JAPAN AND THE GREAT DIVERGENCE, 730-1870

Jean-Pascal Basssino, Université Paul-Valéry Montpellier III, jpbassino@gmail.com
Stephen Broadberry, London School of Economics, S.N.Broadberry@lse.ac.uk
Kyoji Fukao, Hitotsubashi University, k.fukao@srv.cc.hit-u.ac.jp
Bishnupriya Gupta, University of Warwick, B.Gupta@warwick.ac.uk
Masanori Takashima, Hitotsubashi University, takamasa@ier.hit-u.ac.jp

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Abstract: Japanese GDP per capita grew at an annual rate of 0.05 per cent between 730 and 1872. This growth was episodic, with a period of stagnation between 1150 and 1450, and substantially faster growth after 1600. Per capita incomes in Japan were around three quarters of the British level in the thirteenth century, but Britain forged further ahead with a surge of growth after the Black Death of the mid-14th century. Japan narrowed the gap between 1450 and 1650, but the gap widened again as British growth accelerated from the mid-17th century. By the Meiji Restoration, per capita incomes in Japan were around one-fifth of the British level. Japan's GDP per capita was close to $400 during the first millennium, but by the time of the Tokugawa period, Japan had already clearly emerged from bare bones subsistence.

JEL classification: N10, N30, N35, O10, O57

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I. INTRODUCTION

Recently, there has been much progress in reconstructing the historical national accounts of a number of European countries during the early modern and medieval periods (Blomme and van der Wee, 1994; Malanima, 2011; Krantz, 2004; Álvarez-Nogal and Prados de la Escosura, 2007; Broadberry et al., 2010; van Zanden and van Leeuwen, 2010). Broadberry and Gupta (2010) have demonstrated that these methods can also be applied to Asia, and hence shed light on the origins of the Great Divergence of productivity and living standards between Europe and Asia. This paper applies these methods to the case of Japan, the first Asian country to achieve the transition to modern economic growth.

Whilst much of the Asian evidence in the Great Divergence debate has been derived from China and India, Japanese real wages have also been compared with real wages in Europe from the mid-eighteenth century (Bassino and Ma, 2005; Allen et al., 2011). However, Saito (2010) suggests that a real wage comparison understates Japanese living standards because of the way that households combined incomes from the land and from proto-industrial activities. Historical national accounting, by covering all economic activities, avoids this problem, and provides the most appropriate way of assessing the overall level of economic development in Japan. Here, the comparison with Europe is based on the reconstruction of national income in Britain by Broadberry et al. (2010).

The results suggest that Japanese GDP per capita grew at an annual rate of 0.05 per cent between 730 and 1872. However, this was not a smooth growth path, but rather an episodic process, with a period of stagnation between 1150 and 1450, and substantially faster growth after 1600. Per capita incomes in Japan were around three quarters of the British level in the thirteenth century, but fell behind substantially following the Black Death of the mid-

fourteenth century, which led to an approximate doubling of per capita incomes in Britain. By the mid-fifteenth century, Japanese per capita incomes were less than 40 per cent of the British level. Between 1450 and 1600, however, Japanese per capita incomes grew more rapidly, so that by the early years of the Tokugawa period Japanese per capita incomes had recovered to more than half the British level. With accelerating British growth from the mid-seventeenth century, however, the gap widened, so that by the time of the Meiji restoration per capita incomes in Japan were around one fifth of the British level. In 1850, Japan's GDP per capita was around $700 in 1990 international dollars, substantially above Maddison's (2001) definition of bare bones subsistence at $400. This level is derived from the World Bank's poverty line of a dollar a day, and continues to be experienced by the world's poorest economies today. Japan's GDP per capita was close to $400 during the first millennium, but by the time of the Tokugawa period, Japan had already clearly emerged from bare bones subsistence.

II. ESTIMATING JAPANESE NATIONAL INCOME, 800-1870

Here we adapt the recent work on reconstructing the historical national accounts of a number of European countries to the circumstances and data availability of Japan. The starting point is the estimation of population, followed by the output of the agricultural and non-agricultural sectors.

