Appendix B

Growth of World Population, GDP and GDP Per Capita before 1820

Maddison (1995*a*) contained a rough aggregate estimate of world population, GDP and per capita GDP back to 1500 to provide perspective for the detailed analysis of developments after 1820. The main purpose of the brief look backwards was to emphasise the dramatic acceleration of growth in the succeeding capitalist epoch. Maddison (1998*a*) provided a confrontation of Chinese and Western economic performance over a longer period of two millennia. This demonstrated important differences in the pace and pattern of change in major parts of the world economy, which have roots deep into the past.

The present exercise provides a more detailed and disaggregated scrutiny of the protocapitalist experience from 1500 to 1820, with a rough sketch of the contours of development over the preceding millennium and a half.

The quantitative analysis in this appendix works backward from the 1820 estimates in Appendix A, using the same techniques of analysis — assembling evidence on changes in population, retaining the 1990 international dollar as the temporal and spatial anchor in the estimation of movements in GDP and per capita GDP, filling holes in the evidence with proxy estimates in order to derive world totals. This appendix is divided into two parts. The first deals with population. The second with GDP growth.

Population

The evidence here on the more distant past is weaker than that in Appendix A, and there are more gaps in the database. Nevertheless, the exercise in quantification is not a product of fantasy. The strongest and most comprehensive evidence is that for population, and the population component is of greater proportionate importance in analysis of centuries when per capita income growth was exiguous.

Demographic material is important in providing clues to per capita income development. One striking example is the urbanisation ratio. Thanks to the work of de Vries for Europe and of Rozman for Asia, one can measure the proportion of population living in towns with more than 10 000 inhabitants. In the year 1000, this ratio was zero in Europe (there were only 4 towns with more than 10 000 inhabitants) and in China it was 3 per cent. By 1800 the West European urban ratio was 10.6 per cent, the Chinese 3.8 per cent and the Japanese 12.3 per cent. When countries are able to expand their urban ratios, it indicates that there was a growing surplus beyond subsistence in agriculture, and that the non–agricultural component of economic activity was increasing. These changes were used to infer differences in per capita progress between China and Europe in Maddison (1998*a*), and such inference is a feature of the present study. The Chinese bureaucracy kept population registers which go back more than 2 000 years. These bureaucratic records were designed to assess taxable capacity, and

include information on cultivated area and crop production, which was used by Perkins (1969) to assess long run movements in Chinese GDP per capita. Bagnall and Frier (1994) have made brilliant use of fragments of ancient censuses to estimate occupational structure, household size, marriage patterns, fertility and life expectation in Roman Egypt of the third century.

Serious work on historical demography started in the seventeenth century with John Graunt (1662). He derived vital statistics, survival tables, and the population of London by processing and analysing christenings and burials recorded in the London bills of mortality from 1603 onwards. Halley (1693) published the first rigorous mathematical analysis of life tables and Gregory King (1696) derived estimates of the population of England and Wales by exploiting information from hearth and poll taxes, a new tax on births, marriages and burials and his own minicensuses for a few towns.

Historical demography gained new vigour in the twentieth century in several important centres: *a)* the Office of Population Research in Princeton University (established in 1936); *b)* INED (Institut National des Études Demographiques) founded in the 1950s to exploit family reconstitution techniques developed by Louis Henry; *c)* the Cambridge Group for the History of Population and Family Structure (established in the 1970s) has carried out a massive research project to reconstitute English population size and structure on an annual basis back to 1541 (Wrigley, *et al*., 1997); *d)* research on Japanese population history has blossomed under the leadership of Akira Hayami and Osamu Saito; e*)* there has been a flood of publications on Latin American demography from the University of California by members of the Berkeley school. For the second half of the twentieth century we have the comprehensive international surveys of the United Nations, and the US Bureau of the Census.

As a result there are now a large number of monographic studies on European, American and Asian countries, and a long series of efforts to construct aggregative estimates of world population. Riccioli (1672) and Gregory King (1696) inaugurated this tradition. Early estimates are usefully surveyed by Willcox (1931) who listed 66 publications between 1650 and 1850. Modern scholarship is represented by Colin Clark (1967), Durand (1974), McEvedy and Jones (1978) and Biraben (1979).

The following detailed estimates for 1500 onwards rely heavily on monographic country studies for the major countries. To fill holes in my dataset I draw on McEvedy and Jones (1978). For the preceding millennium and a half, I used their work extensively.

There are several reasons for preferring McEvedy and Jones rather than Clark, Durand and Biraben. The McEvedy and Jones estimates are the most detailed and best documented. When reconstructing the past, they define countries in terms of 1975 boundaries, which are in most cases identical with the 1990 boundaries I adopted as a general rule (with exceptions for Germany, India, Korea and the United Kingdom). They also show the impact of frontier changes. There are significant differences of judgement amongst the four standard sources on long term population momentum, particularly for Latin America for 1500 and earlier, and for Africa. In both these cases my judgement was closer to that of McEvedy and Jones, than to that of Clark, Durand or Biraben.

Table B–1 summarises my aggregate findings compared with those of McEvedy and Jones, Clark, Durand and Biraben.

Western Europe

Denmark, Finland, Germany, Netherlands, Norway, Sweden and Switzerland 1500–1700 from Maddison (1991) pp. 226–7; Belgium and Italy from de Vries (1984), p. 36. Austria from McEvedy and Jones (1978). France 1500–1700 (refers to present territory) from Bardet and Dupaquier (1997), pp. 446 and 449; 1700–1820 from Henry and Blayo (1975), pp. 97–9. UK estimate is explained in Table B–13 below. Population for the years 0 and 1000 from McEvedy and Jones (1978). Population of 13 small West European countries assumed to move parallel to the total for the 12 countries above.

Portugal 1500–1700 and Spain 1500 from de Vries (1984), p. 36. Spain 1600 and 1700 from *Espana: Anuario Estadistico 1977,* INE, Madrid, p. 49; 0 and 1000 are from McEvedy and Jones. Greece 0–1700 from McEvedy and Jones.

Table B–1. **Alternative Estimates of the Regional Components of World Population, 0–1700 A.D.**
(000)

Year	*0*	*1000*	*1500*	*1700*
		Europe (including area of former USSR)		
Clark	44 500	44 200	73 800	111 800
Durand	42 500	45 500	79 000	n.a.
Biraben	43 000	43 000	84 000	125 000
McEvedy and Jones	32 800	38 800	85 500	126 150
Maddison	33 350	39 013	87 718	126 810
		Americas		
Clark	3 000	13 000	41 000	13 000
Durand	12 000	37 500	46 500	n.a.
Biraben	12 000	18 000	42 000	12 000
McEvedy and Jones	4 500	9 000	14 000	13 000
Maddison	6 320	12 860	19 750	13 250
		Asia (including Australasia)		
Clark	185 000	173 000	227 000	416 000
Durand	207 000	189 500	304 000	n.a.
Biraben	171 000	152 000	245 000	436 000
McEvedy and Jones	114 200	183 400	277 330	411 250
Maddison	174 650	183 400	284 350	402 350
		Africa		
Clark	23 000	50 000	85 000	100 000
Durand	35 000	37 500	54 000	n.a.
Biraben	26 000	38 000	87 000	107 000
McEvedy and Jones	16 500	33 000	46 000	61 000
Maddison	16 500	33 000	46 000	61 000
		World		
Clark	225 500	280 200	427 800	640 800
Durand	296 500	310 000	483 500	n.a.
Biraben	252 000	253 000	461 000	680 000
McEvedy and Jones	168 700	264 500	423 600	610 000
Maddison	230 820	268 273	437 818	603 410

Source: Clark (1967), Durand (1974), McEvedy and Jones (1978) and Biraben (1979). The estimates of Durand are high/low ranges. I have taken the mid point of his figures. I included the whole of the former USSR in Europe and the whole of Turkey in Asia, and adjusted the estimates of the other authors to conform to this definition.

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Eastern Europe

Population 0 — 1700 of what is now Albania, Bulgaria, Czech Republic, Greece, Hungary, Poland, Romania, Slovakia and the five republics of the former Yugoslavia from McEvedy and Jones (1978).

Table B–2. **Population of Western and Eastern Europe and Western Offshoots, 0–1820 A.D.**
(000)

Year	*0*	*1000*	*1500*	*1600*	*1700*	*1820*
Austria	500	700	2 000	2 500	2 500	3 369
Belgium	300	400	1 400	1 600	2 000	3 434
Denmark	180	360	600	650	700	1 155
Finland	20	40	300	400	400	1 169
France	5 000	6 500	15 000	18 500	21 471	31 246
Germany	3 000	3 500	12 000	16 000	15 000	24 905
Italy	7 000	5 000	10 500	13 100	13 300	20 176
Netherlands	200	300	950	1 500	1 900	2 355
Norway	100	200	300	400	500	970
Sweden	200	400	550	760	1 260	2 585
Switzerland	300	300	650	1 000	1 200	1 829
United Kingdom	800	2 000	3 942	6 170	8 565	21 226
12 Countries	17 600[a]	19 700[b]	48 192	62 580	68 796	114 419
Portugal	500	600	1 000	1 100	2 000	3 297
Spain	4 500	4 000	6 800	8 240	8 770	12 203
Greece	2 000	1 000	1 000	1 500	1 500	2 312
13 Small Countries	100	113	276	358	394	657
Total Western Europe	**24 700**	**25 413**	**57 268**	**73 778**	**81 460**	**132 888**
Albania	200	200	200	200	300	437
Bulgaria	500	800	800	1 250	1 250	2 187
Czechoslovakia	1 000	1 250	3 000	4 500	4 500	7 190
Hungary	300	500	1 250	1 250	1 500	4 571
Poland	450	1 200	4 000	5 000	6 000	10 426
Romania	800	800	2 000	2 000	2 500	6 389
Yugoslavia	1 500	1 750	2 250	2 750	2 750	5 215
Total Eastern Europe	**4 750**	**6 500**	**13 500**	**16 950**	**18 800**	**36 415**
United States	640	1 300	2 000	1 500	1 000	9 981
Canada	80	160	250	250	200	816
Australia & New Zealand	450	500	550	550	550	433
Total Western Offshoots	**1 170**	**1 960**	**2 800**	**2 300**	**1 750**	**11 230**

Table B–3. **European and Asian Population of Russia, 0–1870 A.D.**
(000)

Year	*0*	*1000*	*1500*	*1600*	*1700*	*1820*	*1870*
European Russia	2 000	4 000	12 000	15 000	20 000	44 161	71 726
Siberia	100	100	200	200	300	1 443	3 272
Caucasus	300	500	1 250	1 500	1 750	2 429	4 587
Turkestan	1 500	2 500	3 500	4 000	4 500	6 732	9 087
Total	**3 900**	**7 100**	**16 950**	**20 700**	**26 550**	**54 765**	**88 672**

Source: McEvedy and Jones (1978).

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Former USSR

Table B–3 refers to population in the geographic area that constituted the USSR before it was dissolved in 1991. 0–1870 from McEvedy and Jones (1978), pp. 78–82, 157–63, broken down for European Russia (excluding Finland and the Polish provinces), Siberia, the Caucasus (present republics of Armenia, Azerbaijan and Georgia), and Turkestan (present republics of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan).

Western Offshoots

There is a detailed bibliography and survey of the literature on North America in Daniels (1992). Thornton (1987) analyses the process of indigenous depopulation, and cites Ubelaker's (1976) estimates for the Smithsonian Institution. I took a rounded version of the latter as the basis for my estimate of 2 million in 1500 for the United States, and quarter of a million for Canada. Thornton gives no estimates for 1600 and 1700. My assessment for these two years is based on the assumption that the depopulation ratio was smaller than in Mexico (where population density was much greater). Movement of population for 0–1500 assumed to be proportionately the same as the total for Latin America.

For Australia, the conventional official estimate of the aboriginal population at the time of initial contact with Europeans was 250–300 thousand, but Butlin's (1983) detailed modelling of the likely impact of disease, displacement and deliberate extermination in New South Wales and Victoria suggested a considerably higher figure. I assumed a pre–contact population in Australia and New Zealand combined of 550 000 — smaller than Butlin's estimate but bigger than the old official estimates. For 0–1500 I assumed slower growth than in the Americas.

Latin America

The size of the indigenous population at the time of the Spanish conquest is a matter of considerable controversy. Firm evidence is weak, but there are two very distinct schools of thought. It is clear that population declined substantially after the conquest. The native population had been isolated over millennia from foreign microbes, and suffered from major epidemics of smallpox, measles and other deadly diseases against which they had no immunities.

Mexico

In an assessment based on a careful survey of literary evidence of the conquistadores and documents in Spanish archives, Angel Rosenblat (1945) estimated the pre–conquest population of present day Mexico to have been about 4.5 million. He assumed a rather modest rate of depopulation after the conquest — a drop less than 15 per cent in the sixteenth century. The Berkeley school (Cook and Simpson, 1948) had very much higher estimates of the pre–conquest population — their figure for Central Mexico alone (about a quarter of the territory of present day Mexico) was 11 million. This estimate was based on various flimsy suppositions, e.g. multiplying the number of Franciscan monks by baptismal coefficients or inferring population from the size of Aztec armies as estimated by those who fought them. The Borah and Cook (1963) estimate for Central Mexico was even higher — 25 million on the basis of ambiguous pictographs describing the incidence of Aztec fiscal levies. They assumed a 95 per cent depopulation ratio for the indigenous population between 1519 and 1605, and backcast Spanish estimates for 1605 by a multiplier of 25. They give no detailed specification of the different causes of mortality as Butlin (1983) did for Australia. They did not discuss alternative approaches to measurement as Cook (1981) does for Peru, and they never made an adequate response to Rosenblat's (1967) criticism of their work.

There are two reasons for scepticism about the extremely high mortality estimates of the Berkeley school: *a)* they assume very much higher mortality than European experience in the wake of the Black Death (a one third loss); *b)* it is implausible that Central Mexican population did not recover its alleged 1519 level until 1970 in spite of the additions the Spanish conquest made to production potential. Before the conquest there were no wheeled vehicles, no ploughs and no metal tools. The basic diet was close to vegetarianism with no cattle, sheep, pigs or hens. The absence of horses, donkeys, oxen and wheeled vehicles meant that land transport possibilities were confined to human porterage. Europe recovered from the Black Death mortality within a century with virtually no change in technology. It seems inconceivable that Mexican recovery took 450 years.

My own judgement is that Berkeley School's estimates for Mexico are far too high. However, I think Rosenblat understates the pre–conquest level and the subsequent rate of depopulation. Zambardino (1980), in a critical review of the Berkeley School, suggests a plausible range of 5–10 million. I took the midpoint of the Zambardino estimate for Mexico (see the discussion in Maddison, 1995b), and assumed a depopulation ratio of two thirds between 1500 and 1600.

Rosenblat (1945) describes the structure of the Mexican population in 1825, at the end of Spanish rule when the total population was 6.8 million. At the top of the scale was a thin layer of 70 000 peninsulares (peninsular Spaniards). The second group consisted of 1.2 million criollos (whites of Spanish extraction). The third group consisted of 1.9 million *mestizos* or *castas*. Most of them originated from unions between whites and Indians, some were Indians who had abandoned their rural lifestyle, wore Spanish–type clothes and lived in urban areas. At the bottom of the social scale were rural Indians (3.7 million) living mostly in nucleated pueblos, engaged in subsistence agriculture, with some hunter–gatherer groups in the North. This group wore traditional dress, maintained their own languages and customs except religion. There was a small group (about 10 000) of negro slaves in the South of the country. This information on social structure is of considerable use in constructing income accounts (see below).

Brazil

I adopted the Rosenblat (1945) estimate for 1500 which was used by McEvedy and Jones. It is close to the Kroeber (1939) estimate based on hypotheses about the nature of land use and technology by a population who were mainly hunter–gatherers (with some slash and burn agriculture in coastal regions). Hemming (1978) estimates a pre–contact population of 2.4 million (a figure he describes as "pure guess–work") derived by blowing up present day figures for 28 regions by assumed depopulation ratios. Denevan (1976) estimates 4.8 million for North and Central Brazil (including Amazonia) but this was based on agricultural potential and inferences from evidence on Peru. Hemming exaggerates the likely depopulation ratio for a country with a thinly settled hunter–gatherer population, and Denevan's reliance on estimates of agricultural potential is not relevant for an Indian population who were predominantly hunter–gatherers.

In the first century of settlement it became clear that it was difficult to use Indians as serf or slave labour. They were not docile, had high mortality when exposed to Western diseases, could run away and hide very easily. So the Portuguese imported large numbers of African slaves for manual labour. The ultimate fate of Brazilian Indians was like that of North American Indians. They were pushed beyond the bounds of colonial society. The main difference was greater miscegenation with the white invaders and black slaves.

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Table B–4. **Ethnic Composition of the Brazilian Population, 1500–1870**

(000)

Year	*1500*	*1600*	*1700*	*1820*	*1870*
Indigenous	1 000	700	950	500	400
Black and Mixed		70	200	2 500	5 700[a]
European		30	100	1 500	3 700
Total	**1 000**	**800**	**1 250**	**4 500**	**9 800**

a) including 1.5 million slaves.
Sources: Rosenblat (1945), Simonsen (1962), Merrick and Graham (1979), Marcilio (1984).

Table B–5. **Alternative Estimates of Latin American Population, 0–1820 A.D.**

(000)

Year	*0*	*1000*	*1500*	*1600*	*1700*	*1820*
			Maddison estimates			
Mexico		4 500	7 500	2 500	4 500	6 587
Brazil		700	1 000	800	1 250	4 507
Peru		3 000	4 000	1 300	1 300	1 317
Other		3 200	5 000	4 000	5 000	8 809
Total	5 600	11 400	17 500	8 600	12 050	21 220
			McEvedy and Jones (1978)			
Mexico	1 500	3 000	5 000	3 500	4 000	6 309[a]
Brazil	400	700	1 000	1 000	1 250	3 827[a]
Peru	750	1 500	2 000	1 500	1 500	1 683[a]
Other	1 550	3 300	5 200	4 500	5 400	10 450[a]
Total	4 200	8 500	13 200	10 500	12 150	22 269[a]
			Rosenblat (1945)			
Mexico			4 500	3 645[b]	n.a.	6 800[c]
Brazil			1 000	886[b]	n.a.	4 000[c]
Peru			2 000	1 591[b]	n.a.	1 400[c]
Other			4 885	4 532[b]	n.a.	10 863[c]
Total			12 385	10 654[b]	n.a.	23 063[c]
			Clark (1967)			
Total	2 900	12 600	40 000	14 000	12 000	
			Biraben (1979)			
Total	10 000	16 000	39 000	10 000	10 000	23 980[a]

a) interpolation of 1800 and 1850 estimates; b) interpolation of 1570 and 1650 estimates; c) 1825.

Sources: My estimates for 1500–1820 (see text above). 0–1500 growth rates from McEvedy and Jones.

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Peru

I adopted Cook's (1981, Chapter 7) "minimal" estimate of 4 million. Although he calls it "minimal" he cites lower figures derived by other methods he considers respectable. Cook's approach is like that of the Berkeley school, but he shows alternative estimates derived from *a)* the "ecological" approach, which assesses population potential (carrying capacity) in terms of resources and the technology available; *b)* inferences from the extent of archaelogical remains; *c)* retropolation of assumed depopulation ratios from 1571 when the first reasonably documented Spanish population estimates became available. Cook opts for a pre–conquest figure of 9 million (p. 114) which is near the top of the wide range he shows. I assumed the same depopulation ratio of two thirds between 1500 and 1600, as I did for Mexico.

Other Latin American Countries

I adopted the pre–conquest estimates of McEvedy and Jones (1978) which they derive to a large degree from Rosenblat (1945). I assume a higher depopulation ratio for the sixteenth century than McEvedy and Jones, but less than that for Mexico and Peru (see Table B–5).

Total Latin American Population

Table B–5 compares my estimates, those of McEvedy and Jones and Rosenblat. Mine are higher for 1500 and show bigger depopulation in the sixteenth century, but the differences are modest compared with the Berkeley school. Borah (1976) suggested a population of 100 million upwards for the Americas as a whole in 1500. Colin Clark (1967) and Biraben (1979) were impressed by Borah but obviously felt he exaggerated and adopted compromise estimates (without entering into country detail).

