comparison in Table 8 thus shows a very similar picture to the Anglo-Indian comparison on Table 6. The silver wage was already much lower in China than in Britain by the Late Ming period, while the Chinese grain wage had also fallen decisively behind by the Mid Qing period.

2. Urbanisation and the structure of the economy

It is possible to derive estimates of the extent of urbanisation in China on a comparable basis to the estimates of de Vries (1984) for Europe (Maddison, 1998: 33-36). Although Rozman (1973) focuses on urbanisation ratios for all levels of central places, he presents enough information to derive estimates for cities of at least 10,000 inhabitants (levels 1-4). Table 9 presents estimates on both bases, together with the data on cities of at least 10,000 inhabitants for Europe. On a comparable basis, it is clear that urbanisation was already higher in Europe than in China during the Ming

dynasty, and that Europe's advantage had grown substantially by the early nineteenth century (particularly in England and Wales). Furthermore, the regional breakdown of urbanisation ratios for China in Table 10 does not suggest a development gradient anything like as steep as in Europe. The most developed part of China, the Yangzi delta, is in Jiangsu in east central China. Although the urbanisation ratio was highest in this region, the scale of the difference with the poorer regions was not particularly large. Li (1998: 21-23) argues that Rozman's Jiangsu figure for all urban settlements is an under-estimate for the Yangzi delta, but his suggestion of an urbanisation ratio for the latter of 15 per cent in 1700 is still way below the level in the Netherlands (33.6 per cent, even when the Netherlands figure is restricted to cities of more than 10,000). In short, there is nothing in the urbanisation ratios to suggest that China or the Yangzi delta were on the same development level as northwestern Europe.

VI. MONETARY AND REAL EXPLANATIONS OF THE SILVER WAGE GAP

1. Bullion flows and silver wages

One potential explanation for higher silver wages in Europe would be the inflow of precious metals from the New World during the sixteenth century. It might be expected on quantity theory of money grounds that this would lead to higher prices and wages without any real effects on the standard of living. As is well known, there was a substantial price inflation in Europe during the sixteenth century, which some writers have indeed attributed to the bullion flows (Hamilton, 1934; Braudel and Spooner, 1967). However, on closer examination, it is clear that bullion flows do not provide an adequate explanation of the much higher silver wages in Europe compared with Asia, since much of the bullion flowed to the East, both directly via the

Philippines and indirectly via Europe (Barrett, 1990). Rather, we see these high silver wages as reflecting economic development. This becomes clear when we consider regional patterns within Europe, since although prices converged, silver wages diverged.

Looking first at the issue of price convergence, we know that although the bullion flows entered Europe through Spain, price levels rose by similar amounts in most European countries (Abel, 1980: 116-120).[4] This is consistent with the classical price-specie-flow mechanism, with an initial increase in Spanish prices leading to a reduction in exports and an increase in imports, and hence to a Spanish balance of payments deficit. Since a Spanish balance of payments deficit meant an outflow of bullion from Spain, this meant also a rise in the price level in the bullion receiving countries (Craig and Fisher, 2000: 70-71). However, following criticisms concerning the timing of bullion flows and inflation in particular countries, the argument has been reformulated in terms of the monetary approach to the balance of payments (Flynn, 1978; Frenkel and Johnson, 1976). In this approach, the initial impact of the inflationary monetary shock in Spain was transmitted abroad via the law of one price, which raised the demand for money irrespective of the bullion flows.

Second, turning to the issue of wage divergence, we have seen that while prices rose along the same trend in all European countries, Spain lost its position as the high silver wage country, while England saw the biggest long run gains. This suggests that the shift of silver wage leadership from southern Europe to northwestern

[4] Hence the similar regional pattern in Tables 1 and 3.

Europe reflected real economic forces rather than monetary forces.[5] Hence the development gradient within Europe is broadly captured by the pattern of silver wages. Within this framework, India and China look much more like the stagnating parts of southern or central and eastern Europe, than the developing parts of northwestern Europe.