1. Population

The population data in Table 1 are taken largely from the work of Kito (2000) and Saito's estimates quoted in Farris (2006). Estimates for the years 725, 800, 900, 1750 and 1873 are taken from Kito (2000), while the data for the years 1000, 1250, 1450, and 1600 are Saito's estimates quoted in Farris (2006). Population for the years 1875 and 1878 are taken from

Meiji 5 nen iko wagakuni no jinko (Naikaku tokeikyoku, ed., 1935). The population in other years (1150, 1200, 1300, 1350, 1400, 1500, 1650, 1850) was estimated by log-linear interpolation.

The figure for 725 is derived by multiplying the average number of persons in each *go* (a tax unit for a regional group of families) and the total number of *go* in Japan. For 800, the population estimate is based on the total amount of *ku-suiko* (compulsory state loans), which depends on the number of male farmers. The figure for 900 is based on the total paddy field area from data in *Wamyosho* (an ancient Japanese encyclopaedia compiled in the first half of the tenth century), multiplied by the estimated population per unit of paddy field, which is derived from the system of rules for the distribution of paddy fields.

Population estimates for 1750 and 1850 are based on the Tokugawa Government's population surveys, which started in 1721, and which have been adjusted for under-enumeration. For years before 1721, Kito (2000) follows Hayami (1973) in subdividing Japan into three regions (the developed, less developed and least developed regions), and assuming that the population growth pattern in each region can be approximated by a logistic curve. The shape of the logistic curve is derived from the population growth pattern estimated from data in *shumon-atarame-cho* (temple registry books) for certain regions. By using regional benchmark data for the eighteenth century, and by assuming the starting year of population growth for each region (with population growth in the developed region assumed to have started earlier), Hayami (1973) and Kito (2000) are able to obtain estimates of population in the years between 1600 and 1721.

In his work on famines, Saito (2010) found that in the second half of the sixteenth century there was a sudden drop in the frequency of famines in spite of disadvantageous climatic conditions. Based on this finding, he concludes that population growth must have started earlier and been faster in the developed region than Kito (2000) had assumed. Saito produces revised estimates based on these revised assumptions. Population estimates for the years 1875 and 1878 are based on the government's family registration statistics.

2. Agricultural production

Agricultural output can be estimated from data on the amount of land used for grain production and grain yields, although the precise method of estimation varies by period. For the period 1600-1872, data on arable land, total grain production and grain yields are available from Hayami and Miyamoto (1988), based largely on the work of Nakamura (1968). Nakamura provided figures for 1600, 1645, 1700, 1830, and 1867, which Hayami and Miyamoto have interpolated and extrapolated to provide estimates for 1650, 1730, 1750, 1800, 1850 and 1872. Nakamura (1968) compared his Tokugawa period estimates with his estimates of agricultural production for the early Meiji-era, where he converted all non-rice agricultural production into equivalent rice production using market prices. It is therefore clear that Nakamura intended his Tokugawa period estimates to include output of all major crops, including wheat, barley and millet grown on dry lands as well as rice grown in paddy fields. This is important because Nakamura (1968) estimates that non-rice crops accounted for 44.5 per cent of the arable land area in 1721.

For the period 730-1450, arable output is built up from estimates of land productivity, multiplied by a reconstruction of the amount of arable land in use. Land productivity data for 730, 1280 and 1450 are taken from Farris (2006), who collects his pre-1600 data on the basis

of Nara units, but converts them to Tokugawa units by a very unclear procedure, which produces a surprising fall in land productivity between 1450 and 1600. Accordingly, we have taken Farris's original land productivity data in Nara units and converted them to Tokugawa units on the assumption that 1 Nara cho = 1.088 Tokugawa cho and 1 Tokugawa koku = 2.5 Nara koku. The koku conversion factor is the same as that used by Farris, but the cho conversion factor, taken from Yoshikawa Kobunkan (1987) is smaller than Farris's conversion factor of 1 Nara cho = 1.3 Tokugawa cho. Our revised series exhibits a rise in land productivity between 1450 and 1600, which fits better with the trend in unskilled real wages which we will derive in the next section. The land productivity figures for 900 and 1150 are derived by interpolation with a constant growth rate between 730 and 1280.