China

Chinese population estimates (see Table B–8) are based on bureaucratic records which go much further back than those in any other country. The type of adjustments which are necessary for intertemporal compatibility are discussed in detail in Bielenstein (1987) and Ho (1959). I have used Ho (1970) p.49 for the population in 2A.D. For 960 onwards see Maddison, 1998*a*, Appendix D, pp. 167–9. Recently (in volume 8 of the *Cambridge History of China),* Martin Heidra offered a totally different picture of Chinese population with very rapid growth during the Ming dynasty. However, he provides no detail or bibliographic evidence for his revisionism, and shows no decline in the mid seventeenth century wars between the Ming and their Ch'ing successors. His analysis ends in 1650, and his high hypothesis leaves virtually no room for any growth in the Ch'ing period (see Heidra in Twitchett and Mote, 1998, pp. 436–40). It is therefore difficult to give much credence to his views.

Table B–6. **Alternative Estimates of India's Population, 0–1820 A.D.**
(million)

Year	*0*	*1000*	*1500*	*1600*	*1700*	*1820*
Clark (1967)	70	70	79	100	200	190
McEvedy & Jones (1978)	34	77	100	130	160	200
Biraben (1979)	46	40	95	145	175	194
Durand (1974)	75	75	112.5	n.a.	180[a]	n.a.
Maddison	55	75	110	135	165	209

a) 1750.

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India

India does not have statistical records of the same sort as Western Europe, China or Japan, and there is consequently a wide range of views. A good deal of discussion has hinged on the year 1600, for which Moreland estimated 100 million, Davis (1951) 125 million, Habib (1982) around 145 million (a range of 140–150). Virtually all of these estimates are based on an assessment of the productive capacity of the cultivated area (see Raychaudhuri and Habib, 1982), so there is an interdependence between what one assumes about demographic and economic performance. I took an average of the Davis and Habib estimate for 1600. For the year 0, I used the estimates of Durand.

Japan

Reasonably firm evidence is available from 1721 onwards from national population surveys at six–yearly intervals. These were taken for the shogun's own domains and those of approximately 250 *daimyo* in the rest of Japan. The registers excluded samurai households, the imperial nobility, outcastes and beggars (*eta* and *hinin*). They understated the female population and (to a degree which varied between different domains) young children as well. Nevertheless they can be adjusted to provide reasonable estimates for 1721 onwards when the aggregate level was about 30 million. Before the six–yearly surveys were instituted, information was available from annual registers of religious affiliation which were instituted after the Portuguese were expelled from Japan and Christianity was made illegal. Hayami (1986*a*) shows such retrospective *daimyo* returns for 17 areas for periods varying from 30 to 100 years before the 1730s. Together they covered about 17 per cent of the Japanese population in the 1730s. They show an arithmetic average growth rate of 0.35 per cent a year, and a weighted average of 0.52 per cent. When these rates are backcast they suggest a 1600 population between 16 and 19.7 million, which is close to the Yoshida (1911) estimate of 18.5 million. Yoshida based his estimate on the 1598 cadastral survey which showed 18.5 million *koku* of grain output. He assumed this would support a population of 18.5 million with a consumption of 1 koku (150 kg.) per head.

Table B–7. **Alternative Estimates of Japanese Population, 0–1820 A.D.**
(000)

Year	*0*	*1000*	*1500*	*1600*	*1700*	*1820*
Maddison	3 000	7 500	15 400	18 500	27 000	31 000
Hayami			10 000	12 000	30 000	31 000

Source: For the first century I took the midpoint of the range cited by Farris (1985) p. 3 for the Yayoi period, and for the year 1000 interpolated between the estimate cited by Farris (p. 175) for the mid 7th and by Taeuber (1958), p. 20, for the mid 13th century. For 1500–1600 I assume the same growth rate as Hayami (0.18 per cent a year).

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Yoshida's reasoning was crude but seems more plausible than Hayami's (1986*a*) range of 10 to 14 million for 1600. Hayami implies a very rapid growth in the seventeenth century with an abrupt change to more or less complete stagnation in the eighteenth century.

Korea

Korea had a system of household population registers (*hojok*) for purposes of taxation and manpower mobilisation from 1392 to 1910, from which bureaucratic records survive. These registers had very scanty coverage of the child population, there was substantial regional variance, with much better coverage in Seoul, the capital. Kwon (1993) adjusted these records with the help of other historical

documents, and information on family structure from the first modern census of 1925. Kwon and Shin (1977) provide annual estimates for 1392 to 1910. I used their estimates of population movement for 1500, 1600, 1700 and 1910 and linked them to estimates of the 1910 level from Mizoguchi and Umemura (1988) as described in Appendix A. The revised estimates are about twice as high as those used in McEvedy and Jones (1978) which were based on the unadjusted results of the population registers as reported in Lee (1936), pp. 40–1. For 0–1500 I assumed the same proportionate movement as in Japan.

Table B–8. **Population of Asia, 0–1820 A.D.**
(million)

Year	*0*	*1000*	*1500*	*1600*	*1700*	*1820*
China	59.6	59.0	103.0	160.0	138.0	381.0
India	75.0	75.0	110.0	135.0	165.0	209.0
Japan	3.0	7.5	15.4	18.5	27.0	31.0
Korea	1.6	3.9	8.0	10.0	12.2	13.8
Indonesia	2.8	5.2	10.7	11.7	13.1	17.9
Indochina	1.1	2.2	4.5	5.0	5.9	8.9
Other East Asia	5.9	9.8	14.4	16.9	19.8	23.6
Iran	4.0	4.5	4.0	5.0	5.0	6.6
Turkey	6.1	7.3	6.3	7.9	8.4	10.1
Other West Asia	15.1	8.5	7.5	8.5	7.4	8.5
Total Asia	**174.2**	**182.9**	**283.8**	**378.5**	**401.8**	**710.4**

Source: China, India, Japan and Korea as described in text. All 1820 figures are from Appendix A. Indonesia 1700 from Maddison (1989*b*), 0–1700 proportionate movement from McEvedy and Jones. Indochina (area of Cambodia, Laos and Vietnam), 0–1820 proportionate movement from McEvedy and Jones. Other East Asia, Iran, Turkey and Other West Asia 0–1700 from McEvedy and Jones. The geographic coverage of Asia is the same here as in Appendix A. The Asian population in the former USSR is excluded. Turkey, Polynesia and Melanesia are included.

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Africa

Except for Egypt there is virtually no documentation on African population. The available estimates are speculative. The first were by Riccioli, an Italian Jesuit, in 1672. He suggested a population of 100 million in his day without explaining the derivation. Gregory King (1696) estimated 70 million, starting with the land area of the continent and a rough assessment of agricultural productivity to estimate what population could be sustained with the available natural resources, levels of technique and organisation.

The leading American demographer Walter Willcox (1931) thought Riccioli's estimate was plausible and assumed no change in seventeenth and eighteenth centuries. Colin Clark (1967) did the same. Carr–Saunders (1964) accepted Riccioli's estimate for the mid–seventeenth century and allowed for some decline thereafter because of the slave trade. Biraben (1979) also allowed for some decline due to the slave trade.

Durand (1974) and McEvedy and Jones (1978) took a very different view. Working backwards from their estimated population level in 1900, they assumed a more dynamic growth process. They took a position on the interaction between population pressure and production which is nearer to that of Boserup (1965 and 1981), than to the Malthusian constraints which the other school had in mind. The hypothesis of McEvedy and Jones seems the more plausible, and I adopted their estimates for 0–1913.

Table B–9a. **Alternative Estimates of African Population, 0–1950 A.D.**
(million)

Year	*Willcox (1931)*	*Carr–Saunders (1964)*	*Clark (1967)*	*Biraben (1979)*	*Durand (1974)*	*McEvedy & Jones (1978)*	*Maddison (1999)*
0			23	26	35	16.5	16.5
1000			50	39	37.5	33	33
1500			85	87	54	46	46
1600			95	113	55	55	55
1650	100	100	100				
1700			100	107		61	61
1800	100	90	100	102		70	
1820		(92)				(74.2)	74.2
1870		(104.3)				(90.5)	90.5
1900	141	120	122	138	159	110	110.0
1913						(124.7)	124.7
1950		207		219		205	228.3

Sources: Willcox (1931), p.78; Carr–Saunders (1964), p.42; Clark (1967), pp.64, 104 and 108; Biraben (1979), p. 16; Durand (1974), p. 11 (midpoint of his range); McEvedy and Jones (1978), p. 206. Figures in brackets are interpolations.

Table B–9b. **Regional Distribution of African Population 0–1820 A.D**
(000)

Year	*0*	*1000*	*1500*	*1600*	*1700*	*1820*
Egypt	4 000	5 000	4 000	5 000	4 500	4 195
Other North Africa	4 200	5 500	4 300	6 000	4 800	6 790
Other Africa	8 300	22 500	37 700	44 000	51 700	63 223
Total Africa	16 500	33 000	46 000	55 000	61 000	74 208
North African Share %	49.7	31.8	18.0	20.0	13.6	14.8

Source: McEvedy and Jones (1978). Figure for 1820 is an interpolation of their estimates for 1800 and 1850.

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McEvedy and Jones (1978) is the only source which provides a detailed analysis of the population of Africa. The most striking aspect of their estimates is the dynamism of the expansion south of the Sahara, and the very large decline in the North African share from about half of the African total in the first century to about one seventh in 1820 (see Table B–9b). For about four millennia Egypt was virtually the only area to practise agriculture, and the rest of the continent was sparsely inhabited by hunter–gatherer populations. In the last millennium B.C., Phoenicians and Greeks settled in North Africa west of Egypt, established cities and brought in sophisticated agricultural techniques. By the first century the whole of the prosperous Mediterranean littoral was under Roman control. Its economy and population declined after the Roman collapse, revived with the seventh century Arab takeover, reaching a new peak around the year 1000 A.D.

The dynamic expansion south of the Sahara was due to the spread of agriculturalists into East and Southern Africa, pushing out hunter—gatherer populations. The introduction of manioc and maize from the Americas in the sixteenth century reinforced the possibilities of agricultural expansion. The introduction of agriculture made it possible to accommodate a substantial increase in population, but per capita income probably did not change much.

The slave trade had a substantial effect on African population growth (see Tables 1–7 and 2–5 and the analysis in Chapter 2). Between 1600 and 1870 more than 9 million slaves were shipped to the Americas. The peak was in the eighteenth century when arrivals in the Americas were over 6 million, and African losses were bigger owing to mortality on the passage. Without this trade, African population growth in the eighteenth century might well have been three times as fast.

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Table B–10. **World Population, 20 Countries and Regional Totals, 0–1998 A.D.**

(000)

Year	*0*	*1000*	*1500*	*1600*	*1700*	*1820*	*1870*	*1913*	*1950*	*1973*	*1998*
Austria	500	700	2 000	2 500	2 500	3 369	4 520	6 767	6 935	7 586	8 078
Belgium	300	400	1 400	1 600	2 000	3 434	5 096	7 666	8 640	9 738	10 197
Denmark	180	360	600	650	700	1 155	1 888	2 983	4 269	5 022	5 303
Finland	20	40	300	400	400	1 169	1 754	3 027	4 009	4 666	5 153
France	5 000	6 500	15 000	18 500	21 471	31 246	38 440	41 463	41 836	52 118	58 805
Germany	3 000	3 500	12 000	16 000	15 000	24 905	39 231	65 058	68 371	78 956	82 029
Italy	7 000	5 000	10 500	13 100	13 300	20 176	27 888	37 248	47 105	54 751	57 592
Netherlands	200	300	950	1 500	1 900	2 355	3 615	6 164	10 114	13 438	15 700
Norway	100	200	300	400	500	970	1 735	2 447	3 265	3 961	4 432
Sweden	200	400	550	760	1 260	2 585	4 164	5 621	7 015	8 137	8 851
Switzerland	300	300	650	1 000	1 200	1 829	2 664	3 864	4 694	6 441	7 130
United Kingdom	800	2 000	3 942	6 170	8 565	21 226	31 393	45 649	50 363	56 223	59 237
12 Countries Total	***17 600***	***19 700***	***48 192***	***62 580***	***68 796***	***114 419***	***162 388***	***227 957***	***256 616***	***301 037***	***322 507***
Portugal	500	600	1 000	1 100	2 000	3 297	4 353	6 004	8 512	8 634	9 968
Spain	4 500	4 000	6 800	8 240	8 770	12 203	16 201	20 263	27 868	34 810	39 371
Other	2 100	1 113	1 276	1 858	1 894	2 969	4 590	6 783	12 064	13 909	16 553
Total Western Europe	**24 700**	**25 413**	**57 268**	**73 778**	**81 460**	**132 888**	**187 532**	**261 007**	**305 060**	**358 390**	**388 399**
Eastern Europe	**4 750**	**6 500**	**13 500**	**16 950**	**18 800**	**36 415**	**52 182**	**79 604**	**87 289**	**110 490**	**121 006**
Former USSR	**3 900**	**7 100**	**16 950**	**20 700**	**26 550**	**54 765**	**88 672**	**156 192**	**180 050**	**249 748**	**290 866**
United States	680	1 300	2 000	1 500	1 000	9 981	40 241	97 606	152 271	211 909	270 561
Other Western Offshoots	490	660	800	800	750	1 249	5 892	13 795	23 823	39 036	52 859
Total Western Offshoots	**1 170**	**1 960**	**2 800**	**2 300**	**1 750**	**11 230**	**46 133**	**111 401**	**176 094**	**250 945**	**323 420**
Mexico	2 200	4 500	7 500	2 500	4 500	6 587	9 219	14 970	28 485	57 643	98 553
Other Latin America	3 400	6 900	10 000	6 100	7 550	14 633	30 754	65 545	137 352	250 807	409 070
Total Latin America	**5 600**	**11 400**	**17 500**	**8 600**	**12 050**	**21 220**	**39 973**	**80 515**	**165 837**	**308 450**	**507 623**
Japan	**3 000**	**7 500**	**15 400**	**18 500**	**27 000**	**31 000**	**34 437**	**51 672**	**83 563**	**108 660**	**126 469**
China	59 600	59 000	103 000	160 000	138 000	381 000	358 000	437 140	546 815	881 940	1 242 700
India	75 000	75 000	110 000	135 000	165 000	209 000	253 000	303 700	359 000	580 000	975 000
Other Asia	36 600	41 400	55 400	65 000	71 800	89 366	119 619	185 092	392 481	677 214	1 172 243
Total Asia (excluding Japan)	**171 200**	**175 400**	**268 400**	**360 000**	**374 800**	**679 366**	**730 619**	**925 932**	**1 298 296**	**2 139 154**	**3 389 943**
Africa	**16 500**	**33 000**	**46 000**	**55 000**	**61 000**	**74 208**	**90 466**	**124 697**	**228 342**	**387 645**	**759 954**
World	**230 820**	**268 273**	**437 818**	**555 828**	**603 410**	**1 041 092**	**1 270 014**	**1 791 020**	**2 524 531**	**3 913 482**	**5 907 680**

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Table B–11. **Rates of Growth of World Population, 20 Countries and Regional Totals, 0–1998 A.D.**
(annual average compound growth rates)

Year	*0–1000*	*1000–1500*	*1500–1820*	*1820–70*	*1870–1913*	*1913–50*	*1950–73*	*1973–98*
Austria	0.03	0.21	0.16	0.59	0.94	0.07	0.39	0.25
Belgium	0.03	0.25	0.28	0.79	0.95	0.32	0.52	0.18
Denmark	0.07	0.10	0.20	0.99	1.07	0.97	0.71	0.22
Finland	0.07	0.40	0.43	0.81	1.28	0.76	0.66	0.40
France	0.03	0.17	0.23	0.42	0.18	0.02	0.96	0.48
Germany	0.02	0.25	0.23	0.91	1.18	0.13	0.63	0.15
Italy	–0.03	0.15	0.20	0.65	0.68	0.64	0.66	0.20
Netherlands	0.04	0.23	0.28	0.86	1.25	1.35	1.24	0.62
Norway	0.07	0.08	0.37	1.17	0.80	0.78	0.84	0.45
Sweden	0.07	0.06	0.48	0.96	0.70	0.60	0.65	0.34
Switzerland	0.00	0.15	0.32	0.75	0.87	0.53	1.39	0.41
United Kingdom	0.09	0.14	0.53	0.79	0.87	0.27	0.48	0.21
12 Countries Total	***0.01***	***0.18***	***0.27***	***0.70***	***0.79***	***0.32***	***0.70***	***0.28***
Portugal	0.02	0.10	0.37	0.56	0.75	0.95	0.06	0.58
Spain	–0.01	0.11	0.18	0.57	0.52	0.87	0.97	0.49
Other	–0.06	0.03	0.26	0.88	0.91	1.57	0.62	0.70
Total Western Europe	**0.00**	**0.16**	**0.26**	**0.69**	**0.77**	**0.42**	**0.70**	**0.32**
Eastern Europe	**0.03**	**0.15**	**0.31**	**0.72**	**0.99**	**0.25**	**1.03**	**0.36**
Former USSR	**0.06**	**0.17**	**0.37**	**0.97**	**1.33**	**0.38**	**1.43**	**0.61**
United States	0.06	0.09	0.50	2.83	2.08	1.21	1.45	0.98
Other Western Offshoots	0.03	0.04	0.14	3.15	2.00	1.49	2.17	1.22
Total Western Offshoots	**0.05**	**0.07**	**0.43**	**2.87**	**2.07**	**1.25**	**1.55**	**1.02**
Mexico	0.07	0.10	–0.04	0.67	1.13	1.75	3.11	2.17
Other Latin America	0.07	0.07	0.12	1.50	1.78	2.02	2.65	1.98
Total Latin America	**0.07**	**0.09**	**0.06**	**1.27**	**1.64**	**1.97**	**2.73**	2.01
Japan	**0.09**	**0.14**	**0.22**	**0.21**	**0.95**	**1.31**	**1.15**	**0.61**
China	0.00	0.11	0.41	–0.12	0.47	0.61	2.10	1.38
India	0.00	0.08	0.20	0.38	0.43	0.45	2.11	2.10
Other Asia	0.01	0.06	0.15	0.58	1.02	2.05	2.40	2.22
Total Asia (excluding Japan)	**0.00**	**0.09**	**0.29**	**0.15**	**0.55**	**0.92**	**2.19**	**1.86**
Africa	**0.07**	**0.07**	**0.15**	**0.40**	**0.75**	**1.65**	**2.33**	**2.73**
World	**0.02**	**0.10**	**0.27**	**0.40**	**0.80**	**0.93**	**1.92**	**1.66**

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Table B–12. **Shares of World Population, 20 Countries and Regional Totals, 0–1998 A.D.**
(per cent of world total)

Year	*0*	*1000*	*1500*	*1600*	*1700*	*1820*	*1870*	*1913*	*1950*	*1973*	*1998*
Austria	0.2	0.3	0.5	0.4	0.4	0.3	0.4	0.4	0.3	0.2	0.1
Belgium	0.1	0.1	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.2	0.2
Denmark	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1
Finland	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1
France	2.2	2.4	3.4	3.3	3.6	3.0	3.0	2.3	1.7	1.3	1.0
Germany	1.3	1.3	2.7	2.9	2.5	2.4	3.1	3.6	2.7	2.0	1.4
Italy	3.0	1.9	2.4	2.4	2.2	1.9	2.2	2.1	1.9	1.4	1.0
Netherlands	0.1	0.1	0.2	0.3	0.3	0.2	0.3	0.3	0.4	0.3	0.3
Norway	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Sweden	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.2	0.1
Switzerland	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1
United Kingdom	0.3	0.7	0.9	1.1	1.4	2.0	2.5	2.5	2.0	1.4	1.0
12 Countries Total	***7.6***	***7.3***	***11.0***	***11.3***	***11.4***	***11.0***	***12.8***	***12.7***	***10.2***	***7.7***	***5.5***
Portugal	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2
Spain	1.9	1.5	1.6	1.5	1.5	1.2	1.3	1.1	1.1	0.9	0.7
Other	0.9	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.4	0.3
Total Western Europe	**10.7**	**9.5**	**13.1**	**13.3**	**13.5**	**12.8**	**14.8**	**14.6**	**12.1**	**9.2**	**6.6**
Eastern Europe	**2.1**	**2.4**	**3.1**	**3.0**	**3.1**	**3.5**	**4.1**	**4.4**	**3.5**	**2.8**	**2.0**
Former USSR	**1.7**	**2.6**	**3.9**	**3.7**	**4.4**	**5.3**	**7.0**	**8.7**	**7.1**	**6.4**	**4.9**
United States	0.3	0.5	0.5	0.3	0.2	1.0	3.2	5.4	6.0	5.4	4.6
Other Western Offshoots	0.2	0.2	0.2	0.1	0.1	0.1	0.5	0.8	0.9	1.0	0.9
Total Western Offshoots	**0.5**	**0.7**	**0.6**	**0.4**	**0.3**	**1.1**	**3.6**	**6.2**	**7.0**	**6.4**	**5.5**
Mexico	1.0	1.7	1.7	0.4	0.7	0.6	0.7	0.8	1.1	1.5	1.7
Other Latin America	1.5	2.6	2.3	1.1	1.3	1.4	2.4	3.7	5.4	6.4	6.9
Total Latin America	**2.4**	**4.2**	**4.0**	**1.5**	**2.0**	**2.0**	**3.1**	**4.5**	**6.6**	**7.9**	8.6
Japan	**1.3**	**2.8**	**3.5**	**3.3**	**4.5**	**3.0**	**2.7**	**2.9**	**3.3**	**2.8**	**2.1**
China	25.8	22.0	23.5	28.8	22.9	36.6	28.2	24.4	21.7	22.5	21.0
India	32.5	28.0	25.1	24.3	27.3	20.1	19.9	17.0	14.2	14.8	16.5
Other Asia	15.9	15.4	12.7	11.7	11.9	8.6	9.4	10.3	15.5	17.3	19.8
Total Asia (excluding Japan)	**74.2**	**65.4**	**61.3**	**64.8**	**62.1**	**65.3**	**57.5**	**51.7**	**51.4**	**54.7**	**57.4**
Africa	**7.1**	**12.3**	**10.5**	**9.9**	**10.1**	**7.1**	**7.1**	**7.0**	**9.0**	**9.9**	**12.9**
World	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

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GDP and GDP Per Capita, 1500–1820

Maddison (1995*a*) pp. 19–20 contained a very crude estimate of the movement of world economic growth from 1500 to 1820, as a supplement to the much more detailed analysis for 1820 onwards. In that study I used three simple hypotheses about the growth of real GDP per capita. For Western Europe it was assumed to rise by 0.2 per cent a year, following the hypothesis of Kuznets (1973), 0.1 per cent a year in the rest of Europe and Latin America, and with zero change in Asia and Africa. Maddison (1998*a*), pp. 25 and 40 compared the contours of development in China and Europe from the first century of our era to 1995. The evidence for China was examined in considerable detail, but the estimates for Europe contained a large element of conjecture.

