Real Wages and Relative Factor Prices in the Third Word 1820-1940: Asia

by

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Abstract

By 1914, there were very big economic gaps between the European industrial core and countries around Asia, from Japan to what we now call Pakistan. When did the gaps appear? Can they be explained by lags in the diffusion of the industrial revolution after 1780, or did the gaps appear much earlier? What about the first great globalization boom after about 1870? Which countries in Asia started catching up, which fell further behind, and which held their own? What role did globalization and demographic forces play? Conventional quantitative evidence, like Agnus Maddison's GDP data, is often too incomplete to confront these central questions. In an effort to suggest a new research agenda for the region, this essay uses a new data base on real wages and wage/rental ratios for thirteen major Asian regions -- Burma, China, India (North, South, East and West), Indonesia (Java and Outer Settlements), Japan, Korea, the Philippines, Taiwan and Thailand. These thirteen regions, often documented from as early as 1820, form the data base for the paper, and they are well balanced among the three major areas consisting of South Asia (four), Southeast Asia (five) and East Asia (four) so that we can say something about "north-south gaps" within the region, as well as between it and the European core.

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New Evidence, Controlled Conjectures and an Agenda

Two important features of the world economy after 1970 also characterized the economy after 1870. First, there was rapid globalization a century ago too: capital and labor flowed across national frontiers in unprecedented quantities, and commodity trade boomed as transport costs dropped sharply. Second, the late 19th century underwent an impressive convergence in living standards, at least within most of what we would now call the OECD club, but what historians call the Atlantic economy. Poor countries around the European periphery tended to grow faster than the rich industrial leaders at the European core, and often even faster than the richer countries overseas in the New World. This club excluded most of what is now called the Third World and eastern Europe, and even around this limited periphery there were some who failed to catch up. Nonetheless, there was convergence.

It was not always that way: unambiguous divergence was the case earlier. The Atlantic economy in the first half of the previous century was characterized by high tariffs, modest commodity trade, no mass migrations, and an underdeveloped global capital market. Two profound shocks occurred in this environment still hostile to liberal globalization policy: early industrialization in Britain which then spread to a few countries on the European continent; and resource "discovery" in the New World, set in motion by sharply declining transport costs linking overseas suppliers to European markets, so much so that real freight rates fell by an enormous 1.5 percent per annum between 1840 and 1910 (O'Rourke and Williamson, 1998, ch. 3). These two shocks triggered a divergence in real wages and living standards across the Atlantic economy that lasted until the middle of the century (Williamson 1996).[1]

Figure 1 shows that the convergence which started in mid-century continued up to 1914: a plot of the dispersion of real wages is given there, documenting what the modern macro economists call beta-

[1] Robert Allen (1998) argues that the divergence within Europe started much earlier. This evidence will be discussed below.

convergence. The line with the diamonds on the upper left of Figure 1 is based on a 13-country Atlantic economy sample including Australia, Belgium, Brazil, France, Germany, Great Britain, Ireland, the Netherlands, Norway, Portugal, Spain, Sweden and the United States. The dashed line in Figure 1 documents convergence for an expanded 17-country Atlantic economy sample, now including in addition Argentina, Canada, Denmark and Italy. This measure shows the convergence tide ebbing around 1900. If we exclude Canada and the United States, two "exceptional" rich countries which bucked the convergence tide, convergence continues rapidly up to 1914 (the 15-country sample plotted with the triangles). If we exclude in addition two Mediterranean Basin countries which failed to play the globalization game, Portugal and Spain, convergence up to 1914 is faster still (the 13-country sample plotted with the squares).

Meanwhile, how did Asia do? It is far too easy to assume that enormous distances kept Asia completely out of this First Great Globalization Boom, except for a few expensive spices and raw materials which could bear the freight. True, trade shares were far lower in Asia than in Europe, and a very small share of European financial capital flowed into Asia up to 1914. Yet, transport revolutions created profound price shocks in late 19th century Asia, and a move towards open trade policy (with the help of imperialist gunboats) created even more liberal trade attitudes in the region than was true even of the Atlantic economy after the 1870s, an attitude that seems to have persisted through much of the recent Asian Miracle. What happened to Asian real wages and living standards in response to the challenge of both the European Industrial Revolution and the First Great Globalization Boom?

These are the questions that motivate half of this essay. They are in the tradition of W. Arthur Lewis who was the first to ask whether the core pulled along the periphery during this First Great Globalization Boom (Lewis 1969, 1978a, 1978b). It was he, together with Alexander Gerschenkron (1952), who first tried to break economic history's tenacious fixation on the industrial leaders, Lewis focusing on the Third World and Gerschenkron on European late comers like Italy and eastern Europe.

The other half of this essay asks when the great divide between Core and Periphery first appeared.

By the end of our period, there were huge gaps in living standards and GDP per capita between agrarian Asia and the industrial northwest of Europe. When did the great divide open up? During the late 19th century growth boom? During the early industrial revolutionary decades after 1780? Even before? And what are the explanations? The timing and location of industrial revolutions, population growth, globalization, the rise of efficient political systems, or all of the above?

Furthermore, what about within Asia? When Japan started its experiment with industrialization in the 1880s, where did it stand in Asia's economic pecking order? Were its living standards already far above those in Southeast Asia -- in, for example, what we now call Burma, Thailand and the Philippines -- and in South Asia -- in what we now call Bangladesh, Pakistan and India? Some have recently argued that India probably had living standards comparable with England in the mid-18th century. Others have recently argued the same for China. If so, when did China and India lose this position of mid-18th century parity? And much of Southeast Asia was relatively labor scarce and land abundant at the start of the last century. The region absorbed immigrants from the contiguous parts of China and India, and probably generated rapid population growth from its own domestic sources. Did, as a consequence, Malthusian diminishing returns drive down living standards in Southeast Asia, at least relative to the other two wings of Asia?

These are not questions that could have been attacked very well even only two decades ago since the data had not been gathered in such a way as to make these comparative judgments possible. Now we have enough to make some real progress. However, the paper will go light on the detailed analysis and go heavy instead on some new factor price and living standard data (Appendices 1-9), some "controlled conjectures,"[2] and an Asian agenda which the data suggest.

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[2] I borrow this term from a paper written by Paul David (1967) more than thirty years ago on United States growth performance prior to the 1840s.

Asia and the World Economy: Breaking Down the Tyranny of Distance[3]

In a book entitled The Tyranny of Distance (1966), Geoffrey Blainey showed how distance shaped Australian history. Distance had the same impact on the rest of Asia until late in the 19th century, isolating Asia from Europe where, after all, the industrial revolution was unfolding. Late in the 19th century, transport innovations started to change all that, although not completely. The appearance of the Suez Canal, cost-reducing innovations on sea-going transport, and railroads penetrating the interior did not completely liberate Asia from the tyranny of distance by 1914. Indeed, economists have shown that growth performance today is still influenced by whether a country is landlocked, by the length of its coastline, and by its distance from Tokyo, New York and Europe (Radelet, Sachs and Lee 1997). Yet, it was the change in the economic distance to the European core which mattered to late 19th century Asia, even though the levels remained high well in to this century.

Transport cost declines from interior to port and from port to Europe ensured that Asian economies became more integrated into world markets. Price gaps between Britain and Asia were driven down by the completion of the Suez Canal, by the switch from sail to steam, and by other productivity advances on long distance sea lanes. The cotton price spread between Liverpool and Bombay fell from 57 percent in 1873 to 20 percent in 1913, and the jute price spread between London and Calcutta fell from 35 to 4 percent (Collins 1996: Table 4). The same events were taking place even farther East, involving Burma and Java. The freight rates on sugar between Java and Amsterdam fell by 50-60 percent between 1870 and World War I (Yasuba 1978: Graph 2). They fell by about 65 percent on rice shipments between Burma and Britain (Yasuba 1978: Graph 2). Indeed, the rice price spread between London and Rangoon fell from 93 to 26 percent in the four decades prior to 1913 (Collins 1996: Table 4). These events had a profound impact on the creation of an Asian market for wheat and rice, and, even more, on the creation of a truly global market for grains (Latham

[3] This section draws heavily on O'Rourke and Williamson (1998: Chp. 3).

and Neal 1983; Brandt 1985, 1993; Kang and Cha 1996).

China and Japan were also involved in these events. The freight rate on coal (relative to its export price) between Nagasaki and Shanghai fell by 76 percent between 1880 and 1910, and it has been estimated that the total factor productivity growth rate on Japan's tramp freighter routes serving Asia advanced at 2.5 percent per annum in the thirty years between 1879 and 1909 (Yasuba 1978: Tables 1 and 5).

This commodity price convergence generated an Asian trade boom between 1870 and 1913, just as it did in the Atlantic economy. Export shares in GDP (constant price, Maddison 1995: 190 and 237) almost doubled in India (3 to 5.7 percent); they more than doubled in Indonesia (1 to 2.2 percent); and they more than tripled in Thailand (2.1 to 6.7 percent). But perhaps the greatest 19th century "globalization shock" in Asia did not involve transport revolutions at all. Under the persuasion of American gunships, Japan switched from virtual autarky to free trade in 1858. It is hard to imagine a more dramatic switch from closed to open trade policy, even by the standards of the recent Asian Miracle. In the fifteen years following 1858, Japan's foreign trade rose 70 times, from nil to 7 percent of national income (Huber 1971). The prices of (labor-intensive) exportables soared, rising towards world market levels; the prices of (land and machine-intensive) importables slumped, falling towards world market levels. One researcher estimates that Japan's terms of trade rose by a factor of 3.5 between 1858 and the early 1870s (Huber 1971); another thinks the rise was even bigger, a factor of 4.9 between 1857 and 1875 (Yasuba 1996: 548). Whichever estimate one accepts, this combination of declining transport costs and the dramatic switch to free trade unleashed powerful globalization forces in Japan. Other Asian nations followed this liberal path, most forced to do so by colonial dominance or gunboat diplomacy. Thus, China signed a treaty in 1842 opening her ports to trade and adopting a 5 percent *ad valorem* tariff limit. Siam adopted a 3 percent tariff limit in 1855. Korea emerged from it's autarkic "Hermit Kingdom" about the same time, undergoing market integration with Japan long before colonial status became formalized in 1910. India went the way of British free trade in 1846, and Indonesia mimicked Dutch liberalism. In short, by the 1860s commodity price convergence was driven

entirely by the sharply declining transport costs in Asia without much change in tariffs one way or the other. Asian commitment to globalization started more than a century ago.

With Asian globalization forces now on the agenda, let us turn now to the growth of nations in the region.

The Growth of What?

Most economists who have written about the comparative growth of nations have used GDP per capita or per worker to measure catching up and convergence, or falling behind and divergence. This and other essays of mine favor instead real wage rates (purchasing-power-parity adjusted, and typically for urban unskilled workers). I can think of at least four good reasons why it is a mistake for the convergence debate to have ignored wages and other factor prices, especially for the previous century and earlier.

First, the pre-1940 real wage data -- especially for Asia -- are of far better quality than the GDP data, and they are certainly available for a wider sample. Indeed, while Angus Maddison (1995) is able to document real GDP per capita for a surprisingly large part of early Asia, he still can only record observations for the following: Burma, the Philippines, Korea and Taiwan start only with the turn of this century and offer nothing for the previous one; Thailand starts with 1870, and repeats only every twenty years until 1913; Bangladesh and Pakistan start in 1820 but then leap over eighty years to 1900; China and Japan start in 1820 but then leap fifty years to 1870; and India and Indonesia start in 1820, leap to 1850 and then report observations only for every twenty years up to 1913. While impressive, such GDP per capita data are usually not enough to deal adequately with the questions raised in the introduction. As this paper and Appendices 1-9 show, real wages can be documented for the following: Burma from 1873; China from 1902; India from 1873; Indonesia from 1820; Japan from 1831; Korea from 1907; the Philippines from 1899; Taiwan from

1897; and Siam from 1820.[4] Furthermore, we can begin making statements about PPP-adjusted (purchasing-power-parity adjusted) real wages relative to the European core from each of those dates. In addition, these real wage time series are typically available annually, so that epochs and major turning points can be identified with much greater clarity than is true for the GDP data which is typically reported for every two decades or even longer.

Second, income distribution matters, and wage rates (especially when combined with other factor prices) offer a window by which to look in on distribution issues. Real people earn wages or skill premia or profits or rents, not that statistical artifact known as GDP per capita. GDP per worker hour may sound like a good measure of aggregate productivity, but surely the living standards of ordinary workers as captured by real wages are a better indicator of the economic well-being of the vast majority in any society. By averaging all incomes, macro economists (and economic historians that mimic them) throw away valuable information.

Third, factor price movements help us understand the growth of nations. For example, productivity catch-up in a poor country is more likely to increase all factor prices equally than is mass emigration (easing population pressure on the land) or an export boom for agricultural products (increasing the demand for land). The open economy forces which may have been important in driving late 19th century economic change in Asia -- trade, migration and capital flows -- operated directly on factor prices, and thus only indirectly on GDP per capita.[5] An exclusive focus on GDP per capita misses most of the story.

Fourth, economic change nearly always involves winners and losers, a fact which is crucial in accounting for the evolution of policy and the survival of empires, perhaps more so in politically independent societies like China, Japan and Siam than in dependent colonial societies like Indonesia and India. Still, changes that would increase GDP per capita but would also cause losses to some politically powerful group

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[4] Throughout this paper, we will use the labels Siam and Thailand interchangeably.

[5] For a summary, see Williamson (1996), and O'Rourke and Williamson (1998).

are often successfully resisted even in colonial economies, and examining the behavior of factor prices is a good way to start the search for the sources of such political resistance.

The Asian Real Wage Hierarchy Around the Turn of the Century

Table 1 pulls together estimates of the real wage hierarchy around Asia and between it and the European industrial leader, Britain. The assessment is made around the turn of the century. All of the estimates in Table 1 calculate urban unskilled wages from various parts of Asia relative to urban unskilled wages in Britain.[6] More importantly, none of the wage relatives in Table 1 are calculated at the prevailing exchange rate. It is well-known that the use of exchange rates, dominated by tradable goods, is inferior to the use of purchasing-power-parity, the latter constructed from workers' market baskets. However, trying to construct PPP-adjusted real wages based on common market baskets and region-specific relative prices would entail another research project. Table 1 uses a shortcut: we take Maddison's 1913 PPP-adjusted GDP per capita estimates as our benchmark and project our real wage series forward and backward from that point.

The Asian real wage hierarchy around the turn of century is clear enough, and while some of the estimates in Table 1 seem to be consistent with other qualitative and quantitative accounts, some are quite surprising. Burma was at the bottom of the Asian hierarchy in 1909-1913, a real wage level less than one-eighth that of Britain. In Latin America, only the previously-slave-based Brazilian northeast had levels of living that low (Williamson 1998a), and there were no countries in the Mediterranean that had levels of living that low (Williamson 1998b). China and India were only a bit above the Burmese level, and the figures here, 14.1 and 14.6 percent of Britain, were about the same as Egypt, 13.8 percent (Williamson 1998b: Table 1).

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[6] True, one of the Asia regions, Indonesia, could not yield truly urban wages. But even in this case, all we need assume is that the wage gap between city and countryside was relatively stable over time to assert that the Indonesian time series is a perfectively adequate proxy for changes in the real wages of urban workers.

Given the fragile character of these estimates, however, it would be wiser to say simply that Burma, China and India were all packed close together at the bottom of the Asian hierarchy just prior to the Great War. After all, Burma was just 10 percent below the average for this group of three, and India just 7 percent above. Furthermore, all three (and others in Asia) exhibited enormous instability in the real wage and living standards since so much depended on the relative price of rice, the key foodstuff throughout most of the region, and the key commodity in the market basket of the urban poor. Thus, these three often changed places in the ranking from one half-decade to another. Thailand, Taiwan and Indonesia were in the middle of the hierarchy, 15.1, 16.4 and 18.3 percent of Britain. Korea, the Philippines and Japan were the high income regions of Asia, respectively 25.2, 27.2 and 27.4 percent of Britain. Thus, these three high income Asian regions had living standards that were a little more than a quarter of Britain, levels which appear to have exceeded those of the Italian Mezzogiorno, Portugal, Serbia, and Turkey in the Mediterranean (Williamson 1998b), but they still fell behind Latin American regions like Argentina, southeast Brazil, Colombia, Uruguay and even Mexico (Williamson 1998a).

These real wage estimates for 1909-1913 offer an amazing confirmation of the historical persistence of the wealth of nations. This ranking changed very little in the eighty years between the Great War and the end of the recent Asian Economic Miracle. History and initial conditions matter.

What has changed, however, is the size of the north-south gap in Asia. The 1992 ratio between the two at the top, Japan and Korea, and the two at the bottom, China and India, was about 50 (IBRD 1993: 18-19).[7] The 1909-1913 ratio based on Table 1 was less than 2. This was not solely an East Asian economic miracle at work since the economic distance between the middle and the bottom also surged over this century. The 1992 ratio between the two in the middle, Indonesia and Thailand, and the two at the bottom was 3.6, while the 1909-1913 ratio was 1.2. However, the great gaps in 1992 are primarily due to East Asian development and due to events after World War II, not before. The ratios of the same top and middle two to

[7] All the calculations which follow in this paragraph use unweighted averages.

the same bottom two in 1925-1929 were 2 and 1.03. These small gaps were even smaller at the end of the Great Depression 1935-1939. Clearly, the 20th century was one of spectacular divergence in Asia, but most of it has been a post-World War II phenomenon and most of it has been driven by East Asian success. Nonetheless, these big 1992 North-South gaps in Asia are based on an economic hierarchy which was already well-established at least a century ago.

The most surprising results coming from Table 1, however, relate to the evolution of Asian real wages from the 1870s to just before the Great War. In spite of impressive industrialization efforts, there is no evidence that living standards in Japan were catching up on Britain, even during a period economic historians label "British failure." Elsewhere in Asia, there was a spectacular collapse in real wages relative to Britain, most of which took place in the two decades between 1873-1883 and 1899-1903. In the 1870s, real wages for the unskilled in Bangkok were two-fifths those in urban Britain, and in India's cities they were a third. By the turn-of-the-century, the figures had dropped to something like one-seventh and one-sixth. Just before the Great War, India's position had fallen still further.

So, while unskilled urban workers in Japan and the Philippines managed to keep up with Britain's real wage growth, the rest of Asia fell further behind. Why? What happened during the First Great Globalization Boom?

When Did the Core-Periphery Gap Open Up? The First Great Globalization Boom

When did these gaps open up? It appears that some of it happened during the globalization boom after 1870, most exploiting it badly, and some exploiting it not at all.

Perhaps the comparison with Britain is unfair. Table 4 offers alternatives: comparisons with the Netherlands, which makes things a little worse, and comparisons with the average of Britain, France and Germany, which makes things a little better. But using alternative definitions of the European core does not

change the 19th century story.

Perhaps the comparison with the European core is unfair: trend acceleration is a common attribute of modern economic growth, so late-comers have a hard time catching up to the early industrializers until they have had a chance to gain some momentum.

What follows, therefore, will rely on both relatives and absolutes. Table 2 documents real wage performance. Tables 3 and 4 offer comparisons with the European core using various definitions of the latter. Table 5 limits the comparison to the growth performance within Asia, each region gauged relative to the ultimate leader of the pack, Japan.

Let us begin with the extreme version of the labor surplus model and the 19th century real wage trends in Table 2 and Figures 2 and 3. The extreme version of W. Arthur Lewis's (1954) labor surplus model predicted a constant real wage, as did the classical model developed by British economists who had not appreciated when they were writing how the Industrial Revolution was making a break with the past. Empiricists using 20th century data dealt the labor surplus model severe blows in the 1960s, so severe in fact that it is no longer the dominate paradigm that it was forty years ago. But perhaps the model might do better in pre-industrial 19th century Asia?[8] It does not. Prior to 1914, real wages in Asia underwent enormous shortrun and longrun variation. They collapsed by 42 percent in India between the early 1870s and the Great War. They more than doubled in Indonesia between the early 1820s and 1910-1914. In Siam, they surged , from the early 1820s to the early 1880s, then lost all of those gains by World War I. In Japan, real wages showed no longrun trend at all until the 1880s, after which they started their steady rise which persisted for a century. Theory tells us that even in steady state every country can reach different equilibrium living standards (Barro and Sala-i-Matin 1995), but there is no evidence that 19th century Asia was in steady state.

Consider now Burma, Indonesia and Thailand, the southeast "frontier" of Asia. The available time

[8] The odds are not good even here, given that the classical model didn't even explain the years between 1780 and 1820, the period for which it was originally constructed (Williamson 1985).

series for Burma is short, but what we do have suggests a living standards peak 1900/04 to 1915/19. Indonesia and Thailand peaked earlier, in the 1880s. The enormous rise in living standards in these two parts of the southeast Asian frontier are consistent with globalization, rising export prices, and settlement on an extensive margin. The collapse after the 1880s must be explained by other factors since the positive globalization forces were still at work until primary product prices collapsed after the Great War. Presumably, the extensive margin disappeared and continued immigration into the region began to press downwards the still-relatively-high-compared-to-emigrating-areas living standard. These are all simply assertions which will be tested in future papers, but any explanation will have to deal with the exceptional success of the Philippines since living standards doubled under American occupation.

Korean and Taiwanese experience seems at first sight to be consistent with the nationalist critique that Japanese imperialism eroded workers' living standards (Kimura 1995; Kang and Cha 1996). Certainly living standards there fell from pre- to post-occupation. But correlation is not necessarily causation. How much of these trends can be attributed to Japanese imperial policy? If the answer is most of it, then exactly how did Japanese policy in Korea and Taiwan differ from US policy in the Philippines, and can the policy differences explain the strikingly different experience with living standards? On the other hand, how much of the living standards decline in Korea and Taiwan might be explained by the collapse in primary product prices in world markets facing these relatively small economies that were heavily dependent on trade? If so, why weren't living standards sagging elsewhere in Asia from the turn of the century to the late 1920s, especially in the Philippines? We add these questions to the growing agenda, but some of them will be confronted again when we look at wage-rental ratio trends.

China's time series is too short and too weak in quality to say much at all except that unskilled urban real wages in the major cities changed hardly at all between 1910-1914 and 1935-1939.

We conclude with a comment about India's experience. Real wages there collapsed sharply between the late 1880s and the Great War, and Table 8 shows that it was happening everywhere on the subcontinent.

India seemed to share the same dismal post-1880s experience that was true of Southeast Asia. Why? The next section will ask whether there is any evidence that India (and China) underwent a fall in living standards from the mid 18th century to the Great War, and whether the post-1880s collapse is simply part of that longer trend. If so, it would be very different than the Southeast Asian experience.

Table 3 reports how Asian living standard growth measured up to that of Britain, while Table 4 expands the comparison to include other parts of the European core. The stories are similar, so I will stick with Britain and Table 3. Japan's real wage was 33 percent of Britain in the early 1830s, and it was 32 percent of Britain in the late 1920s. No catching up here, but at least Japan was able to hold her own, first by switching in the 1850s from autarchy to an open trade policy (with some help from American gunboats) and second by mounting a very successful Meiji industrialization program after the 1880s. While the former didn't stick (real wage gains up to the late 1850s and early 1860s disappeared by the 1870s), the latter certainly did.

The other two success stories in 19th century Asia were brief: during their real wage surge from the 1820s to the 1880s, Indonesia and Thailand were actually catching up on Britain, which was impressive since Britain was undergoing unusually fast real wage growth during that period.

With the exception of the Philippines, the rest of Asia was falling behind the European core. The core-periphery gap was already wide by the end of the first third of the 19th century, but it got even wider during the rest of the 19th century, especially after the 1880s.