It is our contention that this model of bullion flows and price and wage developments can be applied to interactions between Europe and Asia as well as to interactions within Europe. There is, however, one important issue which needs to be addressed, concerning the speed of adjustment to disequilibrium. As a number of writers have recently emphasised, bimetallic exchange ratios were substantially different in Europe and Asia for long periods between 1500 and 1800, and to understand these persistent differences, it is essential to keep a clear distinction between stocks and flows of bullion (Doherty and Flynn, 1989). Flynn and Giráldez (2002: 392) identify two "silver cycles" when the bimetallic exchange ratios were substantially different in Europe and Asia, and these can be seen in Table 11. The "Potosí/Japan cycle" is seen as running from the 1540s to the 1640s, when the gold-silver exchange ratio was substantially lower in Asia than in Europe. At the peak of the disequilibrium, the gold-silver exchange ratio was about twice as high in Europe as in Asia, creating a strong incentive for European merchants to pay for Asian goods in silver.[6] Hence equilibrium had been restored by the mid-seventeenth century, as a result of arbitrage. A second "Mexican cycle" is also seen by Flynn and Giráldez (2002: 392) as covering the first half of the eighteenth century. Here the peak

[5] This point can be traced back to Adam Smith's [1776: 218-219, 256] digression on silver. We are grateful to George Grantham for alerting us to this illustrious precedent for our argument.
[6] There was, of course, an equal incentive for Asian merchants to pay for European goods in gold, but these opportunities appear not to have been widely exploited.

European gold premium was only around 50 per cent, and equilibrium had been restored by the mid-eighteenth century.

Doherty and Flynn (1989) attribute the persistence of the disequilibria to the fact that even substantial flows of bullion take a long time to have a large effect on stocks. Flynn and Giráldez (2002: 399) also stress the importance of dynamic demand factors, with the conversion of the Chinese monetary and fiscal systems to silver seen as playing an important role in raising the relative price of silver in Asia between the mid-sixteenth and mid-seventeenth centuries (von Glahn, 1996). Rapid Chinese population growth is seen as playing a similar role in the first half of the eighteenth century (Flynn and Giráldez, 2002: 406; Maddison, 1998: 169).

All this represents a welcome correction to existing accounts in the European literature, where countries as large as China and India are often portrayed as playing a purely passive role in the early modern world economy. However, note that this does not mean that there was no difference in the level of development between Europe and Asia. Remember that we are seeking an explanation for levels of wages and prices in Asia that were lower than in Europe throughout the early modern period. Showing that there were disequilibria in the gold-silver exchange ratios for long periods is not sufficient for this purpose if equilibrium was eventually restored, as in the mid-seventeenth century and again in the mid-eighteenth century. To put it simply, the gold-silver exchange ratios kept returning to equilibrium but the silver wage gaps kept on growing

It must also be borne in mind that the countries which acquired the bullion by colonisation were not the countries which prospered. Indeed, Spain and Portugal stagnated during the early modern period and were overtaken by Britain and the Netherlands, which acquired their silver for export to the east through intra-European trade. Clearly, there were real developments going on behind the surface of the monetary movements, and it is to these real developments that we now turn.

2. Productivity and silver wages

It is well known that there is a tendency for both wages and prices to be higher in developed economies, so that international comparison of wages at the official exchange rate gives a misleading impression of the gap in living standards between developed and less developed countries (Balassa, 1964; Samuelson, 1964). As a result of this, wages and per capita incomes are usually compared on a purchasing power parity (PPP) adjusted basis, taking account of the prices of consumer goods in the countries being compared (Kravis et al., 1978a). Development economists see the relationship between the PPP-converted and the exchange rate converted levels of per capita income as conditioned upon a number of real factors affecting the structure of the economy (Kravis et al., 1978b; Bhagwati, 1984; Clague, 1985). We see the relationship between grain wages and silver wages on a comparative basis as related to these same structural characteristics.

The key results of the Balassa-Samuelson approach to price level differences can be shown most simply in a two-country Ricardian model, with constant returns to the single factor of production, labour. Applying the model to the early modern international economy, we assume that grain is non-tradable internationally, reflecting

the fact that grain was bulky and costly to transport. Thus grain prices were not equalised between Europe and Asia. On the other hand, commodities such as cloth and bullion were widely traded internationally, with arbitrage tending to equalise prices between countries. If the relative prices of all tradable goods are the same in both countries, we can aggregate and consider them to be a single good, with units being chosen so that the price of one unit of each tradable good is the same.[7] Here we set out the main results intuitively, providing a more detailed exposition of the model in Appendix 1.