This appendix involves a much more detailed scrutiny of the evidence for 1500–1820. It strongly suggests that average per capita West European growth rate was slower (at 0.15 per cent a year) from 1500 to 1820 than the 0.2 per cent which Kuznets hypothesised. Growth was faster in Latin America and in the Western offshoots than was assumed in Maddison (1995*a*). The hypothesis of a stagnant level of per capita income in Asia is generally confirmed, but Japan is a significant exception.

The last section of this appendix includes rough and tentative estimates of GDP levels by major regions for the first century of our era and for the year 1000. Estimates of world GDP and per capita GDP are set out in Tables B–18 to B–22.

Western Europe

Belgium

Blomme and Van der Wee (1994) provide estimates (for Flanders and Brabant) of GDP by industry of origin for 1510–1812. They give estimates for seven points within the period, which I used to derive approximate estimates for 1500,1600 and 1700.

France

François Perroux, with encouragement and support from Simon Kuznets, set up a group to measure French growth in the 1950s (Marczewski and Toutain were its most productive members). Marczewski (1961) made some preliminary estimates of growth for the eighteenth century which greatly exaggerated industrial performance. These have now been superseded. J.C. Toutain kindly provided me with the revised estimates which I have used here for 1700–1820.

Over the past few decades French economic history has been dominated by members of the *Annales* school who have been rather disdainful of the Kuznetsian approach. From our point of view, there are three main drawbacks to their work: *a)* disinterest in macroquantification; *b)* concentration on regional or supranational characterisations rather than national performance; *c)* Malthusian bias.

Le Roy Ladurie strongly emphasized the long–term stability of the French economy from 1300 to 1700, both in demographic and per capita terms. He first put forward the thesis of stagnant income in a regional study of the peasants of Languedoc (1966) . He argued that there was a tension between the dynamism of population and the rigidity of the agricultural production potential which led to recurrent and prolonged population setbacks. In 1977 he maintained the same conclusions in a survey drawing on a new generation of regional studies.

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Braudel's pessimism at one time went further than that of Le Roy Ladurie. In a 1967 article with Spooner, he concluded, after summarising the work of Phelps Brown and other real wage analysts and regional studies of the *Annales* school that: "From the late fifteenth century until well into the beginning of the eighteenth century, the standard of living in Europe progressively declined." Later he changed his mind (Braudel, 1985, Vol.III, p. 314): "Visualizing overall quantities throws into relief clear continuities in European history. The first of these is the regular rise in GNP come hell or high water — if Frank Spooner is correct, France's GNP had been rising since the reign of Louis XII and probably even longer." [Louis XII reigned from 1498 to 1515].

My own view is that Braudel's revised judgement is more acceptable than his earlier position, or that of Le Roy Ladurie. However, the graph which Braudel reproduced from Spooner (1972) did not show real GNP, but the movement in value from 1500 to 1800 of a fixed quantity of wheat, multiplied by population, and by a smoothed index of wheat prices in Paris. The quantitative evidence for assessing aggregate French performance from 1500 to 1700 is therefore still quite weak. Judging from the comparative growth of the urban population ratio (Table B–14), it seems clear that French economic growth was slower than that of England. I have assumed that French per capita growth 1500–1700 was about the same as in Belgium.

Italy

Malanima (1995, p. 600) suggests declining per capita income in Italy for 1570–1700, and stability from 1700 to 1820. These conclusions are based on a variety of indicators of industrial and commercial activity in cities, levels of food consumption and real wages, rather than an articulate estimate of GDP movement. The nature of the approach is explained in his short essay, "Italian Economic Performance: Output and Income 1600–1800" in Maddison and van der Wee (1994). Malanima's assumption of a decline up to 1700 fits with the qualitative indicators and assessment of Cipolla (1976, pp. 236–244), who suggests decline from the late fifteenth to seventeenth century. However, there is some dissent on this in Sella's (1979) assessment of seventeenth century development in Spanish Lombardy (centred in Milan) and Rapp's (1976) judgement on the seventeenth century situation in Venice. Both Sella and Rapp assumed some relative decline compared with more dynamic economies in Northern Europe, but not an absolute decline. I assumed that Italian per capita income was stagnant from 1500 to 1820. Italian population growth was slower than that in the rest of Europe and the urban ratio showed little change from 1500 to 1820.

The Netherlands

Estimates of GDP growth for 1580–1820 are from Maddison (1991a) pp. 205 and 277. They are linked at 1820 to new estimates for 1820–1913 by Smits, Horlings and van Zanden (2000). For 1580–1700, GDP movement was inferred from evidence (on explosive urbanisation, the transformation of the rural economy, and the size of household assets as revealed by probate inventories) provided in de Vries (1974). Van Zanden (1987) presented a wide variety of evidence to document his estimates of agricultural and fishery production, industry, transport and services for 1650–1805. The Dutch estimates show rapid growth to 1700, and a significant fall per capita from 1700 to 1820. De Vries and van der Woude (1997), p. 707 give a graphical representation based on alternative assumptions about the decline of Dutch per capita income from its peak to the nadir at the end of the Napoleonic wars. Their profile is not markedly different from the measure I adopted. I interpolated the 1580–1700 per capita growth rate of 0.43 to derive the estimates for 1600, and assumed that the 1500 level was below that of Belgium.

United Kingdom

1700–1820 GDP growth from Maddison (1991*a*), p. 220, modified for England and Wales to incorporate the results of Crafts and Harley (1992) rather than Crafts 1983). I assumed that Scottish per capita GDP was three–quarters of the level in England and Wales in 1801 and that its movement 1700–1801 was parallel to the Crafts–Harley estimate for England and Wales. For Ireland 1700–1801 per capita income was assumed to rise half as fast as in England and Wales.

For 1500–1700 there are several indicators which suggest that the United Kingdom was more dynamic than most other European countries. Population rose by 0.39 per cent a year compared with 0.15 per cent in the rest of Western Europe. The urban population ratio (population in cities 10 000 and over as a percentage of total population) rose from 3.1 to 13.3 per cent in England and Wales — about twice as fast as in France or the Netherlands. It seems clear that the ratio of foreign trade to GDP increased from 1500 to 1820. There are no satisfactory aggregate measures of crop output back to 1500 (see Overton, 1996), but the evidence on yields per acre in Clark (1991), on labour productivity in Allen (1991), and occupational structure (Wrigley, 1988) help to explain the growing urban ratio, as per capita crop availability was maintained with a decreasing share of the labour force. The faster growth in animal husbandry than crops (Wrigley, 1988) suggests an improvement in diets. Recent research on the growing variety of consumption items, improvements in housing and increased stocks of furniture and household linen revealed by probate inventories for successive generations also demonstrates a long process of improvement in living standards — see chapters by de Vries, Wills, and Shammas in Brewer and Porter (1993).

For these reasons, it seemed reasonable to assume that the Crafts–Harley rate of growth of per capita income for 1700–1801 was also valid for 1500–1700. For Ireland I assumed per capita growth was half as fast. For the United Kingdom as a whole this implies a per capita growth rate of 0.28 per cent a year for 1500–1700.

Snooks (1993) estimated the growth of total and per capita income in England 1086–1688 by linking the nominal income assessments in the Domesday Book survey of rural England south of the river Tees with Gregory King's estimates for 1688 as adjusted by Lindert and Williamson (1982). He deflated nominal income growth with the price index for household consumables of Phelps Brown and Hopkins (1981), pp. 28–30, supplemented by an index of wheat prices from Thorold Rogers. His estimates imply a growth rate of per capita real income averaging 0.35 per cent a year from 1492 to 1688 (p. 24). At this rate per capita income would have doubled from 1500 to 1700. This is faster growth than I have suggested.

The estimates of per capita GDP in Table B–13 show a very different movement from the frequently quoted real wage index for building workers in Southern England of Phelps Brown and Hopkins (1981). From 1500 to 1800 they suggested that real wages fell by 60 per cent, whereas I show per capita real GDP increasing 2.4 fold.

The tradition in real wage measurement is quite simplistic compared with that in demography or national accounts. Phelps Brown and Hopkins use daily wage rates for craftsmen and labourers hired for building work by Oxford and Cambridge colleges, Eton school and some other employers in Southern England. For the most part they had 15 or more wage quotations a year for craftsmen, and about 3 a year for building labourers. For the period 1500–1800, in which we are most interested, there were 82 years for which they show no wage estimate because of wide variance in the quotes they had or absence of data. They have no data for weekly or annual earnings, or days worked. There is no discussion in Phelps Brown and Hopkins of the representativity of their wage index for building workers. Lindert and Williamson (1982, p. 393), show that 5.3 per cent of families (73 000) derived their livelihood from the building trades in 1688. Even if the Phelps Brown coverage of this group is assumed to be adequate, and even if it is reasonable to assume that building workers were paid mainly in cash and not in kind, this is certainly not true of the bulk of the working population.

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People employed in agriculture were 56 per cent of the total in 1700, and most of them were producing and directly consuming cereals, meat, butter and cheese which figure so largely in the price index. Many others such as servants, artisans, the clergy, the armed forces were either not wage earners or received an appreciable part of their remuneration in kind. A large part of the working population were thus sheltered from the impact of price rises.

Table B–13. **Regional Components of British GDP, Population and GDP Per Capita, 1500–1920**

	United Kingdom	*England, Wales & Scotland*	*Ireland*	*Scotland*	*England & Wales*
			GDP (million 1990 Geary–Khamis dollars)		
1500	2 815	2 394	421	298	2 096
1600	6 007	5 392	615	566	4 826
1700	10 709	9 332	1 377	1 136	8 196
1801	25 426	21 060	4 366	2 445	18 615
1820	36 232	30 001	6 231		
1870	100 179	90 560	9 619		
1913	224 618	212 727	11 891		
1920	212 938	201 860	11 078		
			Population (000)		
1500	3 942	3 142	800	500	2 642
1600	6 170	5 170	1 000	700	4 470
1700	8 565	6 640	1 925	1 036	5 604
1801	16 103	10 902	5 201	1 625	9 277
1820	21 226	14 142	7 084	2 071	12 071
1870	31 393	25 974	5 419	3 337	22 637
1913	45 649	41 303	4 346	4 728	36 575
1920	46 821	42 460	4 361	4 864	37 596
			Per Capita GDP (1990 Geary–Khamis dollars)		
1500	714	762	526	596	793
1600	974	1 043	615	809	1 080
1700	1 250	1 405	715	1 096	1 463
1801	1 579	1 931	839	1 505	2 006
1820	1 707	2 121	880		
1870	3 191	3 487	1 775		
1913	4 921	5 150	2 736		
1920	4 568	4 754	2 540		

Source: GDP as explained in the text. Population in England (excluding Monmouth) interpolated from quinquennial estimates in Wrigley *et al.* (1997), pp. 614–5 for 1541–1871. 1500 to 1541 growth at the rate suggested by Wrigley and Schofield (1981), p. 737 for 1471–1541. Monmouth and Wales 1700–1820 population movement from Deane and Cole (1964), p. 103, 1500–1600 assumed to move parallel to England. Ireland 1500 and 1600 derived from O Grada in Bardet and Dupaquier (1997) vol. 1, p. 386, 1700–1821 movement from Dickson, O Grada and Daultrey (1982), p. 156. Scotland 1500–1600 from McEvedy and Jones (1978), pp. 45–7, 1700 from Deane and Cole (1964), p. 6, 1820 from Mitchell (1962), pp. 8–10. 1820–1920 population and GDP movement from Maddison (1995a).

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Jan de Vries (1993) is very critical of the real wage approach compared with alternative quantitative methods of measuring well–being. He questions the representativity of construction worker experience in a society with wide income differences. He emphasises the large number of important items left out of the Phelps Brown index and its use of fixed weights for such a long period, but his strongest doubts arise from the conflict between its sombre conclusions with evidence of a different kind which he found in probate inventories "All the studies I have examined for colonial New England and the Chesapeake, England and the Netherlands consistently reveal two features. With very few exceptions, each generation of decedents from the mid–seventeenth to the late eighteenth century left behind more and better possessions."

Aggregate Performance in the West European Core

The aggregate per capita growth rate for the five countries (Belgium, France, Italy, Netherlands and the United Kingdom) where I have given estimates for 1500–1820 is 0.14 per cent per annum, but they are a rather mixed bunch. The growth rate in the United Kingdom was 0.27, the Netherlands 0.28, France 0.16, Belgium 0.13 and zero in Italy. In fact the United Kingdom and the Netherlands are special cases of fast growth. Italian stagnation was also atypical (as is clear from the stability in its urban ratio), and there were special forces retarding Belgian growth. Belgian growth was adversely affected by the break with the Netherlands. Belgium was one of the most prosperous areas of Europe in 1500, as a centre of international trade and banking and substantial textile production. After the Netherlands became independent, the port of Antwerp was blockaded for two centuries, there was substantial migration of capital and skills to Holland. In order to get an approximate picture for Western Europe as a whole, I made proxy estimates for Austria, Denmark, Finland, Norway, Sweden and Switzerland, assuming that per capita real GDP increased at 0.17 per cent a year for 1500–1820. For Germany, a per capita growth rate of 0.14 per cent was assumed, as there was a decline in Germany's role in banking and Hanseatic trade, as well as the impact of the 30 years war. When the proxy estimates are aggregated with the estimates for the 5 countries for which we have better evidence, we find average per capita growth for the 12 West European core countries of 0.15 per cent a year. This is significantly slower than Kuznets' 0.2 per cent hypothesis which I used in Maddison (1995*a*). I assume here that average per capita growth in "other" Western Europe (Greece and 13 small countries) was the same as the average for the 12 core countries.

Table B–14. **Urbanisation Ratios in Europe and Asia, 1500–1890**
(population in cities 10 000 and over as percentage of total population)

Year	*1500*	*1600*	*1700*	*1800*	*1890*
Belgium	21.1	18.8	23.9	18.9	34.5
France	4.2	5.9	9.2	8.8	25.9
Germany	3.2	4.1	4.8	5.5	28.2
Italy	14.9	16.8	14.7	18.3	21.2
Netherlands	15.8	24.3	33.6	28.8	33.4
Scandinavia	0.9	1.4	4.0	4.6	13.2
Switzerland	1.5	2.5	3.3	3.7	16.0
England & Wales	3.1	5.8	13.3	20.3	61.9
Scotland	1.6	3.0	5.3	17.3	50.3
Ireland	0.0	0.0	3.4	7.0	17.6
Western Europe	6.1	7.8	9.9	10.6	31.3
Portugal	3.0	14.1	11.5	8.7	12.7
Spain	6.1	11.4	9.0	11.1	26.8
China	3.8	4.0[a]	n.a.	3.8	4.4
Japan	2.9	4.4	n.a.	12.3	16.0

a) 1650.

Source: European countries from de Vries (1984), pp. 30, 36, 39 and 46 except Italy which is from Malanima (1988*b*); China and Japan from Rozman (1973) adjusted to refer to the ratio in cities 10 000 and over, see Maddison (1998*a*) pp. 33–36.

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Spain and Portugal

Yun's (1994) rough per capita GDP estimates for Castile (about three–quarters of Spain) suggest a per capita growth rate of about 0.22 per cent for 1580–1630, with a decline thereafter, and a level in 1800 slightly below the 1630 peak. He makes spot estimates of output levels in current prices for 6 benchmark years within the period 1580 to 1800 and deflates with a price index for food products. His firmest evidence relates to agricultural output and food consumption, but his indicators for secondary and tertiary activity are weak. He concludes that his "trajectory seems congruent with what we know about the evolution of the Castilian economy: expansion until the end of the sixteenth century; agrarian recession, decomposition of the urban network and industrial and commercial crisis during the seventeenth, with a subsequent fall of the GDP revealed in our numbers; and growth on the basis of the poorly developed urban structures and the greater dynamism of the outlying areas in the eighteenth century". I assumed a growth rate of Spanish GDP per capita of 0.25 per cent a year for 1500–1600, no advance in the seventeenth century and some mild progress from 1700 to 1820. I adopted a similar profile for Portugal.

Eastern Europe and USSR

For these two areas direct evidence was lacking. As a proxy I assumed slower per capita GDP growth than in Western Europe at 0.1 per cent per annum for 1500–1820 (as I did in Maddison, 1995*a*).

Western Offshoots

For the United States, Gallman (1972) p. 22 estimated per capita growth in net national product of 0.42 per cent a year between 1710 and 1840 (taking the mid–point of the range he suggests for 1710). Adjusting for the faster growth of per capita income in 1820–40 (see Maddison, 1995*a*, p. 137), Gallman's estimate implies a per capita growth of about .29 per cent a year for the non–indigenous population, from a level of $909 in 1700 to $1 286 in 1820. Gallman's estimate included only the white and black population. In 1820, the indigenous population was only 3 per cent of the total. In 1700, it was three–quarters of the total (see Table B–15). Assuming the indigenous population had a per capita income of $400 in both 1700 and 1820, the average level for the whole population was $527 in 1700 and $1 257 in 1820. For 1500 and 1600, the population consisted entirely of hunter–gatherer Indians, and an average income of $400 a head was assumed.

Mancall and Weiss (1999) have recently estimated US per capita income for 1700 and 1800, with separate assessments for whites, slaves and Indians. Their "multicultural" estimate (p. 35) shows a per capita growth rate of only 0.28 per cent a year for 1700–1800, compared with my 0.73 per cent a year for 1700–1820. I consider their growth rate to be much too slow, given the huge change in the ethnic composition of the population in the period. They show no figures for population or total GDP, so it is not possible to replicate their "multicultural" measure. They make no reference to the Gallman estimate I used.

For the other Western Offshoots, Canada, Australia and New Zealand, the great bulk of the 1500–1700 population were indigenous hunter–gatherers, and I assumed a per capita GDP of $400 for 1500, 1600, and 1700.