When Did the Core-Periphery Gap Open Up? Looking at the More Distant Past

Conjectures on the Origins of the Core-Periphery Gap

Latter in this section we will review the recent revisionist arguments that living standards in China and India were probably on par with those in Britain around the mid 18th century, that is, immediately prior

to the Industrial Revolution. But assume for the moment that they were on par around 1700 or 1750. Tables 1 and 3 suggest that by the 1870s Indian living standards had fallen from the assumed parity to a third of Britain. By 1910-1915, the figure had fallen to 15 percent of Britain, where the Anglo-Indian gap had reached its maximum. Over two centuries, living standards in India relative to Britain dropped from 100 to 15 percent, a fall of 85 percentage points. That fall does not have its source with the interwar period, since the real wage in India (relative to Britain) was a bit higher in the 1930s than around the Great War. About 18 percentage points of that fall took place during the First Great Globalization Boom after the 1870s. Indian workers did not benefit from globalization, it appears. About 67 percentage points were lost between the mid 18th century and the 1870s. One supposes this measures the disadvantage of failing to industrialize.

Now, can we confirm the assumption of parity in the 18th century? And does the story apply to China as well?

Were Indian Living Standards on Par with Britain in the 18th Century?

Prasannan Parthasarathi (1998) has recently published a paper which persuasively argues that living standards in south India were at least equal to that of Britain in the 18th century. Other historians of India are starting to come around to this revisionist position. And according to Table 8, South India was roughly on par with all-India in the 1870s and 1880s.

What kind of evidence does Parthasarathi marshall? Much of it is quantitative, and all of it is very careful in trying to make the comparison as comparable as possible in terms of the workers, time worked, and the goods and services consumed. This is not the place to survey in detail all the evidence that Parthasarathi brings to bear on the issue. Some highlights will have to serve to state the case.

The evidence for India is mainly based on spinners and weavers in the South, and on the grain content (rice) of their wages compared with the grain content (wheat) of rural and small town spinners and weavers in Britain. So measured, weekly wages for men and women in textiles were roughly comparable in

the 18th century. Weekly wages in agriculture were also comparable. Furthermore, agricultural productivity was about the same, or perhaps even higher.

According to this evidence, 18th century workers' living standards in India could not have been very different than in England. Yet, the evidence does not deal with non-grain consumption, it is not confirmed with mortality data, nor is it confirmed by travelers' or official reports on the quality of homes and furnishings. And are we sure that the South was like India as a whole? These issues may matter, as we shall see in a moment.

Were Chinese Living Standards on Par with Britain in the 18th Century?

Kenneth Pomeranz (1997) has recently published a paper which argues that 18th century living standards on the lower Yangzi and Lingnan – China's two most advanced regions – were at least as high as they were in Britain and the Lowlands – Europe's two most advanced regions. Parthasarathi and Pomeranz seem to be unaware of each other's work, but they are clearly saying the same thing. As in the Indian case, Pomeranz is very careful in making the comparison as comparable as possible.

The evidence for China takes the following form: compared to England, equally high caloric intake based on landless agricultural laborers 17th century diets and 18th century per capita grain consumption country-wide; even higher 18th century rural Chinese life expectancies than Europe; the same share of expenditures by farm laborers in 17th and early 19th century China on basic foodstuffs as by the rural poor in England in the 1790s; late 18th century European travelers noted that the average Chinese smoked more than did the average English, and that China's successful farmers in the interior had the same quality furnishings and house construction as did provincial English farmers; per capita tea, sugar and silk consumption were higher in China about 1800; and furniture inventories in early 20th century Chinese homes were about the same as that in 18th century Netherlands

According to this evidence, 18th century living standards in China could not have been very different

than those in England and the Lowlands. But note that the timing in these comparsions is often a bit vague. Are we talking about the 17th, 18th or early 19th century China? In a moment, we will argue that it may matter.

Has the Case Been Overstated? Pre-Industrial Sources of Core-Periphery Gaps

A recent paper by Robert Allen (1998) suggests that the arguments by Pomeranz and Parthasarathi are probably overstated.[9] Allen has exploited wage and price data which scholars first started collecting for Strasbourg and southern England. In 1929, the International Scientific Committee commissioned similar studies covering all of England, Germany, France, Austria, Poland and Spain (Cole and Crandall 1964). Belgium and Italy were added later. Allen was able to find sufficient material to reconstruct real wages over the four centuries 1500-1913 for London and fifteen other European cities, five of which were in the Mediterranean and many of the remainder in central and eastern Europe. Like our Asian data, the wages are for urban laborers and craftsmen, and the rates of pay are typically daily. Allen then uses the prices and fixed market basket weights to construct true PPP-adjusted wages across these cities.

This is an extraordinarily high quality data base, and Allen uses it to say something concrete about living standard convergence and divergence over the very long run in Europe. That is, it speaks to the question: When did the core-periphery gap appear in Europe? When did economic gap emerge between the rich northwest of Europe -- led by England and the Lowlands -- and what eventually became the poor south, central and eastern parts of Europe?

The central message of both Allen's (1998) paper and my own on the Mediterranean (Williamson 1998b) is that the core-periphery gap in Europe was <u>not</u> the product of the late 19th century globalization surge, although some part of it was in Asia. Instead, the core-periphery gap was the product of two events: 17th and 18th century pre-industrial economic success while the European periphery stagnated; <u>and</u> Britain's

[9] See also Williamson (1998b), where Allen's argument is applied to the Mediterranean Basin.

industrial revolutionary gains up to the mid 19th century which the others were slow to copy. In 1500, the cities in Europe were pretty much on par; by 1850, living standards around the periphery were only 30-40 percent of those in London. Starting at parity early in the 16th century, Florence and Milan were only about 59 percent of London early in the 18th century, while Valencia was only 54 percent; by World War I, the figure for Florence and Milan was 36 percent, while it was 48 percent in Madrid.

In short, a good share of the core-periphery gap in Europe was more than simply the product of some uneven timing of industrial revolutions or of some inability to exploit the First Great Globalization Boom. Rather, pre-industrial events between 1500 and 1800 mattered just as much. Kenneth Pomeranz's (1997) work on China and Prasannan Parthasarathi's (1998) on India suggests that Asia was different, and that all of the core-periphery gap between Europe and Asia was the product of the timing and location of industrial revolutions, and, we now see, the inability of Asia to exploit the globalization boom after the mid 19th century.

Can the experience with the emergence of a core-periphery gap within Europe be so different than the experience with the emergence of a core-periphery gap between Europe and Asia? Are we sure that the gap between the European core and both China and India was due solely to the presence of an industrial revolution in the former and its absence in the latter? If so, we have to explain why about half of the core-periphery gap within Europe emerged between 1500 and 1800, well before any industrial revolution took hold in the European core, and why that did not happen in Asia.

Trends in Asian Wage-Rental Ratios

The revolutionary decline in transport costs across the 19th century had its counterpart in Asia. Price gaps between Europe and Asia were driven down by the completion of the Suez Canal, by the switch from sail to steam, by other productivity advances on long distance sea lanes and by railroad penetration of the

interior. Most dramatically, Japan switched from virtual autarky to free trade in 1858. Between 1858 and the early 1870s, prices of labor-intensive exportables soared in Japan, rising towards world market levels, while prices of land and machine-intensive importables slumped, falling towards world market levels. The Heckscher-Ohlin model of trade would predict that the abundant factor (labor) would have flourished while the scarce factor (land) would have languished over the fifteen years. Did they?

The available factor price evidence for Japan in mid-century is limited. Appendix Table 5.4 reports that data on land rents or land values are not available until 1885, long after Japan's leap to openess had taken place. But we do have some crude evidence, and it seems to confirm the Heckscher and Ohlin prediction. Angus Maddison (1995: 182) estimates that GDP per capita increased by only 17 percent between 1820 and 1870. Assume that all of that increase took place between 1850 and 1870, an unlikely event that argues against our case. J. Richard Huber (1971) estimates that the real wage for unskilled workers in Osaka and Tokyo increased by 67 percent in this period. True, these huge increases are much bigger than the real wage growth we have estimated in the Appendix or in Table 2. According to Appendix Table 5.3, we would have to go all the back to the late 1830s to find a real wage increase between then and 1870 (about 63 percent) anything like that estimated by Huber. Consider, however, the implication of Huber's estimates: the wage of unskilled labor, the abundant factor, increased by 43 percent relative to average incomes in Japan. And under plausible assumptions,[10] this implies that land rents fell by more than 50 percent in Japan. Thus,

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[10]The arithmetic is trivial. Let national income (Y) equal the sum of wages (wL, the wage per worker times the total labor force) and land rents (rD, rent per hectare times total hectares), ignoring skills, capital and all else: $Y = wL + rD$. Then per worker income growth is (where an "*" refers to the percentage growth over the full fifteen years):

$$Y^*-L^* = w^*\theta_L + L^*(\theta_L-1) + r^*\theta_D.$$

We assume that labor and land's share exhausted national income, and that labor got 60 percent. We also assume that land hectarage was fixed, and that labor force growth (assumed equal to population growth) was 7.6 percent between 1850 and 1870 (Maddison 1995: 106). If some of the GDP per capita growth between 1820 and 1870 actually took place before 1850, then land rents fell by even more than we guess here. This calulation is taken from O'Rourke and Williamson (1998: Chp. 4).

the wage-rental ratio rose by more than 3.3 times (from 1.0 to 1.67/0.50). To repeat, this is exactly what one would have predicted when a technologically quiescent economy is hit with a price shock which favors the exportable and disfavors the importable: in a land-scarce economy like pre-industrial Japan, the wage-rental ratio should have soared, with obvious distributional (and, one supposes, political) implications.

These are only informed guesses, of course, but we have the real thing in Table 6. The India series is actually the Punjab where land was relatively abundant and where agricultural exports to Europe boomed after the 1860s and early 1870s. Here we would expect globalization to have the opposite effect on the wage-rental ratio than was true of land-scarce Japan: it should have fallen. And fall it did! Between 1873-79 and 1910-14, the wage-rental ratio in the Punjab fell by 61 percent. The experience of the Punjab was not so different than that of the New World. Over the same period, the wage-rental ratio fell by 71 percent in the combined trio of New World countries consisting of Australia, Argentina and the United States (O'Rourke, Taylor and Williamson 1996: Table 2).

The factor-price-convergence theorem seems to have been alive and well in late 19th century Asia, but the 20th century seems on the face of it to have a different tale to tell. Wage-rental ratio trends can be constructed for Japan starting 1885, Korea starting 1909 and Taiwan starting 1904. In contrast with earlier experience in the Punjab, this was not a period of technological quiescence in East Asian agriculture, but instead was one of dramatic land-saving and labor-using innovation. It was also a period of dramatic industrialization, at least in Japan, which served to pull labor off the farms (Brandt 1993). Nor was the period after 1910-1914 one of favorable farm price shocks, but rather to the contrary (Kimura 1993; Kang and Cha 1996). In short, we might expect quite the opposite trend in Asian wage-rental ratios in the 20th century compared with the 19th. That is exactly what we see: East Asian wage-rental ratios surged up to the early 1930s. Indeed, land-scarce Europe experienced the same surge in wage-rental ratios during the so-called grain invasion after the 1870s, at least where trade policy remained liberal (O'Rourke, Taylor and Williamson 1996). Furthermore, the magnitudes were not so different. Between 1910/14 and 1925/29, the wage-rental

ratio rose by 88 percent in Japan, by 46 percent in Korea, and by 40 percent in Taiwan (Table 6). The average increase in the wage-rental ratio for Britain, Ireland, Denmark and Sweden was 39 percent between 1890 and 1910, and 120 percent between 1870 and 1890 (O'Rourke, Taylor and Williamson 1996: Table 1).

What remains, of course, is to pool this wage-rental ratio data with that from the Atlantic economy and thus to explore econometrically the determinants of price shocks, unbalanced productivity advance, industrialization and resource endowments. Was Asia different? The answer will have to wait for another paper.

Hints and Hunches about Inequality Trends in Asia

Eli Heckscher and Bertil Ohlin argued that the integration of global commodity markets would lead to convergence of international factor prices, as countries everywhere expanded the production and export of commodities which used their abundant (and cheap) factor intensively. As we have seen, limited historical evidence from Asia seems to be consistent with Heckscher and Ohlin: the trade boom between the 1870s and the 1920s led to rising wage-rental ratios in relatively labor-abundant East Asia, and to falling wage-rental ratios in the relatively land-abundant Punjab, and probably in Southeast Asia where we do not have wage-rental ratio data but where real wages were stable or falling. As a consequence, conditions probably improved for the poor unskilled worker relative to the rich landlord in East Asia, while the opposite was probably true of Indonesia, Siam, and Burma. All of this borders on speculation, of course, since, so far, it is guided only by limited information on wage-rental ratio trends.

So much for globalization. What about labor surplus? In his famous model of the labor surplus economy, W. Arthur Lewis (1954) showed how early industrialization could create inequality (and also a rising surplus to finance domestic-savings-constrained accumulation). Stable real wages implied rising profit shares economy-wide. According to his model, the worker fails to share in GDP per capita growth since

elastic labor supplies keep wages and living standards stable. The labor surplus model could also be used to predict stable real wages in Southeast Asia, since the migration of surplus labor from India and China might have served to create an elastic labor supply in, for example, Burma, Siam, and Indonesia.[11] The Lewis model is quiet about what happens to land rents, but the classical model from which it was derived clearly predicted a rise in rents. It follows that the globalization and the Lewis model both predict falling wage-rental ratios and rising inequality in Southeast Asia, far more so than in labor-abundant East and South Asia. Yet, discriminating empirically between the competing Lewis and Heckscher-Ohlin views will prove difficult.

Complete income distributions at various benchmarks between the mid-19th century and World War II are unavailable for any Asian country, including Japan. But even if such data were available, it is not obvious that they would be the best way to search for the underlying causes of changing inequality. Our interest here is factor prices: wages, rents and the structure of pay. How did the typical unskilled worker near the bottom of the distribution do relative to the typical landowner or capitalist near the top, or even relative to the typical skilled blue collar worker or educated white collar employee near the middle? The modern debate over OECD inequality has a fixation on wages, but since land and landed interests were far more important to late 19th century inequality trends -- especially in more agrarian Asia -- we need to add them to any distribution inquiry. In any case, we have two kinds of evidence available to document inequality trends in Asia prior to 1940: trends in the wage-rental ratio, which we have already explored, and which are limited to Japan, Korea, the Punjab and Taiwan; and trends in the ratio of the unskilled wage to GDP per capita, which we have not yet explored, and are available for the full Asian sample between 1870 and 1940.

Table 7 reports trends in the ratio of the unskilled worker's wage (**w**) to the returns on <u>all</u> factors per person as measured by Angus Maddison's (1995) estimates of GDP per capita (**y**). True, the ratio could be influenced by changes in the labor participation rate alone. If there was a sharp increase in population from,

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[11] As long as there is no comparable elastic supply of land on these frontiers. For this endogenous-land argument, see Myint (1958) and Findlay (1995: Chp. 5). Hla Myint's theoretical work was motivated by Burmese experience.

say, a rise in fertility and thus no increase in workers of adult age, **w/y** would (spuriously) rise as **y** fell. In contrast, if there was a sharp increase in population from the immigration of adult labor, **w/y** would seem to be more stable. While this was not a period of dramatic demographic transition in Asia (Bloom and Williamson 1998), the immigration into Southeast Asia probably tends to make **w/y** trends overstate rising inequality there. True, some of the observed changes in **w/y** could also be driven by the performance of the price of wage goods (in the cost-of-living index underlying the real wage, dominated by the price of rice and other grains) relative to the GDP deflator (underlying Maddson's real GDP per capita estimates). But such relative price movements have clear distributional implications on the expenditure side, since the poor are more dependent on rice and other foodstuffs (as a share of their budgets) than are the rich. So, apart from these demographic issues, trends in **w/y** should approximate changes in the economic distance between the working poor near the bottom of the distribution and the average citizen in the middle of the distribution.[12]

Table 7 shows that any successful explanation of changes in **w/y** in Asia between 1870 and 1940 will have to be complex: the Heckscher-Ohlin trade model and the Lewis labor surplus will not, by themselves, account for the variety.

Japan, India, Indonesia and Thailand document the longest time series, and Figures 6-9 show that they share the same trends. They all underwent a long sharp decline in **w/y** before flattening out or even rising after World War I. The turning point for Indonesia seems to be the late 1920s, but for the other three it is 1915-1919. (The Burmese **w/y** time series obeys the same Asian laws of motion, even though its time series is much shorter.) Why did the real wage lag behind GDP per capita in these four Asian countries during the First Great Globalization Boom? Is this evidence of some weaker version of the Lewis model, no constant wage but rather sluggish growth and modest trickling down? If so, why the common turning point for four economies with such different attributes? Since it seems unlikely that such dissimilar economies could share

[12] It turns out that this statistic is highly correlated with more comprehensive inequality measures in the few cases where both are available in the Atlantic economy. See Williamson (1998d, Table 5).

the same Lewis turning point, perhaps a more likely explanation lies with world markets. These four countries were more likely to have shared similar price shocks which produced the same trends in w/y.

The Philippine time series is much shorter, but what we have is consistent with the trends seen in Figures 6-9 for the other four (and for Burma). The Philippine turning point is 1910-1914, and it shares the steep decline up to that point and the sharp reversal thereafter. The experience of Taiwan and Korea is similar, with their turning points in 1915-1919, although the Korean time series is a little short to be completely confident about longrun turning points. As an aside, this evidence does not offer much support for the nationalist critique of Japanese imperialist policies. If they really did tend to exploit the ordinary workers in occupied Korea and Taiwan, while favoring Japanese landlords in those two regions and Japanese consumers at home, why do we not see that redistribution in the form of falling w/y after the 1910-1919 decade? Why do they rise instead? The answer may lie with world markets rather than imperial policy.

We have found an important Asian stylized fact. Real wages lagged behind GDP per capita growth everywhere in Asia up to the World War I decade (with the exception of China). Real wages outstripped GDP per capita growth thereafter. We interpret these trends as a proxy for rising inequalty during the First Great Globalization Boom and falling inequality during the interwar years. What accounts for this stylized fact?[13] This paper will duck this question, but it is added to that lengthening agenda.

Within Versus Between Regional Performance in Asia: India and Indonesia 1870s-1930s

In the 1950s and 1960s, a literature on regional inequality emerged, or what become known as North-South dualism. Some argued that the natural forces were towards divergence (Myrdal 1957; Hirschman 1958), while conventional theory argued for convergence. The evidence seemed to support a life

[13] Presumably, the explanation emerge by applying the same econometric analysis that we propose to implement for the wage-rental ratio trends.

cycle of regional inequality for industrializing countries, first rising and then falling (Williamson 1965). Four classic examples of regional dualism often cited were the Italian Mezzogiorno, the American South, the Brazilian Northeast and the east wing of Pakistan (now called Bangladesh, and what in Table 8 is labeled "East").

The literature on regional inequality and North-South dualism died down in the 1970s, only to awake again over the last decade in two different guises. First, Paul Krugman created the new economic geography which gave elegant theoretical argument to the rise of regional dualism in an industrializing country (Krugman and Venables 1990, 1995). Second, empirical studies using the new growth theory showed that there were forces of convergence embodied in the regional growth experience of Japan and the United States (Barro and Sala-i-Matin 1991).

What do we find in Asia? While the pre-1940 period is hardly one of vigorous industrialization in Asia – with the exception of Japan, it was one of globalization as well as regional integration through railroad development and internal migration from labor abundant to labor scarce areas. What influence did these forces have on regional "dualism"? William Collins (1998), using the same 1873-1906 data underlying the longer time series in Table 8, but at the district level, has shown recently that late 19th century India was not characterized by unconditional or even conditional convergence despite the period's transport revolution, large scale labor mobility did not take place, and globalization was weakly offsetting of any convergence trends.

Tables 8 and 9 seem to confirm Collins' findings, and for a longer period. There is no evidence of unconditional convergence between India's four major regions between 1873 and 1939. On the contrary, real wages in the East started 30 percent below the all-India average and ended up 36 percent below; real wages in the West started 17 percent above average and ended up 44 percent above. The South collapsed to 55 percent below average. These are clear forces of divergence, and we need to know whether they confirm Krugman-Venables industrial concentration effects, or whether they reflect uneven world price shocks associated with

globalization, favoring some regions at the expense of others, or whether it is other forces entirely.

The Indonesian experience is consistent with that of India. There is no evidence of real wage convergence between the high-wage outer provinces and low-wage Java between 1878 and 1939. On the contrary, the wage gaps were even bigger in the 1930s than in the 1870s. This problem has persisted into the 1990s (Saldanha 1997), and any explanation of the present should also explain the past.

An Agenda for Asia

There is so much left to be done. Other scholars may have their own agenda, but what follows is based on the real wage and relative factor price data base reported at the end of this paper and used to carry the discussion in the text.

The data base can, of course, be improved. First, I have been able so far to secure time series information on farm rents or land values only for the Punjab, Japan, Korea and Taiwan, and the latter two only cover this century. We need this information to help discriminate between explanations of growth in more labor-scarce Southeast Asia and the more labor-abundant South Asia. The search continues, therefore, for this kind of information for Indonesia, the Philippines and Thailand, as well as for other parts of India. Second, four of our regions have various real wage problems. Burmese wages and prices disappear from the standard sources during the World War I decade, and they need to be pushed up to 1940. The Chinese real wage data even for big coastal cities like Shanghai are very poor: they cannot be trusted prior to about 1908 or after 1936. Surely, we can do better. Real wages for Japan prior to the 1880s are fraught with problems, so much so that inferences about the switch from total autarky to free trade in 1858 are very different if one uses Huber's (1971) data or those reported here. The issue is much too important to be left in this ambiguous empirical state. And real wages for the Philippines in the decade prior to 1910 must be improved and also extended backwards before 1899. The exceptional real wage experience of this Southeast Asian country is

sufficiently distinctive to warrant much more archival attention. Third, I have been able to uncover absolutely nothing useful for either Ceylon or Vietnam. Ceylon is a disappointment since the impact of its absorption of heavy Indian immigration is of real interest, especially compared with Burma or Thailand. Still, the data base we do have in Appendices 1-9 is much more than I thought was possible when I started this project three years ago, and it has not been used at all by scholars interested in long run Asian growth.

Consider now what the real wage and relative factor price data tell us. To begin with, there is absolutely no evidence to support the view that Asia was in some steady state, let alone that there was some Lewis-like constant real wage that characterized any part of Asia. There was enormous variance over time and across regions in Asia between 1820 and 1940, so that economists don't have to look only to the 1990s to find it. The challenge is to offer explanations for this evidence and then to use it to help guide policy debate for the next century. This paper points to the following agenda:

[1] What were the size of the price shocks which various Asian regions absorbed as the globalizing effects of the Suez Canal, the Panama Canal, railroads to the interior and productivity advance on ocean transport took place? Were they bigger than those which characterized the Atlantic economy after 1870? After all, the political reaction almost everywhere in the Atlantic economy was to mute the impact of those globalizing forces with tariffs (O'Rourke and Williamson 1998: Chp. 6). The opposite was true of Asia.

[2] By 1940, there were already very big real wage and living standard gaps between rich and poor regions in Asia. Furthermore, there was hardly any change in the economic hierarchy in Asia between the 1890s and the 1930s. History mattered, and there was strong persistence. Why?

[3] By 1940, there was an enormous living standard gap between Asia and Europe. When did it emerge? None of it emerged during the interwar years. Some of it emerged during the First Great Globalization Boom after 1870, pointing to the inability of Asia to exploit globalization prior to World War I, an interesting finding given the mounds of literature that point out how East Asia exploited globalization so well after World War II! Why did Asia exploit globalization so badly between 1870 and 1914? Much of the gap

appeared over the century 1770-1870 when Asia failed to mimick the European industrial revolutions, but what about the impact of pre-industrial progress in Northwest Europe between 1500-1770?