Thus there is one international price for the tradable commodity. Furthermore, since labour is the only factor of production, the silver wage rate in both countries must equal revenue labour product in the tradable sector, that is, labour productivity multiplied by the price of the tradable good. Thus the country with higher real labour productivity in the tradable sector has the higher silver wage, because the price is the same in the two countries. Finally, since wages are equalised between sectors within each economy, this will also be the wage in the non-tradable sector. Again, since labour is the only factor of production, the price of the non tradable good must equal the silver wage rate divided by labour productivity in the non-tradable sector. Hence the price of the non-tradable commodity depends negatively on labour productivity in the non-tradable sector and positively on labour productivity in the tradable sector (since this makes for higher silver wages).

[7] Obstfeld and Rogoff (1996: 211).

A more sophisticated version of this analysis which allows for many distinct tradable goods has been developed by Dornbusch, Fischer and Samuelson (1977).[8] The model allows for a continuum of tradable goods, which are arranged in terms of *relative* labour productivities, with good 0 having the highest relative labour productivity for the home country and good 1 having the lowest relative labour productivity. The marginal tradable good is that which both countries are competitive in producing. Thus the relative silver wages must equal the relative labour productivities in the production of this marginal tradable good. The country which has higher productivity in the production of this marginal tradable good will have higher silver wages. This model also shows clearly the principle of comparative advantage – a country will export the good where its *relative* productivity is high even though its absolute productivity may well be lower than that of the other country. Thus India's export of cotton textiles is a reflection of comparative advantage, and not of an absolute superiority in productivity.

Countries in northwestern Europe had high silver wages, while Asia had low silver wages. These lower silver wages reflected lower productivity in the tradable sector.[9] Asian countries produced cheaper grain as a result of lower silver wages, so that grain wages were almost as high as in northwestern Europe. This means that we cannot infer equal levels of economic development in parts of Asia and Europe from observations based on grain wages alone. When silver wages indicate a much higher command of European wages over traded goods, and levels of urbanisation suggest higher levels of production of non-agricultural goods, it is difficult to avoid the

[8] Obstfeld and Rogoff (1996: 236-243) provide a clear exposition.
[9] It is likely that before the Industrial Revolution this European productivity advantage in tradables arose from services such as distribution and finance as much as from production methods in manufacturing (Greif, 2000; Kuran, 2003).

conclusion that north western Europe was more developed and living standards were higher.

It may be objected that the assumptions of the model did not hold in the early modern period. Transport costs were manifestly not zero for traded goods such as textiles. However, all that we require is that there should be a difference between traded and non-traded goods, with arbitrage ensuring that the price differences are proportionally smaller for the traded goods. There is abundant evidence of arbitrage in long-distance trade in non-grain products during the early modern period. Chaudhuri (1978) provides data on goods shipped from India and China to England by the East India Company during the seventeenth and eighteenth centuries. Prices are provided for both purchase in Asia and sale in England, and indicate very strong co-movement. Although we can agree with O'Rourke and Williamson's (2002) conclusion that this stability in mark-ups indicates no substantial change in the degree of global integration during the period 1650-1750, we would emphasise that the data start after the opening of the new trade routes between Europe and Asia round the south of Africa and between Europe and the New World at the end of the fifteenth century. Hence we would also agree with Flynn and Giráldez's (2004) conclusion that the world economy was already significantly integrated by the sixteenth century, and that the growing integration with falling transport costs during the nineteenth century should not be seen as the beginning of the process of globalisation. Evidence of the greater degree of integration in cloth than in grain is provided by Allen (2003), who calculates PPP exchange rates between England and the Yangzi delta around 1800 at 18.32 for cloth and 10.03 for grain at a time when the exchange rate was around 20 bronze cash per penny. Hence the deviation from purchasing power parity was much

greater for grain than for cloth, as we would expect given the greater opportunities for arbitrage in cloth.