The arable land area for 730 is derived from estimates of the amount of kubunden (distributed paddy field) per person from Sawada (1927), multiplied by the estimated population, derived from Table 1 by log-linear interpolation between the figures for 725 and 800. For 900, we use *Wamyosho* data collected in Okurasho sozeikyoku (1882) on the total area of paddy field. For 1150, we use the total area of paddy field reported in *Shugaisho* (an old Japanese encyclopaedia compiled in the early medieval period), again collected in Okurasho sozeikyoku (1882). Although Sawada's (1927) kubunden, the *Wamyosho* and the *Shugaisho* estimates are apparently restricted to paddy field arable land, it should be noted that Sawada also provides some estimates of non-paddy field arable land and output. However, when added to the paddy field data, the total arable area becomes too large to be consistent with the estimates for later years, so they have not been used here. This means that there is some risk of underestimating the agricultural output for the Nara period. For 1280 and 1450, we follow Farris (2006) in multiplying the population older than 6 years by estimates of arable land per head of population (older than 6 years). The 1280 figure for

arable land per capita was derived from the 1450 figure by assuming that arable output per capita remained constant, so that arable land per capita declined as land productivity increased.

3. Real wages and the demand for food

One way of cross-checking our agricultural output estimates is to estimate a demand function for food, using known trends in wages and prices. This approach can be traced back at least as far as the work of Crafts (1985), who calculated the path of agricultural output in Britain during the Industrial Revolution with income and price elasticities derived from the experience of later developing countries. The approach was developed further by Allen (2000) using consumer theory. Allen (2000: 13-14) starts with the identity:

$$Q^A = rcN \qquad (1)$$

where Q^A is real agricultural output, r is the ratio of production to consumption, c is consumption per head and N is population. Real agricultural consumption per head is assumed to be a function of its own price in real terms (P^A/P), the price of non-agricultural goods and services in real terms (P^{NA}/P), and real income per head (y). Assuming a log-linear specification, we have:

$$\ln c = \alpha_0 + \alpha_1 \ln(P^A / P) + \alpha_2 \ln(P^{NA} / P) + \beta \ln y \qquad (2)$$

where α_1 and α_2 are the own-price and cross-price elasticities of demand, β is the income elasticity of demand and α_0 is a constant. Consumer theory requires that the own-price, cross-price and income elasticities should sum to zero, which sets tight constraints on the plausible values, particularly given the accumulated evidence on elasticities in developing countries (Deaton and Muellbauer, 1980: 15-16, 60-82).

For early modern Europe, Allen (2000: 14) works with an own-price elasticity of -0.6 and a cross-price elasticity of 0.1, which constrains the income elasticity to be 0.5. Allen also assumes that agricultural consumption is equal to agricultural production. For the case of Japan, where more limited information is available, we implement a more limited version using the rice wage (the daily wage divided by the price of rice) and an assumed income elasticity of 0.5.[1] However, we face the additional complication that the rice wage follows very different trends for skilled carpenters and for unskilled labourers. These trends can be seen clearly in Figure 1, based on annual data, and in Table 2, using decadal averages, taken from Bassino et al. (2010) and Bassino and Ma (2005).

For the period 1260-1600, rice wages in Kyoto were constructed using information on rice prices in copper coins reported in Momose (1959), Rekihaku (2009), and KKB (1962) while series of nominal wages in copper coins (or directely paid in rice) were generated on the basis of wage rates for benchmark years collected by Endo (1956) and Tanaka (2007) and on individual contracts reported by Rekihaku (2009). The wage series are for highly skilled carpenters on the one hand, and for unskilled helpers of craftsmen and transporters, on the other hand. Throughout the entire period, the nominal wage rates remained fairly stable: around 100 and 10 in copper coins, respectively (an additional skill level with a wage rate of 50 copper coins was also identified that could be regarded as labour compensation for semiskilled workers). Hence, most of the rice wage variation resulted from changes in rice prices.