[4] What would happen if we applied new growth convergence analysis to this real wage data base? How much of the variance in real wage growth might be explained by initial living standards, the presence or absence of industrial revolutions, globalization-induced price shocks, demographic events, geographic disadvantages, and so on?

[5] Wage-rental and wage-GDP per capita ratios trace out a distinctive Asian stylized fact: they fall to about the World War I decade, then rise thereafter. Why? It should be easy to initiate an econometric attack on this problem much like that which has been done already for the Atlantic economy (O'Rourke, Taylor and Williamson 1996; Williamson 1997), where price shocks, factor endowments and factor-saving productivity advance are all allowed to have their say.

[6] Why the spectacular economic demise of Southeast Asia after the 1870s or 1880s? Does this fact offer more evidence supporting the "curse of resources" (Sachs and Warner 1995) and diminishing returns to land? Indeed, why do real wages collapse almost everywhere in late 19th century Asia?

[7] Imperialism seems to have played a minor role in Asia, even in interwar Korea and Taiwan. Will this view be supported when explanations of real wage preformance are "conditioned" by other variables which must have mattered?

[8] What was the spatial impact of globalization on regions within British India, within Indonesia and within the Philippines? Many Asian countries have serious spatial or regional inequality problems today that were bequeathed on the present by the past. What accounts for that past?

These are just some of issues which this data base will let us pursue. There is no longer any reason for historians to fail to take up the challenge that economists have thrown down by exploring the comparative performance of Asia since 1960 or 1970. Economists will continue to use only that narrow empirical window to advise Asian policy debate in the 1990s as long as historians fail to supply a wider empirical window that

lets us look at two centuries of economic performance rather than simply the recent quarter-century.

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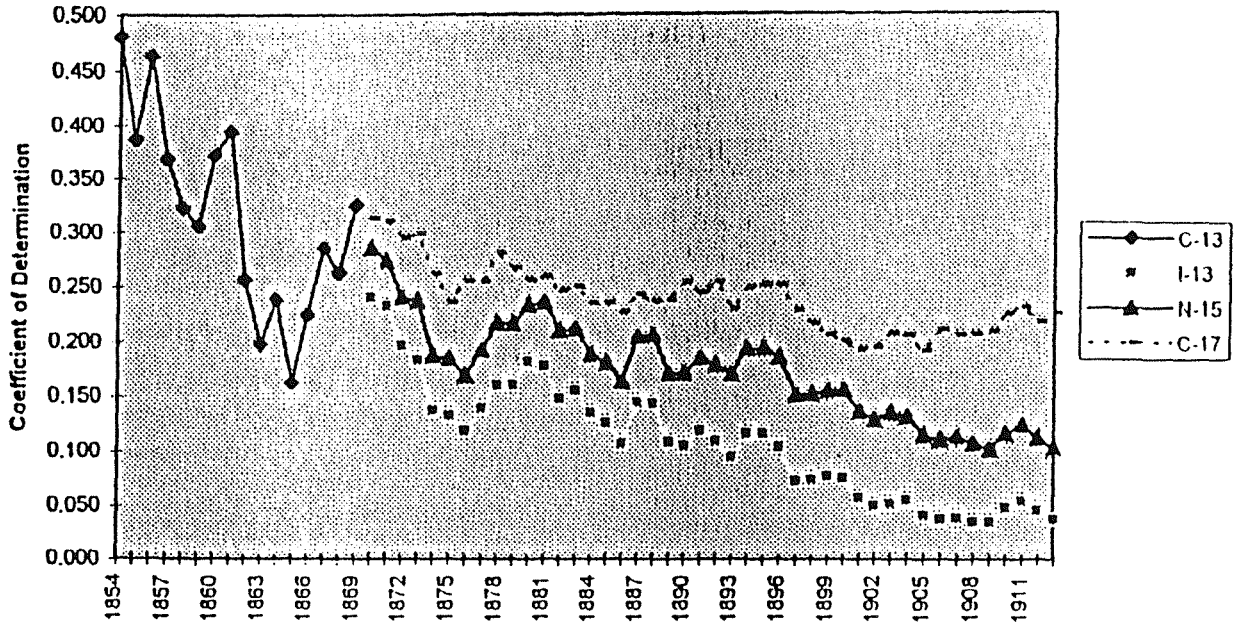
Figure 1

International Real Wage Dispersion in the Atlantic Economy 1854-1913



Source: Williamson (1995, Table A2.1; revised in O'Rourke and Williamson, 1997)

Figure 2

Real Wage Indices for East Asia (1913 = 100)

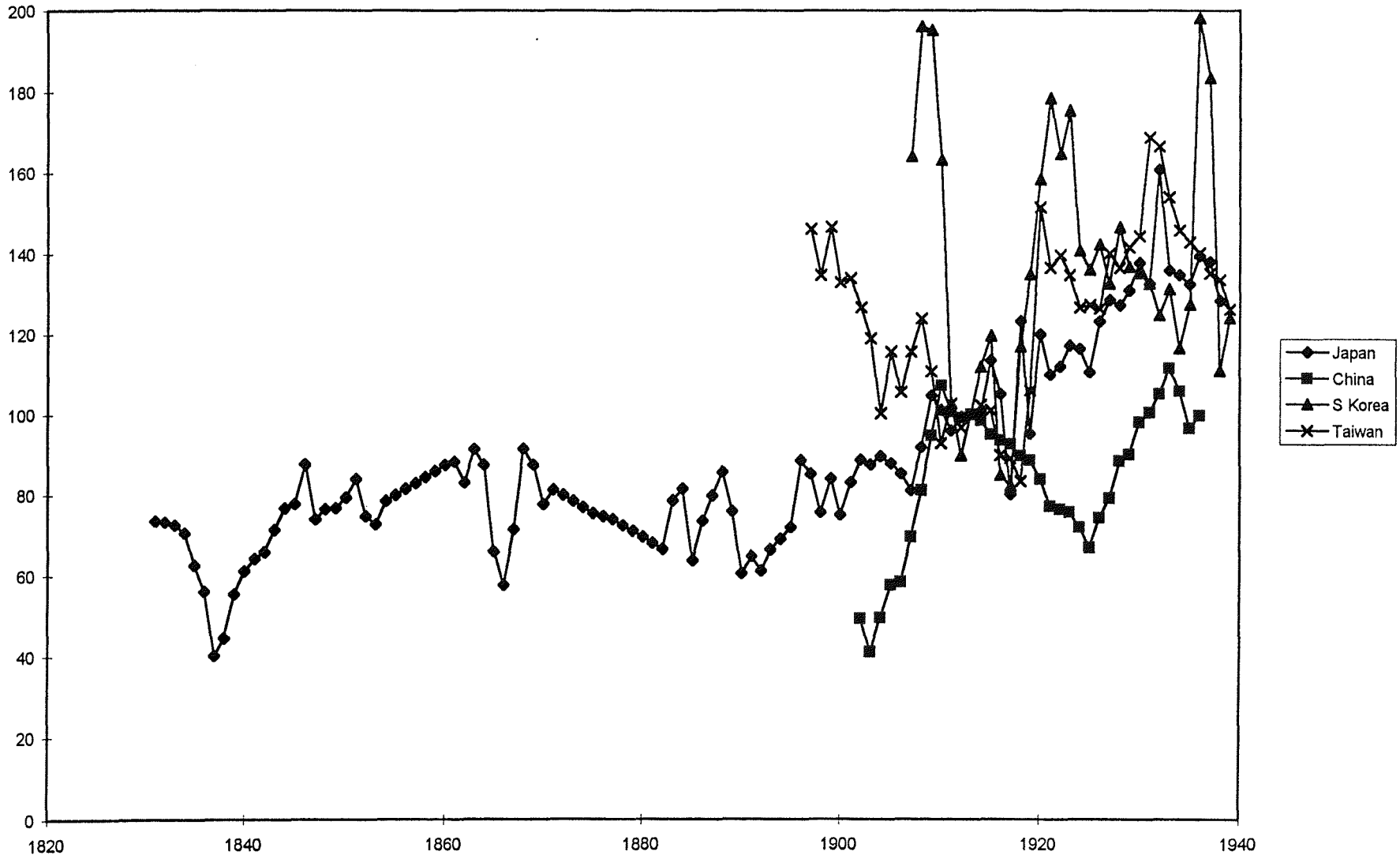


Figure 3

Real Wage Indices for Southeast/South Asia (1913=100)

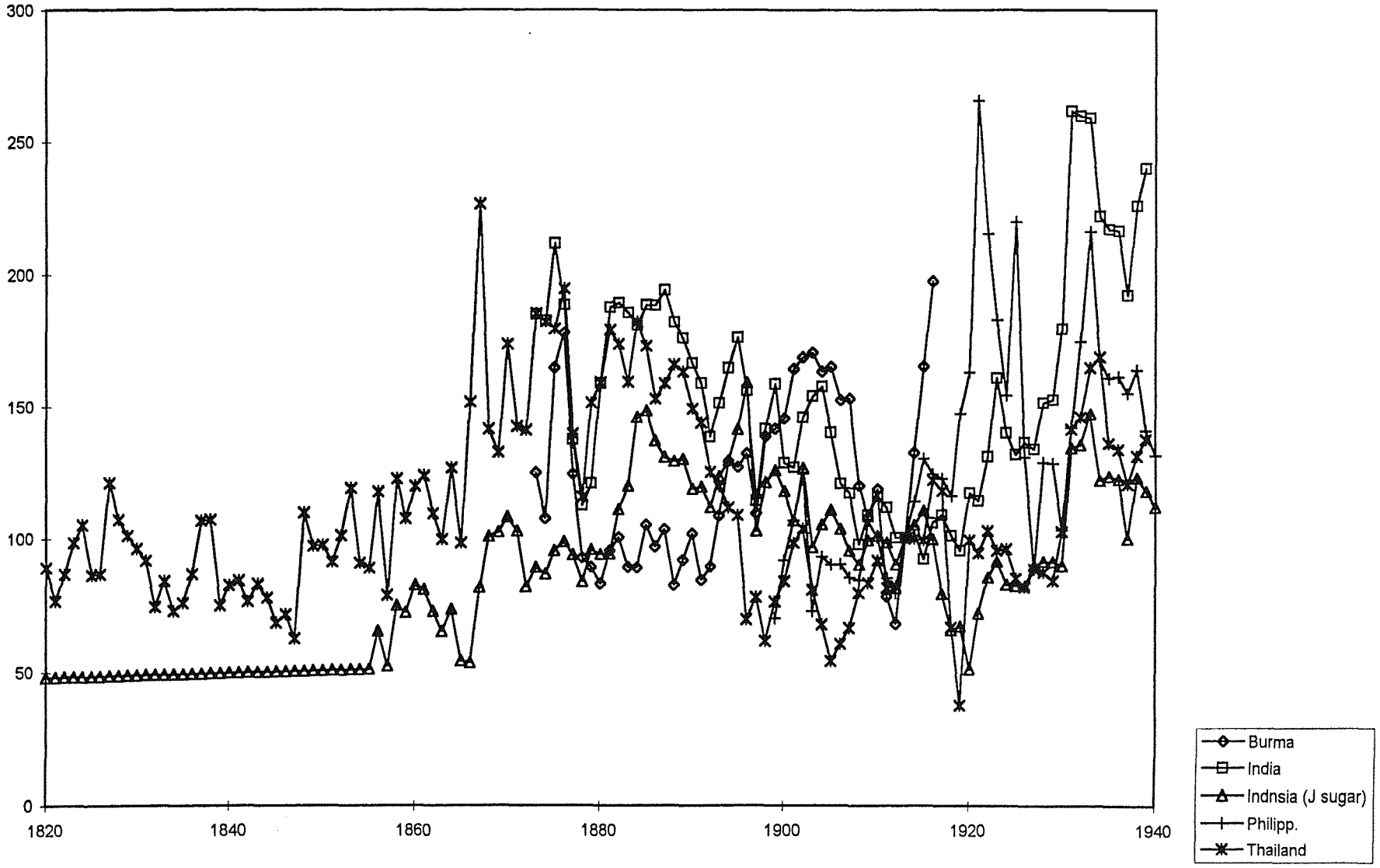


Figure 4

Real Wages in East Asia Relative to Britain (in percent)

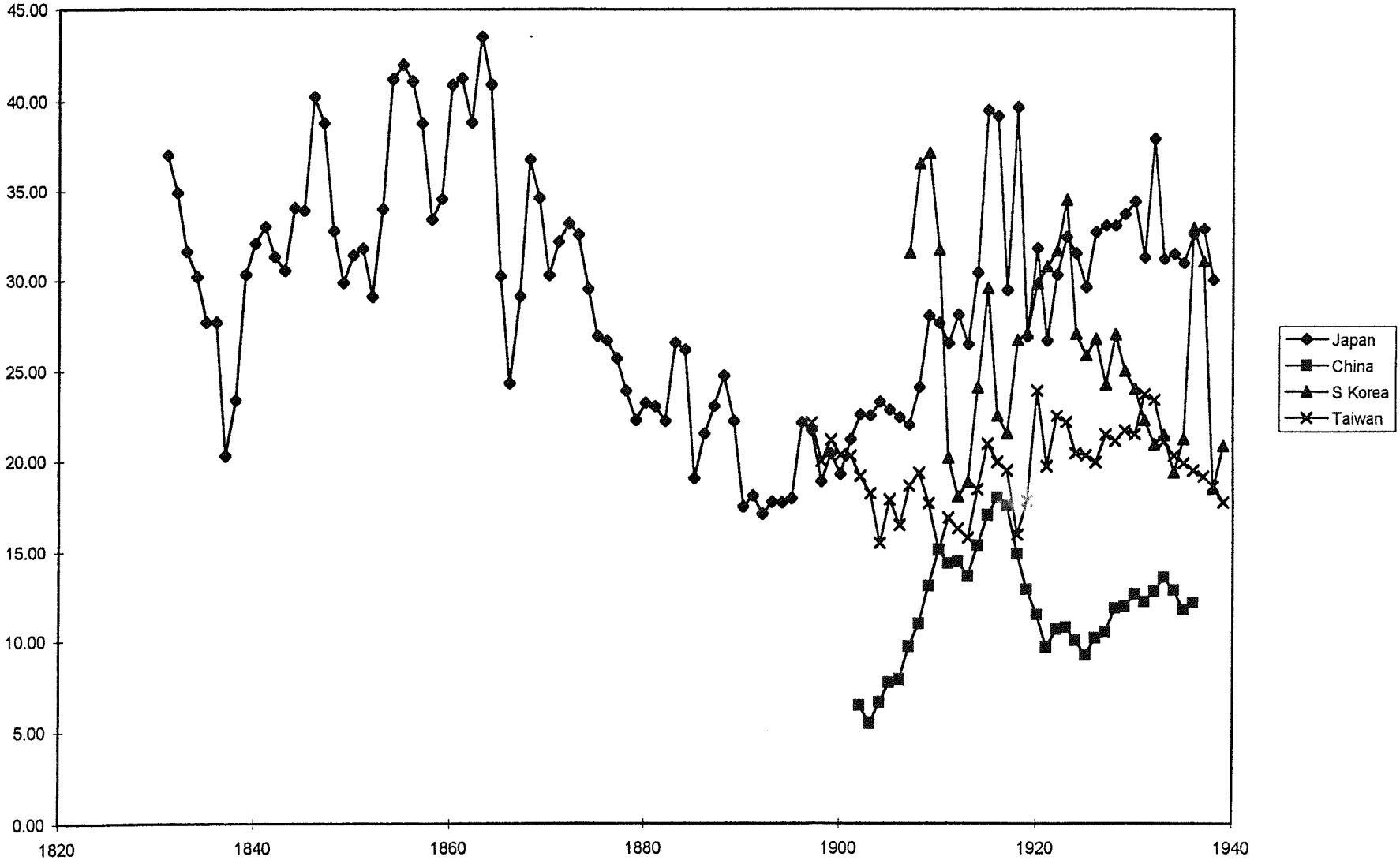
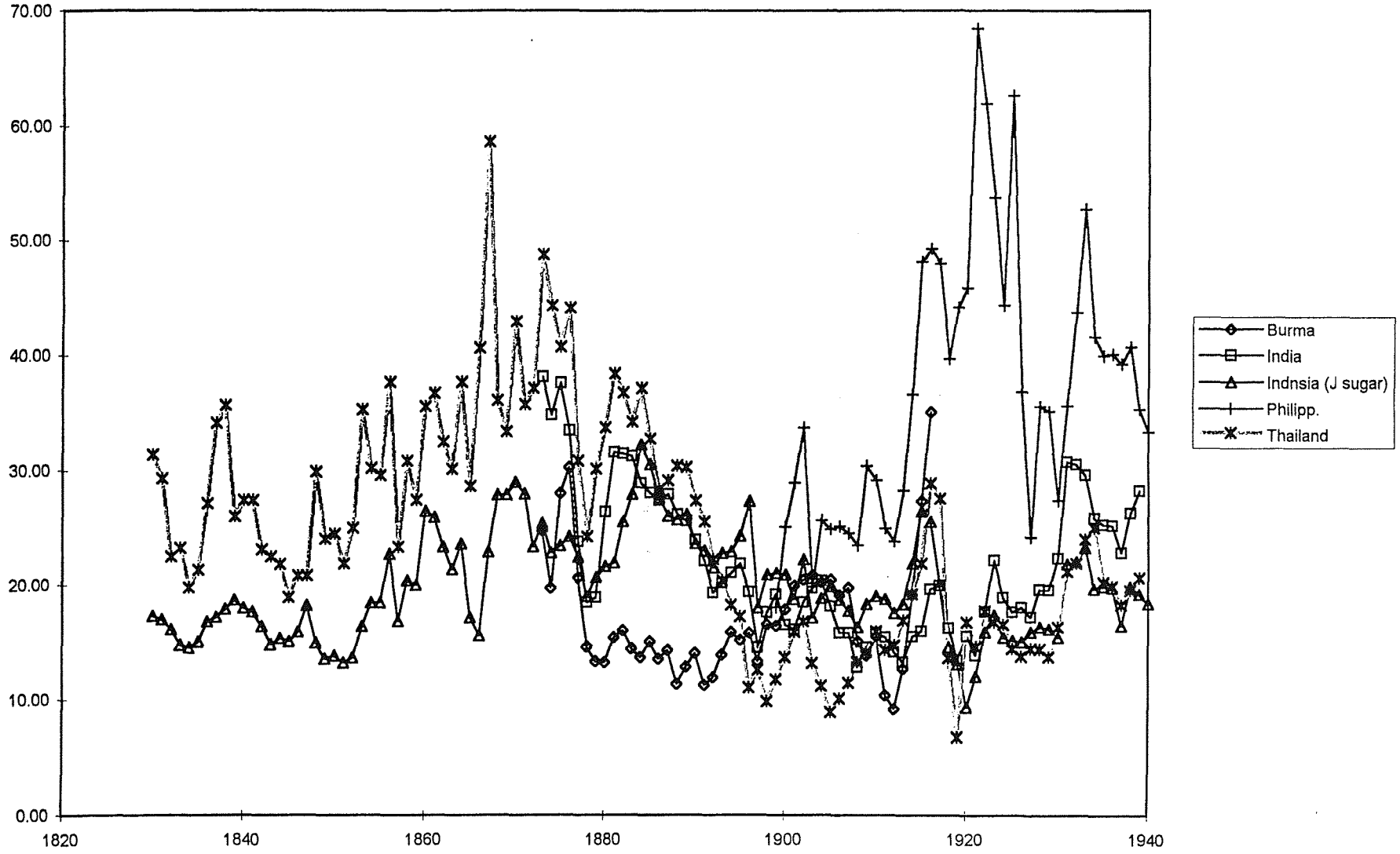


Figure 5

Real Wages in Southeast/South Asia Relative to Britain (in percent)