VII. CONCLUSIONS

This paper has attempted a quantitative assessment of the recent claims of Pomeranz (2000) and other "world historians", that the "Great Divergence" between Europe and Asia occurred only after 1800. An examination of data on wages and prices on the two continents suggests that the prosperous parts of Asia between 1500 and 1800 look similar to the stagnating southern, central and eastern parts of Europe rather than the developing northwestern parts. In India and China, grain wages were comparable to those in northwestern Europe, but silver wages were substantially lower. This is exactly the pattern observed in the less developed parts of Europe. Essentially, then, world historians are generalising the findings of the long-running debate over the standard of living in Europe to encompass the continent of Asia. It is now widely accepted following the work of Crafts and Harley (1992) that British economic growth during the Industrial Revolution was substantially slower than was once thought, which means that gains in the standard of living were slower to materialise for the masses. We know now that in northwestern Europe (1) the amount of food consumed by labourers was slow to rise (2) gains in living standards occurred primarily through the falling relative price of manufactured goods. However, there is no revisionist school of European economic history claiming that Poland or Spain were as likely as Britain to have an Industrial Revolution at the end of the eighteenth century, and it is no more appropriate to make such a claim for the Yangzi delta region of China or for southern India.

It is important not to forget that the revisionist work of Crafts and Harley (1992) had another strand, emphasising structural change. In addition to highlighting the modest nature of the growth acceleration during the Industrial Revolution, Crafts and Harley (1992) pointed out that the extent of the shift of labour out of agriculture in Britain was more radical than had previously been thought, and also occurred earlier than was once thought. Generalising this beyond the British experience, a key feature of the pattern of development in northwestern Europe was a structural shift out of agriculture, accompanied by an extensive urbanisation. The existence of sufficient grain to feed the population at a reasonable standard of living in southern, central and eastern Europe was the result of a high share of the economy's resources being devoted to agriculture, and this shows up in relatively low levels of urbanisation. Similarly, in Asia, the high grain wages of the most prosperous parts of India and China can be attributed to the high share of agriculture in economic activity, combined with the natural advantage of the high yield of rice relative to wheat. This is a long way from the development of a large, specialised, high value added structure above the subsistence agrarian system that characterised northwest European countries such as Britain and the Netherlands. The "Great Divergence" between Europe and Asia, in other words, was already well underway before 1800.

APPENDIX 1: A MODEL OF THE SILVER WAGE GAP

Consider a two-country world, with a single factor of production, labour. We assume one non-tradable commodity (grain) and a single tradable good As a result of arbitrage, there is one international price p^T for the tradable good measured in the common unit of account, silver, so that:

$$p_i^T = p^T \quad (1)$$

where the superscript *T* indicates the tradable good and the subscript *i* indicates the two countries, Asia and Europe (*i=A, E*)

With a single factor of production, labour, the silver wage in the two countries is given by:

$$w_i = p^T \alpha_i^T \quad (2)$$

where α_i^T is labour productivity in the tradable sector of country *i*. Hence the relatively low silver wage in Asia must reflect low productivity in the tradable goods sector.

Since wages are equalised between sectors within each economy, the wage in the tradable sector is also the wage in the non-tradable sector. The price of the non-tradable commodity is thus equal to the silver wage divided by the level of labour productivity in the non-tradable sector:

$$p_i^N = \frac{w_i}{\alpha_i^N} \quad (3)$$

where the superscript *N* indicates the non-tradable good and α_i^N is labour productivity in the non-tradable sector of country *i*. Substituting for wages from (2), we obtain:

$$p_i^N = \frac{\alpha_i^T p^T}{\alpha_i^N} \quad (4)$$

Hence the price of the non-tradable commodity is reduced by high labour productivity in the non-tradable sector as well as increased by high labour productivity in the tradable sector.

The grain wage is the silver wage divided by the price of the non-tradable commodity in each country. Rearranging equation (3), we have:

$$\frac{w_i}{p_i^N} = \alpha_i^N \quad (5)$$

Hence differences in grain wages reflect only labour productivity differences in non-tradable production, and do not depend on other factors such as labour productivity differences in tradable production.

Finally, consider the real consumption wage in the two countries. Assume that the consumption price is given by the weighted geometric average of the prices of the traded and non-traded commodities, with a weight of β on the latter, and with $0 < \beta < 1$ (Obstfeld and Rogoff, 1996: 211). Making the relevant substitutions, we obtain:

$$\frac{w_i}{p_i} = \left(\alpha_i^T\right)^{\beta} \left(\alpha_i^N\right)^{(1-\beta)} \quad (6)$$

If grain wages are roughly equal in the two countries (i.e. $\alpha_A^N = \alpha_E^N$), but silver wages are higher in Europe, this implies that the real consumption wage is lower in Asia, by a factor which depends on the weight β.