[1] One way to justify this would be if the cross-price elasticity is zero and real income is the wage divided by the overall price level. The own-price elasticity must then equal the negative of the real wage elasticity. But then the overall price level used to deflate the wage cancels out with the overall price level used to deflate the grain price, leaving a single term in the grain wage.

For the period 1743-1762 and 1791-1870, the most dependable source is a collection of retail prices of rice sold and labour compensation paid by the Kyoto branch of Mitsui, a trading house that has been published by Mitsui archives (Mitsui Bunko 1981). Various sources reporting individual contracts are used to assess nominal wages paid to carpenters and unskilled workers between 1600 and 1870.[2] These micro data again allow here the identification of two skill levels, with the premium for highly skilled relative to semiskilled somehow lower than in 1260-1600 (closer to 50% than 100%). No attempt was made to interpolate missing data. Pre-1720 rice price series were generated by extrapolating backward the Kyoto Mitsui series, assuming the same yearly variation as for wholesale prices in Osaka for 1700-1742 and 1763-1790, Hiroshima 1620-1700 (Iwahashi 1981) and Osaka 1600-1650 (Kimura 1987). For unskilled workers, owing to the lack of dependable micro data, pre-1743 series were generated using information on wage rates in copper coins in Osaka covering the period 1600-1870 (Miyamoto 1963). The stability of the rate over long periods indicates that an in-kind component of rice was not included. The level is indeed much lower than for unskilled workers employed by Mitsui in Kyoto. Taking advantage of the overlap, the Osaka series was adjusted upward to the Kyoto level by assuming that the in-kind component in Osaka was 0.8 *sho* (1.8 litres per *sho*, and 1.5 kg in the case of husked rice).

The unskilled rice wage remained relatively stable between 1260/69 and 1450/59, before roughly doubling to 1550/59 and then slipping back, but remaining on a higher plateau than before 1450/59. For skilled carpenters, the rice wage shows the same time series pattern of a plateau before the 1450s, a period of sharp increase between the 1450s and 1550s, and another plateau from the seventeenth century. However, for skilled carpenters, the later

[2] For carpenters: Fujio (2001), Kawakami (1981), Kawakami and Nagai (1963), Endo (1985), Oyaizu (2006), Tani (1992), Watanabe (1984).

plateau from the seventeenth century was much lower than the earlier plateau before the mid-fifteenth century, whereas for unskilled labourers the later plateau was substantially higher than the earlier plateau. This implies that the skill premium, given in the final column of Table 2, fell sharply from around 10:1 before 1550/59 to around 5:1 during the seventeenth and eighteenth centuries, with a further fall to roughly 3:1 during the nineteenth century.

We assume that the unskilled rice wage provides a better indicator of average incomes than the skilled rice wage, since the latter was paid to a much smaller share of the population. An index of agricultural output per head has been derived in Table 3 from the unskilled rice wage on the assumption of an income elasticity of demand of 0.5. Agricultural demand per head shows a similar scale of growth between the thirteenth and nineteenth centuries as agricultural output per head, although the growth of demand was more highly concentrated between 1450 and 1600 than the growth of output per head. This would be consistent with changes in the distribution of income, which are anyway suggested by the changing skill premium.

4. Urbanisation and non-agricultural production

A number of authors have used the share of the population living in towns as a measure of the growth of the non-agricultural sector. This approach began with Wrigley (1985), and has recently been combined with the demand approach to agriculture to provide indirect estimates of GDP in a number of European countries during the early modern period (Malanima, 2011; 2011; Álvarez-Nogal and Prados de la Escosura, 2007; Pfister, 2008). With the path of agricultural output (Q_a) derived using equations (1) and (2), overall output (Q) is derived as:

$$Q = \frac{Q_a}{1-(Q_{na}/Q)} \qquad (3)$$

where the share of non-agricultural output in total output (Q_{na}/Q) is proxied by the urbanisation rate. The approach can be made less crude by adjusting the urbanisation rate to deal with rural industry or agricultural workers living in towns.