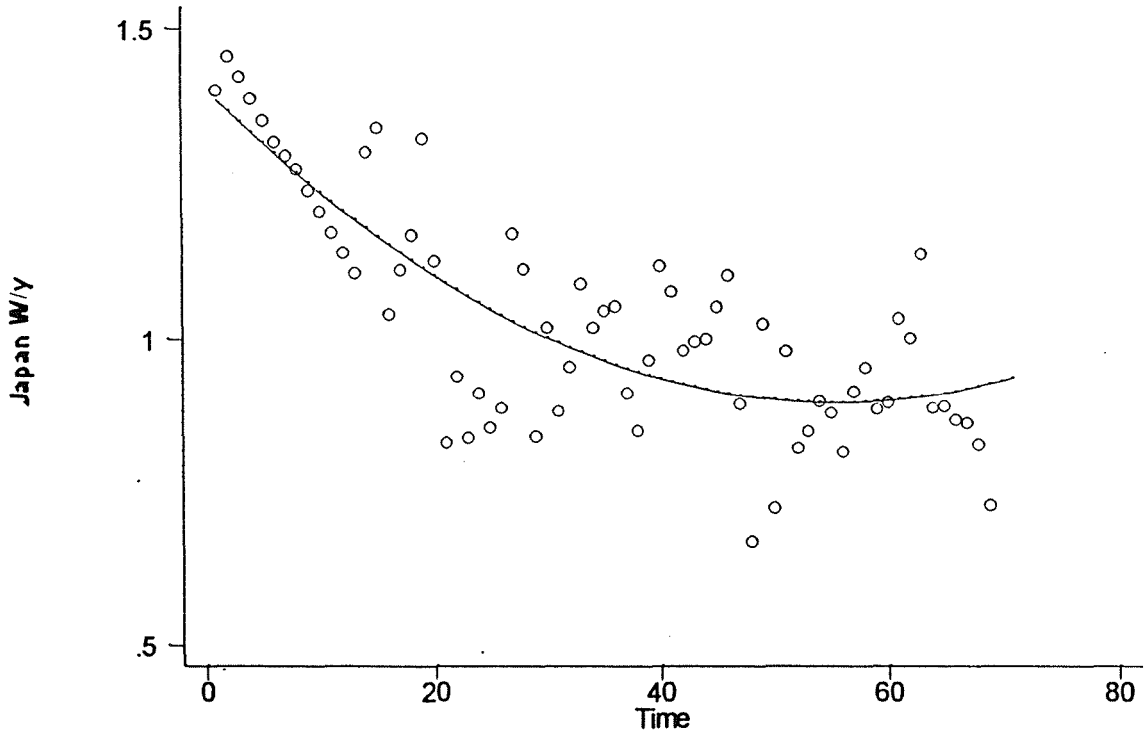


Figure 6

Trends in Wage/GDP Per Capita Ratio Japan 1870-1938

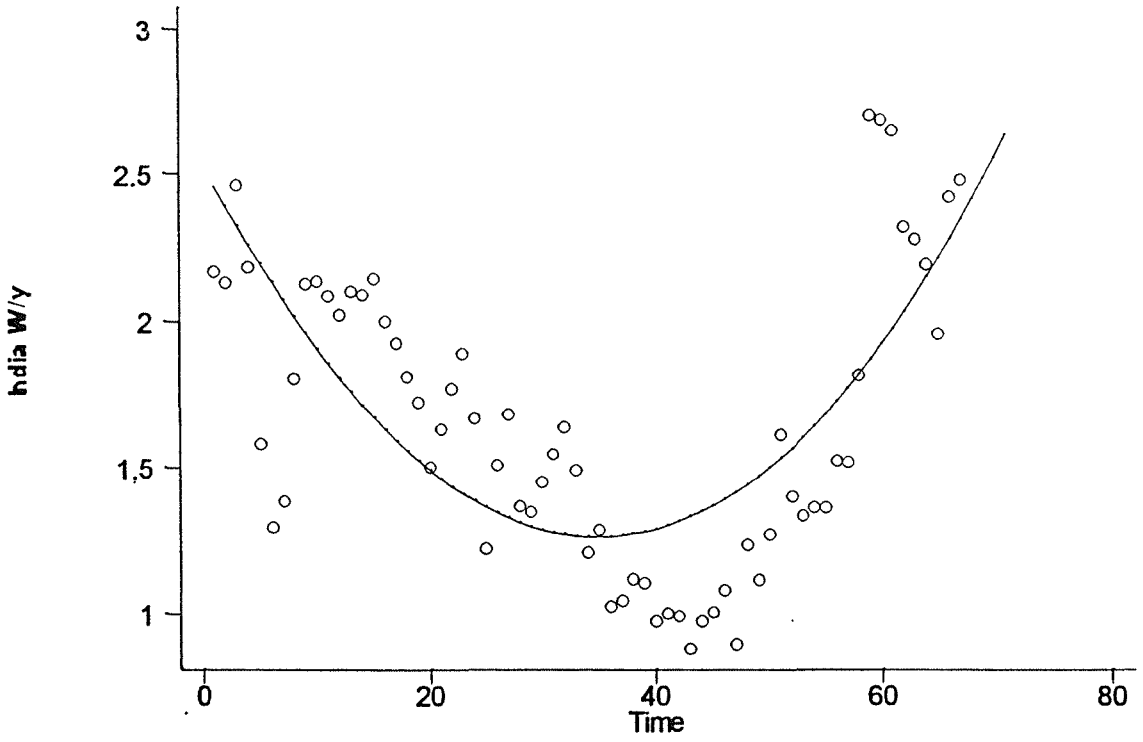


Figure 7

Trends in Wage/GDP Per Capita Ratio India 1873-1939

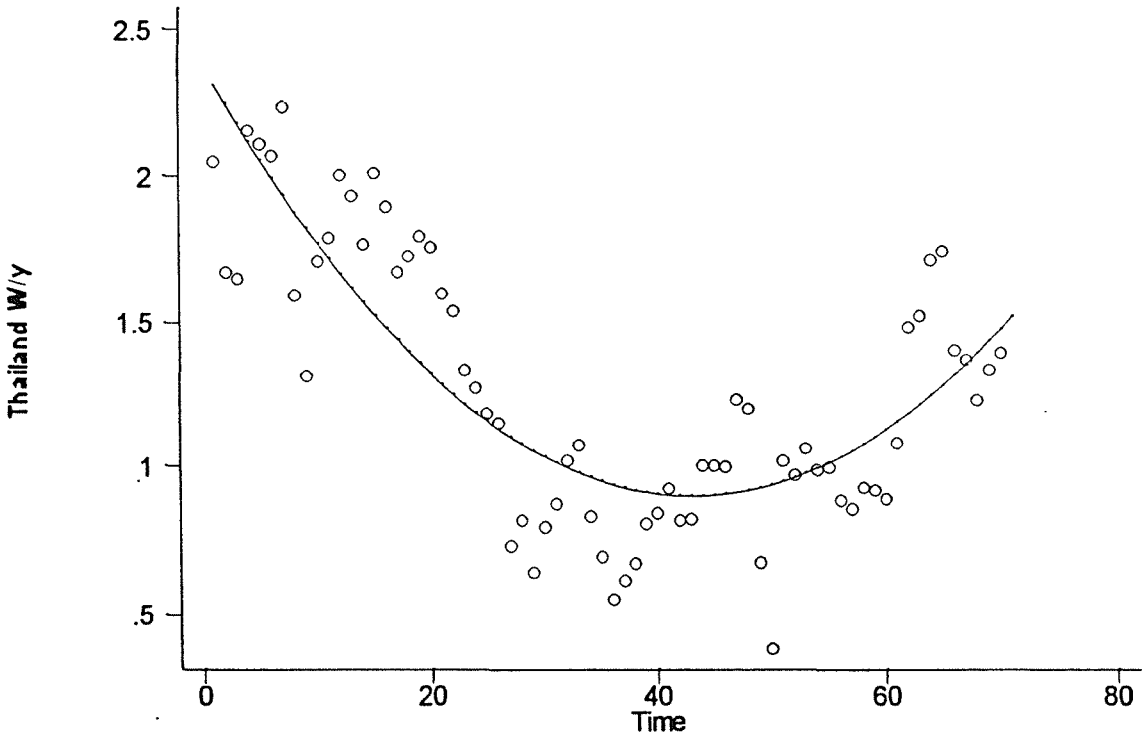


Figure 8

Trends in Wage/GDP Per Capita Ratio Thailand 1870-1939

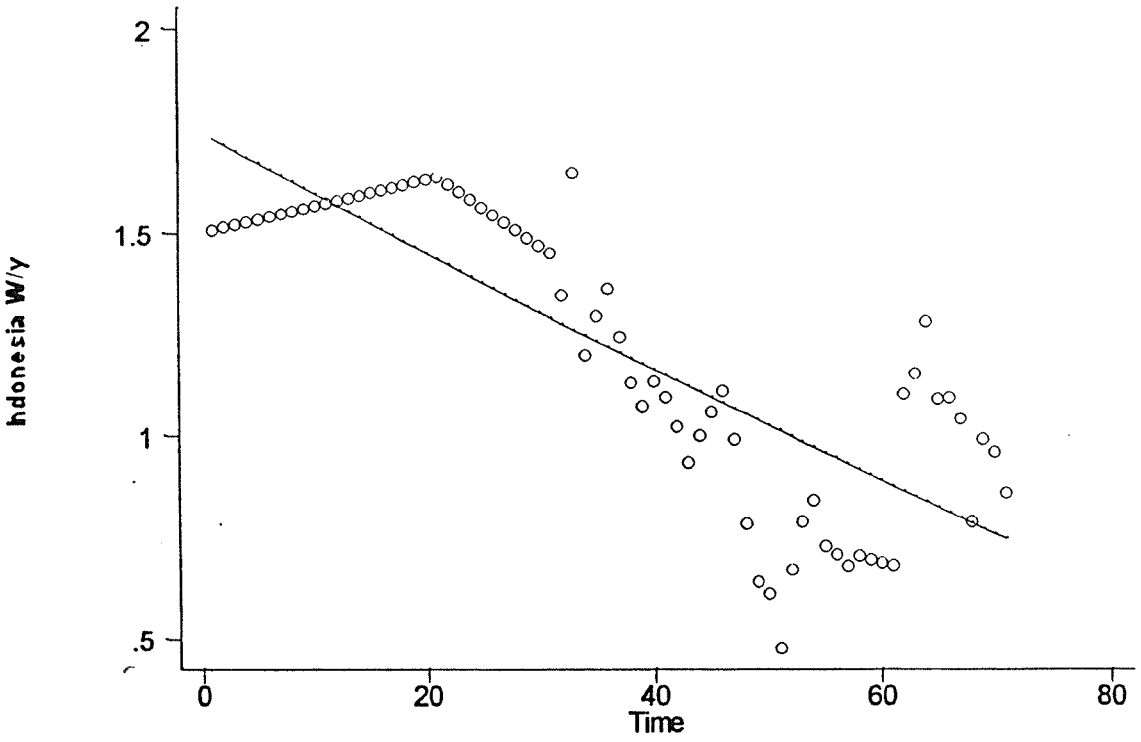


Figure 9

Trends in Wage/GDP Per Capita Ratio Indonesia 1870-1940

Table 1

The Asian Real Wage Hierarchy Near the Turn of the Century

Region	Real Wage Relative to Britain (in percent)		
	1873-1883	1899-1903	1909-1913
Japan	28.26	21.19	27.38
Burma	20.98	19.05	12.22
China			14.14
India	32.54	17.93	14.55
Indonesia	25.45	19.94	18.31
Korea			25.18
Philippines		25.06	27.24
Taiwan		19.84	16.35
Thailand	40.58	14.19	15.12

Sources and notes: The figure for China is 5.98 for 1901-1903, which is not reported here since it seems implausible. The Asian data are taken from Appendices 1-9. The British data are taken from my revised Atlantic economy data base (Williamson 1995; O'Rourke and Williamson 1997), extended to 1820 by relying on Lindert and Williamson (1983, Table 3; 1985, Table 1). The 1913 benchmark is based on the Maddison (1995) GDP per capita estimates, but the 1909-1913 averages exploit our real wage data as well.

Table 2

Real Wage Performance in Asia 1820-1939
(1913 = 100)

Period	Japan	Burma	China	India	Indonesia	Korea	Philippines	Taiwan	Thailand
1820-1824					*48*				91
1825-1829					*49*				100
1830-1834	72				*49*				84
1835-1839	52				*49*				90
1840-1844	68				*50*				81
1845-1849	78				*50*				82
1850-1854	78				*51*				100
1855-1859	83				63				103
1860-1864	88				75				116
1865-1869	75				78				150
1870-1874	79	116		184	94				165
1875-1879	74	130		154	93				156
1880-1884	73	91		180	113				171
1885-1889	76	96		186	135				163
1890-1894	64	103		156	121				130
1895-1899	81	130		149	130		70	142	79
1900-1904	85	162	47	142	111		98	123	87
1905-1909	90	139	72	117	100	185	91	114	68
1910-1914	99	99	101	106	99	114	95	99	91
1915-1919	104	181	92	100	84	108	128	94	88
1920-1924	115		77	132	76	164	196	138	97
1925-1929	124		80	141	87	139	139	134	85
1930-1934	140		104	236	125	128	160	156	144
1935-1939	135		98	218	117	149	156	136	132

Sources and notes: Appendices 1-9. The base year is 1913=100.

Table 3

Real Wage in Asia Relative to Britain 1830-1939
(in percent)

Period	Japan	Burma	China	India	Indonesia	Korea	Philippines	Taiwan	Thailand
1820-1824					18				32
1825-1829					*18*				32
1830-1834	33				*16*				25
1835-1839	26				*17*				29
1840-1844	32				*16*				24
1845-1849	35				*16*				23
1850-1854	33				*15*				27
1855-1859	38				20				30
1860-1864	41				24				35
1865-1869	31				22				39
1870-1874	32	22		36	26				42
1875-1879	25	21		26	22				34
1880-1884	24	14		30	26				36
1885-1889	22	13		27	27				30
1890-1894	18	13		21	23				23
1895-1899	20	15		18	22		18	21	12
1900-1904	22	20	6	18	19		27	19	14
1905-1909	24	18	10	15	18	35	26	18	11
1910-1914	28	13	15	15	19	23	28	16	16
1915-1919	35	12	16	17	20	25	46	19	20
1920-1924	31		11	18	14	31	55	22	16
1925-1929	32		11	18	16	26	39	21	14
1930-1934	33		13	28	20	22	40	22	22
1935-1939	32		12	25	19	25	39	19	20

Sources: Appendices 1-9 and see notes to Table 1 for Britain

Table 4

Real Wage Performance in Asia By Decades Relative to the Center 1820s-1930s

Decade	Japan	Burma	China	India	Indonesia	Korea	Philippines	Taiwan	Thailand
A. Relative to Great Britain									
1820s					0.2074				0.3765
1850s	0.2058				0.0988				0.1614
1870s	0.1238	0.0931		0.1248	0.1040				0.1614
1890s	0.2010	0.1533		0.1997	0.2320		0.2487	0.3033	0.1614
1909-1913	0.2960	0.1315	0.1526	0.1574	0.1978	0.2731	0.2940	0.1771	0.1628
1930s	0.2592		0.0968	0.2095	0.1541	0.1865	0.3100	0.1624	0.1614
B. Relative to Average of Britain, France and Germany									
1850s	0.4259				0.2070				0.3410
1870s	0.3405	0.2595		0.3511	0.2866				0.4543
1890s	0.2444	0.1855		0.2560	0.2903		0.2337	0.2730	0.2257
1909-1913	0.3289	0.1468	0.1699	0.1748	0.2200	0.3017	0.3272	0.1964	0.1818
1930s	0.4100		0.1566	0.3369	0.2484	0.2940	0.5010	0.2588	0.2608
C. Relative to the Netherlands									
1830s	0.3995				0.2209				0.3591
1850s	0.4663				0.2261				0.3733
1870s	0.3287	0.2431		0.3321	0.2758				0.4389
1890s	0.2182	0.1655		0.2289	0.2589		0.2255	0.2498	0.2024
1909-1913	0.3456	0.1546	0.1784	0.1837	0.2312	0.3188	0.3443	0.2065	0.1909
D. Per Annum Growth Rate (%)									
1820s-1830s	-3.4496				0.1787				-0.9024
1820s-1850s	0.5655				1.0511				0.4872
1830s-1850s	0.5655				1.3531				0.3876
1850s-1870s	-0.3829	-5.5252		-6.8305	2.2181				1.5256
1870s-1890s	0.2703	0.4251		-0.5292	0.5245			0.1684	-2.8132
1890s-1909/13	2.4261	-0.3540	8.1944	-2.0663	-0.9272	-5.6138	2.5227	-2.6232	-2.5093
1909/13-1930s	0.9218	15.9119	-0.0203	2.9200	0.6711	-0.1690	1.4463	0.8154	1.6251

Sources: Appendices 1-9, Maddison. The "center" countries are from my revised Atlantic economy database, described in notes to Table 1 The average wage was taken for the period 1909-1913, and treated as the wage in 1911.

Table 5

Real Wages in Asia Relative to Japan 1831-1939
(in percent)

Period	Burma	China	India	Indonesia	Korea	Philippines	Taiwan	Thailand
1831-1834				*37*				71
1835-1839				*68*				116
1840-1844				*51*				76
1845-1849				*44*				67
1850-1854				*45*				82
1855-1859				52				79
1860-1864				59				84
1865-1869				71				131
1870-1874	71		117	82				133
1875-1879	84		104	87				134
1880-1884	60		124	106				150
1885-1889	61		123	124				138
1890-1894	76		120	129				129
1895-1899	77		92	111		88	104	62
1900-1904	91	27	83	90		123	87	65
1905-1909	75	41	65	77	143	107	76	48
1910-1914	47	52	53	68	81	102	59	58
1915-1919	79	47	50	57	75	135	55	56
1920-1924		35	57	45	101	182	71	54
1925-1929		33	57	48	80	122	64	43
1930-1934		39	84	62	65	122	66	66
1935-1939		37	63	48	65	101	49	49

Sources: Appendices 1-9.

Table 6

Asian Wage/Rental Ratio Trends 1873-1939

Period	Japan	India	Korea	Taiwan
1873-1879		2.5807		
1880-1884		1.9249		
1885-1889	0.9120	1.9874		
1890-1894	0.7864	1.3411		
1895-1899	1.0401	1.2157		
1900-1904	1.0950	1.2649		0.6805
1905-1909	1.2586	1.1860	0.8331	0.8507
1910-1914	1.2253	1.0109	0.9876	0.9645
1915-1919	1.1953	1.1496	0.8867	1.1106
1920-1924	1.8926	0.9821	1.7624	1.3985
1925-1929	2.3062	0.7858	1.6965	1.3467
1930-1934	2.6160	0.4092	1.5728	1.3057
1935-1939	1.7082	0.3402	1.7463	1.2342

Sources and notes: Appendix Tables 3.4, 5.4, 6.4 and 8.4. The base year is 1913 = 1.0

Table 7

Wage/GDP Per Capita Ratio Trends 1870-1939
(1913=1.00)

Period	Japan	Burma	China	India	Indonesia	Korea	Philippines	Taiwan	Thailand
1870-1874	1.4016			2.1486	1.5218				1.9264
1875-1879	1.2644			1.7803	1.5550				1.7828
1880-1884	1.2106			2.0345	1.5882				1.9002
1885-1889	1.1526			2.0515	1.6214				1.7687
1890-1894	0.8749			1.6892	1.6031				1.3852
1895-1899	1.0058			1.5953	1.5074				0.8261
1900-1904	0.9981	1.7407	0.4875	1.4692	1.3885		1.2781	1.2883	0.8968
1905-1909	0.9794	1.6477	0.7402	1.2094	1.1887		1.0525	1.1818	0.6968
1910-1914	1.0213	1.0404	1.0148	1.0369	1.0221	1.0231	0.9811	0.9377	0.9116
1915-1919	0.8824	0.6210	0.8914	0.9666	0.8276	0.8667	1.2483	0.7985	0.8963
1920-1924	0.8855		0.7190	1.3259	0.7020	1.3046	1.8559	1.1512	1.0046
1925-1929	0.8927		0.7151	1.4189	0.6964	1.0986	1.2785	1.0175	0.8913
1930-1934	0.9896		0.9191	2.4310	1.0620	1.0060	1.4769	1.0943	1.5066
1935-1939	0.4103		0.8407	2.2626	0.9750	0.9168	1.4729	0.8174	1.3449

Sources and notes: The real wage data are taken from Appendices 1-9. The real GDP per capita data are taken from Maddison (1995). The base year is 1913=1.00

Table 8

Regional Real Wage Indices for India 1873-1939
(All India 1900=100)

Year	All-India	North (%)	South (%)	East (%)	West (%)
1873	120	99	116	70	117
1874	120	101	100	76	122
1875	145	99	93	103	103
1876	129	125	65	99	113
1877	97	102	67	122	102
1878	79	97	92	107	101
1879	83	101	104	97	99
1880	112	89	90	101	112
1881	131	81	97	106	106
1882	129	68	101	104	113
1883	129	81	101	105	105
1884	122	89	105	79	123
1885	128	109	90	80	122
1886	133	88	91	106	107
1887	144	65	83	141	91
1888	131	71	97	126	93
1889	124	84	103	107	99
1890	119	82	98	112	100
1891	114	80	98	116	96
1892	99	93	95	109	98
1893	106	96	100	96	108
1894	115	105	98	88	112
1895	123	88	87	100	118
1896	109	69	100	100	120
1897	83	77	107	112	94
1898	106	87	94	120	90
1899	120	85	104	123	77
1900	100	80	91	135	76
1901	95	97	93	121	82
1902	110	111	96	116	77
1903	114	96	101	109	91
1904	117	106	96	107	90
1905	103	101	88	110	96
1906	86	100	93	91	115
1907	82	104	92	86	120
1908	72	92	98	104	102
1909	81	92	94	111	95
1910	87	106	91	110	91
1911	87	104	117	110	90
1912	77	116	15	95	95
1913	76	108	14	91	100
1914	76	126	16	88	103
1915	70	102	20	96	94
1916	77	62	136	94	107
1917	81	86	30	94	97
1918	79	117	29	108	82
1919	70	165	68	93	98
1920	82	166	80	78	113
1921	83	129	67	82	108
1922	95	122	63	79	112
1923	113	147	58	70	122
1924	99	176	61	69	123
1925	93	145	63	68	124
1926	95	145	68	63	129
1927	93	163	68	62	131
1928	103	145	61	53	141
1929	105	140	61	56	138
1930	120	120	55	46	149
1931	179	79	37	51	144
1932	183	76	37	60	135
1933	183	75	38	59	136
1934	161	84	45	58	138
1935	158	84	47	59	138
1936	160	82	47	62	134
1937	147	88	52	77	119
1938	171	74	46	72	128
1939	178	70	45	64	144

Source and notes: Appendix Table 3.3. All-India 1900 = 100. The four regions are taken as a percentage of All-India.

Table 9

Indonesia Real Wage Indices 1873-1939

(Java 1912=100)

Year	Javan Sugar	Outer Provinces (%)
1820	54	
.	.	
.	.	
.	.	
1855	57	
1856	73	
1857	58	
1858	83	
1859	80	
1860	92	
1861	90	
1862	81	
1863	73	
1864	82	
1865	60	
1866	60	
1867	91	
1868	112	
1869	114	
1870	120	
1871	115	
1872	91	
1873	99	
1874	96	
1875	106	
1876	110	
1877	104	
1878	93	152
1879	107	151
1880	105	151
1881	105	157
1882	124	141
1883	133	148
1884	162	144
1885	165	153
1886	153	166
1887	146	182
1888	144	191
1889	145	182
1890	132	187
1891	133	185
1892	124	178
1893	138	183
1894	144	176
1895	157	174
1896	177	152
1897	114	178
1898	135	180
1899	140	183
1900	131	198
1901	119	171
1902	141	152
1903	107	204
1904	117	185
1905	123	187
1906	115	192
1907	106	189
1908	100	185
1909	110	189
1910	112	189
1911	110	179
1912	100	174
1913	111	169
1914	117	173
1915	123	167
1916	111	168
1917	88	179
1918	73	173
1919	74	153
1920	56	150
1921	80	164
1922	95	162
1923	101	150
1924	92	169
1925	91	169
1926	91	186
1927	99	181
1928	101	189
1929	101	185
1930	99	181
1931	150	176
1932	151	202
1933	164	198
1934	136	242
1935	137	238
1936	136	260
1937	111	266
1938	137	211
1939	131	224
1940	124	

Source and notes: Appendix Table 4.4-5. Java 1912 = 100.
The Outer Provinces are taken as a percentage of Java.

Appendix 1

Nominal Wage, Cost of Living, and Real Wage Data for Burma 1873-1916

Overview: The wage and price information for Burma is fairly good between the early 1870s and World War I. After that, the quality and coverage drops off sharply, so we chose to cut off our series at the year 1916. Both wages and prices are based on urban observations from Mandalay and Rangoon.

APPENDIX TABLE 1.1: Nominal wage indices

Nominal Wages 1873-1916: Monthly wages for carpenters, masons, and blacksmiths in Rangoon (1873-1874, 1876-1912, 1916) and Mandalay (1887-1912, 1916), as reported by Prices and Wages in India. For years for which wages are given not as a single value but as a range between a maximum and a minimum, we took the mean of the two values. The wage observation for Rangoon in 1875 was missing and was filled in by linear interpolation. The 1911 and 1916 figures are daily rather than monthly wages, so we multiplied these figures by 25 in order to convert them to monthly wages (assuming a 25-day work month). Wages in Foreign Countries reports a monthly wage observation for Rangoon laborers in 1922, but we did not use that information in calculating real wages.

The nominal wage series are indexed 1900 = 100.

APPENDIX TABLE 1.2: Cost of living indices

Cost of Living 1873-1920: Prices for working class expenditure items could only be found for foodstuffs or, more specifically, for grains. Rice and wheat prices, given in Prices and Wages in India, are available for both Rangoon and Mandalay because retail and harvest prices were reported extensively in Indian statistical documents. These two cereals were eaten throughout Burma, and their purchase entailed a very large share of the unskilled worker's budget. We calculated two COL series. The first is an indexed series for the price of rice. The second is an indexed series for the weighted average of rice and wheat prices. The second series is more comprehensive, more accurately reflecting workers' cost of living, but the first series covers a longer interval of time. Since we could not find the prices for Rangoon wheat from 1916-1918, we filled in this gap by interpolation, setting the incremental yearly price changes in Rangoon proportional to the incremental yearly price changes in Mandalay. For the second series, we approximated the weights for rice and wheat using the relative shares of rice and wheat represented in the typical unskilled Bombay worker's budget, as reported by the Report on an Enquiry into Working Class Family Budgets in Bombay City: p = .86(rice price) + .14(wheat price).

The cost of living series are indexed 1900 = 100.

APPENDIX TABLE 1.3: Real wage indices

Real Wages 1873-1916: Real wages for Rangoon and Mandalay were calculated by dividing the indexed nominal wage series in each city by the COL index in each city. An all-Burma

real wage series was also calculated. The all-Burma index consists of two segments. From 1887 to 1916, the index is a weighted average of the real wages in Rangoon and Mandalay. However, since information was available only for Rangoon from 1873 to 1886, the earlier segment is based solely on real wages in Rangoon. The two series were linked at the overlapping year 1887.