Table B–15. **Ethnic Composition of the US Population, 1700–1820**
(000)

	Indigenous	*White*	*Black*	*Total*
1700	750	223	27	1 000
1820	325	7 884	1 772	9 981

Source: US Bureau of the Census, *Historical Statistics of the United States: Colonial Times to 1970,* 1975, pp. 14 and 18 for 1820, p. 1168 for 1700 white and black populations. Indian population figures from Rosenblat (1945) for 1820; 1700 as explained above.

Table B–16. **Ethnic Composition of Latin American Population in 1820**
(000)

	Indigenous	*White*	*Black*	*Mixed*	*Total*
Mexico	3 500	1 200	10	1 880	6 590
Brazil	500	1 500	2 200	300	4 500
Caribbean Islands	0	420	1 700	350	2 470
Other Latin America	3 160	1 300	200	3 000	7 660
Total Latin America	7 160	4 420	4 110	5 530	21 220

Source: Table B–4 for Brazil, otherwise from Rosenblat (1945).

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Mexico

My per capita income estimate for 1820 is $759 (see Appendix A). At that time the indigenous population was about 53 per cent of the total (see Table B–16). There was a thin layer of "peninsular" Spaniards (about 1 per cent of the population) who ran the army, administration, the church, trading monopolies and part of the professions. They had a baroque life style with sumptuous residences and retinues of servants. About a sixth of the population were *criollos*, i.e. whites of Spanish origin, who had been born in Mexico. They were hacienda owners, merchants, part of the clergy, army and professions. The third social group, over a quarter of the population, were *mestizos* originating from unions between whites and Indians. They were generally workers, farm hands, servants and some were rancheros. I assume a per capita income of $425 for the native population. The aggregate estimate for 1820 implies an average per capita income of $1 140 for the non–native population. 1500–1700 per capita income level of the two segments of the population was assumed to be the same as in 1820, but the average was lower for the two segments combined, because the non–native population was only a quarter of the total in 1700, 4 per cent in 1600, and negligible in 1500.

Other Latin America

In 1500, other parts of Latin America were poorer than Mexico. Except in Peru, most of the inhabitants were hunter gatherers rather than agriculturalists. They also had a lower per capita income than Mexico at the end of the colonial period in 1820. Thus their per capita income grew more slowly than in Mexico from 1500 to 1820. I assumed that the growth differential between Mexico and the rest of Latin America was stable between 1500 and 1820.

China

Maddison (1998*a*) contains an extensive analysis of the course of population, total output, and per capita product over the past 2000 years. There is a greater mass of survey material on Chinese population for the past two millennia than for any other country, thanks to the bureaucratic system and its efforts to monitor economic activity for tax purposes.

In assessing the growth of agricultural output, Perkins (1969) is a masterpiece of scholarly endeavour, covering the period 1368–1968, on which I relied heavily. Perkins' analysis is basically Boserupian. He feels that China responded successfully to population pressure, and managed to sustain more or less stable per capita consumption over the period he covers. This was achieved by increases in cultivated area, in per capita labour input, and land productivity. It involved heavy inputs of traditional fertilisers, irrigation, development of crop varieties and seeds which permitted multiple cropping, diffusion of best–practice techniques by officially sponsored distribution of agricultural handbooks (available at an early stage due to the precocious development of paper and printing). Crops from the Americas were introduced after the mid–sixteenth century. Maize, peanuts, potatoes and sweet potatoes added significantly to China's output potential because of their heavy yields and the possibility of growing them on inferior land. Tobacco and sugar cane were widely diffused in the Ming period. The pattern of Chinese food consumption was heavily concentrated on proteins and calories supplied by crop production which makes more economic use of land than pastoral activities. Chinese consumption of meat was very much lower than in Europe and concentrated on poultry and pigs which were scavengers rather than grazing animals. Milk and milk products were almost totally absent. Chinese also made very little use of wool. Ordinary clothing came largely from vegetable fibres (hemp, ramie, and then cotton). Quilted clothing supplied the warmth that wool might have provided. The richer part of the population used silk. Silk cocoons were raised on mulberry bushes often grown on hillsides which were not suitable for other crops.

Chinese rural households had many labour–intensive activities outside farming. They raised fish in small ponds, used grass and other biomass for fuel. Important "industrial" activities were centred in rural households. Textile spinning and weaving, making garments and leather goods were largely household activities. The same was true of oil and grain milling; drying and preparation of tea leaves; tobacco products; soybean sauce; candles and tung oil; wine and liqueurs; straw, rattan and bamboo products. Manufacture of bricks and tiles, carts and small boats, and construction of rural housing were also significant village activities. Chinese farmers were engaged in a web of commercial activity carried out in rural market areas to which virtually all villages had access. All these non–farm activities appear to have intensified in the Sung dynasty (960–1280). Thereafter some proportionate increase seems plausible because of the growing importance over the long term of cash crops like cotton, sugar, tobacco and tea. In the nineteenth century well over a quarter of GDP came from traditional handicrafts, transport, trade, construction and housing and most of these were carried out in rural areas. It seems likely that their proportionate importance was just as large in 1500 as it was in 1820.

On the basis of Rozman's (1973) rough estimates, it would seem that there were no dramatic changes in the proportion of the urban population (persons living in towns with a population of 10 000 or more) in China between the Tang dynasty and the beginning of the nineteenth century. This is in striking contrast to the situation in Western Europe, and is a significant piece of corroborative evidence of the comparative performance of China and Europe.

Another type of evidence which is very useful is the detailed documentation and chronology of Chinese technology in Needham's *magnum opus* on Chinese science and civilisation. Although it is weak in analysing the economic impact of invention, it is an invaluable help in assessing comparative development in agriculture, metallurgy, textile production, printing, shipbuilding, navigation etc. and in its assessment of Chinese capacity to develop the fundamentals of science.

The big advance in Chinese land productivity, and the more modest advance in living standards came before the period we are examining here. The big shift from wheat and millet farming in North China, to much more intensive wet rice farming south of the Yangtse came in the Sung dynasty (tenth to thirteenth century). The evidence strongly suggests that per capita GDP stagnated for nearly six centuries thereafter although China was able to accommodate a large rise in population through extensive growth.

India

Maddison (1971) contained an analysis of the social structure and institutions of the Moghul Empire and of British India. For the Moghul period, I relied heavily on the economic survey of Abul Fazl, Akbar's vizier, carried out at the end of the sixteenth century (see translation by Jarrett and Sarkar, 1949). I had no firm conclusions on the growth rate from 1500 to 1820, but there was little evidence to suggest that it was a dynamic economy. There is no reason to think that the British takeover had a positive effect on economic growth before the 1850s.

The Cambridge Economic History of India, Vol.1 (Raychaudhuri and Habib, 1982) does not address the growth question very directly, and deals with India by major area, without trying to generalise for the country as a whole. Habib suggests that farm output per head of population may have been higher in 1595 than in 1870, or 1900, and bases this inference on the availability of more cultivatable land per head at the earlier period and apparently greater relative availability of bullocks and buffaloes as draft animals. On the other hand he also stresses the introduction of new crops in the seventeenth and eighteenth centuries. He is more upbeat about manufacturing: "The expansion of the domestic and foreign markets, and the rising public expenditure on urban developments, public monuments and the army suggest an upward trend in output and possibly labour productivity." (p. 305)

Shireen Moosvi (1987, p. 400) assumes that rural per capita consumption was about the same in 1601 as in 1901, but that urban income was bigger at the earlier date. She therefore assumes an aggregate per capita consumption level 5 per cent higher at the first date. Moreland (1920, p. 274) using the same sort of evidence as Habib and Moosvi, but with less intensive scrutiny, concluded that India was almost certainly not richer at the death of Akbar than in 1910–14, "and probably that she was a little poorer".

My own judgement is that Indian per capita income fell from 1700 to the 1850s due to the collapse of the Moghul Empire and the costs of adjusting to the British regime of governance (see analysis in Chapter 2).

Japan

There are no previous estimates of the long term macroeconomic performance of Japan before the Meiji Restoration of 1868. However, one can get some idea of what happened by comparing Japanese and Chinese experience.

In the seventh century, Japan tried to model its economy, society, religion, literature and institutions on those of China. Admiration for things Chinese continued until the eighteenth century, even though Japan was not integrated into the Chinese international order (with two brief exceptions) as a tributary state. However, Japan never created a meritocratic bureaucracy but let the effective governance of the country fall into the hands of a hereditary and substantially decentralized military elite. The institutional history of Japan from the tenth to the fifteenth century therefore had a closer resemblance to that of feudal Europe than to that of China.

Japan copied the institutions of Tang China in the seventh century, creating a national capital at Nara, on the model of China's Chang–an. It also adopted Chinese style Buddhism, and allowed its religious orders to acquire very substantial properties and economic influence. It adopted Chinese

ideograms, the kanji script, Chinese literary style, Chinese clothing fashions, the Chinese calendar, methods of measuring age and hours. There was already a substantial similarity in the cropping mix and food consumption, with a prevalence of rice agriculture, and much smaller consumption of meat and meat products than in Europe. There was greater land scarcity in Japan and China than in Europe or India, so the agriculture of both countries was very labour–intensive.

Although Japanese emperors continued to be nominal heads of state, governance fell into the hands of a hereditary aristocracy. From 1195 to 1868, the effective head of state was a military overlord known as the *shogun*.

From the seventh to the ninth century, the central government controlled land allocation in imitation of Tang China, but ownership gradually devolved on a rural military elite. The *shoen* was a complex and fragmented feudal system. Many layers of proprietors claimed a share of the surplus from a servile peasantry.

Technological progress and its diffusion were facilitated in China by its bureaucracy to a degree which was not possible in Japan, which had no educated secular elite. Knowledge of printing was available almost as early as in China, but there was little printed matter except for Buddhist tallies and talismans. The Chinese, by comparison, used printed handbooks of best–practice farming to disseminate the methods of multicropping, irrigation and use of quick ripening seeds which the Sung dynasty imported from Vietnam. The degree of urbanisation was smaller in Japan than in China. The division of Japan into particularistic and competing feudal jurisdictions meant that farming and irrigation tended to develop defensively on hillsides. The manorial system also inhibited agricultural specialisation and development of cash crops.

Whilst the Chinese had switched from hemp to cotton clothing in the fourteenth century, the change did not come in Japan until the seventeenth. Until the seventeenth century, Japanese production of silk was small, and consumption depended on imports from China. Shipping and mining technology remained inferior to that in China until the seventeenth century. Rural by–employments were slower to develop than in China.

The old regime collapsed in Japan after a century of civil war (*sengoku*) which started in 1467. The capital city, Kyoto, was destroyed early in these conflicts, with the population reduced from 400 000 to 40 000 by 1500. A new type of regime emerged from the wreckage, with a new type of military elite.

Tokugawa Ieyasu established his shogunal dynasty in 1603, after serving two successive military dictators, Nobunaga (1573–82) and Hideyoshi (1582–98) who had developed some of the techniques of governance which Ieyasu adopted (notably the demilitarisation of rural areas, the *kokudaka* system of fiscal levies based initially on a cadastral survey, the reduction in ecclesiastical properties, and the practice of keeping *daimyo* wives and children as hostages).

The Tokugawa shogun controlled a quarter of the land area directly. The imperial household and aristocracy in Kyoto had only 0.5 per cent of the fiscal revenue, the Shinto and Buddhist temple authorities shared 1.5 per cent. A third was assigned to smaller *daimyo* who were under tight control. The rest was allocated to bigger more autonomous (*tozama*) *daimyo* in rather distant areas who were already feudal lords before the establishment of the Tokugawa regime. These were potential rivals of the shogunate and eventually rebelled in the 1860s. But the shogun in fact held unchallenged hegemonial power after 1615 when he killed Hideyoshi's family and destroyed his castle in Osaka. The Tokugawa shoguns neutered potential *daimyo* opposition by keeping their families hostage, and their incomes precarious (between 1601 and 1705, "some 200 *daimyo* had been destroyed; 172 had been newly created; 200 had received increases in holdings; and 280 had their domains transferred" — Hall, 1991 (pp. 150–1). The shogun's magistrates directly administered the biggest cities (Edo, Kyoto, Osaka and some others), operated as the emperor's delegate, controlled foreign relations and the revenue from gold and silver mines.

The Tokugawa shogunate was not ideal for economic growth or resource allocation but it exercised a more favourable influence than the Kamakura (1192–1338) and Ashikaga (1338–1573) shogunates which preceded it. It initiated a successful process of catch–up and forging ahead. Between 1600 and 1868 Japanese per capita income probably rose by about 40 per cent, moving from a level below China, to a significantly higher position, in spite of the heavy burden of supporting a large and functionally redundant elite.

The Tokugawa established a system of checks and balances between the leading members of the military elite (*daimyo*) who had survived the civil war. It ensured internal peace on a lasting basis. Rural areas were completely demilitarised by Hideyoshi's 1588 sword hunt and the Tokugawa government's gradual suppression of the production and use of Western type firearms which the Portuguese had introduced in 1543.

The *daimyo* and their military vassals (the *samurai*) were compelled to live in a single castle town in each domain, and abandon their previous managerial role in agriculture. As compensation they received stipends in kind (rice), which was supplied by the peasantry in their domain. *Daimyo* had no fixed property rights in land and could not buy or sell it. The shogun could move *daimyo* from one part of the country to another, confiscate, truncate or augment their rice stipends in view of their behaviour (or intentions as determined by shogunal surveillance and espionage). *Daimyo* were also required to spend part of the year in the new capital Edo (present day Tokyo), and to keep their families there permanently as hostages for good behaviour. *Daimyo* were not required to remit revenue on a regular basis to the shogunal authority, though they had to meet the very heavy costs of their compulsory (*sankin kotai*) residence in Edo and respond to ad hoc demands for funds for constructing Edo and rebuilding it after earthquake damage.

This system of goverment was very expensive compared with that of China. The shogunal, *daimyo* and samurai households were about 6.5 per cent of the Japanese population, compared with 2 per cent for the bureaucracy, military and gentry in China. Fiscal levies accounted for 20–25 per cent of Japanese GDP compared with about 5 per cent in China, though the Chinese gentry had rental incomes and the Chinese bureaucracy had a substantial income from non–fiscal exactions. The Tokugawa did, however, achieve some savings by a very substantial reduction in Buddhist income and properties. They also made an ideological shift away from religion towards neo–confucianism. In both respects they were replicating changes which occurred in China in the ninth century.

The economic consequences of these political changes were important for all parts of the economy.

Growth of Farm Output in the Tokugawa Period

The farm population were no longer servile households subjected to arbitrary claims to support feudal notables and military. Rice levies were large but more or less fixed and fell proportionately over time as agriculture expanded. The ending of local warfare meant that it was safer to develop agricultural land in open plains. There was greater scope for land reclamation and increases in area under cultivation. This was particularly true in the previously underdeveloped Kanto plain surrounding the new capital Edo.

Printed handbooks of best practice agriculture started to appear on Chinese lines. *Nogyo Zensho* (Encyclopaedia of Farming, 1697) was the earliest commercial publication, and by the early eighteenth century there were hundreds of such books (see Robertson, 1984). Quick ripening seeds and double cropping were introduced. There was increased use of commercial fertiliser (soybean meal, seaweed etc.), and improvement in tools for threshing. There was a major expansion of commercial crops — cotton, tobacco, oil seeds, sugar (in South Kyushu and the Ryuku islands), and a very substantial increase in silkworm cultivation. Large scale land reclamation was initiated in the 1720s — partly financed by merchants.

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Some idea of the progress of agricultural production in Tokugawa Japan can be derived from the *kokudaka* cadastral surveys initiated by Hideyoshi between 1582 and 1590. They assessed the productive capacity of land in terms of *koku* of rice equivalent (i.e. enough to provide subsistence for one person for a year). The *koku* as a volumetric measure equivalent to 5.1 US bushels or to 150 kilograms in terms of weight. This *kokudaka* assessment was the basis on which the shogun allocated income to *daimyo*. The smallest *daimyo* were allocated 10 000 *koku*, the biggest got much larger allocations (over a million *koku* in the Kaga domain at Kanazawa on the Japan Sea coast, 770 000 for the Satsuma domain in Southern Kyushu). In 1598, the total was estimated to be 18.5 million. The official estimate increased over time, as the cultivated area increased, but there were substantial and varying degrees of mismeasurement of the aggregate. Craig (1961, p. 11) gives examples of the difference between nominal and actual productive capacity for the late Tokugawa period; the actual yield for the 9 domains he specifies was one third higher than the official assessment. Nakamura (1968) made an estimate of cereal production for 1600 to 1872 which was adjusted to eliminate these variations in coverage of the official statistics. Table B–17 shows that cereal output per capita increased by 18 per cent from 1600 to 1820, and probably by a quarter over the Tokugawa period as a whole. In 1874, rice and other cereals were 72 per cent of the value of gross farm output, other traditional products 10.7 per cent, and relatively new crops (cotton, sugar, tobacco, oil seeds, silk cocoons and potatoes) 17.2 per cent. Most of the latter were absent in 1600 and most of these escaped taxation, so their production grew faster than cereals. If one assumes that these other items were about 5 per cent of output in 1600, this would imply a growth of total farm output per capita of about a quarter from 1600 to 1820, and over 40 per cent for the Tokugawa period as a whole. For the period before 1600 there is no real quantitative evidence, but it seems likely that there was little growth in agricultural output per head in the sixteenth century which was so severely plagued by civil war.

Table B–17. **Japanese Cereal Production and Per Capita Availability, 1600–1874**

	Cereal Production		*Population*	*Per Capita Availability*
	(000 koku)	*(000 metric tons)*	*(000)*	*(kg)*
1600	19 731	2 960	18 500	160
1700	30 630	4 565	27 000	169
1820	39 017	5 853	31 000	189
1872	46 812	7 022	34 859	201
1874	49 189	7 378	35 235	209

Source: First column for 1600–1872 from Hayami and Miyamoto (1988), p. 44; with 1820 derived by interpolation of their figures for 1800 and 1850. Their estimates were derived from Satoru Nakamura (1968), pp. 169–171. 1874 cereal production from Ohkawa, Shinohara and Umemura (1966), volume 9, *Agriculture and Forestry,* p. 166, with an upward adjustment of rice output by 1 927 *koku* — see Yamada and Hayami (1979), p. 233. In 1874, adjusted cereal output represented 72 per cent of the value of gross agricultural output at 1874–6 prices, other traditional crops 10.8 per cent, and other crops 17.2 per cent (see vol. 9, p. 148). The latter group consisted of industrial crops, potatoes and sericulture, most of which were unimportant in 1600. It seems highly likely therefore that per capita farm output rose more rapidly than cereal output. Col. 2, *koku* (150 kg.) converted into metric tons. Col. 3 is my estimate of population from Table B–7. Col. 4 equals col. 2 divided by col. 3. The standard production measure in Tokugawa Japan was in terms of husked rice, whereas in China the standard unit was unhusked rice. Perkins (1969) assumed a per capita availability of 250 kg. of unhusked rice for China in the period shown here. Using Perkins' (1969, p. 305) coefficient, this meant a per capita availability of 167 kg. of husked rice — higher than Japan in 1600, but lower from 1700 onwards. In 1872, Japan had net imports of rice which raised per capita availability to 219 kg, and in 1874 to 231 kg.

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Performance in the Non–Farm Sector

Most analysts of the Tokugawa period (Smith, 1969; Hanley and Yamamura, 1977; Yasuba, 1987) stress the growing importance of industrial and commercial by–employments in rural areas.

Smith (1969) produced the classic analysis of rural non–farm activity, drawing on a 1843 survey of 15 districts of the Choshu domain. Komonoseki county had a population of 6501 families in a region at the extreme south of Honshu, with a big coastline projecting into the inland sea between Kyushu and Shikoku — an area particularly advantageous for trade with other parts of Japan. 82 per cent of the population were farmers, but 55 per cent of net income originated outside agriculture. The arithmetic average of Smith's district ratios suggests that industry produced nearly 28 per cent of family income. I am skeptical of the representativity of the Kaminoseki sample. If it were typical of all rural areas, and urban areas had a proportionately greater commitment to non–agriculture, one could expect over 30 per cent of late Tokugawa GDP to have been derived from industry.