Data on the Japanese urban population are shown in Table 4. The definition of urrbanisation chosen here is the number of people living in settlements of at least 10,000, in line with the work of de Vries (1984) on Europe. The data on the size of individual towns were derived from historiographies compiled by local governments in Japan. The urban population share remained relatively stable at around 4 per cent until the late sixteenth century, when it increased substantially. The urbanisation ratio remained on a higher plateau of around 13 per cent during the seventeenth and eighteenth centuries, but declined during the nineteenth century.

5. Estimating Japanese GDP per capita

We now proceed to estimating Japanese GDP per capita using the direct estimates of agricultural output, combined with the urbanisation rate as an indicator of the non-agricultural sector. The GDP per capita series is shown in level form in Table 5A, and in annual growth rate form in Table 5B.

Japanese GDP per capita grew at an annual rate of 0.05 per cent between 730 and 1872. However, this was not a smooth growth path, but rather an episodic process. Growth occurred at an annual rate of 0.06 per cent per annum between 730 and 1150, followed by a period of stagnation between 1150 and 1450. Growth returned to a rate of 0.06 per cent per annum between 1450 and 1600, before accelerating to 0.11 per cent between 1600 and 1850 and 0.36 per cent between 1850 and 1872.

III. AN ANGLO-JAPANESE COMPARISON, 1270-1870

To pin down the timing and extent of the Great Divergence, we need to compare GDP per capita in Japan with Britain. Here, we project back from Maddison's (2003) widely accepted estimates of GDP per capita in 1850, expressed in 1990 international dollars. However, whereas Maddison worked with the territory of the United Kingdom, Broadberry et al. (2010) provide a series for Great Britain covering the period 1700-1870 and England for the period 1270-1870. They note that even in the Middle Ages, British levels of GDP per capita were well above $400 in 1990 international prices. The figure of $400, or a little more than a dollar a day, is usually taken as the measure of bare bones subsistence, and is observed for many poor countries in the twentieth century. Broadberry et al. (2010) note that GDP per capita figures of well above $400 are noted for many west European countries in the late Middle Ages, while Broadberry and Gupta (2010) also find early modern India well above bare bones subsistence. It is therefore of great interest to establish Japan's position in the Great Divergence.

Table 6 shows that GDP per capita in Japan around 1280 was roughly three quarters of the British level. However, following the Black Death of the mid-fourteenth century, which wiped out around a third of the British population immediately and more than half by the mid-fifteenth century, British GDP per capita increased sharply. A similar increase in GDP per capita and in the real wage occurred across much of Europe, where the Black Death also sharply reduced the population. However, the Black Death did not reach Japan and there was accordingly no similar increase in GDP per capita. Hence by 1450, Japanese GDP per capita had shrunk to less than 40 per cent of the British level and the Great Divergence was thus already well under way by the end of the late medieval period. Although the period of

growth in Japanese GDP per capita between 1450 and 1600 narrowed the gap, a surge of economic growth in Britain from the middle of the seventeenth century further widened the gap and Japan's per capita GDP was less than 20 per cent of the British level by the time of the Meiji restoration.

The finding that Japanese GDP per capita in 1280 was roughly three quarters of the British level is extremely interesting, since it is clear that the degree of urbanisation was greater in Japan. One way of understanding this is to see two counterbalancing forces at work. First, it seems likely that Japan had a more sophisticated urban culture than Britain. Second, however, offsetting this first effect was the fact that Britain had an unusually large share of its agricultural sector devoted to high value added pastoral farming. Although this did not produce more kilocalories than the minimum required for the population to work and reproduce, it did allow a varied diet, including meat, dairy produce and ale as well as the more basic grain products such as bread and oatmeal. Given the importance of agriculture at the time, it is this effect which dominated, making per capita GDP higher in Britain than in Japan.