The weights for the all-Burma index were based on population data for Mandalay and Rangoon. Mandalay data for 1875 and 1900, and Rangoon data for 1800, 1900 and 1925 come from Chandler. Mandalay data for 1890, 1900, 1910, 1920, 1930 and 1940, and Rangoon data for 1870, 1880, 1890, 1900, 1910, 1920, 1930 and 1940 come from Mitchell. Where both Chandler and Mitchell give population figures for a given year (i.e. Mandalay, 1900 and Rangoon, 1900), the actual population was taken as the mean of the two figures. In practice, the two authors tend to give highly consistent figures (e.g. both give 184,000 as the population of Mandalay in 1900; Chandler gives the population of Rangoon in 1900 as 229,000, while Mitchell gives it as 235,000). Population figures for all intervening years were found by geometric interpolation.

The real wage series is indexed 1900 = 100.

Works cited:

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Mitchell, B. R. International Historical Statistics: Africa, Asia and Oceania, 1750-1988. Second edition. New York: Stockton Press, 1995.

United States Bureau of Labor Statistics. Wages in Foreign Countries. Washington: US Government Printing Office, 1929.

Appendix Table 1.1
Nominal Wage Indices for Burma 1873-1916

1900 = 100

Year	Rangoon	Mandalay
1873	94	
1874	100	
1875	100	
1876	100	
1877	83	
1878	83	
1879	83	
1880	67	
1881	67	
1882	67	
1883	67	
1884	67	
1885	67	
1886	67	
1887	67	87
1888	67	58
1889	67	62
1890	83	69
1891	83	58
1892	83	69
1893	61	85
1894	61	88
1895	61	96
1896	100	85
1897	100	85
1898	100	85
1899	100	96
1900	100	100
1901	100	115
1902	100	100
1903	100	115
1904	100	96
1905	100	115
1906	100	115
1907	100	115
1908	100	115
1909	78	115
1910	73	146
1911	77	80
1912	76	83
1913		
1914		
1915		
1916	118	240

Appendix Table 1.2
Cost of Living Indices for Burma 1873-1920

1900 = 100

Year	Rangoon	Mandalay
1873	110	
1874	135	
1875	88	
1876	82	
1877	97	
1878	131	
1879	136	
1880	117	
1881	102	
1882	96	
1883	109	
1884	109	
1885	92	
1886	100	
1887	111	107
1888	116	104
1889	117	90
1890	126	94
1891	133	108
1892	136	113
1893	106	92
1894	96	76
1895	96	85
1896	100	104
1897	141	105
1898	104	89
1899	107	94
1900	100	100
1901	94	95
1902	84	90
1903	87	96
1904	88	88
1905	96	90
1906	102	99
1907	95	109
1908	126	131
1909	130	112
1910	138	102
1911	159	124
1912	182	148
1913	154	111
1914	149	101
1915	150	115
1916	117	112
1917	97	96
1918	108	101
1919	185	166
1920	218	202

Appendix Table 1.3
Real Wage Indices for Burma 1873-1916

1900 = 100

Year	Rangoon	weight	Mandalay	weight	Average	All-Burma index
1873	86	0.3498		0.6502		86
1874	74	0.3576		0.6424		74
1875	113	0.3654		0.6346		113
1876	122	0.3734		0.6266		122
1877	86	0.3814		0.6186		86
1878	64	0.3894		0.6106		64
1879	61	0.3976		0.6024		61
1880	57	0.4057		0.5943		57
1881	66	0.4138		0.5862		66
1882	69	0.4219		0.5781		69
1883	61	0.4300		0.5700		61
1884	61	0.4382		0.5618		61
1885	72	0.4464		0.5536		72
1886	67	0.4546		0.5454		67
1887	60	0.4629	81	0.5371	71	71
1888	57	0.4712	56	0.5288	57	57
1889	57	0.4795	69	0.5205	63	63
1890	66	0.4878	73	0.5122	70	70
1891	63	0.4948	53	0.5052	58	58
1892	61	0.5018	61	0.4982	61	61
1893	58	0.5088	92	0.4912	75	75
1894	64	0.5159	116	0.4841	89	89
1895	64	0.5229	113	0.4771	87	87
1896	100	0.5299	81	0.4701	91	91
1897	71	0.5368	81	0.4632	75	75
1898	96	0.5438	95	0.4562	95	95
1899	94	0.5508	102	0.4492	97	97
1900	100	0.5577	100	0.4423	100	100
1901	107	0.5705	121	0.4295	113	113
1902	119	0.5832	111	0.4168	116	116
1903	115	0.5958	120	0.4042	117	117
1904	114	0.6083	109	0.3917	112	112
1905	104	0.6207	128	0.3793	113	113
1906	98	0.6329	116	0.3671	105	105
1907	105	0.6449	106	0.3551	105	105
1908	80	0.6567	88	0.3433	83	83
1909	60	0.6684	103	0.3316	74	74
1910	53	0.6798	142	0.3202	82	82
1911	48	0.6815	65	0.3185	54	54
1912	42	0.6832	56	0.3168	46	46
1913	57	0.6849	96	0.3151	69	69
1914	71	0.6866	135	0.3134	91	91
1915	86	0.6882	175	0.3118	114	114
1916	101	0.6899	214	0.3101	136	136

Appendix 2

Nominal Wage, Cost of Living and Real Wage Data for China 1902-1936

Overview: Wages denote daily rates for common laborers. In cases where common labor wages were unavailable, average daily wages were used and noted as such. Cost of living indices are compiled from various sources, all of which are noted. While the majority of the data are from Shanghai, some of the wages are taken from Canton, Zhongxin, Tientsin, Beijing and Anyuan.

APPENDIX TABLE 2.1: Nominal wage index

Nominal Wages 1902-1936: Shaffer lists daily nominal wages for Tientsin carpenters (1902–1908) and Anyuan mine workers (1904-1915). Ma and Liang list daily nominal wages for Canton workers in various industries (1912 to 1926). We then found an average Canton time series by averaging across industries. Wright lists daily nominal wages for mine workers in Zhongxin (1927-1930). We linked the Tientsin series to the Anyuan series at the overlapping year 1904 and discarded the post-1904 Tientsin data, linked the Anyuan series to the averaged Canton series at the overlapping year 1911 and discarded the post-1911 Anyuan data, and linked the Canton series to the Zhongxin series by the overlapping year 1926 and discarded the pre-1926 Zhongxin data.

A nominal wage index 1930-1936 was unavailable to us, but we reconstructed one by taking the product of our real wage and COL indices described below.

The nominal wage series is indexed 1930 = 100.

APPENDIX TABLE 2.2: Cost of living index

COL 1902-1941: For the sake of consistency we tried to deflate the nominal wages in each of the cities by the COL for the same city and same year. The necessary data to do this properly were not available, but we tried to come as close to this goal as possible. Wright lists COL in Beijing from 1902 to 1912. Ma and Liang list COL in Canton from 1912 to 1927 and Tientsin from 1926-1930. Hinder lists COL in Shanghai from 1930 to 1941. The Beijing series was linked to the Canton series at the overlapping year 1912, the Canton series was linked to the Tientsin series at the overlapping year 1927 (the 1926 datum for Tientsin was discarded) and the Tientsin series was linked to the Shanghai series at the overlapping year 1930. The segment of the final COL series originating from the Canton data covers roughly the same period as the segment of the final nominal wage series originating from the Canton data. However, the other COL series do not correspond to the cities in the nominal wage data, but were used simply because they were the only cities for which reliable COL indices were available.

The cost of living series is indexed 1930 = 100.

APPENDIX TABLE 2.3: Real wage index

Real Wages 1902-1936: A partial real wage series spanning the years 1902 through 1930 was first constructed by deflating the nominal wage series by the COL. In addition, two other

sources listed real wages (for Shanghai daily laborers) directly without supplying nominal wage and COL data: Howe's Wage Patterns and Wage Policy in modern China 1919-1972 and Hinder's Life and Labour in Shanghai.

Howe provides real wage data across different industries. The unweighted average across industries was used to calculate the final China real wage series. Because data are provided for only 1930, 1936 and 1946, we used linear interpolation to determine average wages for all years in between. Hinder lists the cross-industry average real wage for each year from 1930 to 1941.

Linking the 1902-1930 real wage series to each of the Shanghai real wage series, we constructed two preliminary series that are identical through the year 1929, remain very closely correlated through 1936, but diverge drastically after 1936: Howe's series increases dramatically while Hinder's decreases by a mirrored amount. Because we were unable to resolve this inconsistency, the final series is truncated at 1936 and uses only Hinder's data.

The real wage series is indexed 1930 = 100.

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Appendix Table 2.1
Nominal Wage Index for China 1902-1936

1930 = 100

Year	Wage index	Year	Wage index	Year	Wage index
1902	19	1914	54	1926	67
1903	18	1915	56	1927	72
1904	20	1916	59	1928	83
1905	22	1917	60	1929	89
1906	24	1918	61	1930	100
1907	31	1919	62	1931	100
1908	37	1920	59	1932	48
1909	43	1921	57	1933	47
1910	49	1922	59	1934	45
1911	51	1923	61	1935	41
1912	51	1924	62	1936	45
1913	53	1925	61		

Appendix Table 2.2
Cost of Living Index for China 1902-1941

1930 = 100

Year	COL index	Year	COL index	Year	COL index
1902	38	1916	62	1930	100
1903	42	1917	64	1931	98
1904	39	1918	67	1932	45
1905	37	1919	69	1933	41
1906	41	1920	69	1934	41
1907	43	1921	73	1935	42
1908	44	1922	76	1936	45
1909	44	1923	79	1937	53
1910	45	1924	84	1938	69
1911	50	1925	89	1939	91
1912	51	1926	89	1940	192
1913	52	1927	90	1941	389
1914	54	1928	92		
1915	58	1929	96		

Appendix Table 2.3
Real Wage Index for China 1902-1936

1930 = 100

Year	Wage Series	Year	Wage Series	Year	Wage Series
1902	50	1914	100	1926	76
1903	42	1915	97	1927	81
1904	51	1916	95	1928	90
1905	59	1917	94	1929	92
1906	59	1918	91	1930	100
1907	71	1919	90	1931	102
1908	83	1920	86	1932	107
1909	96	1921	79	1933	114
1910	109	1922	78	1934	108
1911	103	1923	77	1935	98
1912	101	1924	73	1936	102
1913	102	1925	68		

Appendix 3

Nominal Wage, Cost of Living and Real Wage Data for India 1873-1939 and Land Prices for the Punjab 1871-1939

APPENDIX TABLE 3.1: Nominal wage indices

Nominal Wages 1873-1910: During this period, the Indian authorities collected an enormous amount of wage and price data, presented in Prices and Wages in India. The data we use here are the monthly wage quotes for carpenters, masons and blacksmiths in Calcutta, Dacca, Agra, Cawnpore, Delhi, Bombay, Ahmedabad, Secunderabad, Madras, and Bangalore.

There were gaps in the data for Agra and Cawnpore (1873, 1907-1910) and Madras (1908-1910). Some of the gaps were filled by linear interpolation. For each of the remaining gaps, data were interpolated by setting the incremental yearly wage changes proportional to the trends in a neighboring city for which data are available for the period of time in question. Since wages varied throughout each city, some sources occasionally presented a min-max range. Using discretion about the validity of the data, in such cases we used the average of the minimum and the maximum.

Although very little wage data can be found in most sources dealing with the early part of the period, we did come across one additional respected source that reported information over the period 1890-1912: K. L. Datta's Report on the Enquiry into the Rise of Prices in India. However, we elected to use Prices and Wages in India rather than Datta. First, it offers price and wage data for a longer period, both before and after Datta's series. Second, only Prices and Wages in India reports the information by city, the way in which the remainder of our data are reported.

Nominal Wages 1911-1939: Additional sources were used to extend the series beyond 1910. The Report on the Royal Commission on Labour in India supplied additional data for Delhi, Agra and Madras, and Wages in Foreign Countries supplied additional data for Dacca. However, wage trends between 1910 and 1950 could be completely documented for only three cities: Calcutta (Mukerji: 1960), Bombay (Mukerji: 1959) and Ahmedabad (Mukerji: 1961).

The nominal wage series for each city is indexed 1900 = 100

APPENDIX TABLE 3.2: Cost of living indices

Cost of Living 1873-1939: We were unable to find comprehensive and consistent annual figures for consumer good prices other than for grains. Of course, expenditure on grains amounted to a very large share of the worker's budget in India, and rice and/or wheat were eaten throughout the country. Another argument for the use of grain prices as the cost of living deflator is that retail and harvest prices for grains were extensively reported in Indian statistical documents. Rice and wheat are grown (and thus consumed) in different climates. This regional specialization is reflected in the official reports themselves: rice growing regions tended to have more complete data on rice prices, and wheat-growing regions tended to have more complete data on wheat prices. For example, since Ahmedabad was a major producer of wheat, there is much more information on historical prices in Ahmedabad for wheat than for rice. In contrast, Madras primarily grew rice, so it tends to have much more complete price data for rice than for wheat. In light of this fact, we elected to use region-

specific cost of living deflators: for rice-specializing regions (Calcutta, Dacca, Secunderabad and Madras) we used the price of rice as the deflator, and for wheat-specializing areas (Agra, Delhi, Bombay and Ahmedabad) we used the price of wheat as the deflator. For Cawnpore and Bangalore, where both rice and wheat prices were given in detail, we used a weighted average of rice and wheat prices as the deflator. The weights were constructed from the typical unskilled Bombay worker's budget, as reported by the Report on an Enquiry into Working Class Family Budgets in Bombay City: p = .86(rice price) + .14(wheat price).

Price data up to 1916 are from Prices and Wages in India. Post-1916 data for Bombay and Calcutta are from Index Numbers of Indian Prices and Narain. Post-1916 data for Delhi are from the Report on the Royal Commission on Labour in India and Narain. Post-1916 data for Agra, Ahmedabad, Madras, Punjab and the United Provinces are from Narain.

Each region's cost of living series is indexed 1900 = 100

APPENDIX TABLE 3.3: Real wage indices

Real Wages 1873-1939: Each city's indexed nominal wage series was first deflated by its own indexed price series to create a city real wage index. An all-India real wage index was then created in two parts. Between 1873 and 1910, the all-India series is a weighted (by regional population) average of the real wage indices for all ten of the cities for which we had collected data. However, as noted above, after 1910 only three cities -- Calcutta, Bombay and Ahmedabad -- have quality wage data, so after 1910 the all-India index is a weighted average of the real wages in only these three cities. The two series were linked at 1910.

In a similar fashion, real wage indices were also created for four separate geographical regions: North (Agra, Kanpur, Delhi), South (Bangalore, Madras, Secunderabad), East (Calcutta, Dacca) and West (Bombay, Ahmedabad). Regional real wage indices were found by taking the weighted average of the real wages for the cities within each region. If data were missing for one or more of the cities in a region during a given year, we took the weighted average of the remaining cities in that region. Thus, as in the case of the all-India index, each of the regional indices was made up of several linked series, each incorporating varying amounts of data.

The weights for the all-India index and the regional indices were based on population series constructed for the ten cities. Chandler provides population data for the following years:

Agra: 1846, 1850, 1852, 1900, 1925
Cawnpore: 1848, 1853, 1900
Delhi: 1846, 1850, 1853, 1900
Ahmedabad: 1846, 1851, 1872, 1900
Bombay: 1849, 1850, 1864, 1875, 1900, 1914
Calcutta: 1850, 1875, 1900, 1914
Dacca: 1850, 1867, 1900
Bangalore: 1850, 1852, 1900
Madras: 1850, 1863, 1875, 1900
Secunderabad: 1850

Mitchell provides population data for the following years:

Agra: 1858, 1870, 1880, 1890, 1900, 1910, 1920, 1930, 1940
Cawnpore: 1870, 1880, 1890, 1900, 1910, 1920, 1930, 1940
Delhi: 1870, 1880, 1890, 1900, 1910, 1920, 1930, 1940

Ahmedabad: 1870, 1880, 1890, 1900, 1910, 1920, 1930, 1940
Bombay: 1870, 1880, 1890, 1900, 1910, 1920, 1930, 1940
Calcutta: 1870, 1880, 1890, 1900, 1910, 1920, 1930, 1940
Dacca: 1870, 1880, 1890, 1900, 1910, 1920, 1930, 1940
Bangalore: 1870, 1880, 1890, 1900, 1910, 1920, 1930, 1940
Madras: 1870, 1880, 1890, 1900, 1910, 1920, 1930, 1940

The Census of India, 1931, provides population data for the following years:

Secunderabad: 1901, 1911, 1921, 1931 (1931 figure includes the town of Bolarum)

Where both Chandler and Mitchell give population figures for a given year, the actual population was taken as the mean of the two figures. In practice, the two authors tend to give highly consistent figures (e.g. both give 197,000 as the population of Cawnpore in 1900; Chandler gives the population of Agra in 1900 as 186,000 while Mitchell gives it as 188,000). Population figures for all intervening years were found by geometric interpolation.

All real wage series are indexed 1900 = 100.

APPENDIX TABLE 3.4: Land price index

Land Prices in Punjab 1862-1963: Mukerji reports two price series in Table 6 of "Land Prices in Punjab": one for the average price of all land (for every Census year from 1871 to 1961) and the other for the average price of "cultivated" land (for 1897 and every Census year from 1901 to 1961). Mukerji also gives the average price of all land in 1866 and 1862-63 (p. 533). Finally, Mukerji gives the average prices -- both for cultivated land and for all land -- during the periods 1899-1900, 1913-1914, 1938-1939, 1944-1945, 1947-1948 and 1962-1963 in his Table 1.

Even after combining these three groups of data, we still had many gaps in the land price series, which we filled using geometric interpolation. One complication was the fact that some of the prices were for individual years, while others were for two-year periods. For the purposes of interpolation, the prices for the one-year periods were treated as the price in the middle of the year, while prices for two-year periods were treated as the value at the end of the former year. For example, we treated the price given for the 1947-1948 period as the price on December 31, 1947, and the price given for the 1949 period as the price on June 30, 1949.

Mukerji also report two-year moving averages for periods starting with 1915-1916 and ending with 1948-1949 (Appendix I), but we elected not to use it because its data were inconsistent with the data in the rest of his paper.

Appendix Table 3.4 reports the land price series indexed 1900=100, as well as the wage to land price ratio, indexed 1900 = 1.00. Due to Delhi's proximity to Punjab, nominal wages in Delhi were used to calculate the wage to land price ratio.

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Appendix Table 3.1
Nominal Wage Indices for India 1873-1939

1900 = 100

Year	Calcutta	Dacca	Agra	Cawnpore	Delhi	Bombay	Ahmedabad
1873	46	120	163	89	65	108	98
1874	58	140	163	89	65	104	98
1875	82	132	163	89	65	104	113
1876	82	92	139	89	77	104	113
1877	82	88	89	89	73	104	113
1878	63	100	83	89	77	104	113
1879	61	112	99	89	77	104	113
1880	63	112	95	89	73	104	150
1881	63	112	90	86	73	104	113
1882	63	112	94	104	39	122	113
1883	63	132	94	92	73	112	125
1884	63	112	94	92	73	112	125
1885	79	112	89	130	86	112	125
1886	79	112	78	118	86	112	125
1887	92	112	72	118	81	115	125
1888	79	112	72	118	83	116	94
1889	79	120	100	118	79	112	94
1890	79	112	83	118	79	100	94
1891	79	112	117	107	77	100	94
1892	79	112	117	100	79	100	94
1893	82	128	117	100	79	100	94
1894	82	88	122	100	81	100	94
1895	82	88	122	100	81	100	94
1896	82	88	100	100	82	100	113
1897	100	88	100	100	85	100	113
1898	100	100	100	100	85	100	113
1899	100	100	100	100	100	100	101
1900	100	100	100	100	100	100	100
1901	100	108	100	121	97	100	70
1902	105	110	100	122	129	100	70
1903	105	110	100	134	97	100	94
1904	105	120	100	134	110	100	94
1905	105	124	100	135	110	100	94
1906	79	128	72	91	116	92	94
1907	84	132	80	101	129	94	94
1908	89	168	80	101	129	92	96
1909	89	160	80	101	129	94	94
1910	89	160	80	101	129	94	94
1911	90	121				82	94
1912	87				194	86	94
1913	95				194	87	94
1914	95		148		194	100	94
1915	96					102	94
1916	96	124	148	222		102	94

Year	Secunderabad	Madras	Bangalore	Weighted average	Simple average
1873	62	100	95	95	103
1874	60	100	95	97	109
1875	60	98	95	100	110
1876	60	80	70	91	95
1877	60	80	95	87	90
1878	60	94	95	88	92
1879	60	80	95	89	96
1880	60	80	95	92	99
1881	60	97	95	89	95
1882	60	97	97	90	98
1883	60	97	97	94	104
1884	71	96	97	93	99
1885	71	97	97	100	106
1886	71	97	97	97	103
1887	96	87	97	99	103
1888	96	100	97	97	100
1889	96	101	112	101	106
1890	96	101	110	97	101
1891	96	102	120	100	104
1892	96	104	108	99	102
1893	96	104	121	102	107
1894	82	104	107	96	96
1895	96	104	87	95	95
1896	104	104	120	99	98
1897	104	104	80	97	96
1898	104	104	120	103	102
1899	104	104	120	103	102
1900	100	100	100	100	100
1901	89	104	100	99	102
1902	104	104	99	104	105
1903	100	104	100	104	107
1904	100	104	80	105	109
1905	100	104	80	105	110
1906	100	104	80	96	100
1907	100	104	80	100	104
1908	100	104	80	104	114
1909	100	104	80	103	112
1910	100	104	80	103	112
1911	100	145	80	99	108
1912	100		80	99	108
1913	100		80	102	111
1914	100		80	108	117
1915	100		80	109	118
1916	100	159	120	109	118

Year	Calcutta	Dacca	Agra	Cawnpore	Delhi	Bombay	Ahmedabad
1917	97					104	96
1918	97					129	124
1919	108		240		374	151	140
1920	121		295		374	188	159
1921	131		314		374	187	223
1922	131		314		316	194	228
1923	129		295		310	200	233
1924	128		295		361	200	234
1925	130		277		361	200	235
1926	126		258		348	211	237
1927	127		258		342	211	237
1928	116		258		348	211	237
1929	109					211	237
1930	94					211	237
1931	107					211	250
1932	101					211	250
1933	96					211	250
1934	96					166	250
1935	96					166	234
1936	111					166	234
1937	120					174	217
1938	129					196	231
1939	129		220		155	216	245
1940	147		260		133	216	258
1941	141		231		176	233	317
1942	151		296		219	267	490
1943	195		381		262	377	723
1944	201		435		285	390	742
1945	216		445		292	385	650
1946	236		555		306	427	657
1947	276		578		319	540	708
1948	353		681		336	574	914
1949	440		820		476	588	903
1950	442		689		425	595	928

Year	Secunderabad	Madras	Bangalore	Weighted average	Simple average
1917	82		120	110	120
1918	82		120	130	143
1919	100	103	120	149	163
1920	100	158	147	174	192
1921		165		201	224
1922		173		205	229
1923		177		209	233
1924		181		209	233
1925		186		210	235
1926		190		213	238
1927		195		214	239
1928		193		210	235
1929				207	232
1930				201	227
1931				211	238
1932				209	236
1933				207	234
1934				190	216
1935				185	209
1936				190	214
1937				190	212
1938				207	231
1939		138		219	245
1940		146		231	257
1941		148		257	289
1942		163		337	386
1943		181		482	554
1944		249		495	569
1945		248		465	530
1946		291		491	558
1947		335		567	641
1948		535		685	776
1949		452		718	806
1950		355		730	821