Nishikawa (1987) presents a much more sophisticated and comprehensive account of the Choshu economy in the 1840s. Using the same survey material he constructed a set of aggregate input–output accounts. His analysis covers 107 000 households (520 000 population) including both rural and urban areas, i.e. a sample 16 times bigger than Smith's. His approach is in the national accounting tradition with careful consistency checks, merging of different data sources to estimate the labour force, gross output and value added by economic sector. On a value added basis, manufacturing (including handicrafts) accounts for 18.8 per cent of his aggregate. However, he points out that the survey data were seriously deficient for output. His aggregate therefore excludes *daimyo–samurai* military and civil government services, the activity of monks, nuns, priests and servants, urban services "concentrated in `entertainment' such as inns, restaurants, teahouses, brothels, streetwalking, hair–dressing, massage and so forth". There is no imputation for residential accommodation. The construction sector is also omitted. If we augment Nishikawa's aggregate by a quarter to include the omitted items and bring it to a GDP basis, the structure of value added in Choshu in the 1840s would have been 53 per cent for agriculture, forestry and fisheries, 15 per cent for manufacturing, 32 per cent for the rest (including services and construction). Other very interesting features of the Nishikawa accounts are estimates of Choshu's transactions with other parts of Japan and demonstration of the physiocratic bias in the Tokugawa fiscal regime. 97 per cent of tax revenue consisted of levies on agriculture, 3 per cent was derived from levies on non agriculture. Apart from his structural analysis, Nishikawa also ventures an estimate of the rate of growth of per capita Choshu income between the 1760s and the 1840s of 0.4 per cent a year. However, this is based entirely on land survey estimates for fiscal purposes.

In 1500, less than 3 per cent of Japanese lived in towns of 10 000 population and over. By 1800 more than 12 per cent lived in such cities. Edo which had been a village became a city of a million inhabitants. There were more than two hundred castle towns, half of whose population were *samurai*. Kanazawa and Nagoya were the biggest with a population over 100 000. The old capital, Kyoto, had half a million (being the seat of the Emperor and his court and the centre of a prosperous agricultural area). Osaka became a large commercial metropolis, similar in size to Kyoto. This four–fold increase in the urban proportion contrasted with a stable and much lower ratio in China. Japan had a smaller proportion of small towns than China, because concentration of samurai in one single castle town per domain was accompanied by compulsory destruction of scattered smaller fortified settlements. There was also a decline in the size of Osaka in the eighteenth century as commercial activity increased in smaller towns and rural areas.

The urban centres created a market for the surrounding agricultural areas. They also created a demand for servants, entertainment and theatres. Merchants ceased to be mere quartermasters for the military, and acted as commodity brokers, bankers and money–lenders. They were active in promoting significant expansion of coastal trade and shipping in the inland sea (see Crawcour, 1963). Thus there was clearly a substantial increase in many types of service activity per head of population in Tokugawa Japan. However, the biggest service industry was that of the *samurai* and *daimyo* who supplied an exaggeratedly large amount of military and civil governance. The evidence suggests that they remained a

stable proportion of the population throughout the Tokugawa epoch. Yamamura's (1974) study suggests there was not much change in their household real incomes, and Smith's work on the falling incidence of fiscal levies in agriculture helps to reinforce this latter conclusion.

There was a very substantial increase in levels of education in Tokugawa Japan, and an emphasis on secular neo–confucian values rather than Buddhism. This improved the level of popular culture and knowledge of technology. There was a huge increase in book production and circulation of woodblock prints. Between the eighth century and the beginning of the seventeenth fewer than 100 illustrated books appeared in Japan but by the eighteenth there were large editions of books with polychrome illustrations and 40 per cent literacy of the male population.

In 1639, the Jesuits and the Portuguese traders were expelled from Japan, Christianity was suppressed and contact with Europeans was restricted to the small Dutch trading settlement in the South of Japan, near Nagasaki. This was done because the Portuguese were intrusive and thought to be a political threat. The Togugawa were aware of the Spanish takeover in the Philippines and wanted to avoid this in Japan. The Dutch were only interested in commerce, but in the course of their long stay in Japan, their East India Company appointed three very distinguished doctors in Deshima (Engelbert Kaempfer, 1690–2, an adventurous German savant and scientist; C.P. Thunberg, 1775–6, a distinguished Swedish botanist; and Franz Philipp von Siebold, 1823–9 and 1859–62, a German physician and naturalist). These scholars wrote books which were important sources of Western knowledge about Japan, but they also had a significant impact in transmitting European science and technology to Japan.

The Japanese had depended on Chinese books for knowledge of the West (Chinese translations of works by Matteo Ricci and other Jesuits in Peking), but in 1720 the shogun, Yoshimune, lifted the ban on European books. An important turning point occurred in 1771 when two Japanese doctors observed the dissection of a corpse and compared the body parts (lungs, kidneys and intestines) with those described in a Chinese book and a Dutch anatomy text. The Dutch text corresponded to what they found, and the Chinese text was inaccurate (see Keene, 1969). As a result translations of Dutch learning (*rangaku*) became an important cultural influence. Although they were limited in quantity, they helped destroy Japanese respect for "things Chinese", and accentuate curiosity about "things Western".

Japanese exposure to Western knowledge was more limited than Chinese, but its impact went much deeper. The old tradition was easier to reject in Japan as it was foreign. However, contacts with foreigners and foreign ideas were often frowned upon by the authorities. Von Siebold was expelled from Japan in 1829, and a Japanese friend was executed for giving him copies of Ino Tadataka's magnificent survey maps for the Kuriles and Kamchatka. Nevertheless, the Dutch window into the Western world was important and influential in preparing the ground intellectually for the Meiji Restoration of 1868. Dutch learning (painfully acquired) was the major vehicle of enlightenment for Japan's greatest Westerniser, Yukichi Fukuzawa (1832–1901), whose books sold millions of copies, and who founded Keio University on Western lines.

Although the Tokugawa regime had a positive impact on Japanese growth, it had certain drawbacks.

It involved the maintenance of a large elite whose effective military potential was very feeble in meeting the challenges which came in the nineteenth century, and whose life style involved extremely lavish expenditure. The Meiji regime was able to capture substantial resources for economic development and military modernisation by dismantling these Tokugawa arrangements.

The system of hereditary privilege and big status differentials with virtually no meritocratic element, meant a large waste of potential talent. The frustrations involved are clearly illustrated in Fukuzawa's autobiography. The Tokugawa system was inefficient in its reliance on a clumsy collection of fiscal revenue in kind and overdetailed surveillance of economic activity. It also imposed restrictions on the diffusion of technology. One example of this was the ban on wheeled vehicles on Japanese roads and the virtual

absence of bridges. These restrictions were imposed for security reasons, but made journeys very costly and time consuming. There were also restrictions on the size of boats which inhibited coastal shipping, foreign trade, and naval preparedness. There were restrictions on property rights (buying and selling of land), arbitrary levies by the shogun, cancellation of *daimyo* debts, or defaults by samurai which inhibited private enterprise.

All of these, plus increasing pressures on Japan from Russia, England and the United States, eventually led to the breakdown of the Tokugawa system.

Aggregate Japanese Performance

There has been a good deal of research on the economic history of the Tokugawa period, but hitherto no aggregative quantification of performance except at a regional level. Most of the postwar revisionist historians (Akira Hayami, Yasuba, Nishikawa, Hall, Smith, Hanley and Yamamura) agree (in contrast to earlier Marxists) that there was substantial economic advance.

Levels of income were probably depressed in 1500 as a result of civil war but there may have been a modest increase in Japanese per capita income in the sixteenth century. For 1600–1820, there are indicators of substantial increase in performance in several sectors of the economy. For farming as a whole (including new crops — cotton, sugar, tobacco, oil seeds, silk cocoons and potatoes), gross output per head of population rose by about a quarter (see Table B–17 and accompanying text), and value added by somewhat less. In the early Tokugawa period, agriculture probably represented well over half of GDP.

There is substantial evidence of an expansion in the importance of rural household activity, and the large increase in the size of the urban population led to an increase in commercial activity and urban services. There were substantial improvements in education, and a large increase in book production. It seems likely that all these activities rose faster than agriculture.

An offset to these elements of dynamism was the high cost of the Tokugawa system of governance. The elite of samurai, *daimyo* and the shogunate absorbed nearly a quarter of GDP. Their official function was to provide administrative and military services. But the way this fossilised elite functioned was extremely wasteful and put inreasing strain on the economy. The apparatus of government was a system of checks and balances — an armed truce whose original rationale had been to end the civil wars which lasted from the mid–fifteenth to the mid–sixteenth century.

My overall assessment (see Table B–21) is that from 1500 to 1820 Japanese GDP per capita rose by a third. This was enough to raise its level above that of China and most of the rest of Asia.

Other Asia

Other Asia is a miscellaneous conglomerate of countries with about 12.5 per cent of Asia's population and about 12 per cent of GDP in 1820. For most of them, there is not much hard evidence for assessing their GDP performance from 1500 to 1820.

Indonesia is the largest of these countries. The estimates in Tables 2–21c and 2–22 show that most of the modest rise in per capita income from 1700 to 1820 accrued to European and Chinese trading interests. Boomgaard (1993) pp. 208–210 came to a similar conclusion for 1500–1835. He found that the "Dutch and Chinese introduced new technologies, organisational skills and capital, which strengthened the non–agricultural sectors, and led to the introduction of some cash crops (coffee and sugar). However, they also pushed the Javanese out of the more rewarding economic activities and increased the burden of taxation and corvee levies".

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Korea was the second biggest of the "other Asia" countries. Until the 1870s, it was a hermit kingdom with only exiguous contact with the outside world except China. Its social organisation and technology were very close to the Chinese model, and there is reason to suppose that its economic performance was similar to that of China, i.e. stagnant per capita income at a level above the Asian norm. The major disturbances to Korean development because of the Mongol and Japanese invasions happened before 1500.

The Indochinese states were also Chinese tributaries. They were more open to foreign trade than Korea, but there do not seem to be grounds for supposing that per capita income changed much in the period under consideration.

In 1500, the Ottoman Empire had control over a large part of Western Asia and the Balkans. In 1517 it took control of Syria and Egypt and suzerainty of Arabia. The Empire had widespread trading interests in Asia. By the eighteenth century, it had entered a long period of decline, and its trading interests in Asia had been taken over by Europeans. Although estimates of per capita income are not available, there is enough evidence (see Inalcik (1994) and Faroqui *et al.*, 1994) to suggest that it was lower in 1820 than in 1500. In Iran; the second biggest country in West Asia, it also seems very unlikely that per capita income in 1820 was as high as in the heyday of the Safavid dynasty in the sixteenth and seventeenth centuries.

Africa

I assumed that African per capita income did not change from 1500 to 1700.

GDP and GDP Per Capita from First Century to 1000 A.D.

Before 1500, the element of conjecture in the estimates is very large indeed. The derivation of per capita GDP levels for China and Europe are explained in Maddison (1998*a*), and the conjectures for other areas are explained below. In all cases GDP is derived by multiplying the per capita levels by the independently estimated levels of population.

Maddison (1998*a*) contained estimates of Chinese economic performance from the first century onwards. The evidence suggested that per capita GDP in the first century (in the Han dynasty) was above subsistence levels — about $450 in our numeraire (1990 international dollars), but did not change significantly until the end of the 10th century.

During the Sung dynasty (960 — 1280) Chinese per capita income increased significantly, by about a third, and population growth accelerated. The main reason for this advance was a major transformation in agriculture. Until the Sung dynasty, large parts of South China had been relatively underdeveloped. Primitive slash and burn agriculture and moving cultivation had been practiced, but the climate and accessibility of water gave great potential for intensive rice cultivation. The Sung rulers developed this potential by introducing quick ripening strains of rice imported from Indochina. They exploited new opportunities to diffuse knowledge of agricultural technology by printing handbooks of best practice in farming. As a result there was a major switch in the centre of gravity, with a substantial rise in the proportion of people in rice growing south of the Yangtse, and a sharp drop in the proportionate importance of the dry farming area (millet and wheat) of North China. Increased density of settlement in the South gave a boost to internal trade, a rise in the proportion of farm output which was marketed, productivity gains from increased specialisation of agricultural production in response to higher living standards. The introduction of paper money facilitated the growth of commerce, and raised the proportion of state income in cash from negligible proportions to more than half.

For most of the rest of Asia, it seemed reasonable here to assume that the level of per capita income was similar to that in China and showed no great change from the first century to the year 1000. The $450 level of per capita income assumed here is sufficiently above subsistence to maintain the governing elite in some degree of luxury and to sustain a relatively elaborate system of governance. Japan was a rather special case. In the first century, it was a subsistence economy in course of transition to agriculture from hunting and gathering, and from wooden to metal tools. By the year 1000, it had made some progress but lagged well behind China.

In Maddison (1998*a*), pp. 25, 37–38, it was assumed that European per capita income levels in the first century were similar to those in China. Goldsmith (1984) provided a comprehensive assessment of economic performance for the Roman Empire as a whole, and also provided a temporal link, suggesting that Roman levels were about two fifths of Gregory King's estimate of English income for 1688.

The West Asian and North African parts of the Roman Empire were at least as prosperous and urbanised as the European component, which warrants the assumption of similar levels of income there.

Between the first century and the year 1000, there was a collapse in living standards in Western Europe. Urbanisation ratios provide the strongest evidence that the year 1000 was a nadir. The urban ratio of Roman Europe was around 5 per cent in the first century. This compares with zero in the year 1000, when there were only 4 towns with more than 10 000 population (see Maddison, 1998*a*, p. 35). The urban collapse and other signs of decline warrant the assumption of a relapse more or less to subsistence levels ($400 per capita) in the year 1000.

For the Americas, Australasia, Africa south of the Sahara, Eastern Europe and the area of the former USSR, I have assumed that more or less subsistence levels of income ($400 per capita) prevailed from the first century to the end of the first millennium.

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Table B–18. **World GDP, 20 Countries and Regional Totals, 0–1998 A.D.**
(million 1990 international $)

Year	*0*	*1000*	*1500*	*1600*	*1700*	*1820*	*1870*	*1913*	*1950*	*1973*	*1998*
Austria			1 414	2 093	2 483	4 104	8 419	23 451	25 702	85 227	152 712
Belgium			1 225	1 561	2 288	4 529	13 746	32 347	47 190	118 516	198 249
Denmark			443	569	727	1 471	3 782	11 670	29 654	70 032	117 319
Finland			136	215	255	913	1 999	6 389	17 051	51 724	94 421
France			10 912	15 559	21 180	38 434	72 100	144 489	220 492	683 965	1 150 080
Germany			8 112	12 432	13 410	26 349	71 429	237 332	265 354	944 755	1 460 069
Italy			11 550	14 410	14 630	22 535	41 814	95 487	164 957	582 713	1 022 776
Netherlands			716	2 052	4 009	4 288	9 952	24 955	60 642	175 791	317 517
Norway			192	304	450	1 071	2 485	6 119	17 838	44 544	104 860
Sweden			382	626	1 231	3 098	6 927	17 403	47 269	109 794	165 385
Switzerland			482	880	1 253	2 342	5 867	16 483	42 545	117 251	152 345
United Kingdom			2 815	6 007	10 709	36 232	100 179	224 618	347 850	675 941	1 108 568
12 Countries Total			***38 379***	***56 708***	***72 625***	***145 366***	***338 699***	***840 743***	***1 286 544***	***3 660 253***	***6 044 301***
Portugal			632	850	1 708	3 175	4 338	7 467	17 615	63 397	128 877
Spain			4 744	7 416	7 893	12 975	22 295	45 686	66 792	304 220	560 138
Other			590	981	1 169	2 206	4 891	12 478	30 600	105 910	227 300
Total Western Europe	**11 115**	**10 165**	**44 345**	**65 955**	**83 395**	**163 722**	**370 223**	**906 374**	**1 401 551**	**4 133 780**	**6 960 616**
Eastern Europe	**1 900**	**2 600**	**6 237**	**8 743**	**10 647**	**23 149**	**45 448**	**121 559**	**185 023**	**550 757**	**660 861**
Former USSR	**1 560**	**2 840**	**8 475**	**11 447**	**16 222**	**37 710**	**83 646**	**232 351**	**510 243**	**1 513 070**	**1 132 434**
United States			800	600	527	12 548	98 374	517 383	1 455 916	3 536 622	7 394 598
Other Western Offshoots			320	320	300	941	13 781	68 249	179 574	521 667	1 061 537
Total Western Offshoots	**468**	**784**	**1 120**	**920**	**827**	**13 489**	**112 155**	**585 632**	**1 635 490**	**4 058 289**	**8 456 135**
Mexico			3 188	1 134	2 558	5 000	6 214	25 921	67 368	279 302	655 910
Other Latin America			4 100	2 623	3 813	9 120	21 683	95 760	356 188	1 118 398	2 285 700
Total Latin America	**2 240**	**4 560**	**7 288**	**3 757**	**6 371**	**14 120**	**27 897**	**121 681**	**423 556**	**1 397 700**	**2 941 610**
Japan	**1 200**	**3 188**	**7 700**	**9 620**	**15 390**	**20 739**	**25 393**	**71 653**	**160 966**	**1 242 932**	**2 581 576**
China	26 820	26 550	61 800	96 000	82 800	228 600	189 740	241 344	239 903	740 048	3 873 352
India	33 750	33 750	60 500	74 250	90 750	111 417	134 882	204 241	222 222	494 832	1 702 712
Other Asia	16 470	18 630	31 301	36 725	40 567	50 486	72 173	146 999	362 578	1 398 587	4 376 931
Total Asia (excluding Japan)	**77 040**	**78 930**	**153 601**	**206 975**	**214 117**	**390 503**	**396 795**	**592 584**	**824 703**	**2 633 467**	**9 952 995**
Africa	**7 013**	**13 723**	**18 400**	**22 000**	**24 400**	**31 010**	**40 172**	**72 948**	**194 569**	**529 185**	**1 039 408**
World	**102 536**	**116 790**	**247 116**	**329 417**	**371 369**	**694 442**	**1 101 369**	**2 704 782**	**5 336 101**	**16 059 180**	**33 725 635**

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Table B–19. **Rates of Growth of World GDP, 20 Countries and Regional Totals, 0–1998 A.D.**
(annual average compound growth rates)

Year	*0–1000*	*1000–1500*	*1500–1820*	*1820–70*	*1870–1913*	*1913–50*	*1950–73*	*1973–98*
Austria			0.33	1.45	2.41	0.25	5.35	2.36
Belgium			0.41	2.25	2.01	1.03	4.08	2.08
Denmark			0.38	1.91	2.66	2.55	3.81	2.09
Finland			0.60	1.58	2.74	2.69	4.94	2.44
France			0.39	1.27	1.63	1.15	5.05	2.10
Germany			0.37	2.01	2.83	0.30	5.68	1.76
Italy			0.21	1.24	1.94	1.49	5.64	2.28
Netherlands			0.56	1.70	2.16	2.43	4.74	2.39
Norway			0.54	1.70	2.12	2.93	4.06	3.48
Sweden			0.66	1.62	2.17	2.74	3.73	1.65
Switzerland			0.50	1.85	2.43	2.60	4.51	1.05
United Kingdom			0.80	2.05	1.90	1.19	2.93	2.00
12 Countries Total			***0.42***	***1.71***	***2.14***	***1.16***	***4.65***	***2.03***
Portugal			0.51	0.63	1.27	2.35	5.73	2.88
Spain			0.31	1.09	1.68	1.03	6.81	2.47
Other			0.41	1.61	2.20	2.45	5.55	3.10
Total Western Europe	**–0.01**	**0.30**	**0.41**	**1.65**	**2.10**	**1.19**	**4.81**	**2.11**
Eastern Europe	**0.03**	**0.18**	**0.41**	**1.36**	**2.31**	**1.14**	**4.86**	**0.73**
Former USSR	**0.06**	**0.22**	**0.47**	**1.61**	**2.40**	**2.15**	**4.84**	**–1.15**
United States			0.86	4.20	3.94	2.84	3.93	2.99
Other Western Offshoots			0.34	5.51	3.79	2.65	4.75	2.88
Total Western Offshoots	**0.05**	**0.07**	**0.78**	**4.33**	**3.92**	**2.81**	**4.03**	**2.98**
Mexico			0.14	0.44	3.38	2.62	6.38	3.47
Other Latin America			0.25	1.75	3.51	3.61	5.10	2.90
Total Latin America	**0.07**	**0.09**	**0.21**	**1.37**	**3.48**	**3.43**	**5.33**	3.02
Japan	**0.10**	**0.18**	**0.31**	**0.41**	**2.44**	**2.21**	**9.29**	**2.97**
China	0.00	0.17	0.41	–0.37	0.56	–0.02	5.02	6.84
India	0.00	0.12	0.19	0.38	0.97	0.23	3.54	5.07
Other Asia	0.01	0.10	0.15	0.72	1.67	2.47	6.05	4.67
Total Asia (excluding Japan)	**0.00**	**0.13**	**0.29**	**0.03**	**0.94**	**0.90**	**5.18**	**5.46**
Africa	**0.07**	**0.06**	**0.16**	**0.52**	**1.40**	**2.69**	**4.45**	**2.74**
World	**0.01**	**0.15**	**0.32**	**0.93**	**2.11**	**1.85**	**4.91**	**3.01**