IV. JAPAN AND INDIA IN THE GREAT DIVERGENCE

Table 7 places Japan's experience during the Great Divergence alongside that of India as well as Britain, using the estimates of Indian GDP per capita from Broadberry and Gupta (2010). Although GDP per capita was substantially higher in India than in Japan at the height of the Mughal Empire in the first half of the seventeenth century, relative decline was much faster in the case of India. By the middle of the eighteenth century, although Britain was forging ahead rapidly of both Asian countries, Japan had almost caught up with India. During the second half of the eighteenth century and the first three quarters of the nineteenth century,

Japan pulled decisively ahead of India, even before the establishment of modern industry in Japan following the Meiji restoration.

V. CONCLUSIONS

This paper provides estimates of Japanese GDP per capita for the period 730-1872, constructed from the output side, using methods developed for the estimation of GDP per capita in medieval and early modern Europe. Our estimates for the agricultural sector are built up from direct estimates of arable land use and land productivity, and checked against trends in agricultural demand derived from the grain wages of unskilled labourers. Activity in the non-agricultural sector is quantified by the urbanisation ratio.

The results suggest that Japanese GDP per capita grew at an annual rate of 0.05 per cent between 730 and 1872. However, this was not a smooth growth path, but rather an episodic process. Growth occurred at a rate of 0.06 per cent per annum between 730 and 1150, followed by a period of stagnation between 1150 and 1450. Growth returned to a rate of 0.06 per cent per annum between 1450 and 1600, before accelerating to 0.11 per cent between 1600 and 1850, and 0.36 per cent between 1850 and 1872. A comparison with Britain established the main contours of Japan's position in the Great Divergence. Per capita incomes in Japan were around three quarters of the British level in the thirteenth century, but Britain forged further ahead with a surge of growth after the Black Death of the mid-14th century. Japan narrowed the gap between 1450 and 1600, but the gap widened again as British growth accelerated from the mid-17th century, By the Meiji Restoration, per capita incomes in Japan were around one-fifth of the British level. Japan's GDP per capita was close to $400 during the first millennium, but by the time of the Tokugawa period, Japan had already clearly emerged from bare bones subsistence.

TABLE 1: Total population of Japan, 725-1878 (millions)

Year	Population	Year	Population
725	4.5	1450	10.5
800	5.5	1500	12.3
900	6.4	1550	14.5
1000	6.0	1600	17.0
1150	6.3	1650	22.4
1200	6.4	1750	31.0
1250	6.5	1850	32.4
1300	7.3	1873	33.3
1350	8.3	1875	35.3
1400	9.3	1878	36.2

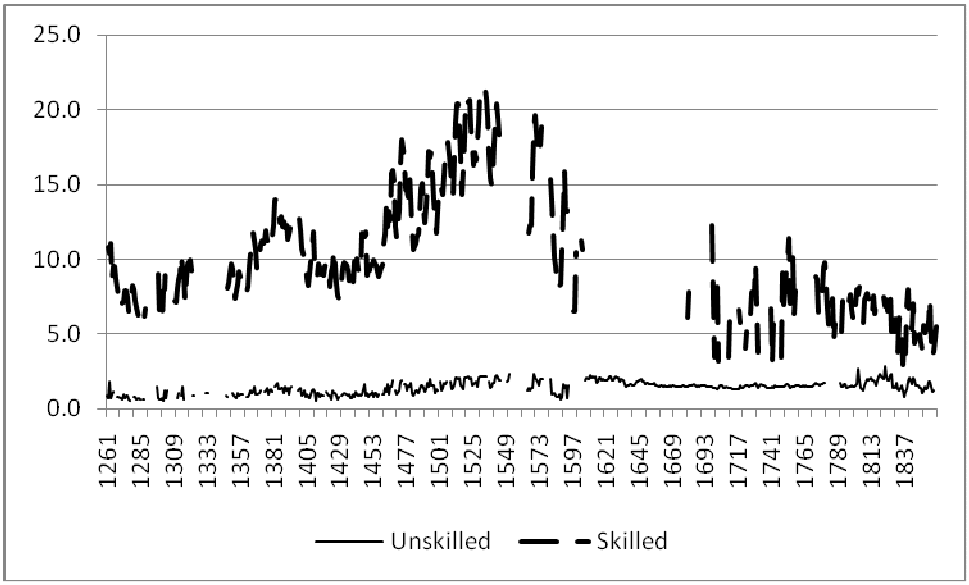
Sources and notes: Years 725, 800, 900, 1750, 1873 from Kito (2000); Years 1000, 1250, 1450, 1600, from Saito's estimates quoted in Farris (2006); Years 1875, 1878 from Meiji 5 nen iko wagakuni no jinko (Naikaku tokeikyoku, ed., 1935). Other years (1150, 1200, 1300, 1350, 1400, 1500, 1550, 1650, 1850) derived by log-linear interpolation.