Appendix Table 3.2
Cost of Living Indices for India 1873-1939

1900 = 100

Year	Calcutta	Dacca	Agra	Cawnpore	Delhi	Bombay	Ahmedabad	Secunderabad	Madras	Bangalore
1873	91	59	69	70	60	52	67	67	56	69
1874	93	111	67	72	59	49	63	76	69	69
1875	77	78	54	59	53	51	55	75	59	60
1876	90	73	44	69	46	52	58	75	79	87
1877	93	90	63	78	61	74	95	140	105	120
1878	105	119	81	111	80	92	117	140	106	114
1879	106	117	81	87	80	87	119	94	82	87
1880	77	106	67	68	65	68	66	92	67	78
1881	66	60	62	64	59	55	57	91	58	73
1882	69	59	64	63	61	58	66	94	56	74
1883	70	61	65	69	60	59	74	90	56	75
1884	94	93	59	75	57	54	63	85	58	77
1885	111	85	55	67	50	53	56	78	68	86
1886	77	81	65	67	59	58	62	84	61	84
1887	62	71	78	70	77	61	85	83	63	77
1888	66	69	78	76	77	63	87	87	65	74
1889	82	98	74	81	66	61	80	92	66	81
1890	82	94	75	78	69	58	75	90	76	85
1891	82	88	83	82	81	62	82	88	81	96
1892	101	110	82	85	78	72	89	113	91	112
1893	111	134	75	80	68	62	71	102	83	103
1894	109	119	68	77	55	55	63	91	74	95
1895	91	82	74	78	66	46	71	106	77	87
1896	101	121	100	93	96	51	92	148	79	90
1897	144	143	116	116	114	91	125	145	86	118
1898	107	104	76	89	79	80	89	91	95	112
1899	93	77	77	83	78	79	90	106	71	82
1900	100	100	100	100	100	100	100	100	100	100
1901	118	134	94	95	85	91	82	96	105	100
1902	112	114	80	90	75	82	78	81	91	88
1903	117	97	77	86	74	75	63	71	81	87
1904	117	90	71	81	71	73	64	71	83	75
1905	130	107	92	87	88	73	81	96	104	83
1906	140	169	97	105	90	64	89	117	110	104
1907	168	170	104	122	101	65	96	124	118	105
1908	174	167	143	140	137	92	109	136	125	125
1909	142	144	129	119	121	88	104	107	121	119
1910	135	129	101	110	97	89	91	114	114	110
1911	129	137	91	109	89	77	94	128	105	114
1912	148	150	96	112	99	88	95		119	135
1913	171	186	105	126	109	86	93		121	151
1914	179	206	124	132	124	89	111		120	148
1915	179	206	146	139	143	110	125		113	134
1916	185	182	128	146	121	86	114	104	122	130

Year	Calcutta	Dacca	Agra	Cawnpore	Delhi	Bombay	Ahmedabad	Secunderabad	Madras	Bangalore
1917	160	178	135	137	125	91	121		120	133
1918	143	155	166	159	160	140	173		142	150
1919	207	275	198	203	195	150	210		195	200
1920	237	270	183	232	171	138	176		189	227
1921	237		213		227	155	191		157	
1922	217		195		183	137	168		155	
1923	203		141		122	108	133		143	
1924	234		143		136	124	152		159	
1925	258		179		176	131	161		169	
1926	264		172		166	128	158		157	
1927	274		155		150	129	159		163	
1928	267		164		156	109	134		164	
1929	230		164		160	109	134		152	
1930	211		105		93	88	109		132	
1931	145		78		64	62	77		97	
1932	115		97		86	65	80		91	
1933	110		91		92	65	80		74	
1934	127		81		74	63	78		71	
1935	129		88		81	64	79		84	
1936	139		92		89	65	80		82	
1937	134		109		111	79	97		81	
1938	132		116		110	70	86		84	
1939	144		97		87	65	80		88	

Appendix Table 3.3
Real Wage Indices for India 1873-1939

1900 = 100

Year	Calcutta	weight	Dacca	weight	Agra	weight	Cawnpore	weight	Delhi	weight
1873	51	0.2683	203	0.0274	237	0.0580	126	0.0498	108	0.0608
1874	62	0.2623	126	0.0276	242	0.0581	123	0.0506	110	0.0612
1875	105	0.2563	170	0.0278	303	0.0582	150	0.0514	122	0.0615
1876	91	0.2588	126	0.0278	313	0.0578	129	0.0517	169	0.0613
1877	87	0.2612	98	0.0278	141	0.0573	114	0.0520	118	0.0612
1878	60	0.2637	84	0.0277	102	0.0569	80	0.0523	96	0.0610
1879	57	0.2661	96	0.0277	122	0.0565	103	0.0526	96	0.0608
1880	82	0.2686	105	0.0277	143	0.0560	131	0.0529	112	0.0606
1881	96	0.2698	188	0.0275	145	0.0558	136	0.0536	124	0.0607
1882	92	0.2710	191	0.0273	147	0.0556	165	0.0543	64	0.0608
1883	90	0.2722	218	0.0272	145	0.0554	133	0.0550	121	0.0608
1884	67	0.2734	120	0.0270	159	0.0551	122	0.0557	128	0.0609
1885	71	0.2746	132	0.0269	162	0.0549	195	0.0564	170	0.0610
1886	102	0.2757	137	0.0267	119	0.0547	176	0.0571	145	0.0611
1887	150	0.2769	158	0.0265	93	0.0544	169	0.0578	105	0.0611
1888	119	0.2781	161	0.0264	93	0.0542	156	0.0586	109	0.0612
1889	96	0.2792	123	0.0262	136	0.0540	147	0.0593	120	0.0613
1890	96	0.2842	119	0.0264	111	0.0545	152	0.0609	113	0.0622
1891	96	0.2870	127	0.0266	140	0.0544	131	0.0604	95	0.0619
1892	78	0.2898	102	0.0267	143	0.0543	117	0.0600	100	0.0616
1893	74	0.2927	96	0.0268	155	0.0542	124	0.0595	115	0.0614
1894	75	0.2955	74	0.0269	181	0.0540	130	0.0590	145	0.0611
1895	90	0.2983	108	0.0271	165	0.0539	127	0.0585	123	0.0608
1896	81	0.3011	73	0.0272	100	0.0538	107	0.0581	86	0.0605
1897	69	0.3039	62	0.0273	86	0.0537	86	0.0576	74	0.0602
1898	93	0.3068	96	0.0274	132	0.0536	112	0.0571	107	0.0599
1899	107	0.3096	131	0.0275	130	0.0534	121	0.0566	129	0.0596
1900	100	0.3124	100	0.0277	100	0.0533	100	0.0562	100	0.0593
1901	85	0.3130	81	0.0281	107	0.0528	128	0.0551	114	0.0594
1902	94	0.3135	97	0.0286	125	0.0522	136	0.0541	172	0.0596
1903	90	0.3140	113	0.0291	131	0.0517	156	0.0531	130	0.0597
1904	90	0.3144	134	0.0296	141	0.0511	165	0.0521	154	0.0598
1905	81	0.3147	116	0.0301	109	0.0506	155	0.0511	125	0.0599
1906	56	0.3150	76	0.0306	74	0.0500	87	0.0501	129	0.0600
1907	50	0.3152	78	0.0310	77	0.0495	83	0.0491	128	0.0600
1908	51	0.3154	101	0.0315	56	0.0489	72	0.0481	94	0.0601
1909	62	0.3155	111	0.0320	62	0.0483	85	0.0472	106	0.0601
1910	66	0.3155	124	0.0325	80	0.0478	92	0.0462	133	0.0602
1911	70	0.3187	89	0.0321		0.0467		0.0460		0.0603
1912	59	0.3221		0.0316		0.0456		0.0458	195	0.0605
1913	55	0.3255		0.0311		0.0446		0.0455	177	0.0607
1914	53	0.3288		0.0307	119	0.0435		0.0453	156	0.0609
1915	54	0.3234		0.0307		0.0432		0.0458		0.0620
1916	52	0.3180	68	0.0308	115	0.0429	152	0.0463		0.0632

Year	Bombay	weight	Ahmedabad	weight	Secunderabad	weight	Madras	weight	Bangalore	weight
1873	207	0.2619	147	0.0450	92	0.0207	181	0.1521	138	0.0559
1874	213	0.2663	157	0.0453	79	0.0210	145	0.1515	137	0.0561
1875	204	0.2707	204	0.0456	81	0.0214	165	0.1508	157	0.0563
1876	200	0.2707	195	0.0454	81	0.0215	102	0.1490	81	0.0560
1877	141	0.2707	118	0.0453	43	0.0216	77	0.1473	79	0.0556
1878	113	0.2707	96	0.0451	43	0.0217	89	0.1456	83	0.0553
1879	119	0.2707	95	0.0450	64	0.0219	98	0.1439	109	0.0550
1880	154	0.2707	228	0.0448	65	0.0220	119	0.1422	122	0.0546
1881	189	0.2681	197	0.0450	66	0.0222	167	0.1424	131	0.0549
1882	208	0.2656	169	0.0453	64	0.0225	172	0.1426	131	0.0552
1883	189	0.2631	169	0.0455	67	0.0227	174	0.1428	128	0.0554
1884	207	0.2605	197	0.0457	84	0.0230	166	0.1430	126	0.0557
1885	209	0.2580	222	0.0459	92	0.0232	144	0.1432	113	0.0559
1886	191	0.2555	201	0.0462	85	0.0235	159	0.1433	114	0.0562
1887	188	0.2531	148	0.0464	115	0.0237	139	0.1435	126	0.0565
1888	184	0.2506	107	0.0466	109	0.0240	154	0.1437	131	0.0567
1889	183	0.2481	117	0.0468	104	0.0242	153	0.1438	139	0.0570
1890	173	0.2353	125	0.0477	106	0.0248	134	0.1460	129	0.0580
1891	160	0.2340	115	0.0482	108	0.0250	127	0.1459	125	0.0566
1892	139	0.2326	105	0.0486	84	0.0252	113	0.1458	97	0.0553
1893	161	0.2313	131	0.0491	93	0.0255	125	0.1457	117	0.0540
1894	181	0.2300	148	0.0495	90	0.0257	140	0.1455	113	0.0527
1895	217	0.2286	131	0.0500	90	0.0259	135	0.1454	100	0.0515
1896	195	0.2273	122	0.0505	71	0.0261	131	0.1452	133	0.0503
1897	110	0.2259	90	0.0509	72	0.0263	120	0.1451	68	0.0491
1898	126	0.2245	127	0.0514	115	0.0265	109	0.1449	108	0.0479
1899	127	0.2232	113	0.0518	98	0.0267	147	0.1447	147	0.0467
1900	100	0.2218	100	0.0523	100	0.0269	100	0.1445	100	0.0456
1901	110	0.2249	85	0.0527	93	0.0272	99	0.1436	100	0.0432
1902	122	0.2280	90	0.0531	129	0.0274	114	0.1426	112	0.0408
1903	134	0.2311	149	0.0535	140	0.0276	127	0.1416	115	0.0386
1904	137	0.2342	146	0.0539	140	0.0278	125	0.1405	106	0.0366
1905	137	0.2373	116	0.0543	104	0.0280	99	0.1395	96	0.0346
1906	143	0.2404	105	0.0546	86	0.0282	94	0.1384	77	0.0327
1907	145	0.2435	97	0.0550	81	0.0283	88	0.1374	76	0.0309
1908	100	0.2466	88	0.0554	74	0.0285	83	0.1363	64	0.0292
1909	107	0.2497	90	0.0557	93	0.0287	86	0.1351	67	0.0276
1910	106	0.2528	103	0.0560	87	0.0288	91	0.1340	73	0.0261
1911	106	0.2529	100	0.0560	78	0.0286	138	0.1310	70	0.0277
1912	97	0.2532	99	0.0560		0.0275		0.1282	59	0.0295
1913	101	0.2535	101	0.0560		0.0264		0.1254	53	0.0314
1914	112	0.2536	85	0.0559		0.0253		0.1226	54	0.0334
1915	93	0.2553	75	0.0568		0.0246		0.1219	60	0.0361
1916	120	0.2569	83	0.0577	96	0.0240	130	0.1211	93	0.0391

Year	Weighted average	North	South	East	West
1873	144	158	162	65	198
1874	142	159	137	68	205
1875	165	192	155	112	204
1876	147	206	94	94	200
1877	107	125	74	88	138
1878	88	93	83	62	111
1879	94	107	97	61	116
1880	123	128	114	84	164
1881	146	135	147	105	190
1882	147	123	151	101	203
1883	144	133	152	102	186
1884	141	136	148	72	205
1885	147	176	131	77	211
1886	147	147	140	105	193
1887	151	122	133	150	182
1888	141	120	144	123	172
1889	137	134	144	99	173
1890	129	126	130	98	165
1891	123	121	124	98	152
1892	108	119	106	80	133
1893	118	131	119	76	156
1894	128	151	128	75	175
1895	137	137	122	91	202
1896	121	97	124	80	182
1897	89	82	103	69	106
1898	110	117	110	94	126
1899	123	127	141	109	124
1900	100	100	100	100	100
1901	99	116	98	85	105
1902	113	146	116	94	116
1903	120	139	127	92	137
1904	123	153	124	93	139
1905	109	129	100	84	133
1906	94	99	90	58	136
1907	91	98	85	53	136
1908	76	76	79	56	98
1909	85	86	84	67	104
1910	90	104	88	71	105
1911	87		119	71	105
1912	78	78	11	54	98
1913	78	71	11	51	101
1914	80	98	12	49	107
1915	71		14	49	90
1916	82	79	118	53	113

Year	Calcutta	weight	Dacca	weight	Agra	weight	Cawnpore	weight	Delhi	weight
1917	61	0.3126		0.0308		0.0426		0.0468		0.0644
1918	68	0.3072		0.0308		0.0422		0.0473		0.0655
1919	52	0.3017		0.0308	121	0.0419		0.0477	192	0.0667
1920	51	0.2962		0.0308	161	0.0415		0.0482	219	0.0678
1921	55	0.2955		0.0309	147	0.0419		0.0482	165	0.0699
1922	60	0.2945		0.0310	161	0.0423		0.0482	173	0.0720
1923	63	0.2934		0.0311	209	0.0426		0.0482	253	0.0741
1924	54	0.2923		0.0312	206	0.0430		0.0482	265	0.0763
1925	51	0.2912		0.0313	154	0.0434		0.0482	205	0.0786
1926	48	0.2911		0.0314	150	0.0437		0.0481	209	0.0803
1927	46	0.2910		0.0315	166	0.0440		0.0480	228	0.0820
1928	44	0.2909		0.0315	158	0.0443		0.0479	224	0.0838
1929	47	0.2907		0.0316		0.0447		0.0478		0.0856
1930	45	0.2905		0.0317		0.0450		0.0477		0.0874
1931	74	0.2934		0.0318		0.0443		0.0493		0.0874
1932	88	0.2962		0.0319		0.0437		0.0510		0.0874
1933	87	0.2990		0.0320		0.0430		0.0527		0.0873
1934	75	0.3017		0.0321		0.0424		0.0545		0.0873
1935	75	0.3044		0.0322		0.0417		0.0563		0.0872
1936	80	0.3071		0.0323		0.0411		0.0582		0.0871
1937	90	0.3296		0.0311		0.0388		0.0577		0.0835
1938	97	0.3529		0.0298		0.0366		0.0570		0.0798
1939	89	0.3769		0.0286		0.0344		0.0562	178	0.0761

Year	Bombay	weight	Ahmedabad	weight	Secunderabad	weight	Madras	weight	Bangalore	weight
1917	114	0.2584	79	0.0586		0.0234		0.1203	90	0.0422
1918	92	0.2598	72	0.0594		0.0228		0.1194	80	0.0456
1919	101	0.2611	67	0.0603		0.0222	53	0.1185	60	0.0492
1920	136	0.2623	91	0.0611		0.0216	84	0.1175	65	0.0531
1921	120	0.2590	117	0.0612		0.0210	105	0.1186		0.0538
1922	142	0.2555	136	0.0613		0.0212	112	0.1195		0.0545
1923	185	0.2520	175	0.0613		0.0215	124	0.1205		0.0552
1924	162	0.2486	154	0.0614		0.0217	114	0.1214		0.0559
1925	153	0.2451	146	0.0614		0.0219	110	0.1223		0.0565
1926	165	0.2414	150	0.0614		0.0222	121	0.1232		0.0572
1927	163	0.2378	149	0.0614		0.0224	119	0.1240		0.0579
1928	194	0.2342	177	0.0614		0.0226	117	0.1249		0.0585
1929	193	0.2306	176	0.0614		0.0228		0.1257		0.0592
1930	239	0.2270	218	0.0614		0.0231		0.1265		0.0598
1931	339	0.2241	326	0.0631		0.0228		0.1243		0.0594
1932	323	0.2212	311	0.0649		0.0226		0.1222		0.0590
1933	324	0.2183	311	0.0667		0.0224		0.1201		0.0585
1934	262	0.2153	319	0.0685		0.0221		0.1179		0.0581
1935	261	0.2124	298	0.0704		0.0219		0.1158		0.0576
1936	255	0.2094	292	0.0723		0.0217		0.1137		0.0572
1937	220	0.2059	223	0.0712		0.0206		0.1072		0.0544
1938	280	0.2019	268	0.0700		0.0195		0.1007		0.0517
1939	331	0.1974	305	0.0686		0.0184	157	0.0944		0.0489

Year	Weighted average	North	South	East	West
1917	85		23	56	108
1918	78		22	62	88
1919	74	114	55	47	95
1920	91	137	78	46	128
1921	89	110	72	50	120
1922	102	118	77	54	140
1923	125	168	85	57	183
1924	109	174	78	49	160
1925	102	134	75	46	152
1926	106	136	83	43	162
1927	104	149	81	42	160
1928	118	146	80	39	191
1929	119			43	190
1930	139			40	235
1931	204			66	336
1932	202			79	320
1933	201			79	321
1934	173			68	276
1935	169			67	270
1936	168			72	265
1937	149			82	220
1938	176			90	277
1939	187	81	103	83	325

Appendix Table 3.4
Land Price Index for Punjab 1862-1963
Wage to Land Price Ratio for Punjab 1873-1950

1900 = 100

Period	Land price	Wage/Land price
1862-1863	17.1	
1864	18.9	
1865	20.1	
1866	21.4	
1867	22.9	
1868	24.5	
1869	26.2	
1870	28.0	
1871	30.0	
1872	31.1	
1873	32.2	2.0024
1874	33.4	1.9322
1875	34.6	1.8645
1876	35.9	2.1590
1877	37.2	1.9532
1878	38.5	2.0104
1879	39.9	1.9399
1880	41.4	1.7550
1881	42.9	1.6935
1882	44.6	0.8681
1883	46.4	1.5646
1884	48.3	1.5038
1885	50.2	1.7102
1886	52.2	1.6438
1887	54.3	1.4838
1888	56.5	1.4764
1889-1890	60.0	1.3107
1891	70.7	1.0829
1892	73.7	1.0668
1893	76.9	1.0233
1894	80.1	1.0066
1895	83.5	0.9655
1896	87.1	0.9447
1897	95.5	0.8862
1898	97.0	0.8729
1899-1900	99.2	1.0082
1901	101.6	0.9521
1902	106.2	1.2147
1903	111.0	0.8718
1904	116.0	0.9454
1905	121.2	0.9046
1906	126.7	0.9165
1912	205.5	0.9418
1913-1914	304.9	0.6348
1915	325.5	
1916	339.9	
1917	355.0	
1918	370.8	
1919	387.3	0.9662
1920	404.5	0.9251
1921	422.5	0.8857
1922	430.9	0.7337
1923	439.4	0.7047
1924	448.2	0.8062
1925	457.1	0.7905
1926	466.1	0.7474
1927	475.4	0.7193
1928	484.8	0.7186
1929	494.5	
1930	504.3	
1931	514.3	
1932	521.7	
1933	526.7	
1934	531.7	
1935	536.8	
1936	541.9	
1937	547.1	
1938-1939	552.3	0.1407
1940	540.4	0.2457
1941	532.7	0.3299
1942	706.7	0.3095
1943	937.6	0.2793
1944-1945	1432.7	0.2015
1946	1669.7	0.1832
1947-1948	1945.8	0.1684
1949	1386.3	0.3436
1950	1027.9	0.4132
1951	1105.8	
1952	1101.3	
1953	1096.8	
1954	1092.4	
1955	1087.9	
1956	1083.5	
1957	1079.1	

Period	Land price	Wage/Land price
1907	132.4	0.9744
1908	138.4	0.9323
1909	144.6	0.8921
1910	151.2	0.8536
1911	158.0	

Period	Land price	Wage/Land price
1958	1074.7	
1959	1070.4	
1960	1066.0	
1961	1061.7	
1962-1963	1225.8	

Appendix 4

Nominal Wage, Cost of Living and Real Wage Data for Indonesia Java 1820-1940, Outer Provinces 1878-1939

APPENDIX TABLES 4.1-2: Nominal wage indices

Nominal Wages for Javan Sugar Coolies 1820-1940: Wages in cents per day, as given by Boomgaard in Changing Economy in Indonesia, vol. 13. 1820 data come from Table 1; 1855 data from Table 3.2; 1861-1866 data from Table 5.1; 1869-1871 data from Table 5.2; 1875-1915 data from Table 5.4 (discarded outliers at 1889 Semarang, 1910 Kediri, and no data given for 1896); 1916-1920 data from Tables 10.1 and 10.3; and 1921-1940 data from Table 9.2.

A coolie is a manual, common laborer working either in the fields of a plantation or on the production floor of a factory. The labor force was primarily male until around 1880, at which point women and children became more prominent, eventually reaching 45 percent of the workforce in the sugar industry in 1925. In nineteenth century Indonesia, Chinese immigrants sometimes provided coolie labor. Where the nationality of workers is given by Boomgaard, the data on Chinese laborers have been omitted, and only Javanese coolie wages are used.

Up to 1920, Boomgaard reports annual regional wages as a range between a minimum and a maximum. We took the unweighted mean of the minimum and the maximum, since movements of the mean matched those of the range itself, suggesting that Boomgaard's concern with this aspect of the data is overdrawn. Our time-series uses annual averages for Java as a whole, which were found as an unweighted average of the regional observations (because we could not find data for the sizes of the sugar coolie workforces in the individual regions, the mean is unweighted rather than weighted). To maintain continuity, the data for the regions of Yombang, Mojokerto and Nganjuk were not included, as they only appear after 1930.

From 1921-1940, Boomgaard does not give a range but instead gives the average values for males and females. However, we also treated the male and female data as the bounds of a range, taking the unweighted mean of the two as the mean wage, the lower of the two (almost always female) as the min and the higher as the max. As noted above, the time series of the means and the min-max gender-determined ranges 1921-1940 are almost perfectly correlated, and again, our final time-series uses annual averages for Java as a whole, which were found by averaging the regional means.

Since sugar coolie data were unavailable for the period from 1916 to 1920, we substituted data for wages in the oil and metallurgical industries (Tables 10.1 and 10.3). In order to do so, we had to adjust the data for wage differences between the oil/metallurgical industry and the sugar industry: using the 1907-1915 data for sugar (Table 5.4) and oil/metallurgical (Tables 10.1 and 10.3), we found the ratio of mean values in the two industries to be 0.745. By multiplying oil/metallurgical wages by this ratio, we were able to adjust for the difference across industries, thereby obtaining estimates for the 1916-1920 sugar industry wages. Using the same ratio, the adjusted values for 1921-1923 oil/metallurgical wages were found to match up precisely with the actual observed values for sugar wages during the same time period (Table 9.2), giving us reason to believe that the adjustment was appropriate.

Due to gaps in the data, mean wages for some years (1821-1854, 1856-1860, 1867-1868, 1872-1874, and 1896) were interpolated by taking the difference between the two nearest years for

which data were available and assuming that the wage changed by the same absolute amount during each of the intervening years. Nominal wage data were indexed 1912 = 100.