The model can be generalised to allow for many distinct tradable goods. Dornbusch, Fischer and Samuelson (1977) consider such a Ricardian model with a continuum of tradable goods (see Obstfeld and Rogoff, 1996: 236-243 for an exposition). Let α_E^j / α_A^j denote relative labour productivity in good j. Arrange these goods in order of decreasing relative labour productivity. Let * denote the index of the marginal tradable good, i.e. the good that can be produced in both countries. Equation (2) applies where the productivities relate to the marginal tradable good. That is, the silver wages are now given by

$$w_i = p^* \alpha_i^* \qquad (7)$$

The rest of the analysis, including the determination of non-tradable prices is the same as with two goods, given this determination of silver wages.

TABLE 1: Silver wages of unskilled and skilled building workers in Europe, 1500-1849 (grams of silver per day)

A. Unskilled labourers	1500-49	1550-99	1600-49	1650-99	1700-49	1750-99	1800-49
Northwestern Europe							
London	3.2	4.6	7.1	9.7	10.5	11.5	17.7
Southern England	2.5	3.4	4.1	5.6	7.0	8.3	14.6
Amsterdam	3.1	4.7	7.2	8.5	8.9	9.2	9.2
Antwerp	3.0	5.9	7.6	7.1	6.9	6.9	7.7
Paris	2.8	5.5	6.6	6.9	5.1	5.2	9.9
Southern Europe							
Valencia	4.2	6.6	8.8	6.9	5.7	5.1	--
Madrid	--	6.3	8.0	--	5.1	5.3	8.0
Milan	--	--	5.9	4.1	3.2	2.9	3.1
Florence	2.9	3.8	4.7	--	--	--	--
Naples	3.3	3.5	5.3	4.8	4.8	3.8	3.8
Central & eastern Europe							
Gdansk	2.1	2.1	3.8	4.3	3.8	3.7	4.8
Warsaw	--	2.5	3.2	2.7	1.9	3.4	4.9
Krakow	1.9	2.9	3.4	2.9	2.2	2.9	2.4
Vienna	2.7	2.6	4.4	3.5	3.2	3.0	2.1
Leipzig	--	1.9	3.5	3.9	3.7	3.1	4.4
Augsburg	2.1	3.1	4.0	4.7	4.2	4.3	--

B. Skilled craftsmen	1500-49	1550-99	1600-49	1650-99	1700-49	1750-99	1800-49
Northwestern Europe							
London	5.0	6.9	11.3	14.5	14.7	17.8	28.9
Southern England	4.2	5.1	6.1	8.4	10.4	12.6	22.0
Amsterdam	4.5	7.0	10.4	11.9	11.7	11.9	12.1
Antwerp	5.2	10.3	12.6	11.8	11.5	11.5	12.8
Paris	4.4	9.0	10.6	11.0	8.2	9.3	16.4
Southern Europe							
Valencia	6.5	8.5	10.5	10.3	8.6	7.6	--
Madrid	6.2	12.5	20.1	15.1	11.6	10.7	16.5
Milan	--	--	10.5	8.0	6.1	5.4	6.2
Florence	5.3	7.5	10.6	--	--	--	--
Naples	6.8	5.5	7.8	--	5.9	5.7	6.6
Central & eastern Europe							
Gdansk	2.8	4.7	6.4	7.7	6.7	5.2	8.0
Warsaw	--	3.6	5.6	4.3	5.3	7.4	10.9
Krakow	3.8	5.2	4.2	4.1	3.3	3.8	5.2
Vienna	4.0	3.9	5.5	5.2	4.8	4.8	3.2
Leipzig	2.9	3.3	6.8	7.0	6.2	5.0	6.7
Augsburg	3.5	4.2	5.4	6.5	6.0	5.4	5.8

Source: Allen (2001: 416).