TABLE 2: Japanese agricultural production, 730-1872

	Arable land	Land productivity	Agricultural production		Agricultural production per head
	1000 cho	Tokugawa koku/cho	1000 koku	Million kg	1850=100
730	656	5.77	3,786	568	64.8
900	939	6.10	5,730	860	70.5
1150	1,029	6.62	6,816	1,022	85.1
1280	1,098	6.91	7,589	1,138	85.3
1450	1,358	8.38	11,383	1,707	85.3
1600	2,065	9.55	19,721	2,958	91.3
1650	2,354	9.83	23,140	3,471	81.3
1700	2,841	10.78	30,626	4,594	91.3
1720	2,927	10.94	32,021	4,803	89.7
1730	2,971	11.02	32,736	4,910	88.5
1750	2,991	11.41	34,140	5,121	86.7
1800	3,032	12.42	37,650	5,648	93.5
1850	3,170	12.98	41,160	6,174	100.0
1872	3,234	14.47	46,812	7,022	110.7

Sources and notes: (1) 730-1450: Agricultural output is derived from arable land multiplied by land productivity. Arable land taken from Sawada (1927) for 700, *Wamyosho* collected in Okurasho sozeikyoku (1882) for 900, *Shugaisho* collected in Okurasho sozeikyoku (1882) for 1150, and Farris (2006) for 1280-1450. Land productivity is from Farris (2006), who expressed his figures in Nara units. We convert Farris's figures into Tokugawa units by assuming 1 Nara cho =1.088 Tokugawa cho and 1 Tokugawa koku = 2.5 Nara koku.
(2) 1600-1872: Arable land, land productivity and agricultural production from Hayami and Miyamoto (1988).
Units: 1 Tokugawa cho = 10 Tokugawa tan = 2.4506 acres; 1 Tokugawa koku = 150 kg.

FIGURE 1: Japanese rice wages , 1261-1860 (kg per day)



Sources: Bassino et al. (2010), Bassino and Ma (2005).

TABLE 3: Japanese rice wages and agricultural demand, 1260-1860

	Unskilled rice wage (kg/day)	Skilled rice wage (kg/day)	Skill premium (%)	Agricultural demand per head (1850=100)
1260/69	1.0	9.6	960	79.4
1300/09	0.8	7.6	950	73.5
1350/59	0.9	8.6	955	76.5
1400/49	1.0	10.2	1,020	79.4
1450/59	1.0	9.5	950	79.4
1500/09	1.6	15.6	975	97.1
1550/59	1.9	19.2	1,010	105.9
1600/09	2.0	11.1	555	108.8
1650/59	1.7	8.8	518	100.0
1750/59	1.5	8.6	573	94.1
1850/59	1.7	5.2	306	100.0

Sources: Wages and skill premium: Bassino et al. (2010), Bassini and Ma (2005). Agricultural demand per head derived from the unskilled rice wage with an assumed income elasticity of demand of 0.5.