Nominal Wages for Coolies in the Outer Provinces 1878-1939: Nominal wages for outer province coolies in cents per day, in Boomgaard, vol. 13. As was true of the Javan coolies, the outer province coolies were predominately male in the early years, but became progressively more mixed. The same procedure as the one used for Java was used here: Boomgaard's min and max were averaged to find the mean wage for each province each year, and for each year the aggregate mean wage for all of Indonesia outside of Java was found by taking the unweighted mean of the provincial means. 1878-1902 data (for "craftsmen and coolies") are from Table 6.1 (discarded points at 1883 Bengkulu; 1897 Palembang); 1903-1913 data from Table 6.2 (discarded point at 1903 Riau; also, Table 6.2 gives data for railroad and plantation wages); 1914-1916 data from Table 10.3 (these observations are for oil coolies). We used only the Eastern Sumatra data for 1914-1916. Because we wanted to link this series as consistently as possible with the following series -- which includes only data for Eastern Sumatra and Palembang, we threw away the data for all provinces save these two. Furthermore, we had to throw away data for Palembang due to concerns about its consistency. The 1917-1939 data is taken from Table 8.2 (for tobacco coolies in Eastern Sumatra and Palembang).

As in the Java series, data from several different industries had to be used since we could not find a complete time series for any individual industry. We made the necessary adjustments in an analogous fashion, by finding the cross-industry wage ratios for years for which we had overlapping data. Three such adjustments have been made in this series:

1902-1903: There is no overlap between Tables 6.1 and 6.2. However, the series for Public Works wages (below) is remarkably stable between 1902 and 1903. There is no reason to believe that outer province wages behaved any differently during that year. Thus, we equated 1902 and 1903 and used the ratio of their original values to adjust the remainder of Table 6.2 through 1913.

1913-1914: Here the data switches from plantation and railroad coolies to oil coolies between Tables 6.2 and 10.3. The average ratio of Table 6.2 to Table 10.3 for the overlapping years 1910-1913 was 1.18. We controlled for differences across the industries by multiplying the 1914-1919 data from Table 10.3 by a factor of 1.18.

1916-1917: This is the transition between the adjusted Table 10.3 data and the long 1917-1939 series from Table 8.2. Table 10.3 is for oil coolies and Table 8.2 is for tobacco coolies. Both give reliable data only for Eastern Sumatra. The average ratio of Table 10.3 to Table 8.2 for the overlapping years 1917-1919 wages was 0.92. We controlled for differences across the industries by multiplying the 1920-1939 data from Table 8.2 by a factor of 0.92.

The following missing years were filled in by interpolation: 1881 and 1896. Nominal wage data were indexed 1912 = 100.

Nominal Wages for Javan Public Works Coolies 1855-1912: As before, these are daily wages in cents for unskilled laborers (coolies) of a predominately male but increasingly mixed labor force. The source is Boomgaard, vol. 13: 1855 and 1860 data are from Table 4.1; 1860, 1864, 1868 and 1870 data from Table 4.1; 1863 and 1869 data from Table 4.6; 1893 data from Table 4.4; 1895-1909 data from Table 4.5; and 1903-1912 data from Table 4.7. Where Table 4.7 overlaps with Table 4.5, an average was taken.

Nominal wage data were indexed 1912 = 100.

APPENDIX TABLE 4.3: Cost of living index

Cost of Living 1820-1940: This index was constructed using prices for rice, imported textiles, domestic cooking oils, and sugar:

Rice prices are taken from Boomgaard, vol. 4. Two series of rice prices are reported in this source: 1744-1846 and 1848-1940. The notes to the tables emphasized that no attempt had been made to link the two. To do so, we used an alternative series of rice prices found in Boomgaard, Vol. 14. This series gives rice prices for each of up to 20 locations for the years 1837-1872. We used an unweighted average of the prices given in this series from 1846-1848 to link the two series from Boomgaard, vol. 4. A price index for rice is thus constructed 1820-1940.

Imported textile prices are taken from Boomgaard, vol. 15, Table 1A. The textiles used to construct the index were chosen on the basis of continuity and relevance to a worker§s needs. Each type of textile is assigned a code number for easy reference in Boomgaard; from now on we will give these reference numbers along with the names of the commodities used. Specifically, textile price were for madapollams 7, 25, 27; shirtings 35, 36; sarongs 41; cambrics 14; drills 18; calicoes 9; and prints 30. An unweighted average of these textile prices was constructed for 1827-1940.

Cooking oil prices are taken from Boomgaard, Vol. 15, Table 3A. To eliminate high variability and discontinuity in the series, we used the prices of peanut and coconut oil in Surabaya alone, reference numbers 3 and 12 in Table 3A. These prices were only available for 1827 to 1873.

Sugar prices are taken from Boomgaard, Vol. 15, Table 2A. This table is for export prices, but we used the prices at Javan port cities, thereby minimizing the effects of freight costs. Specifically, an unweighted average of sugar prices numbered 60, 62, 63, and 65 in Table 2A, dating from 1822 to 1937, was used to achieve continuity.

The Cost of Living index was constructed using a weighted sum of the above prices. Because only rice prices were available for the entire interval from 1820 to 1940, the index incorporated different combinations of prices for different time spans. Sugar prices were available from 1822 to 1937, textile prices were available for 1827 to 1940 and oil prices were available from 1827 to 1873. The COL index consists of a weighted average of the available prices, and is therefore calculated in a different manner for each of five periods. The budget weights are taken from Scheltema (pp. 48-52), augmented by weights taken from other parts of Southeast Asia. The budget weights used in constructing the cost of living index are: 1820-1821, rice 100%; 1822-1826, rice 95.436%, sugar 4.564%; 1827-1873, rice 82%, sugar 3.92%, oils 1.02%, textiles 13.007%; 1874-1937, rice 83.02%, sugar 3.97%, textiles 13.007%; 1938-1940, rice 86.992% and textiles 13.007%.

These five series were then linked over each break; 1821-1822, 1826-1827, 1873-1874, and 1937-1938 to create a continuous series from 1820-1940.

Cost of living data were indexed 1912 = 100.

APPENDIX TABLES 4.4-5: Real wage indices

Real Wages 1820-1940: To calculate real wages, the nominal wage series were divided by the COL index. Real wage data were indexed 1912=100.

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Appendix Table 4.1
Nominal Wage Indices for Java 1820-1940

1912 = 100

Year	Sugar coolies	Public works coolies
1820	49	
.	.	.
.	.	.
.	.	.
1855	61	55
1856	67	
1857	73	
1858	79	
1859	85	
1860	91	77
1861	96	88
1862	97	99
1863	93	110
1864	90	109
1865	84	109
1866	91	109
1867	98	109
1868	105	108
1869	112	141
1870	113	157
1871	112	
1872	112	
1873	113	
1874	113	
1875	114	
1876	114	
1877	110	
1878	113	
1879	116	
1880	116	
1881	115	
1882	131	
1883	129	
1884	128	
1885	121	
1886	109	
1887	100	
1888	99	
1889	100	
1890	99	
1891	101	
1892	106	
1893	103	78
1894	100	118
1895	98	157
1896	112	125
1897	96	123
1898	94	118
1899	93	113
1900	89	109
1901	95	104
1902	106	95
1903	84	95
1904	87	93
1905	89	93
1906	87	93
1907	90	97
1908	90	95
1909	91	98
1910	93	99
1911	98	99
1912	100	100
1913	103	
1914	106	
1915	110	
1916	109	
1917	102	
1918	108	
1919	118	
1920	136	
1921	144	
1922	131	
1923	135	
1924	134	
1925	130	
1926	131	
1927	132	
1928	132	
1929	139	
1930	132	
1931	130	
1932	107	
1933	94	
1934	76	
1935	76	
1936	72	
1937	73	
1938	91	
1939	83	
1940	82	

Appendix Table 4.2
Nominal Wage Index for the Outer Provinces 1878-1939

1912 = 100

Year	Wage index	Year	Wage index	Year	Wage index
1878	98	1899	98	1920	116
1879	101	1900	101	1921	136
1880	100	1901	94	1922	122
1881	103	1902	93	1923	116
1882	106	1903	98	1924	130
1883	110	1904	92	1925	126
1884	106	1905	95	1926	140
1885	106	1906	96	1927	137
1886	103	1907	97	1928	144
1887	104	1908	95	1929	147
1888	108	1909	98	1930	137
1889	105	1910	100	1931	132
1890	106	1911	101	1932	124
1891	107	1912	100	1933	107
1892	108	1913	100	1934	105
1893	108	1914	105	1935	104
1894	101	1915	105	1936	107
1895	98	1916	105	1937	111
1896	98	1917	104	1938	110
1897	98	1918	107	1939	107
1898	98	1919	103		

Appendix Table 4.3
Cost of Living Index for Indonesia 1820-1940

1912 = 100

Year	COL index	Year	COL index	Year	COL index
1820	92	1861	107	1902	75
1821	107	1862	120	1903	78
1822	108	1863	128	1904	74
1823	95	1864	110	1905	72
1824	89	1865	139	1906	76
1825	108	1866	152	1907	85
1826	109	1867	108	1908	90
1827	82	1868	93	1909	82
1828	100	1869	99	1910	83
1829	95	1870	94	1911	89
1830	96	1871	98	1912	100
1831	98	1872	124	1913	93
1832	106	1873	114	1914	91
1833	87	1874	118	1915	90
1834	94	1875	107	1916	99
1835	93	1876	104	1917	116
1836	89	1877	106	1918	148
1837	80	1878	121	1919	158
1838	83	1879	109	1920	241
1839	93	1880	111	1921	182
1840	87	1881	109	1922	139
1841	84	1882	106	1923	134
1842	92	1883	97	1924	147
1843	88	1884	79	1925	143
1844	95	1885	73	1926	144
1845	103	1886	71	1927	133
1846	98	1887	69	1928	131
1847	90	1888	68	1929	137
1848	88	1889	69	1930	133
1849	92	1890	75	1931	87
1850	90	1891	76	1932	71
1851	99	1892	85	1933	58
1852	95	1893	75	1934	56
1853	89	1894	69	1935	56
1854	104	1895	62	1936	53
1855	107	1896	63	1937	65
1856	92	1897	84	1938	66
1857	125	1898	70	1939	64
1858	95	1899	66	1940	66
1859	105	1900	67		
1860	99	1901	80		

Appendix Table 4.4
Real Wage Indices for Java 1820-1940

1912 = 100

Year	Sugar coolies	Public works coolies
1820	54	
.	.	.
.	.	.
.	.	.
1855	57	51
1856	73	
1857	58	
1858	83	
1859	80	
1860	92	78
1861	90	82
1862	81	82
1863	73	85
1864	82	99
1865	60	79
1866	60	72
1867	91	101
1868	112	116
1869	114	143
1870	120	166
1871	115	
1872	91	
1873	99	
1874	96	
1875	106	
1876	110	
1877	104	
1878	93	
1879	107	
1880	105	
1881	105	
1882	124	
1883	133	
1884	162	
1885	165	
1886	153	
1887	146	
1888	144	
1889	145	
1890	132	
1891	133	
1892	124	
1893	138	104
1894	144	170
1895	157	252

Year	Sugar coolies	Public works coolies
1896	177	198
1897	114	147
1898	135	169
1899	140	171
1900	131	161
1901	119	130
1902	141	126
1903	107	122
1904	117	126
1905	123	130
1906	115	123
1907	106	114
1908	100	106
1909	110	120
1910	112	120
1911	110	111
1912	100	100
1913	111	
1914	117	
1915	123	
1916	111	
1917	88	
1918	73	
1919	74	
1920	56	
1921	80	
1922	95	
1923	101	
1924	92	
1925	91	
1926	91	
1927	99	
1928	101	
1929	101	
1930	99	
1931	150	
1932	151	
1933	164	
1934	136	
1935	137	
1936	136	
1937	111	
1938	137	
1939	131	
1940	124	

Appendix Table 4.5
Real Wage Index for the Outer Provinces 1878-1939

1912 = 100

Year	Wage index	Year	Wage index	Year	Wage index
1878	81	1899	147	1920	48
1879	93	1900	149	1921	75
1880	91	1901	117	1922	88
1881	94	1902	123	1923	87
1882	100	1903	126	1924	89
1883	113	1904	124	1925	88
1884	134	1905	132	1926	97
1885	144	1906	127	1927	103
1886	145	1907	114	1928	110
1887	152	1908	106	1929	107
1888	158	1909	120	1930	103
1889	152	1910	121	1931	151
1890	142	1911	113	1932	175
1891	141	1912	100	1933	186
1892	127	1913	108	1934	188
1893	144	1914	116	1935	187
1894	146	1915	118	1936	203
1895	157	1916	106	1937	169
1896	154	1917	90	1938	165
1897	116	1918	72	1939	168
1898	140	1919	65		

Appendix 5

Nominal Wage, Cost of Living, Real Wage and Land Rent Data for Japan 1831-1938

Overview: The complete real wage series for the period of 1831-1938 is a combination of three series: Sano's series, a series for the early Meiji period and a series for the modern period. The first two series were linked in the overlapping year 1874, and the early Meiji series was linked to the modern series at 1887. The complete series maintains the base year of 1934-1936 = 100.

APPENDIX TABLE 5.1: Nominal wage index

Nominal Wages 1868-1886: Daily wages for carpenters in Japan (Bank of Japan: 72-73). The year 1881 was derived by linear interpolation.

Nominal Wages 1887-1938: Daily wages for carpenters in Tokyo (Long Term Economic Statistics, hereafter called LTES, vol. 8: 244-245). The missing years 1888-91 and 1893 were filled by linear interpolation.

APPENDIX TABLE 5.2: Cost of living index

Cost of Living 1868-1886: Taken to be the price of rice in Tokyo (Bank of Japan: 90).

Cost of Living 1887-1938: The cost of living index was constructed from prices in Tokyo for rice, soy beans, and salt (LTES vol. 8: 153-154), and prices of firewood and salted fish (LTES vol. 8: 138-151). The missing years 1894-95 for the price of salt were filled by linear interpolation. The (fixed) weights were derived from consumption budgets for the "typical" family (LTES vol. 8: 138-141 and vol. 6: 136-137). The weights were: cost of living = (rice).70 + (soy).07 + (salt).01 + (firewood).08 + (salted fish).14.

APPENDIX TABLE 5.3: Real wage index

Real Wages 1831-1874: An index of daily real wages for Tokyo carpenters (Sano 1962: Table 6, p. 24). The nominal wages for these construction workers and their cost of living were extracted by Sano from the yearly series *Wagakuni Shohin Soba Tokei-hyo*. The deflator is based on fixed expenditure share weights of a representative worker's family. Between the years 1854 and 1861, the Sano series demonstrates a trend that is neither consistent with the general trend of the real wage before and after these dates, nor plausible with regard to the economic state of Japan at the time. In particular, the series undergoes some very improbable upward spikes, rising by a factor of three to five, in particular in 1855. We removed these aberrations in two steps: first, the 1855 observation was purged and replaced by the average of 1854 and 1856; second, we interpolated linearly over the period from 1854 to 1861. In order that the interpolation end points not be set arbitrarily, the real wages in 1854 and 1861 were computed as a three year average of 1853-55 and 1860-62. We used the same method to interpolate over 1870-1882, for similar reasons. Only the years 1870-1874 from that interval come from Sano, the remainder coming from the Bank of Japan.

***Real Wages 1875-1938*:** The nominal wage series was divided by the COL index and indexed 1934-36 = 100.

APPENDIX TABLE 5.4: Land price and rent index

Land Rents and Land Prices 1885-1945: Two series for paddy field land prices were available: a price series for 1890-1945 (LTES vol. 9, Table 34) and a price index for 1913-1965 (Bank of Japan: 88). The LTES series is for all of Japan, but does not include the island of Hokkaido until the year 1911. The Bank of Japan series is a weighted average for eleven districts, including Hokkaido.

The 1885-1945 price series for paddy field land rents (LTES vol. 9, Table 34) includes Hokkaido for all years except for 1885, 1890 and 1899. All three series were in units of yen per *tan* (1 *tan* = 991.74 m^2), and indexed 1934-36 = 100. The table also reports the wage/rental ratio indexed 1934-36 = 1.00.

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Appendix Table 5.1
Nominal Wage Index for Japan 1868-1938

1934-1936 = 100

Year	Wage index	Year	Wage index	Year	Wage index
1868	26	1892	14	1916	44
1869	26	1893	*15*	1917	49
1870	26	1894	15	1918	95
1871	26	1895	16	1919	95
1872	26	1896	20	1920	135
1873	22	1897	23	1921	136
1874	20	1898	24	1922	149
1875	22	1899	26	1923	154
1876	22	1900	28	1924	159
1877	22	1901	30	1925	153
1878	21	1902	30	1926	150
1879	21	1903	30	1927	149
1880	16	1904	30	1928	146
1881	16	1905	31	1929	143
1882	17	1906	33	1930	128
1883	14	1907	39	1931	110
1884	12	1908	42	1932	102
1885	12	1909	41	1933	97
1886	12	1910	41	1934	99
1887	11	1911	43	1935	99
1888	*12*	1912	45	1936	102
1889	*12*	1913	45	1937	113
1890	*13*	1914	44	1938	121
1891	*13*	1915	43		

Appendix Table 5.2
Cost of Living Index for Japan 1868-1938

1934-1936 = 100

Year	COL index	Year	COL index	Year	COL index
1868	23	1892	31	1916	56
1869	35	1893	30	1917	83
1870	35	1894	30	1918	104
1871	22	1895	31	1919	134
1872	15	1896	30	1920	152
1873	18	1897	36	1921	168
1874	28	1898	43	1922	181
1875	28	1899	42	1923	178
1876	19	1900	50	1924	185
1877	21	1901	49	1925	187
1878	23	1902	46	1926	165
1879	30	1903	47	1927	157
1880	40	1904	46	1928	155
1881	40	1905	48	1929	148
1882	34	1906	53	1930	126
1883	25	1907	64	1931	112
1884	20	1908	61	1932	86
1885	25	1909	53	1933	96
1886	22	1910	55	1934	99
1887	19	1911	60	1935	101
1888	19	1912	61	1936	99
1889	22	1913	61	1937	111
1890	29	1914	59	1938	127
1891	28	1915	51		

Appendix Table 5.3
Real Wage Index for Japan 1831-1938

1934-1936 = 100

Year	Wage index	Year	Wage index	Year	Wage index
1831	54	1867	53	1903	65
1832	54	1868	68	1904	66
1833	53	1869	64	1905	65
1834	52	1870	57	1906	63
1835	46	1871	60	1907	60
1836	41	1872	59	1908	68
1837	30	1873	58	1909	77
1838	33	1874	57	1910	75
1839	41	1875	56	1911	71
1840	45	1876	55	1912	73
1841	47	1877	55	1913	74
1842	49	1878	53	1914	74
1843	53	1879	52	1915	84
1844	57	1880	51	1916	78
1845	57	1881	50	1917	59
1846	65	1882	49	1918	91
1847	55	1883	58	1919	70
1848	56	1884	60	1920	88
1849	57	1885	47	1921	81
1850	59	1886	54	1922	83
1851	62	1887	59	1923	87
1852	55	1888	63	1924	86
1853	54	1889	56	1925	82
1854	58	1890	45	1926	91
1855	59	1891	48	1927	95
1856	60	1892	45	1928	94
1857	61	1893	49	1929	97
1858	62	1894	51	1930	102
1859	63	1895	53	1931	98
1860	65	1896	65	1932	119
1861	65	1897	63	1933	100
1862	61	1898	56	1934	99
1863	67	1899	62	1935	98
1864	65	1900	55	1936	103
1865	49	1901	61	1937	102
1866	43	1902	65	1938	95

Appendix Table 5.4
Land Price and Rent Index for Japan 1885-1938
Wage/Rental Ratio for Japan 1885-1938

1934-1936 = 100

Year	Rent	Price (LTES)	Wage/Rent
1885	19		0.6338
1886	21		0.5713
1887	23		0.4973
1888	25		0.4771
1889	27		0.4599
1890	29	16	0.4452
1891	30	18	0.4472
1892	31	20	0.4490
1893	32	22	0.4668
1894	33	24	0.4679
1895	34	26	0.4841
1896	35	27	0.5580
1897	36	29	0.6278
1898	37	31	0.6520
1899	38	33	0.6885
1900	42	33	0.6681
1901	45	35	0.6736
1902	48	36	0.6148
1903	52	36	0.5836
1904	48	35	0.6291
1905	44	36	0.7005
1906	51	41	0.6491
1907	59	43	0.6556
1908	56	49	0.7415
1909	46	54	0.8958
1910	48	58	0.8640
1911	65	62	0.6597
1912	78	72	0.5759
1913	78	72	0.5788
1914	51	66	0.8679
1915	50	61	0.8667
1916	56	65	0.7818
1917	80	76	0.6140
1918	134	104	0.7053
1919	192	173	0.4917
1920	151	144	0.8910
1921	148	142	0.9223
1922	107	150	1.4013
1923	128	142	1.2007
1924	149	137	1.0622
1925	137	132	1.1213
1926	125	140	1.1995
1927	104	133	1.4268
1928	100	131	1.4662
1929	98	127	1.4606
1930	61	118	2.0828
1931	61	98	1.7901
1932	74	93	1.3811
1933	74	93	1.3120
1934	98	95	1.0052
1935	101	100	0.9816
1936	101	105	1.0137
1937	116	118	0.9743
1938	123	125	0.9853

Year	Rent	Price (LTES)	Price (Bank of Japan)	Wage/Rent
1912	78	72		0.5759
1913	78	72	72	0.5788
1914	51	66	67	0.8679
1915	50	61	61	0.8667
1916	56	65	65	0.7818
1917	80	76	77	0.6140
1918	134	104	104	0.7053
1919	192	173	170	0.4917
1920	151	144	143	0.8910
1921	148	142	143	0.9223
1922	107	150	149	1.4013
1923	128	142	140	1.2007
1924	149	137	135	1.0622
1925	137	132	135	1.1213
1926	125	140	137	1.1995
1927	104	133	131	1.4268
1928	100	131	129	1.4662
1929	98	127	126	1.4606
1930	61	118	118	2.0828
1931	61	98	99	1.7901
1932	74	93	93	1.3811
1933	74	93	93	1.3120
1934	98	95	96	1.0052
1935	101	100	100	0.9816
1936	101	105	105	1.0137
1937	116	118	113	0.9743
1938	123	125	125	0.9853

Appendix 6

Nominal Wage, Cost of Living, Real Wage and Land Rent Data for Korea 1907-1939

Overview: Wages are hourly unless otherwise noted. Nominal wage data for Korea are for outdoor laborers. The cost of living and nominal wage series were indexed 1934-1936 = 100.

APPENDIX TABLE 6.1: Nominal wage index

Nominal Wages 1906-1909: Simple average of nominal wages over major cities in Korea in *sen* for two forms of unskilled labor, *tobang* (earth workers; coolies) and *pyung in jok* (laymen). Mizoguchi (1972) argues that the simple and weighted averages do not differ greatly, and therefore the former can be used to approximate the latter. From the same source, the average nominal wage for 1910 was linked to the 1910-1938 series which follows. From Statistical Yearbook of Government-General in Korea (Chosen Sotokufu Tokei Nempo), various years.

Nominal Wages 1910-1938: Simple average of nominal wages of outdoor laborers over major cities in Korea in *sen*. From Umemura, Mataji, and Mizoguchi (1989: p. 262).

Nominal Wages 1939-1940: Simple average of nominal wages over major cities in Korea in *won* for two forms of unskilled labor, *tobang* (earth workers; coolies) and *pyung in jok* (laymen). From the same source, the average nominal wage for 1938 was linked to the 1910-1938 series. From Statistical Yearbook of Government-General in Korea (Chosen Sotokufu Tokei Nempo), various years.