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Table B–20. **Shares of World GDP, 20 Countries and Regional Totals, 0–1998 A.D.**
(per cent of world total)

Year	*0*	*1000*	*1500*	*1600*	*1700*	*1820*	*1870*	*1913*	*1950*	*1973*	*1998*
Austria			0.6	0.6	0.7	0.6	0.8	0.9	0.5	0.5	0.5
Belgium			0.5	0.5	0.6	0.7	1.2	1.2	0.9	0.7	0.6
Denmark			0.2	0.2	0.2	0.2	0.3	0.4	0.6	0.4	0.3
Finland			0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3
France			4.4	4.7	5.7	5.5	6.5	5.3	4.1	4.3	3.4
Germany			3.3	3.8	3.6	3.8	6.5	8.8	5.0	5.9	4.3
Italy			4.7	4.4	3.9	3.2	3.8	3.5	3.1	3.6	3.0
Netherlands			0.3	0.6	1.1	0.6	0.9	0.9	1.1	1.1	0.9
Norway			0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
Sweden			0.2	0.2	0.3	0.4	0.6	0.6	0.9	0.7	0.5
Switzerland			0.2	0.3	0.3	0.3	0.5	0.6	0.8	0.7	0.5
United Kingdom			1.1	1.8	2.9	5.2	9.1	8.3	6.5	4.2	3.3
12 Countries Total			***15.5***	***17.2***	***19.5***	***20.9***	***30.7***	***31.1***	***24.1***	***22.8***	***17.9***
Portugal			0.3	0.3	0.5	0.5	0.4	0.3	0.3	0.4	0.4
Spain			1.9	2.1	2.2	1.9	2.0	1.7	1.3	1.9	1.7
Other			0.2	0.3	0.3	0.3	0.4	0.5	0.6	0.7	0.7
Total Western Europe	**10.8**	**8.7**	**17.9**	**19.9**	**22.5**	**23.6**	**33.6**	**33.5**	**26.3**	**25.7**	**20.6**
Eastern Europe	**1.9**	**2.2**	**2.5**	**2.7**	**2.9**	**3.3**	**4.1**	**4.5**	**3.5**	**3.4**	**2.0**
Former USSR	**1.5**	**2.4**	**3.4**	**3.5**	**4.4**	**5.4**	**7.6**	**8.6**	**9.6**	**9.4**	**3.4**
United States			0.3	0.2	0.1	1.8	8.9	19.1	27.3	22.0	21.9
Other Western Offshoots			0.1	0.1	0.1	0.1	1.3	2.5	3.4	3.2	3.1
Total Western Offshoots	**0.5**	**0.7**	**0.5**	**0.3**	**0.2**	**1.9**	**10.2**	**21.7**	**30.6**	**25.3**	**25.1**
Mexico			1.3	0.3	0.7	0.7	0.6	1.0	1.3	1.7	1.9
Other Latin America			1.7	0.8	1.0	1.3	2.0	3.5	6.7	7.0	6.8
Total Latin America	**2.2**	**3.9**	**2.9**	**1.1**	**1.7**	**2.0**	**2.5**	**4.5**	**7.9**	**8.7**	**8.7**
Japan	**1.2**	**2.7**	**3.1**	**2.9**	**4.1**	**3.0**	**2.3**	**2.6**	**3.0**	**7.7**	**7.7**
China	26.2	22.7	25.0	29.2	22.3	32.9	17.2	8.9	4.5	4.6	11.5
India	32.9	28.9	24.5	22.6	24.4	16.0	12.2	7.6	4.2	3.1	5.0
Other Asia	16.1	16.0	12.7	11.2	10.9	7.3	6.6	5.4	6.8	8.7	13.0
Total Asia (excluding Japan)	**75.1**	**67.6**	**62.1**	**62.9**	**57.6**	**56.2**	**36.0**	**21.9**	**15.5**	**16.4**	**29.5**
Africa	**6.8**	**11.8**	**7.4**	**6.7**	**6.6**	**4.5**	**3.6**	**2.7**	**3.6**	**3.3**	**3.1**
World	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

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Table B–21. **World GDP per Capita, 20 Countries and Regional Averages, 0–1998 A.D.**
(1990 international $)

Year	*0*	*1000*	*1500*	*1600*	*1700*	*1820*	*1870*	*1913*	*1950*	*1973*	*1998*
Austria			707	837	993	1 218	1 863	3 465	3 706	11 235	18 905
Belgium			875	976	1 144	1 319	2 697	4 220	5 462	12 170	19 442
Denmark			738	875	1 039	1 274	2 003	3 912	6 946	13 945	22 123
Finland			453	538	638	781	1 140	2 111	4 253	11 085	18 324
France			727	841	986	1 230	1 876	3 485	5 270	13 123	19 558
Germany			676	777	894	1 058	1 821	3 648	3 881	11 966	17 799
Italy			1 100	1 100	1 100	1 117	1 499	2 564	3 502	10 643	17 759
Netherlands			754	1 368	2 110	1 821	2 753	4 049	5 996	13 082	20 224
Norway			640	760	900	1 104	1 432	2 501	5 463	11 246	23 660
Sweden			695	824	977	1 198	1 664	3 096	6 738	13 493	18 685
Switzerland			742	880	1 044	1 280	2 202	4 266	9 064	18 204	21 367
United Kingdom			714	974	1 250	1 707	3 191	4 921	6 907	12 022	18 714
12 Countries Total			***796***	***906***	***1 056***	***1 270***	***2 086***	***3 688***	***5 013***	***12 159***	***18 742***
Portugal			632	773	854	963	997	1 244	2 069	7 343	12 929
Spain			698	900	900	1 063	1 376	2 255	2 397	8 739	14 227
Other			462	528	617	743	1 066	1 840	2 536	7 614	13 732
Total Western Europe	**450**	**400**	**774**	**894**	**1 024**	**1 232**	**1 974**	**3 473**	**4 594**	**11 534**	**17 921**
Eastern Europe	**400**	**400**	**462**	**516**	**566**	**636**	**871**	**1 527**	**2 120**	**4 985**	**5 461**
Former USSR	**400**	**400**	**500**	**553**	**611**	**689**	**943**	**1 488**	**2 834**	**6 058**	**3 893**
United States			400	400	527	1 257	2 445	5 301	9 561	16 689	27 331
Other Western Offshoots			400	400	400	753	2 339	4 947	7 538	13 364	20 082
Total Western Offshoots	**400**	**400**	**400**	**400**	**473**	**1 201**	**2 431**	**5 257**	**9 288**	**16 172**	**26 146**
Mexico			425	454	568	759	674	1 732	2 365	4 845	6 655
Other Latin America			410	430	505	623	705	1 461	2 593	4 459	5 588
Total Latin America	**400**	**400**	**416**	**437**	**529**	**665**	**698**	**1 511**	**2 554**	**4 531**	**5 795**
Japan	**400**	**425**	**500**	**520**	**570**	**669**	**737**	**1 387**	**1 926**	**11 439**	**20 413**
China	**450**	450	600	600	600	600	530	552	439	839	3 117
India	**450**	450	550	550	550	533	533	673	619	853	1 746
Other Asia	**450**	450	565	565	565	565	603	794	924	2 065	3 734
Total Asia (excluding Japan)	**450**	**450**	**572**	**575**	**571**	**575**	**543**	**640**	**635**	**1 231**	**2 936**
Africa	**425**	**416**	**400**	**400**	**400**	**418**	**444**	**585**	**852**	**1 365**	**1 368**
World	**444**	**435**	**565**	**593**	**615**	**667**	**867**	**1 510**	**2 114**	**4 104**	**5 709**

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Table B–22. **Rates of Growth of World GDP per Capita, 20 Countries and Regional Totals, 0–1998 A.D.**
(annual average compound growth rates)

Year	*0–1000*	*1000–1500*	*1500–1820*	*1820–70*	*1870–1913*	*1913–50*	*1950–73*	*1973–98*
Austria			0.17	0.85	1.45	0.18	4.94	2.10
Belgium			0.13	1.44	1.05	0.70	3.55	1.89
Denmark			0.17	0.91	1.57	1.56	3.08	1.86
Finland			0.17	0.76	1.44	1.91	4.25	2.03
France			0.16	0.85	1.45	1.12	4.05	1.61
Germany			0.14	1.09	1.63	0.17	5.02	1.60
Italy			0.00	0.59	1.26	0.85	4.95	2.07
Netherlands			0.28	0.83	0.90	1.07	3.45	1.76
Norway			0.17	0.52	1.30	2.13	3.19	3.02
Sweden			0.17	0.66	1.46	2.12	3.07	1.31
Switzerland			0.17	1.09	1.55	2.06	3.08	0.64
United Kingdom			0.27	1.26	1.01	0.92	2.44	1.79
12 Countries Total			***0.15***	***1.00***	***1.33***	***0.83***	***3.93***	***1.75***
Portugal			0.13	0.07	0.52	1.39	5.66	2.29
Spain			0.13	0.52	1.15	0.17	5.79	1.97
Other			0.15	0.72	1.28	0.87	4.90	2.39
Total Western Europe	**–0.01**	**0.13**	**0.15**	**0.95**	**1.32**	**0.76**	**4.08**	**1.78**
Eastern Europe	**0.00**	**0.03**	**0.10**	**0.63**	**1.31**	**0.89**	**3.79**	**0.37**
Former USSR	**0.00**	**0.04**	**0.10**	**0.63**	**1.06**	**1.76**	**3.36**	**–1.75**
United States			0.36	1.34	1.82	1.61	2.45	1.99
Other Western Offshoots			0.20	2.29	1.76	1.14	2.52	1.64
Total Western Offshoots	**0.00**	**0.00**	**0.34**	**1.42**	**1.81**	**1.55**	**2.44**	**1.94**
Mexico			0.18	–0.24	2.22	0.85	3.17	1.28
Other Latin America			0.13	0.25	1.71	1.56	2.38	0.91
Total Latin America	**0.00**	**0.01**	**0.15**	**0.10**	**1.81**	**1.43**	**2.52**	**0.99**
Japan	**0.01**	**0.03**	**0.09**	**0.19**	**1.48**	**0.89**	**8.05**	**2.34**
China		0.06	0.00	–0.25	0.10	–0.62	2.86	5.39
India		0.04	–0.01	0.00	0.54	–0.22	1.40	2.91
Other Asia		0.05	0.00	0.13	0.64	0.41	3.56	2.40
Total Asia (excluding Japan)	**0.00**	**0.05**	**0.00**	**–0.11**	**0.38**	**–0.02**	**2.92**	**3.54**
Africa	**0.00**	**–0.01**	**0.01**	**0.12**	**0.64**	**1.02**	**2.07**	**0.01**
World	**0.00**	**0.05**	**0.05**	**0.53**	**1.30**	**0.91**	**2.93**	**1.33**

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Bibliography

Abel, W. (1978), *Agrarkrisen und Agrarkonjunktur*, Parey, Hamburg and Berlin.

Abramovitz, M. (1989), *Thinking About Growth*, Cambridge University Press, Cambridge.

Abulafia, D. (1987), "Asia, Africa and the Trade of Medieval Europe", in Postan *et al.*, (eds.), vol. II, pp. 402–73.

Abu–Lughod, J.L. (1989), *Before European Hegemony: The World System AD 1250–1350*, Oxford University Press, Oxford.

Abu–Lughod, J.L. (1971), *Cairo, 1001 Years of the City Victorious*, Princeton University Press, New Jersey.

ADB (Asian Development Bank) (1999), *Key Indicators of Developing Asian and Pacific Countries*, Oxford University Press, Oxford.

Alden, D. (1973), *The Colonial Roots of Modern Brazil,* University of California Press, Berkeley.

Allen, R.C. (1991), "The Two English Agricultural Revolutions, 1450–1850", in Campbell and Overton.

Amin, S. (1966), *L'économie du Maghreb*, Editions de Minuit, Paris.

Arasaratnam, S. (1990), "Recent Trends in the Historiography of the Indian Ocean, 1500 to 1800", *Journal of World History,* Fall, pp. 225–48.

Ark, B. van (1999), "Economic Growth and Labour Productivity in Europe: Half a Century of East–West Comparisons", Research Memorandum GD–41, Groningen Growth and Development Centre.

Ark, B. van (2000), "Measuring Productivity in the 'New Economy': Towards a European Perspective", *De Economist*, 148,1, pp. 87–105.

Ark, B. van and N. Crafts (1996), *Quantitative Aspects of Post–War European Economic Growth,* Cambridge University Press, Cambridge.

Ark, B. van , S. Kuipers and G. Kuper (2000), *Productivity, Technology and Economic Growth*, Kluwer, Dordrecht.

Ashtor, E. (1976), *A Social and Economic History of the Near East in the Middle Ages,* University of California Press, Berkeley.

Ashtor, E. (1980), "The Volume of Medieval Spice Trade", *Journal of European Economic History,* vol. 9, No. 3, Winter, pp. 753–763.

Aubin, F. (ed.) (1970), *Études Song in Memoriam Etienne Balazs,* Mouton, Paris.

Bagnall, R.S. and B.W. Frier (1994), *The Demography of Roman Egypt*, Cambridge University Press, Cambridge.

Bairoch, P. (1967), *Diagnostic de l'évolution économique du tiers–monde 1900–1966,* Gauthiers–Villars, Paris.

Bairoch, P. and Associates (1968), *The Working Population and Its Structure*, Université Libre de Bruxelles, Brussels.

Bairoch, P. and M. Levy–Leboyer (1981), *Disparities in Economic Development since the Industrial Revolution,* Macmillan, London.

Balcerowicz, L. (1995), *Socialism, Capitalism, Transformation*, Central European University Press, Budapest, London and New York.

Banens, M. (2000), "Vietnam: a Reconstitution of its 20th Century Population History", in Bassino, Giacometti and Odaka (2000).

Baran, P.A. (1957), *The Political Economy of Growth*, Prometheus Paper Back, New York.

Barclay, G.W. *et al*. (1976), "A Reassessment of The Demography of Traditional Rural China", *Population Index,* Winter, pp. 606–35.

Bardet, J–P. and J. Dupaquier (1997), *Histoire des populations de l'Europe*, Fayard, Paris, 2 vols.

Bassino, J–P., J–D. Giacometti and K. Odaka (2000), *Quantitative Economic History of Vietnam, 1900–1990*, Institute of Economic Research, Hitotsubashi University.

Batista, D, C. Martins, M. Pinheiro and J. Reis (1997), "New Estimates of Portugal's GDP, 1910–1958", Bank of Portugal, Lisbon.

Baugh, A.C. and T. Cable (1993), *A History of the English Language,* Macmillan, London.

Baumol, W.J. (1986), "Productivity Growth, Convergence and Welfare: What the Long Run Data Show", *American Economic Review*, December.

Beloch, J. (1886), *Die Bevölkerung der griechisch–römischen Welt*, Duncker and Humblot, Leipzig.

Beloch, K.J. (1961), *Bevölkerungsgeschichte Italiens,* de Gruyter, Berlin.

Bergson, A. (1953), *Soviet National Income and Product in 1937*, Columbia University Press, New York.

Bertola, L., L. Calicchio, M. Camou and L. Rivero (1998), *El PIB de Uruguay*, Universidad de la Republica, Montevideo.

Bethell, L. (ed.) (1984–1991), *Cambridge History of Latin America*, 8 vols., Cambridge University Press, Cambridge.

Bevan, D., P. Collier and J. Gunning (1999), *The Political Economy of Poverty, Equity and Growth: Indonesia and Nigeria*, Oxford University Press, Oxford.

Bhanoji Rao, V.V. (1976), *National Accounts of West Malaysia, 1947–1971*, Heinemann, Singapore.

Bhattacharya, D. (1987), "A Note on the Population of India, 1000–1800 AD" in *Le Peuplement du Monde avant 1800*, Société de Démographie Historique, Paris.

Bideau, A., B. Desjardins and H. Perez–Brignoli (1997), *Infant and Child Mortality in the Past*, Clarendon Press, Oxford.

Bielenstein, H. (1987), "Chinese Historical Demography AD 2 – 1982", *Bulletin of the Museum of Far Eastern Antiquities*, Stockholm, No. 59.

Biraben, J.N. (1972), "Certain Demographic Characteristics of the Plague Epidemic in France, 1720–1722" in Glass and Revelle.

Biraben, J.N. (1979), "Essai sur l'évolution du nombre des hommes", *Population*, Jan–Feb., pp. 13–25.

Blackburn, R. (1997), *The Making of New World Slavery,* Allen and Unwin, London.

Blayo, Y. (1975), "La population de la France de 1740 à 1860" and "La mortalité en France de 1740 à 1829", *Population*, November, pp. 71–122 and 124–142, respectively.

Blomme, J. and H. van der Wee (1994), "The Belgian Economy in a Long–Term Historical Perspective: Economic Development in Flanders and Brabant, 1500–1812", in Maddison and van der Wee.

Bloom, D.E. and J.D. Sachs (1998), "Geography, Demography and Economic Growth in Africa", *Brookings Papers on Economic Activity, 2*, pp. 207–296.

Bolotin, B.M. (1992), "The Former Soviet Union as Reflected in National Accounts Statistics", in Hirsch.

Boomgaard, P. (1993), "Economic Growth in Indonesia, 500–1990", in Szirmai, Van Ark and Pilat.

Booth, A. and A. Reid (1994), "Population, Trade and Economic Growth in South–East Asia in the Long Term: An Exploratory Analysis 1400–1990", in Maddison and Van Der Wee.

Borah, W.C. (1976), "The Historical Demography of Aboriginal and Colonial America: An Attempt at Perspective", in Denevan, pp. 13–34.

Borah, W. and S.F. Cook (1963), *The Aboriginal Population of Central Mexico on the Eve of the Spanish Conquest*, University of California, Berkeley.

Boserup, E. (1965), *The Conditions of Agricultural Growth*, Allen and Unwin, London.

Boserup, E. (1981), *Population and Technology*, Blackwell, Oxford.

Bowley, A.L. (1942), *Studies in the National Income*, Cambridge University Press, Cambridge.

Bowman, A.K. and E. Rogan (1999), *Agriculture in Egypt from Pharaonic to Modern Times*, Oxford University Press, Oxford.

Boxer, C.R. (1974), *Four Centuries of Portuguese Expansion, 1414–1825: A Succinct Survey,* Witwatersrand University Press, Johannesburg.

Braudel, F. (1985), *Civilisation and Capitalism, 15th–18th Century*, 3 vols., Fontana, London.

Braudel, F. and F. Spooner (1967), "Prices in Europe from 1450 to 1750", in Rich and Wilson.

Braudel, F. and E. Larousse (eds.) (1977*), Histoire économique et sociale de la France*, Vol. 2, P.U.F., Paris.

Bray, F. (1984), *Agriculture*, Vol. VI:2 in Needham (1954–2000).

Bray, F. (1986), *The Rice Economies: Technology and Development in Asian Societies*, Blackwell, Oxford.

Brewer, J. (1989), *The Sinews of Power: War, Money and the English State, 1688–1783*, Unwin Hyman, London.

Brewer, J. and R. Porter (eds.) (1993), *Consumption and the World of Goods*, Routledge, London.

Bruijn, J.R. and F.S. Gaastra (eds.) (1993), *Ships, Sailors and Spices, East India Companies and their Shipping in the 16th, 17th and 18th Centuries,* NEHA, Amsterdam.

Bulbeck, D., A. Reid, L.C. Tan and Y. Wu (1998), *Southeast Asian Exports since the Fourteenth Century,* KITLV Press, Leiden.

Butlin, N.G. (1983), *Our Original Aggression*, Allen and Unwin, Sydney.