TABLE 2: Grain wages of unskilled and skilled building workers in Europe, 1500-1849 (kilograms of grain per day)

A. Unskilled labourers	1500-49	1550-99	1600-49	1650-99	1700-49	1750-99	1800-49
Wheat							
Southern England	10.1	6.3	4.0	5.4	8.0	7.0	8.6
Antwerp	8.8	7.2	7.7	7.4	9.8	9.6	--
Paris	6.8	4.9	6.0	7.2	7.2	6.0	8.4
Valencia/Madrid	10.7	7.4	6.3	7.6	8.6	4.8	--
Florence/Milan	4.7	3.4	4.4	6.1	5.2	3.3	2.8
Rye							
Amsterdam	10.3	8.6	11.5	13.3	17.8	14.0	10.7
Krakow	48.7	27.9	15.7	18.7	22.7	23.0	--
Vienna	18.6	7.6	9.9	9.0	8.0	7.0	3.1
Leipzig/Augsburg	9.6	5.6	6.0	9.5	8.4	6.1	5.8

B. Skilled craftsmen	1500-49	1550-99	1600-49	1650-99	1700-49	1750-99	1800-49
Wheat							
Southern England	16.9	9.4	6.9	8.0	11.8	10.6	13.0
Antwerp	15.3	12.6	12.7	12.2	16.3	16.1	--
Paris	10.7	8.0	9.6	11.5	11.5	10.8	13.9
Valencia/Madrid	16.4	12.0	11.5	13.9	16.1	8.5	--
Florence/Milan	8.6	6.8	8.8	11.8	9.9	6.2	5.6
Rye							
Amsterdam	15.0	12.8	16.6	18.7	23.4	18.1	14.1
Krakow	97.4	50.0	19.4	26.5	34.0	30.2	--
Vienna	27.6	11.5	12.4	13.4	12.0	11.2	4.7
Leipzig/Augsburg	14.6	8.4	9.7	14.9	13.0	8.5	8.3

Sources: Wages from Table 1 deflated by grain prices from Abel (1980: 304-305); Additional information on grain prices in Spain from Hamilton (1934; 1947).

TABLE 3: Real consumption wages of European unskilled building labourers (London 1500-49 = 100)

	1500-49	1550-99	1600-49	1650-99	1700-49	1750-99	1800-49
Northwestern Europe							
London	100	85	80	96	110	99	98
Amsterdam	97	74	92	98	107	98	79
Antwerp	98	88	93	88	92	88	82
Paris	62	60	59	60	56	51	65
Southern Europe							
Valencia	79	63	62	53	51	41	--
Madrid	--	56	51	--	58	42	--
Florence/Milan	62	53	57	51	47	35	26
Naples	73	54	69	--	88	50	33
Central & eastern Europe							
Gdansk	78	50	69	72	73	61	40
Warsaw	--	75	66	72	45	64	82
Krakow	67	74	65	67	58	63	40
Vienna	88	60	61	63	61	50	27
Leipzig	--	34	35	57	53	44	53
Augsburg	62	50	39	63	55	50	--

Source: Derived from Allen (2001: 428).

TABLE 4: Urban shares of the population in Europe, 1500-1850 (%)

	1500	1600	1700	1800	1850
England & Wales	3.1	5.8	13.3	20.3	40.8
Netherlands	15.8	24.3	33.6	28.8	29.5
Belgium	21.1	18.8	24.3	18.9	20.5
France	4.2	5.9	9.2	8.8	14.5
Spain	6.1	11.4	9.0	11.1	17.3
Italy	12.4	15.1	13.2	14.6	20.3
Poland	0.0	0.4	0.5	2.4	9.3
Austria/Bohemia	1.7	2.1	3.9	5.2	6.7
Germany	3.2	4.1	4.8	5.5	10.8
Europe	5.6	7.6	9.2	10.0	16.7

Note: Based on the percentage of the population living in towns of at least 10,000 inhabitants.
Source: Derived from de Vries (1984: 30, 36, 45).