APPENDIX TABLE 6.2: Cost of living index

Cost of Living 1907-1911: The COL for this period was estimated by taking a weighted average of three different prices: rice, barley and soybean. Chosen no Nogyo (1942) gives figures for the production of these crops in 1910, 1924, 1931 and 1935-40 (pp. 92, 99-103). To calculate budget weights for the COL index, we used the raw figures in Chosen no Nogyo to calculate the average yearly output of each crop, and made the assumption that the relative sizes of the outputs stayed roughly the same over the years. However, the figures in Chosen no Nogyo could not be used directly to calculate the weights. According to Kimura, rice consumption in Korea steadily dropped during the Japanese occupation because much of the rice produced in Korea was being exported to Japan (p. 638). As a result, the actual share of rice in the average Korean's budget was much lower than the proportion of rice to the total agricultural output of Korea. Although another source (Nasu) lists figures for the dietary composition of members of various social classes in Korea, it unfortunately does not mention barley (p. 150).

Fortunately, Kimura provides figures comparing the annual per capita consumption of rice to the consumption of the "coarse grains (millet, barley, rye and others) and beans" during the period 1915-1919. Moreover, soybeans were probably a close substitute for virtually all varieties of beans, and millet and barley were similar grains that were used interchangeably as an inferior substitute for rice (Kimura, 86). Thus, we assumed that the trend in soybean and barley price, which we weighted

using the average annual production figures in Chosen no Nogyo, adequately represents the trend in the price of "coarse grains and beans" in general.

The data were drawn from the following sources: white rice prices for 1907-1912 were drawn from Statistical Yearbook of Government-General in Korea (Chosen Sotokufu Tokei Nempo); barley prices for 1907-1912 were drawn from Statistical Yearbook of Government-General in Korea (Chosen Sotokufu Tokei Nempo), various years; soybean prices for 1907-1911 were drawn from Statistical Yearbook of Government-General in Korea (Chosen Sotokufu Tokei Nempo), various years.

***Cost of Living 1912-1939*:** The cost of living index is for Korean urban dwellers. It is taken from Mizoguchi, pp. 40-56. The 1907-1911 series was linked to the 1912-1939 series by the overlapping year 1912. The entire series was indexed 1934-1936 = 100.

APPENDIX TABLE 6.3: Real wage index

***Real Wages 1907-1939*:** Real wages were calculated by dividing the nominal wage by the cost of living, and indexed 1934-1936 = 100.

APPENDIX TABLE 6.4: Land rent index

Land Rents 1909-1938: Nominal rental data were available for farmland across the thirteen main provinces of Korea. A weighted average rent was determined, using the actual amounts of farmland in each province as weights. From Statistical Yearbook of Government-General in Korea (Chosen Sotokufu Tokei Nempo), various years. The rent series is indexed 1934-36 = 100. The table also reports the wage/rental ratio indexed 1934-36 = 1.00.

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Appendix Table 6.1
Nominal Wage Index for Korea 1906-1940

1934-1936 = 100

Year	Wage index	Year	Wage index	Year	Wage index
1906	63	1918	82	1930	98
1907	56	1919	127	1931	81
1908	64	1920	167	1932	79
1909	54	1921	160	1933	82
1910	50	1922	152	1934	74
1911	42	1923	155	1935	85
1912	44	1924	127	1936	141
1913	46	1925	123	1937	141
1914	48	1926	122	1938	96
1915	48	1927	108	1939	118
1916	38	1928	117	1940	141
1917	45	1929	109		

Appendix Table 6.2
Cost of Living Indices for Korea 1907-1939

1934-1936 = 100

Year	COL index	Year	COL index	Year	COL index
1907	51	1918	104	1929	118
1908	49	1919	140	1930	107
1909	41	1920	157	1931	91
1910	46	1921	134	1932	94
1911	61	1922	137	1933	93
1912	73	1923	132	1934	95
1913	69	1924	134	1935	99
1914	64	1925	135	1936	106
1915	60	1926	128	1937	115
1916	66	1927	121	1938	129
1917	81	1928	118	1939	141

Appendix Table 6.3
Real Wage Index for Korea 1907-1939

1934-1936 = 100

Year	Wage index	Year	Wage index	Year	Wage index
1907	110	1918	79	1929	92
1908	132	1919	91	1930	91
1909	131	1920	106	1931	89
1910	110	1921	120	1932	84
1911	69	1922	111	1933	88
1912	60	1923	118	1934	78
1913	67	1924	94	1935	86
1914	75	1925	91	1936	133
1915	80	1926	95	1937	123
1916	57	1927	89	1938	75
1917	55	1928	98	1939	83

Appendix Table 6.4
Land Rent Index for Korea 1909-1938
Wage/Rental Ratio in Korea 1909-1938

1934-1936 = 100

Year	Rent index	Wage/Rent	Year	Rent index	Wage/Rent	Year	Rent index	Wage/Rent
1909	107	0.5064	1919	118	1.0704	1929	82	1.3247
1910	73	0.6851	1920	143	1.1713	1930	75	1.3071
1911	86	0.4928	1921	128	1.2506	1931	78	1.0392
1912	84	0.5196	1922	127	1.1941	1932	82	0.9585
1913			1923	193	0.8046	1933	125	0.6540
1914	69	0.6960	1924	135	0.9357	1934	91	0.8211
1915	81	0.5998	1925	126	0.9759	1935	99	0.8592
1916	93	0.4040	1926	125	0.9758	1936	110	1.2733
1917	183	0.2448	1927	125	0.8662	1937	114	1.2434
1918	218	0.3759	1928	115	1.0134	1938	110	0.8699

Appendix 7

Nominal Wage, Cost of Living and Real Wage Data for the Philippines 1899 to 1940

Overview: A unified nominal wage series was constructed for the period from 1899 to 1940 by linking together the partially overlapping wage series for different groups of workers. A COL index was constructed by linking together a weighted price series for rice and sugar for the early years with a COL index for lower income families in Manila for the later years. The real wage series was constructed by deflating the nominal wage series by the COL index. While the sources are not always clear regarding the location of the labor markets being observed, it seems safe to assume it is the Manila area.

APPENDIX TABLE 7.1: Nominal wage index

Nominal Wages 1899 to 1941: The 1903 Census lists hourly wage (in pesos) for "day laborers" for each year between 1899 and 1902 (inclusive); the Second Annual Report of the Bureau of Labor lists hourly wage for "municipal day laborers" for each year between 1899 and 1910 (inclusive), and the Fourth Annual Report of the Bureau of Labor lists hourly wage figures for the same group for 1911 and 1912; the 1918 Census lists hourly wage figures for "industrial commercial workmen" for 1903-1918; Labor Conditions in the Philippine Islands lists hourly wage figures for "lumber laborers" for 1913-1926; the Statistical Bulletin lists hourly wage figures for "common laborers in lumber yards" for 1918 to 1928; and the Journal of Philippine Statistics lists hourly wage figures for "common laborers" for 1941-1948.

All of the series had gaps in them, which were filled by linear interpolation for the following periods:

"Day laborers": 1899-1901
"Municipal day laborers": 1899-1901
"Industrial commercial workmen": 1904-1910, 1912-1916
"Lumber laborers": 1914-1919, 1921, 1922, 1924, 1925
"Common laborers in lumber yards": 1919, 1921, 1923
"Common laborers": 1942-1944

The day laborer figures were linked to the municipal day laborer figures at the year 1902 (the 1899-1901 municipal day laborer figures were discarded). The municipal day laborer figures were linked to the industrial commercial workmen figures at the year 1911 (the 1912 municipal day laborer figures and the 1903-1910 industrial commercial workmen figures were discarded). The industrial commercial workmen figures were linked to the lumber laborer figures at the year 1918 (the 1913-1917 lumber laborer figures were discarded). The lumber laborer figures were linked to the "common laborers in lumber yards" figures at the year 1918 (the 1919-1926 lumber laborer figures were discarded). The result was a unified series spanning the period from 1899 to 1928.

Finally, we assumed that the wages for "common laborers" were similar to the wages for "common laborers in lumber yards," and linked the 1899-1928 series to the 1941-1948 series from the Journal of Philippine Statistics by interpolating the wage figures for the years 1929-1940.

The final linked series for 1899 to 1940 is indexed 1941 = 100.

APPENDIX TABLES 7.2: Cost of living index

Cost of Living 1899-1934: Cost of living during this period was calculated using a weighted average of the prices of exported sugar and imported rice. The data are available through 1937, and come from the Annual Report of the Insular Collector of Customs, which provides annual figures for the quantity of sugar exports and rice imports in terms of tonnages (kilograms) and the total peso-denominated values of the commodities. By dividing the peso-denominated values of the commodities by the tonnage, we found the price series for exported sugar (in pesos/kg) and imported rice (in pesos/kg).

The cost of living was constructed by applying the following weights to the two consumption goods: 91.02% rice and 8.98% for sugar. The weights are taken from the average Thai household budget in 1962-1963 (Household Expenditure Survey).

Cost of Living 1935-1941: The Journal of Philippine Statistics (vol. 8) lists COL figures for "lower income families in Manila" for the years 1935-1959. The figures are based on a weighted average of food prices (given a weight of 63.43%), rent (11.96%), clothing prices (2.04%), fuel/lighting/water prices (7.73%) and miscellaneous expenses (14.84%). This series was linked to the 1899-1937 series at the year 1935, forming the final COL series. 1936-37 data for the commodity prices were discarded.

The final linked cost of living series for 1899-1941 is indexed 1941 = 100.

APPENDIX TABLES 7.3: Real wage index

Real Wages from 1899 to 1940: Real wages were calculated by dividing the nominal wage series by the cost of living and indexed 1941 = 100.

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Appendix Table 7.1
Nominal Wage Index for the Philippines 1899-1941

1941 = 100

Year	Wage index	Year	Wage index	Year	Wage index
1899	43	1913	70	1927	144
1900	53	1914	75	1928	140
1901	62	1915	79	1929	137
1902	72	1916	84	1930	134
1903	52	1917	88	1931	132
1904	52	1918	100	1932	129
1905	54	1919	246	1933	126
1906	54	1920	355	1934	124
1907	56	1921	290	1935	121
1908	56	1922	226	1936	118
1909	60	1923	207	1937	115
1910	61	1924	188	1938	113
1911	61	1925	269	1939	110
1912	65	1926	161	1940	107

Appendix Table 7.2
COL Index for the Philippines 1899-1941

1941 = 100

Year	COL index	Year	COL index	Year	COL index
1899	73	1913	83	1927	195
1900	69	1914	78	1928	130
1901	70	1915	72	1929	127
1902	69	1916	80	1930	156
1903	85	1917	86	1931	111
1904	66	1918	103	1932	88
1905	72	1919	199	1933	70
1906	71	1920	260	1934	88
1907	79	1921	130	1935	90
1908	80	1922	125	1936	87
1909	67	1923	135	1937	89
1910	72	1924	146	1938	82
1911	85	1925	146	1939	93
1912	98	1926	147	1940	97

Appendix Table 7.3
Real Wage Index for the Philippines 1899-1941

1941 = 100

Year	Wage index	Year	Wage index	Year	Wage index
1899	56	1913	80	1927	71
1900	73	1914	91	1928	103
1901	86	1915	104	1929	103
1902	100	1916	100	1930	83
1903	58	1917	98	1931	114
1904	74	1918	93	1932	140
1905	72	1919	118	1933	173
1906	72	1920	131	1934	134
1907	68	1921	213	1935	129
1908	67	1922	173	1936	129
1909	85	1923	147	1937	124
1910	80	1924	124	1938	131
1911	68	1925	176	1939	113
1912	63	1926	105	1940	105

Appendix 8

Nominal Wage, Cost of Living, Real Wage and Land Rent Data for Taiwan 1897-1939

Overview: Wages for Taiwan are hourly unless otherwise noted. They are also for day laborers, except for 1897 to 1901 when the nominal wage for day laborers was estimated by wages of government workers.

APPENDIX TABLE 8.1: Nominal wage index

Nominal Wages 1897-1901: Simple average of unskilled laborers' nominal wages, in *ch'ian* units, in major cities throughout Taiwan. From Statistical Yearbook of Government-General in Taiwan (Taiwan Sotokufu Tokei Nempo), various years.

Nominal Wages 1902-1937: Weighted average of nominal wages over major cities in Taiwan in *sen* units. The 1897-1901 series was linked to the 1902-1937 series at the overlapping year 1902. From Umemura and Mizoguchi (1989: p. 259).

Nominal Wages 1938-1939: Simple average of nominal wages over major cities in Taiwan in *ch'ian*. The 1938-1939 series was linked to the 1902-1937 series at the overlapping year 1938. From Statistical Yearbook of Government-General in Taiwan (Taiwan Sotokufu Tokei Nempo), various years.

The nominal wage series is indexed 1934-36 = 100.

APPENDIX TABLE 8.2: Cost of living index

Cost of Living 1897-1902: Given the absence of useful Taiwanese price data for these early years, we tried estimating the COL for Taiwan by two different measures: the CPI for Japan and the rice price for Japan. The Japan CPI is preferred because it is more comprehensive, and it is taken from LTES vol. 8 (Bukka). The 1903 Japan CPI figure was spliced onto the 1903-1938 CPI series for Taiwan.

Cost of Living 1903-1938: Cost of living index based on weights from a family budget survey for urban workers conducted 1934-1935. While our calculations are based on this index, another based on weights from a small scale survey conducted in 1919 yields similar COL trends. From Mizoguchi (1972: pp. 40-56).

Cost of Living 1939: Cost of living extrapolated from rice price trends in Taiwan. The average price of rice for 1938 was linked to the cost of living value for 1938 given in the 1903-1938 series, and then extrapolated to 1939. From Statistical Yearbook of Government-General in Taiwan (Taiwan Sotokufu Tokei Nempo), various years.

The cost of living series is indexed 1934-36 = 100.

APPENDIX TABLE 8.3: Real wage index

Real Wages 1897-1939: Calculated by dividing the nominal wage by the cost of living. The average real wages were indexed 1934-1936 = 100.

APPENDIX TABLE 8.4: Land rent index

Land Rent 1904-1939: Land rent for farmland was calculated by dividing the total value of all farmland by the area of farmland for each year. Both indices obtained from Statistical Yearbook of Government-General in Taiwan (Taiwan Sotokufu Tokei Nempo), various years. The rent series is indexed 1934-36 = 100. The table also reports the wage/rental ratio series indexed 1934-36 = 1.00.

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Appendix Table 8.1
Nominal Wage Index for Taiwan 1897-1939

1934-1936 = 100

Year	Wage index	Year	Wage index	Year	Wage index
1897	41	1912	55	1927	107
1898	41	1913	55	1928	106
1898	42	1914	56	1929	111
1900	43	1915	52	1930	99
1901	43	1916	49	1931	105
1902	42	1917	60	1932	102
1903	41	1918	70	1933	99
1904	38	1919	110	1934	96
1905	46	1920	141	1935	100
1906	42	1921	112	1936	104
1907	46	1922	107	1937	107
1908	52	1923	101	1938	112
1909	50	1924	102	1939	119
1910	45	1925	107		
1911	54	1926	103		

Appendix Table 8.2
Cost of Living Index for Taiwan 1897-1939

1934-1936 = 100

Year	COL index	Year	COL index	Year	COL index
1897	40	1912	82	1927	109
1898	44	1913	79	1928	111
1898	41	1914	78	1929	112
1900	46	1915	73	1930	98
1901	45	1916	78	1931	88
1902	47	1917	96	1932	87
1903	50	1918	120	1933	92
1904	54	1919	149	1934	94
1905	57	1920	133	1935	100
1906	57	1921	118	1936	106
1907	57	1922	109	1937	113
1908	60	1923	107	1938	119
1909	64	1924	115	1939	134
1910	70	1925	120		
1911	75	1926	116		

Appendix Table 8.3
Real Wage Index for Taiwan 1897-1939

1934-1936 = 100

Year	Wage index	Year	Wage index	Year	Wage index
1897	102	1912	68	1927	98
1898	94	1913	70	1928	96
1898	102	1914	72	1929	99
1900	93	1915	71	1930	101
1901	94	1916	63	1931	118
1902	89	1917	62	1932	117
1903	83	1918	58	1933	108
1904	70	1919	74	1934	102
1905	81	1920	106	1935	100
1906	74	1921	95	1936	98
1907	81	1922	98	1937	95
1908	87	1923	94	1938	94
1909	78	1924	89	1939	88
1910	65	1925	89		
1911	72	1926	88		

Appendix Table 8.4
Land Rent Index for Taiwan 1904-1939
Wage/Rental Ratio in Taiwan 1904-1939

1934-1936 = 100

Year	Rent index	Wage/Rent	Year	Rent index	Wage/Rent	Year	Rent index	Wage/Rent
1904	67	0.5703	1916	66	0.7474	1928	94	1.1251
1905	67	0.6919	1917	66	0.9156	1929	94	1.1773
1906	67	0.6334	1918	65	1.0686	1930	94	1.0535
1907	67	0.6982	1919	97	1.1397	1931	94	1.1143
1908	66	0.7877	1920	97	1.4612	1932	91	1.1202
1909	66	0.7537	1921	96	1.1664	1933	89	1.1081
1910	66	0.6841	1922	96	1.1125	1934	89	1.0752
1911	65	0.8370	1923	96	1.0556	1935	106	0.9386
1912	66	0.8405	1924	96	1.0645	1936	104	0.9983
1913	66	0.8381	1925	95	1.1209	1937	104	1.0235
1914	66	0.8417	1926	95	1.0871	1938	104	1.0720
1915	66	0.7826	1927	95	1.1328	1939	104	1.1393

Appendix 9

Nominal Wage, Cost of Living and Real Wage Data for Thailand (Siam) 1820-1939

APPENDIX TABLE 9.1: Nominal wage index

Nominal Wage 1820-1939: This index reports a daily wage for urban unskilled labor -- primarily dock workers -- in Bangkok. Where wage data were missing, we interpolated by taking a linear approximation between the two closest data points. Wage data are missing for the years 1821-1849, 1851-1863, 1865-1888, 1891-1895, 1897, 1900, 1903-1904, 1906-1911 and 1913. All interpolated figures are italicized. The wage data are from various sources, as compiled by Feeny. The wages were cross-referenced with data from Manarangsan and the Statistical Yearbook of Thailand, both of which reported similar figures.

The nominal wage series is indexed 1915 = 100.

APPENDIX TABLE 9.2: Cost of living index

Cost of Living 1865-1941: A cost of living (COL) index from 1865 through 1941 was constructed from price data for rice and white and grey shirting. A simple average of the white and grey shirting was used as the price of clothing, and rice prices were used as a proxy for the cost of food. Agricultural (fixed) budget weights were used to approximate the expenditure composition between food and clothing for the urban labor household. All prices and weights were obtained from Feeny.

Cost of Living 1820-1864: The Thai COL living index was extended backwards to 1820 by use of Indonesian rice prices. For sources, see the Indonesia Appendix 4.

The cost of living series is indexed 1915 = 100.

APPENDIX TABLE 9.3: Real wage index

Real Wage 1820-1939: The real wage was obtained by dividing the nominal wage by the cost of living. The series is indexed 1915 = 100.

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Appendix Table 9.1
Nominal Wage Index for Thailand (Siam) 1820-1939

1915 = 100

Year	Wage index	Year	Wage index	Year	Wage index
1820	49	1860	83	1900	97
1821	*50*	1861	85	1901	111
1822	*50*	1862	88	1902	117
1823	*50*	1863	91	1903	100
1824	*50*	1864	93	1904	83
1825	*50*	1865	94	1905	67
1826	*51*	1866	94	1906	74
1827	*51*	1867	94	1907	81
1828	*51*	1868	94	1908	88
1829	*51*	1869	95	1909	95
1830	*52*	1870	95	1910	102
1831	*52*	1871	95	1911	110
1832	*52*	1872	95	1912	117
1833	*52*	1873	96	1913	108
1834	*52*	1874	96	1914	100
1835	*53*	1875	96	1915	100
1836	*53*	1876	97	1916	133
1837	*53*	1877	97	1917	133
1838	*53*	1878	97	1918	133
1839	*54*	1879	97	1919	133
1840	*54*	1880	98	1920	133
1841	*54*	1881	98	1921	133
1842	*54*	1882	98	1922	133
1843	*54*	1883	98	1923	133
1844	*55*	1884	99	1924	149
1845	*55*	1885	99	1925	133
1846	*55*	1886	99	1926	133
1847	*55*	1887	99	1927	133
1848	*56*	1888	100	1928	133
1849	*56*	1889	100	1929	133
1850	56	1890	100	1930	133
1851	59	1891	94	1931	107
1852	61	1892	89	1932	107
1853	64	1893	83	1933	107
1854	67	1894	78	1934	107
1855	69	1895	72	1935	107
1856	72	1896	67	1936	107
1857	75	1897	67	1937	107
1858	77	1898	67	1938	107
1859	80	1899	83	1939	107

Appendix Table 9.2
Cost of Living Index for Thailand (Siam) 1820-1941

1915 = 100

Year	COL index	Year	COL index	Year	COL index
1820	55	1861	68	1902	111
1821	64	1862	80	1903	123
1822	57	1863	90	1904	122
1823	50	1864	73	1905	123
1824	47	1865	94	1906	121
1825	58	1866	61	1907	121
1826	58	1867	41	1908	110
1827	42	1868	66	1909	114
1828	47	1869	71	1910	111
1829	50	1870	54	1911	134
1830	53	1871	66	1912	141
1831	56	1872	67	1913	107
1832	69	1873	51	1914	99
1833	62	1874	52	1915	100
1834	71	1875	53	1916	108
1835	69	1876	49	1917	112
1836	61	1877	69	1918	199
1837	49	1878	83	1919	355
1838	49	1879	64	1920	133
1839	71	1880	61	1921	140
1840	65	1881	54	1922	129
1841	64	1882	56	1923	139
1842	70	1883	61	1924	155
1843	65	1884	54	1925	156
1844	70	1885	57	1926	162
1845	80	1886	64	1927	150
1846	76	1887	62	1928	152
1847	88	1888	60	1929	158
1848	50	1889	61	1930	129
1849	57	1890	66	1931	75
1850	57	1891	65	1932	72
1851	64	1892	70	1933	64
1852	60	1893	69	1934	63
1853	53	1894	69	1935	78
1854	73	1895	66	1936	79
1855	77	1896	95	1937	88
1856	61	1897	85	1938	81
1857	94	1898	108	1939	77
1858	62	1899	109	1940	99
1859	74	1900	115	1941	164
1860	68	1901	112		

Appendix Table 9.3
Real Wage Index for Thailand (Siam) 1820-1939

1915 = 100

Year	Wage index	Year	Wage index	Year	Wage index
1820	90	1860	121	1900	84
1821	77	1861	125	1901	99
1822	87	1862	111	1902	105
1823	99	1863	101	1903	81
1824	106	1864	128	1904	68
1825	87	1865	99	1905	54
1826	87	1866	153	1906	61
1827	122	1867	229	1907	67
1828	108	1868	143	1908	80
1829	102	1869	134	1909	84
1830	97	1870	175	1910	92
1831	93	1871	144	1911	82
1832	75	1872	143	1912	83
1833	85	1873	187	1913	101
1834	74	1874	184	1914	101
1835	77	1875	181	1915	100
1836	87	1876	197	1916	123
1837	108	1877	141	1917	119
1838	108	1878	117	1918	67
1839	76	1879	153	1919	38
1840	83	1880	161	1920	100
1841	85	1881	181	1921	95
1842	77	1882	175	1922	104
1843	84	1883	161	1923	96
1844	78	1884	184	1924	97
1845	69	1885	174	1925	85
1846	72	1886	154	1926	82
1847	63	1887	160	1927	89
1848	111	1888	167	1928	88
1849	98	1889	165	1929	84
1850	98	1890	151	1930	103
1851	92	1891	145	1931	143
1852	102	1892	126	1932	147
1853	120	1893	121	1933	166
1854	92	1894	113	1934	170
1855	90	1895	110	1935	137
1856	119	1896	70	1936	135
1857	79	1897	78	1937	122
1858	124	1898	62	1938	132
1859	109	1899	77	1939	139