Butlin, N.G. (1993), *Economics and the Dreamtime,* Cambridge University Press, Melbourne.

Campbell, B.M.S. and M. Overton (eds.), (1991), *Land, Labour and Livestock: Historical Studies in European Agricultural Productivity*, Manchester University Press.

Carr–Saunders, A.M. (1964), *World Population,* Cass, London.

Caselli, G. (1991), "Health Transition and Cause Specific Mortality", in Schofield, Reher and Bideau.

Chandler, A.D., Jr. (1990), *Scale and Scope: The Dynamics of Industrial Capitalism*, Harvard.

Chang, Chung–Li (1962), *The Income of the Chinese Gentry*, Greenwood, Westport.

Chao, K. (1986), *Man and Land in Chinese History*, Stanford.

Chaudhuri, K.N. (1978), *The Trading World of Asia and the English East India Company, 1660–1760*, Cambridge University Press, Cambridge.

Chaudhuri, K.N. (1982), "Foreign Trade", in Raychaudhuri and Habib.

Chaudhury, S. (1999), *From Prosperity to Decline: Eighteenth Centry Bengal,* Manohar, New Delhi.

Chaudhury, S. and M. Morineau (1999), *Merchants, Companies and Trade: Europe and Asia in the Early Modern Era,* Cambridge University Press, Cambridge.

Chesnais, J.–C. (1987), *La revanche du tiers–monde*, Laffont, Paris.

Chou, K.R. (1966), *The Hong Kong Economy*, Academic Publications, Hong Kong.

Cipolla, C.M. (1969), *Literacy and Development in the West,* Penguin Books, London.

Cipolla, C.M. (1970), *European Culture and Overseas Expansion*, Pelican, London.

Cipolla, C.M. (ed.) (1972–76), *The Fontana Economic History of Europe,* 6 vols., Collins/Fontana Books, London.

Cipolla, C.M. (1976), *Before the Industrial Revolution: European Society and Economy, 1000–1700*, Norton, New York.

Clark, C. (1940), *The Conditions of Economic Progress*, Macmillan, London.

Clark, C. (1967), *Population Growth and Land Use,* Macmillan, London.

Clark, G. (1991), "Yields per Acre in English Agriculture, 1250–1860: Evidence from Labour Inputs", *Economic History Review*, August, pp. 445–60.

Clark, G.N. (1968), *Science and Social Welfare in the Age of Newton*, Clarendon Press, Oxford.

Coale, A.J. and P. Demeny (1983), *Regional Model Life Tables and Stable Populations*, Academic Press, New York.

Coatsworth, J.H. (1978), "Obstacles to Economic Growth in Nineteenth Century Mexico", *American Historical Review*, February, pp. 80–100.

Coatsworth, J.H. (1989), "The Decline of the Mexican Economy, 1800–1860" in Liehr.

Collier, P. and J.W. Gunning (1999), "Explaining African Performance", *Journal of Economic Literature*, March, pp. 64–111.

Cook, D.N. (1981), *Demographic Collapse: Indian Peru, 1520–1620*, Cambridge University Press, Cambridge.

Cook, S.F. and L.B. Simpson (1948), *The Population of Central Mexico in the Sixteenth Century*, University of California, Berkeley.

Cooper, J.P. (1967), "The Social Distribution of Land and Men in England, 1436–1700", *Economic History Review* 20, pp. 419–440.

Crafts, N.F.R. (1983), "British Economic Growth, 1700–1831: A Review of the Evidence", *Economic History Review*, May, pp. 177–199.

Crafts, N.F.R. and C.K. Harley (1992), "Output Growth and the British Industrial Revolution: A Restatement of the Crafts–Harley View", *Economic History Review*, November, pp. 703–730.

Craig, A.M. (1961), *Choshu in the Meiji Restoration*, Harvard University Press, Cambridge, Ma.

Crawcour, E.S. (1963), "Changes in Japanese Commerce in the Tokugawa Period", *Journal of Asian Studies*, pp. 387–400.

Crosby, A.W. (1972), *The Columbian Exchange: Biological and Cultural Consequences of 1492*, Greenwood Press, Westport, Connecticut.

Crosby, A.W. (1986), *Ecological Imperialism: The Biological Expansion of Europe, 900–1900,* Cambridge University Press, Cambridge.

Crouzet, F. (1964), "Wars, Blockade, and Economic Change in Europe, 1792–1815", *Journal of Economic History,* December, pp. 567–88.

Crouzet, F. (1985), *De la supériorité de l'Angleterre sur La France*, Perrin, Paris.

Curtin, P.D. (1969), *The Atlantic Slave Trade: A Census,* University of Wisconsin Press, Madison.

Curtin, P.D. (1984), *Cross–cultural Trade in World History,* Cambridge University Press, Cambridge.

Daniels, J.D. (1992), "The Indian Population of North America in 1492", *William and Mary Quarterly*, pp. 298–320.

Das Gupta, A. and M.N. Pearson (1987), *India and the Indian Ocean, 1500–1800,* New Delhi.

David, P.A. (1967), "The Growth of Real Product in the United States Before 1840: New Evidence, Controlled Conjectures", *Journal of Economic History*, June.

David, P.A. (1991), "Computer and Dynamo: The Modern Productivity Paradox in a Not Distant Mirror", in *Technology and Productivity: The Challenge for Economic Policy*, OECD, Paris, pp. 315–48.

Davies, R.T. (1964), *The Golden Century of Spain,* Macmillan, London.

Davis, K. (1951), *The Population of India and Pakistan*, Princeton.

Davis, L. and Associates (eds.) (1972), *American Economic Growth: An Economist's History of the United States*, Harper and Row, New York.

Davis, R. (1962), *The Rise of the English Shipbuilding Industry*, Macmillan, London.

Day, C. (1921), *A History of Commerce*, Longmans Green, New York.

Deane, P. (1955), "The Implications of Early National Income Estimates for the Measurement of Long–Term Economic Growth in the United Kingdom", *Economic Development and Cultural Change*, pp. 3–38.

Deane, P. (1955–6), "Contemporary Estimates of National Income in the First Half of the Nineteenth Century", *Economic History Review*, VIII, 3, pp. 339–354.

Deane, P. (1956–7), "Contemporary Estimates of National Income in the Second Half of the Nineteenth Century", *Economic History Review*, IX, 3, pp. 451–61.

Deane P. (1957), "The Industrial Revolution and Economic Growth: The Evidence of Early British National Income Estimates", *Economic Development and Cultural Change*, pp. 159–74.

Deane, P. and W.A. Cole (1964), *British Economic Growth 1688–1958*, Cambridge University Press, Cambridge.

Deane, P. (1968), "New Estimates of Gross National Product for the United Kingdom, 1830–1914", *Review of Income and Wealth*, June, pp. 95–112.

Denevan, W.M. (ed.) (1976), *The Native Population of the Americas in 1492*, University of Wisconsin.

Denison, E.F. and W.C. Haraldson (1945), "The Gross National Product of Germany 1936–1944", Special Paper 1, (mimeographed appendix to Galbraith, *et al*.

Dickson, D., C. O'Grada and S. Daultrey (1982), "Hearth Tax, Household Size and Irish Population Change 1672–1981", *Proceedings of the Royal Irish Academy*, Vol. 82 C, No. 6, Dublin.

Dickson, P.M.G. (1967), *The Financial Revolution in England,* Macmillan, London.

Domar, E.D. (1989), *Capitalism, Socialism and Serfdom*, Cambridge University Press, Cambridge.

Dore, R.P. (1965), *Education in Tokugawa Japan*, University of California Press, Berkeley.

Dublin, L.I., A.J. Lotka and M. Spiegelman (1963), *Length of Life,* Ronald Press, New York.

Dupaquier, J. (1997), "La connaissance démographique", in Bardet and Dupaquier, Vol. 1, pp. 218–38.

Durand, J.D. (1974), *Historical Estimates of World Population: An Evaluation*, University of Pennsylvania, Philadelphia.

Dyson, T. (ed.) (1989), *India's Historical Demography*, Curzon, Riverdale.

EBRD (European Bank for Reconstruction and Development), (1999), *Transition Report 1999*, London.

ECE (Economic Commission for Europe), (1994), *International Comparison of Gross Domestic Product in Europe 1990*, Geneva.

ECLAC, (Economic Commission for Latin America and the Caribbean) (1978), *Series Historicas del Crecimiento de America Latina*, Santiago, Chile.

ECLAC (1996), *Preliminary Overview of the Economy of Latin America and the Caribbean*, Santiago, Chile.

Eisner, G. (1961), *Jamaica, 1830–1930: a Study in Economic Growth*, Manchester University Press.

Eltis, D. (1995), "The Total Product of Barbados 1667–1701", *Journal of Economic History,* vol. 55:2, pp. 321–38

Engerman, S.L. and R.E. Gallman (1986), *Long Term Factors in American Economic Growth,* NBER, University of Chicago Press, Chicago.

ENGERMAN, S.L. AND R.E. GALLMAN (1996), *The Cambridge History of the United States,* Vol. 1, Cambridge University Press, Cambridge.

ESCAP (Economic and Social Commission for Asia and the Pacific), (1999), *Escap Comparisons of Real Gross Domestic Product and Purchasing Power Parities, 1993*, Bangkok.

EUROSTAT (Statistical Office of the European Communities), (1989), *Comparison of Price Levels and Economic Aggregates 1985: The Results for 22 African Countries*, Luxemburg.

FAGERBERG, J. (1994), "Technology and International Differences in Growth Rates", *Journal of Economic Literature*, September.

FAIRBANK, J.K. (ed.) (1968), *The Chinese World Order,* Harvard University Press, Cambridge, Ma.

FAIRBANK, J.K. (ed.) (1983), *The Cambridge History of China,* Vol. 12, Cambridge University Press, Cambridge.

FAROQHI, S., B. MCGOWAN, D. QUATAERT, AND S. PAMUK (1994), *An Economic and Social History of the Ottoman Empire, 1600–1914*, Vol. 2, Cambridge University Press, Cambridge.

FARRIS, W.W. (1985), *Population, Disease and Land in Early Japan, 645–900*, Harvard.

FEINSTEIN, C.H. (1998), "Pessimism Perpetuated: Real Wages and the Standard of Living in Britain during and after the Industrial Revolution", *Journal of Economic History*, September, pp. 625–58.

FERNANDES, F. (1969), *The Negro in Brazilian Society,* Columbia University Press, New York.

FEUERWERKER, A. (1983), "The Foreign Presence in China", IN FAIRBANK.

FIRESTONE, O.J. (1958), *Canada's Economic Development, 1867–1953,* Bowes and Bowes, London.

FOGEL, R.W. (1964), *Railroads and American Economic Growth*, Johns Hopkins, Baltimore.

FOGEL, R.W. (1986), "Nutrition and the Decline in Mortality since 1700: Some Preliminary Findings", in ENGERMAN AND GALLMAN.

FOGEL, R.W. AND S.L. ENGERMAN (1974), *Time on the Cross: The Economics of American Negro Slavery*, Little Brown, London.

FOY, C., Y.–H. KIM AND H. REISEN (2000), *Sustainable Recovery in Asia: Mobilising Resources for Development,* OECD Development Centre, Paris (Preface by Braga de Macedo and Chino).

FRANK, A.G. (1998), *Reorient: Global Economy in the Asian Age*, University of California Press, Berkeley.

FREYRE, G. (1959), *New World in the Tropics,* Knopf, New York.

GALBRAITH, J.K., *et al*. (1945), *The Effects of Strategic Bombing on the German War Economy*, US Strategic Bombing Survey, Washington, D.C.

GALENSON, D.W. (1996), "The Settlement and Growth of the Colonies, Population, Labour and Economic Development", in ENGERMAN AND GALLMAN.

GALLMAN, R.E. (1972), "The Pace and Pattern of American Economic Growth", in DAVIS AND ASSOCIATES.

GALLOWAY, P.R. (1994), "A Reconstitution of the Population of North Italy from 1650 to 1881 using Annual Inverse Projection with Comparisons to England, France and Sweden", *Journal of Population*, 10, pp. 222–74.

GERSCHENKRON, A. (1965), *Economic Backwardness in Historical Perspective,* Praeger, New York.

GILBERT, M. AND I.B. KRAVIS (1954), *An International Comparison of National Products and Purchasing Power of Currencies*, OEEC, Paris.

GILLE, H. (1949), "The Demographic History of the Northern European Countries in the Eighteenth Century", *Population Studies*, III:1, June, pp. 3–65.

GLAMANN, K. (1981), *Dutch Asiatic Trade, 1620–1740,* Nijhoff, the Hague.

GLASS, D.V. (1965), "Two Papers on Gregory King", in GLASS AND EVERSLEY (1965), pp. 159–221.

GLASS, D.V. (1966), *London Inhabitants Within the Walls 1695*, London Record Society, London.

Glass, D.V. and D.E.C. Eversley (eds.) (1965), *Population in History: Essays in Historical Demography*, Arnold, London.

Glass, D.V. and E. Grebenik (1966), "World Population, 1800–1950", in H.J. Habakkuk and M. Postan, *Cambridge Economic History of Europe*, Vol. VI:1, Cambridge University Press, Cambridge.

Glass, D.V. and R. Revelle (1972), *Population and Social Change*, Arnold, London.

Goitein, S.D. (1967), *A Mediterranean Society,* vol. 1, *Economic Foundations,* University of California Press, Berkeley.

Goldsmith, R.W. (1984), "An Estimate of the Size and Structure of the National Product of the Roman Empire", *Review of Income and Wealth*, September.

Goodman, D. and C.A. Russell (1991), *The Rise of Scientific Europe, 1500–1800*, Hodder and Stoughton, London.

Gordon, R.J. (2000), "Interpreting the 'One Big Wave in US Long–Term Productivity Growth", in van Ark, Kuipers and Kuper.

Goubert, P. (1965), "Recent Theories and Research in French Population Between 1500 and 1700", in Glass and Eversley.

Graunt, J. (1676), *Natural and Political Observations upon the Bills of Mortality,* fifth edition, reprinted in Hull (1899).

Habakkuk, H.J. and M. Postan (eds.) (1966), *The Cambridge Economic History of Europe,* vol. VI, Cambridge University Press, Cambridge.

Habib, I. (1982), "Technology and Economy of Moghul India", *Indian Economic and Social History Review,* XVII(1), pp. 1–34.

Habib, I. (1995), *Essays in Indian History,* Tulika, New Delhi.

Hall, J.W. (ed.) (1991), *Early Modern Japan*, Vol. 4 of *The Cambridge History of Japan*, Cambridge University Press, Cambridge.

Hall, J.W., N. Nagahara, and K. Yamamura (1981), *Japan Before Tokugawa*, Princeton.

Halley, E. (1693), "An Estimate of the Degrees of Mortality of Mankind, drawn from curious tables of the births and funerals at the city of Breslaw; with an attempt to ascertain the price of annuities upon lives", *Philosophical Transactions of the Royal Society,* Vol. XVII, No. 198, pp. 596–610.

Hanley, S.B. and K. Yamamura (1977), *Economic and Demographic Change in Preindustrial Japan*, Princeton.

Hanley, S.B. (1997), *Everyday Things in Premodern Japan*, University of California Press, Berkeley.

Hansen, B. and G.A. Marzouk (1965), *Development and Economic Policy in the UAR (Egypt)*, North Holland, Amsterdam.

Harley, C.K. (1988), "Ocean Freight Rates and Productivity, 1740–1913: The Primacy of Mechanical Invention Reaffirmed", *Journal of Economic History,* December, pp. 851–76.

Hawke, G.R. (1985), *The Making of New Zealand,* Cambridge University Press, Melbourne.

Hayami, A. (1973), *Kinsei Noson no Rekishi Jinkogakuteki Kenkyu* (A Study of Historical Demography of Pre–Modern Rural Japan), Toyo Keizai Shimposha, Tokyo.

Hayami, A. (1986*a*), "Population Trends in Tokugawa Japan, 1600–1868", paper presented at the 46th session of the International Statistical Institute Congress.

Hayami, A. (ed.) (1986*b*), *Preconditions to Industrialization in Japan*, International Economic History Conference, Berne.

Hayami, A. and M. Miyamoto (eds.) (1988), *Keizai Shakai no seritsu: 17–18 seiki*, *Nihon keizai–shi*, Vol. 1, Iwanami Shoten, Tokyo.

Hayami, Y., V.W. Ruttan and H.M. Southworth (eds.) (1979), *Agricultural Growth in Japan, Taiwan, Korea and the Philippines*, Asian Productivity Center, Honolulu.

HAYAMI, Y. AND V.W. RUTTAN (1985), *Agricultural Development*, second edition, Johns Hopkins, Baltimore.

HEMMING, J. (1978), *Red Gold: The Conquest of the Brazilian Indians*, Macmillan.

HENRY L. AND D. BLANCHET (1983), "La population de l'Angleterre de 1514 à 1871", *Population,* 4–5, pp. 781–826.

HENRY L. AND Y. BLAYO (1975), "La population de la France de 1740 à 1860", *Population*, November.

HIGMAN, B.W. (1996), "Economic and Social Development in the British West Indies", in ENGERMAN AND GALLMAN.

HIRSCH, S. (ed.) (1992), *Memo 3: In Search of Answers in the Post–Soviet Era,* Bureau of National Affairs, Washington, D.C.

HLAING, A. (1964), "Trends of Economic Growth and Income Distribution in Burma 1870–1940", *Journal of the Burma Research Society.*

HO, P.T. (1959), *Studies on the Population of China, 1368–1953*, Harvard University Press, Cambridge, Ma.

HO, P.T. (1970), "An Estimate of the Total Population of Sung–Chin China", in AUBIN.

HOFFMANN, W.G. (1965), *Das Wachstum der deutschen Wirtschaft seit der Mitte des 19. Jahrhunderts,* Springer, Berlin.

HOFMAN, A.A. (2000), *The Economic Development of Latin America in the Twentieth Century,* Elgar, Cheltenham.

HODGES, R. AND D. WHITEHOUSE (1998), *Mohammed, Charlemagne and the Origins of Europe,* Duckworth, London.

HOLMES, G.S. (1977), "Gregory King and the Social Structure of Pre–Industrial England", *Transactions of the Royal Historical Society*, 5th series, Vol. 27, pp. 41–68.

HOOLEY, R.W. (1968), "Long Term Growth of the Philippine Economy, 1902–1961", *Philippine Economic Journal*.

HONDA, G. (1997), "Differential Structure, Differential Health: Industrialisation in Japan, 1868–1940", in STECKEL AND FLOUD.

HONJO, E. (1935), *The Social and Economic History of Japan,* Kyoto.

HOPKINS, K. (1980), "Taxes and Trade in the Roman Empire (200 B.C.–400 A.D.)", *Journal of Roman Studies,* Vol. LXX, pp. 101–25.

HORIOKA, C.Y. (1990), "Why is Japan's Household Saving Rate So High? A Literature Survey", *Journal of Japanese and International Economies,* 4.

HOURANI, G.F. (1951), *Arab Seafaring in the Indian Ocean in Ancient and Early Medieval Times,* Princeton.

HSUEH, TIEN–TUNG AND LI, QIANG (1999), *China's National Income, 1952–1995*, Westview Press, Boulder, Colorado.

HULL, C.H. (ed.) (1899), *The Economic Writings of Sir William Petty*, 2 vols, Cambridge University Press, Cambridge.

IBGE (1960), *O Brasil em Numeros*, Rio de Janeiro.

IKRAM, K. (1980), *Egypt: Economic Management in a Period of Transition*, Johns Hopkins, Baltimore.

IMF (International Monetary Fund) (1999), *World Economic Outlook*, Washington, D.C.

INALCIK, H. (1994), *An Economic and Social History of the Ottoman Empire, 1300–1600*, Vol. 1, Cambridge University Press, Cambridge.

ISHII, R. (1937), *Population Pressure and Economic Life in Japan*, King, London.

ISRAEL, J.I. (1989), *Dutch Primacy in World Trade, 1585–1740,* Clarendon Press, Oxford.

ISRAEL, J. (1995), *The Dutch Republic,* Clarendon Press, Oxford.

JANNETTA, A.B. (1986), *Epidemics and Mortality in Early Modern Japan,* Princeton.

JANNETTA, A.B. AND S.H. PRESTON (1991), "Two Centuries of Mortality Change in Central Japan: The Evidence from a Temple Death Register", *Population Studies*, 45, pp. 417–36.