TABLE 5: Indian silver and grain wages, 1595-1874

A. Northern and western India

	Silver wage (grams per day)		Wheat grain wage (kg per day)		Rice grain wage (kg per day)	
	Unskilled	Skilled	Unskilled	Skilled	Unskilled	Skilled
1595	0.67	1.62	5.2	12.6	3.1	7.5
1616	0.86		3.0		2.4	
1623	1.08		3.8		2.9	
1637	1.08	2.37	3.8	8.3	2.9	6.5
1640	1.29		4.5		3.5	
1690	1.40		4.3			
1874	1.79	5.27	2.5	7.5		

B. Southern India

	Silver wage (grams per day)		Rice grain wage (kg per day)	
	Unskilled	Skilled	Unskilled	Skilled
1610-13	1.15		5.7	
1600-50	1.15		3.2	
1680	1.44	2.44	3.9	6.9
1741-50	1.49		2.1	
1750	(3.02)	(7.56)	(4.2)	(10.5)
1779	0.86		1.1	
1790	1.44		1.8	

Sources and notes:

Northern and western India: Silver wages: 1595: Daily wages for unskilled labourers and skilled craftsmen in Agra from Abū 'l-Fazl [1595: 123, 132-133, 145-146, 155, 159, 161-162, 235-236, 261-264, 297], following Desai (1978: 56-57).

1616, 1623, 1690: Daily wage for unskilled labourers in Surat derived from monthly wages of peons from Habib (1982: 379).

1637: Daily wage for unskilled labourers in Agra derived from monthly wages of peons from Habib (1982: 378). Daily wages for skilled workers in Agra from Mukerjee (1967: 24, 48).

1640: Daily wage for unskilled labourers in Surat derived from monthly wages of peons from Foster (1906-27, volume 1634-36: 151).

1874: Daily wages for unskilled and skilled labourers in Agra from Moosvi (1987: 335).

Conversion rates from rupees to silver: 1 rupee was worth 10.78 grams of pure silver (Habib, 1982: 360-361; Chaudhuri, 1978: 471).

Grain prices: 1595: Grain prices from Abū 'l-Fazl [1595: 65], noting that a "man" of 1595 was 55.32 lb (Heston, 1977: 393). Rice price 110.62 lb per rupee, wheat price 184.36 lb per rupee.

1616, 1623, 1637, 1640: Grain prices from Moreland (1923: 171) at 65 lbs per rupee for rice and 82.5 lb per rupee for wheat.

1690: Wheat price from Habib (1982: 373) at 72.40 lb per rupee.

1874: Wheat price from Moosvi (1987: 335) at 33.73 lb per rupee.

Southern India:

Silver wages: 1610-13: Daily wages for unskilled labourers in Golconda based on wages of servants in Dutch factory from Arasaratnam (1986: 342).

1600-50: Daily wages for unskilled labourers in East Godavari Delta based on earnings of weavers from Brennig (1986: 348).
1680: Daily wages for unskilled and skilled labourers in East Godavari Delta based on earnings of skilled and unskilled weavers from Brennig (1986: 349).
1741-50: Daily wages for unskilled labourers in Madras based on wages of labourers in scavenging services from Arasaratnam (1986: 343).
1750: Daily wages of unskilled and skilled labourers in Cuddalore based on earnings of calico weavers from Parthasarathi (1998: 84, 97).
1779: Daily wages of unskilled labourers in Cuddalore based on earnings of weavers from Arasaratnam (1980: 269-270).
1790: Daily wages for unskilled labour in Cuddalore based on weavers' earnings from Arasaratnam (1980: 269-270) and Ramaswamy, (1985:153)
Conversion rates from pagodas to rupees: East India Company standard rate of 3.2 rupees per pagoda, apart from during the period 1678-1705, when it was 4 rupees per 1 pagoda (Chaudhuri, 1978: 471).
Grain prices: 1610-13: Price of rice at 117 lb per rupee from Arasaratnam (1986: 336-337).
1600-50, 1680: Rice price 65 lb per rupee from Arasaratnam (1980: 270)
1741-50, 1750: Rice price at 33 lb per rupee from Arasaratnam (1980: 270).
1779, 1790: Rice price at 30 lb per rupee from Arasaratnam (1980: 270).

TABLE 6: An Anglo-Indian comparison of the daily wages of unskilled labourers, 1550-1849

A. Silver wages (grams of silver per day)

Date	Southern England	India	Indian wage as % of English wage
1550-99	3.4	0.7	21
1600-49	4.1	1.1	27
1650-99	5.6	1.4	25
1700-49	7.0	1.5	21
1750-99	8.3	1.2	14
1800-49	14.6	1.8	12

B. Grain wages (kilograms of grain per day)

Date	England (wheat)	India (wheat)	India (rice, on wheat equivalent basis)	Indian wage as % of English wage
1550-99	6.3	5.2		83
1600-49	4.0	3.8		95
1650-99	5.4	4.3		80
1700-49	8.0		3.2	40
1750-99	7.0		2.3	33
1800-49	8.6	2.5		29

Sources: Tables 1, 2, 5.
Note: Wheat equivalence of rice obtained on calorific basis, multiplying rice grain wage by 1.5 (Parthasarathi, 1998: 83).