TABLE 4: Urban population in Japan, 730-1878

	Urban population (1000s)	Total population (millions)	Urban share (%)
730	200	4.572	4.4
800	171	5.506	3.1
900	175	6.441	2.7
1000	179	6.000	3.0
1150	172	6.295	2.7
1200	188	6.397	2.9
1250	241	6.500	3.7
1300	295	7.328	4.0
1350	305	8.261	3.7
1400	329	9.314	3.5
1450	405	10.500	3.9
1500	507	12.329	4.1
1550	1,011	14.478	7.0
1600	949	17.000	5.6
1650	3,039	22.400	13.6
1750	4,318	31.011	13.9
1850	4,172	32.444	12.9
1873	3,659	33.301	11.0
1875	3,790	35.316	10.7
1878	3,633	36.166	10.0

Sources and notes: Urban population includes persons living in settlements of at least 10,000. Data derived from Farris (2006; 2009), Harada (1942), Hayashiya (1968), Ishii and Omiwa (1989), Jojima (1973a; 1973b), Kamata (1984), Kinoshita (2003), Kito (1994), Kito (2000), Kodama (1970-72), Murai (1979), Oguchi (1998; 2000), Ono (1934), Tanaka (1984), Saito (1984), Sasaki (1975), Sawada (1927), Sekiyama (1948; 1957), Takahashi (1941), Takao, Hayashiya and Matsuura (1968), Tanaka (1984), Toyoda (1952), Nihon chishi teiyo (Naimusho chirikyoku, ed., 1875), Meiji 8 nen Kyobu seihyo (Rikugun sanbokyoku, ed., 1875), Meiji 11 nen Kyobu seihyo (Rikugun sanbohonbu, ed., 1878), Meiji 5 nen iko wagakuni no jinko (Naikaku tokeikyoku, ed., 1935) and historiographies compiled by local governments in Japan.

TABLE 5: Japanese per capita GDP, 730-1872

A. Level of GDP per capita

	Population (1850=100)	Agricultural output (1850=100)	Urban share (%)	GDP per capita (1850=100)
730	14.2	9.2	4.4	59.0
900	19.8	13.9	2.7	63.1
1150	19.4	16.6	2.7	76.2
1280	21.6	18.4	3.9	77.4
1450	32.4	27.7	3.9	77.4
1600	52.5	47.9	5.6	84.3
1650	69.1	56.2	13.6	82.0
1700	81.5	74.4	13.8	92.3
1720	86.7	77.8	13.8	90.6
1730	89.8	79.5	13.8	89.5
1750	95.7	82.9	13.9	87.7
1800	97.8	91.5	13.4	94.0
1850	100.0	100.0	12.9	100.0
1872	102.8	113.7	11.0	108.3

B. Annual growth rates of per capita GDP

	Growth rate (%)
730-1150	0.06
1150-1450	0.01
1450-1600	0.06
1600-1850	0.11
1850-1872	0.36
730-1872	0.05
1280-1872	0.06

Sources: See text.

TABLE 6: An Anglo-Japanese comparison of per capita GDP, 1250-1872

	Japan p.c. GDP ($1990)	GB p.c. GDP ($1990)	Japan/GB p.c. GDP (GB=100)
730	401		
900	428		
1150	518		
1280	525	672	78.2
1450	525	1,355	38.8
1600	572	1,127	50.8
1650	557	979	56.9
1700	627	1,506	41.6
1720	615	1,619	38.0
1730	608	1,607	37.8
1750	596	1,660	35.9
1800	639	2,140	29.8
1850	679	2,718	25.0
1872	735	3,925	18.7

Source: see text.

TABLE 7: Japan and India in the Great Divergence, 1280-1872

	Japan/GB p.c. GDP (GB=100)	India/GB p.c. GDP GB=100)
1280	78.2	
1450	38.8	
1600	50.8	70.9
1650	56.9	81.5
1700	41.6	48.7
1750	38.0	39.4
1800	37.8	29.9
1850	35.9	21.6
1872	29.8	14.5

Source: Japan/GB from Table 6, India/GB from Broadberry and Gupta (2010)

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