TABLE 7: Daily wage of hired farm labourers in the Yangzi delta, 1573-1850

	Late Ming 1573-1644	Mid Qing 1736-1850
Money wage (taels)	0.04	0.045
Silver wage (grams of silver)	1.5	1.7
Grain wage (kg of rice)	3.0	2.0

Notes and sources: Late Ming: Daily money wage from Li (1998: 94), converted to silver wage using 1 tael = 37.5 grams of silver, from von Glahn (1996: 133). Money wage converted to grain wage using rice price of 1 tael per shi of 75 kg from Li (1998: 210, fn 1). Mid Qing: Money wage from Pomeranz (2000: 319-320), with maximum annual wage on basis of full employment converted to a daily basis on assumption of 300 day year, converted to silver wage using 1 tael = 37.5 grams of silver, from von Glahn (1996: 133). Money wage converted to grain wage using rice price of 1.67 tael per shi of 75 kg from Pomeranz (2000: 319).

TABLE 8: An Anglo-Chinese comparison of the daily wage of unskilled labourers, 1550-1849

A. Silver wages (grams of silver per day)

Date	Southern England	Yangzi delta	Chinese wage as % of English wage
1550-1649	3.8	1.5	39
1750-1849	11.5	1.7	15

B. Grain wages (kilograms of grain per day)

Date	England (wheat)	Yangzi delta (rice)	Yangzi delta (rice, on wheat equivalent basis)	Chinese wage as % of English wage
1550-1649	5.2	3.0	4.5	87
1750-1849	7.8	2.0	3.0	38

Sources: Tables 1, 2, 7.
Note: Wheat equivalence of rice obtained on calorific basis, multiplying rice grain wage by 1.5 (Parthasarathi, 1998: 83).

TABLE 9: Urban shares of the population in China and Europe, 618-1820 (%)

	Tang 618-906	Song 960-1279	Ming 1368-1644	Early Qing 1644-1736	Early 19th century
China					
All urban	4.7	5.2	6.5	6.8	5.9
Cities > 10,000	3.0	3.7	4.9	6.0	3.8
Europe					
Cities > 10,000	--	--	7.6	9.2	10.0

Source: China: Derived from Rozman (1973: 102, 279-283); Europe: Table 4.
Note: Urbanisation ratio for cities of at least 10,000 inhabitants derived from Rozman's level 1-4 cities.

TABLE 10: Regional variations in the Chinese urbanisation ratio in the mid-19th century (%)

	All urban	Cities >10,000
Northern China		
Shandong	4.4	2.6
Shanxi	4.0	2.0
Henan	5.0	2.2
Northwestern China		
Shaanxi	7.3	4.5
Gansu	4.3	2.3
East central China		
Anhui	4.0	1.9
Jiangsu	7.4	5.6
Zheijiang	6.1	4.1
Central China		
Hubei	6.0	4.0
Hunan	5.2	2.8
Jiangxi	6.3	3.8
Southeastern China		
Fujian	8.2	5.3
Guangdong	6.7	5.0
Guangxi	6.1	3.3
Southwestern China		
Guizhou	5.8	3.3
Yunnan	4.4	2.5
Sichuan	6.0	3.6

Source: Derived from Rozman (1973: 205, 213, 218, 231, 239, 247).

TABLE 11: Gold-silver exchange ratios, 1500-1800 (units of silver per unit of gold)

	England	France	European average	China	India
1500	12	12	11	9	
1525	12	12	11	7	
1550	12	12	11	6	
1575	12	12	12	6	9
1600	12	12	12	7	10
1625	14	13	13	8	13
1650	14	14	14	14	14
1675	15	15	15	15	15
1700	15	15	15	11	13
1725	15	15	15	10	12
1750	15	15	15	15	14

Sources: Craig (1953: 413-417); Spooner (1972: 330); Braudel and Spooner (1967: 459); von Glahn (1996: 128; 1998); Habib (1982: 367).

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