Jarrett, H.S. and S–N. Sarkar (1949), *Ain–I–Akbari of Abul Fazl–I–Allami*, Royal Asiatic Society of Bengal, Calcutta.

Jones, E.L. (1981), *The European Miracle,* Cambridge University Press, Cambridge.

Jones, V. (1978), *Sail the Indian Sea,* Gordon and Cremonesi, London.

Jorgenson, D.W. and K.J. Stiroh (2000), "Raising the Speed Limit: US Economic Growth in the Information Age", *Brookings Papers on Economic Activity I*, pp. 125–236.

Kalland, A. and J. Pederson (1984), "Famine and Population in Fukuoka Domain during the Tokugawa Period", *Journal of Japanese Studies*, 10, pp. 31–72.

Keene, D. (1969), *The Japanese Discovery of Europe, 1720–1820*, Stanford.

Kendrick, J.W. (1961), *Productivity Trends in the United States*, Princeton.

Kennedy, P. (1987), *The Rise and Fall of the Great Powers,* Random House, New York.

Keynes, J.M. (1919), *The Economic Consequences of the Peace,* Macmillan, London.

Kim, K.S. and M. Roemer (1979), *Growth and Structural Transformation: The Republic of Korea*, Harvard University Press, Cambridge, Mass.

King, G. (1696), *Natural and Political Observations and Conclusions upon the State and Condition of England*, in Barnett (ed.), Johns Hopkins (1936).

Kirsten, E., E.W. Buchholz and W. Köllmann (1956), *Raum und Bevölkerung in der Weltgeschichte*, Ploetz–Verlag, Würzburg.

Klein, H.S. (1999), *The Atlantic Slave Trade,* Cambridge University Press, Cambridge.

Knodel, J.E. (1988), *Demographic Behavior in the Past*, Cambridge University Press, Cambridge.

Kornai, J. (1992), *The Socialist System: The Political Economy of Communism,* Clarendon Press, Oxford.

Kravis, I.B., A. Heston and R. Summers (1982), *World Product and Income, International Comparisons of Real Gross Product*, Johns Hopkins, Baltimore.

Kroeber, A.L. (1939), *Cultural and National Areas of Native North America*, Berkeley.

Kuhn, D. (1988), *Textile Technology: Spinning and Reeling*, Vol. 5, Part IX of Needham, Cambridge University Press, Cambridge.

Kumar, D. and M. Desai (1983), *Cambridge Economic History of India*, Vol. 2, Cambridge.

Kuznets, S. (1966), *Modern Economic Growth*, Yale.

Kuznets, S. (1971), *Economic Growth of Nations*, Harvard.

Kuznets, S. (1973), *Population, Capital and Growth: Selected Essays*, Norton, New York.

Kuznets, S. (1979), *Growth, Population and Income Distribution*, Norton, New York.

Kwon, T.H. (1993), "Reconstructing Population Phenomena in Chosun Korea",International Workshop on Historical Demography, Reitaku University, Chiba, Japan.

Kwon, T.H. and Y–H. Shin (1977), "On Population Estimates of the Yi Dynasty, 1392–1910", *Tong–A Munhwa*, 14 (in Korean).

Lal, D. (1988), *The Hindu Equilibrium: Cultural Stability and Economic Stagnation,* Oxford University Press, Oxford.

Landers, J. (1993), *Death and the Metropolis: Studies in the Demographic History of London, 1670–1830*, Cambridge University Press, Cambridge.

Landes, D.S. (1966), "Technological Change and Development in Western Europe, 1750–1914", in Habakkuk and Postan.

Landes, D.S. (1969), *The Unbound Prometheus,* Cambridge University Press, Cambridge.

LANDES, D.S. (1998), *The Wealth and Poverty of Nations,* Little Brown, London.

LANE, F.C. (1966), *Venice and History: Collected Papers,* Johns Hopkins Press, Baltimore.

LANE, F.C. (1973), *Venice: A Maritime Republic,* Johns Hopkins Press, Baltimore.

LANE, F.C. AND R.C. MUELLER (1985), *Money and Banking in Medieval and Renaissance Venice,* vol. 1, Johns Hopkins Press, Baltimore.

LASLETT, P. (1969), "John Locke, the Great Recoinage, and the Origins of the Board of Trade" in YOLTON.

LASLETT, P. (ed.) (1973), *The Earliest Classics: John Graunt and Gregory King*, Gregg International, London.

LEBERGOTT, S. (1984), *The Americans: An Economic Record,* Norton, New York.

LEBOUTTE, R. (ed.) (1996), *Proto–industrialization*, Droz, Geneva.

LEE, H.K. (1936), *Land Utilization and Rural Economy in Korea*, Oxford University Press.

LEE, J.Z AND C. CAMPBELL (1997), *Fate and Fortune in Rural China*, Cambridge University Press, Cambridge.

LEE, J.Z. AND F. WANG (forthcoming*), Malthusian Mythology and Chinese Reality: The Population History of One Quarter of Humanity: 1700–2000*.

LEFF, N.H. (1982), *Underdevelopment and Development in Brazil,* 2 vols., Allen and Unwin, London.

LENIHAN, P. (1997), "War and Population, 1649–52", *Irish Economic and Social History*, *XXIV*, pp. 1–21.

LE ROY LADURIE, E. (1966), *Les paysans de Languedoc*, Mouton, Paris.

LE ROY LADURIE, E. (1977), "Les masses profondes: la paysannerie", in BRAUDEL AND LAROUSSE.

LE ROY LADURIE, E. (1978), *Le territoire de l'historien*, 2 vols., Gallimard, Paris.

LEVATHES, L. (1994), *When China Ruled the Seas*, Simon and Schuster, New York.

LIEHR, R. (1989), *La formacion de las economias latinoamericanos en la epoca de Simon Bolivar*, Colloquium Verlag, Berlin.

LIM, C.H. (1967), *Economic Development of Modern Malaya*, Oxford University Press, Kuala Lumpur.

LINDERT, P.H. (1980), "English Occupations, 1670–1811", *Journal of Economic History*, XL, 4, pp. 685–713.

LINDERT, P.H. AND J.G. WILLIAMSON (1982), "Revising England's Social Tables, 1688–1812", *Explorations in Economic History*, 19, 1982, pp. 385–408.

LIVI BACCI, M. AND D.S. REHER (1993), "Other Paths to the Past: from Vital Series to Population Patterns", in REHER AND SCHOFIELD.

LORIMER, F. (1946), *The Population of the Soviet Union: History and Prospects*, League of Nations, Geneva.

LOVEJOY, P.E. (1982), "The Volume of the African Slave Trade: A Synthesis", *Journal of African History,* pp. 473–75.

LUNDBERG, E. (1968), *Instability and Economic Growth,* Yale University Press, New Haven.

MACEDO, J. BRAGA DE (1995), "Convertibility and Stability 1834–1994: Portuguese Currency Experience Revisited", in *Ensaios de Homenagem a Francisco Pereira de Moura,* UTL, Lisbon.

MACFARLANE, A. (1997), *The Savage Wars of Peace*, Blackwell, Oxford.

MADDISON, A. (1962), "Growth and Fluctuation in the World Economy, 1870–1960", *Banca Nazionale del Lavoro Quarterly Review,* June.

MADDISON, A. (1969), *Economic Growth in Japan and the USSR*, Allen and Unwin, London.

MADDISON, A. (1970), *Economic Progress and Policy in Developing Countries*, Allen and Unwin, London.

MADDISON, A. (1971), *Class Structure and Economic Growth: India and Pakistan Since the Moghuls*, Allen and Unwin, London.

MADDISON, A. (1972), "Explaining Economic Growth", *Banca Nazionale del Lavoro Quarterly Review*, 102, September.

MADDISON, A. (1976), "Economic Policy and Performance in Europe, 1913–70", in CIPOLLA.

MADDISON, A. (1980), "Monitoring the Labour Market", *Review of Income and Wealth*, June.

MADDISON, A. (1982), *Phases of Capitalist Development*, Oxford University Press, Oxford.

MADDISON, A. (1983), "A Comparison of Levels of GDP Per Capita in Developed and Developing Countries, 1700–1980", *Journal of Economic History*, March, pp. 27–41.

MADDISON, A. (1985), *Two Crises: Latin America and Asia, 1929–38 and 1973–83,* OECD Development Centre, Paris.

MADDISON, A. (1987*a*), "Growth and Slowdown in Advanced Capitalist Economies: Techniques of Quantitative Assessment", *Journal of Economic Literature*, June.

MADDISON, A. (1987*b*), "Recent Revisions to British and Dutch Growth, 1700–1870 and their Implications for Comparative Levels of Performance", in MADDISON AND VAN DER MEULEN (1987).

MADDISON, A. (1989*a*), *The World Economy in the Twentieth Century*, OECD Development Centre, Paris.

MADDISON, A. (1989*b*), "Dutch Income in and from Indonesia 1700–1938", *Modern Asian Studies*, pp. 645–70.

MADDISON, A. (1990*a*), "The Colonial Burden: A Comparative Perspective", in SCOTT AND LAL.

MADDISON, A. (1990*b*), "Measuring European Growth: the Core and the Periphery", in E. AERTS AND N. VALERIO, *Growth and Stagnation in the Mediterranean World*, Tenth International Economic History Conference, Leuven.

MADDISON, A. (1991*a*), *Dynamic Forces in Capitalist Development*, Oxford University Press, Oxford.

MADDISON, A. (1991*b*), *A Long Run Perspective on Saving*, Research Memorandum 443, Institute of Economic Research, University of Groningen (a shorter version appeared in the *Scandinavian Journal of Economics*, June 1992, pp. 181–96).

MADDISON, A. (1995*a*), *Monitoring the World Economy 1820–1992*, OECD Development Centre, Paris.

MADDISON, A. (1995*b*) *Explaining the Economic Performance of Nations: Essays in Time and Space*, Elgar, Aldershot.

MADDISON, A. (1995*c*), "The Historical Roots of Modern Mexico: 1500–1940", in MADDISON (1995*b*).

MADDISON, A. (1996), "Macroeconomic Accounts for European Countries", in VAN ARK AND CRAFTS.

MADDISON, A. (1997), "The Nature and Functioning of European Capitalism: A Historical and Comparative Perspective", *Banca Nazionale del Lavoro Quarterly Review*, December.

MADDISON, A. (1998*a*), *Chinese Economic Performance in the Long Run*, OECD Development Centre, Paris.

MADDISON, A. (1998*b*), "Measuring the Performance of A Communist Command Economy: An Assessment of the CIA Estimates for the USSR", *Review of Income and Wealth*, September.

MADDISON, A. (1999*a*), "Poor until 1820", *Wall Street Journal*, January 11th, p.8.

MADDISON, A. (1999*b*), "Book Review", of Hanley (1997), *Journal of Japanese and International Economies*, 13, pp. 150–151.

MADDISON, A. AND B. VAN ARK (1994), "The International Comparison of Real Product and Productivity", paper presented at IARIW meetings, St. Andrews, New Brunswick, Canada.

MADDISON, A. AND ASSOCIATES (1992), *The Political Economy of Economic Growth: Brazil and Mexico*, Oxford University Press, New York.

MADDISON, A. AND G. PRINCE (eds.) (1989), *Economic Growth in Indonesia, 1820–1940,* Foris, Dordrecht.

MADDISON, A. AND H. VAN DER MEULEN (eds.) (1987), *Economic Growth in Northwestern Europe: The Last 400 Years*, Research Memorandum 214, Institute of Economic Research, University of Groningen.

MADDISON, A. AND H. VAN DER WEE (eds.) (1994), *Economic Growth and Structural Change: Comparative Approaches over the Long Run*, Proceedings of the Eleventh International Economic History Congress, Milan, September.

Maddison, A., D.S. Prasada Rao and W. Shepherd (eds.) (2001), *The Asian Economies in the Twentieth Century*, Elgar, Aldershot.

Malanima, P. (1995), *Economia Preindustriale*, Mondadori, Milan.

Malanima, P. (1998*a*), *La Fina del Primato*, Mondadori, Milan.

Malanima, P. (1998*b*), "Italian Cities 1300–1800: A Quantitative Approach", *Revista de Storia Economica*, August, pp. 91–126.

Mancall, P.C. and T. Weiss (1999), "Was Economic Growth Likely in British North America?", *Journal of Economic History*, March, pp. 17–40.

Marcilio, M.L. (1984), "The Population of Colonial Brazil", in Bethell (1984), Vol. 2.

Marczewski, J. (1961), "Some Aspects of the Economic Growth of France, 1660–1958", *Economic Development and Cultural Change*, April.

Mari Bhat, P.N. (1989), "Mortality and Fertility in India, 1881–1961: A Reassessment", in Dyson.

Mathias, P. (1957), "The Social Structure in the Eighteenth Century: A Calculation by Joseph Massie", *Economic History Review*, pp. 30–45.

McEvedy, C. (1967), *The Penguin Atlas of Ancient History,* Penguin Books, London.

McEvedy, C. (1997), *The New Penguin Atlas of Medieval History,* Penguin Books, London.

McEvedy, C. and R. Jones (1978), *Atlas of World Population History*, Penguin, Middlesex.

McNeill, W.H. (1964), *Europe's Steppe Frontier*, University of Chicago Press, Chicago.

McNeill, W.H. (1974), *Venice: The Fringe of Europe,* University of Chicago Press, Chicago.

McNeill, W.H. (1977), *Plagues and Peoples*, Anchor Books, Doubleday, New York.

Meier, G.M. and D. Seers (eds.) (1984), *Pioneers in Development*, Oxford University Press, Oxford.

Merkel, W. and S. Wahl (1991), *Das geplünderte Deutschland,* IWG, Bonn.

Merrick, T.W. and D.H. Graham (1979), *Population and Development in Brazil 1800 to the Present*, Johns Hopkins University Press, Baltimore and London.

Metzer, J. (1998), *The Divided Economy of Mandatory Palestine*, Cambridge University Press, Cambridge.

Mitchell, B.R. (1975), *European Historical Statistics, 1750–1970*, Macmillan, London.

Mitchell, B.R. and P. Deane (1962), *Abstract of British Historical Statistics,* Cambridge University Press, Cambridge.

Mitchell, B.R. and H.G. Jones (1971), *Second Abstract of British Historical Statistics,* Cambridge University Press, Cambridge.

Mizoguchi, T. (1999), *Long Term Economic Statistics of Taiwan: 1905–1990*, Institute of Economic Research, Hitotsubashi University, Tokyo.

Mizoguchi, T. and M. Umemura (1988), *Basic Economic Statistics of Japanese Colonies, 1895–1938*, Toyo Keizai Shinposha, Tokyo.

Moosvi, S. (1987), *The Economy of the Moghul Empire c.1595: A Statistical Study*, Oxford University Press, Delhi.

Moreland, W.H. (1920), *India at the Death of Akbar: An Economic Study*, Atmar Ram, Delhi (1962 reprint).

Morineau, M. (1985), *Incroyables gazettes et fabuleux métaux,* Cambridge University Press, Cambridge.

Morison, S.E. (1971), *The European Discovery of America: The Northern Voyages,* A.D. 500–1600, Oxford Univeristy Press, Oxford.

Morison, S.E. (1974), *The European Discovery of America: The Southern Voyages, A.D. 1492–1616,* Oxford University Press, Oxford.

Mote, F.W. and D. Twitchett (eds.) (1988), *The Cambridge History of China, The Ming Dynasty, 1368–1644,* Part 1, Cambridge University Press, Cambridge.

Mowery, D.C. and N. Rosenberg (1989), *Technology and the Pursuit of Economic Growth*, Cambridge University Press, Cambridge.

Mulhall, M.G. (1896), *Industries and Wealth of Nations*, Longmans, London.

Mulhall, M.G. (1899), *The Dictionary of Statistics*, Routledge, London, 4th edition.

Myers, R.H. (ed.) (1996), *The Wealth of Nations in the Twentieth Century*, Hoover Institution, Stanford.

Nakamura, J.I. (1966), *Agricultural Production and the Economic Development of Japan, 1873–1922*, Princeton.

Nakamura, S. (1968), *Meiji Ishin no Kiso Kozo*.

Naoroji, D. (1901), *Poverty and Un–British Rule in India,* London, Government of India Reprint, Delhi, 1962.

Ndulu, B. and S.A. O'Connell (1999), "Governance and Growth in Sub–Saharan Africa", *Journal of Economic Perspectives,* Summer, pp. 41–66.

Needham, J. and Associates (1954–2000), *Science and Civilisation in China*, 50 major sections, many co–authors, many volumes, Cambridge University Press, Cambridge.

Nef, J.U. (1987), "Mining and Metallurgy in Medieval Civilisation", in Postan *et al.* (eds.), vol. II, pp. 693–762.

Nishikawa, S. (1987), "The Economy of Choshu on the Eve of Industrialisation", *Economic Studies Quarterly*, December.

North, D.C. (1966), *Growth and Welfare in the American Past,* Prentice Hall, New Jersey.

North D.C. (1968), "Sources of Productivity Change in Ocean Shipping, 1600–1850", *Journal of Political Economy,* September–October, pp. 953–70.

North D.C. (1990), *Institutions, Institutional Change and Economic Performance*, Cambridge University Press, Cambridge.

Ó Gráda, C. (1988), *Ireland Before and After the Famine,* Manchester University Press, Manchester.

OECD (1979), *Demographic Trends 1950–1990*, Paris.

Ohkawa, K. (1957), *The Growth Rate of the Japanese Economy since 1878*, Kinokuniya, Tokyo.

Ohkawa, K., M. Shinohara, and M. Umemura (eds.) (1966–1988), *Estimates of Long–Term Economic Statistics of Japan since 1868*, 14 volumes, Toyo Keizai Shinposha, Tokyo.

Ohkawa, K. and M. Shinohara (eds.) (1979), *Patterns of Japanese Economic Development: A Quantitative Appraisal*, Yale.

Ohlin, G. (1955), *The Positive and Preventive Check: A Study of the Rate of Growth of Pre–Industrial Populations*, Harvard Ph.D thesis, reprinted by Arno Press, New York, 1981.

Okamoto, Y. (1972), *The Namban Art of Japan,* Heibonsha, Tokyo.

Oliner. S.D. and D.E. Sichel (2000), "The Resurgence of Growth in the Late 1990s: Is Information Technology the Story?", Federal Reserve Board, Washington, D.C., February.

Oliver, R. and J.D. Fage (1995), *A Short History of Africa*, Penguin Books, London.

O'Rourke, K.H. and J.G. Williamson (1999), *Globalization and History,* MIT Press, Cambridge, Ma.

Overton, M. (1996), *Agricultural Revolution in England: The Transformation of the Agrarian Economy, 1500–1850*, Cambridge University Press, Cambridge.

Paige, D. and G. Bombach (1959), *A Comparison of National Output and Productivity of the UK and the United States*, OECD, Paris.

Pannikar, K.M. (1953), *Asian and Western Dominance,* Allen and Unwin, London.

Parker, G. (1979), *Spain and the Netherlands, 1599–1659,* Fontana/Collins, London.

Parry, J.H. (1967), "Transport and Trade Routes", in Rich and Wilson.

Parry, J.H. (1974), *The Discovery of the Sea,* Weidenfeld and Nicolson, London.

Patinkin, D. (1960), *The Israeli Economy: The First Decade*, Falk Project, Jerusalem.

Pebrer, P. (1833), *Taxation, Revenue, Expenditure, Power, Statistics of the Whole British Empire,* Baldwin and Cradock, London.

Perkins, D.W. (1969), *Agricultural Development in China, 1368–1968*, Aldine, Chicago.

Perrin, N. (1979), *Giving up the Gun: Japan's Reversion to the Sword, 1543–1879,* Godine, Boston.

Petty, W. (1690), *Political Arithmetick,* in Hull (1899), Vol. 1.

Petty, W. (1997), *The Collected Works of Sir William Petty*, 8 volumes, Routledge/Thoemes Press, London (includes Hull's (1899) collection of Petty's economic writings; E.G. Fitzmaurice's (1895) biography of Petty; Lansdowne's (1927 and 1928) collection of Petty papers and the Southwell–Petty correspondence; Larcom's (1851) edition of Petty's Irish Land Survey, and critical appraisals by T.W. Hutchinson and others).

Phelps Brown, H. and S.V. Hopkins (1981), *A Perspective on Wages and Prices*, Methuen, London.

Pirenne, H. (1939), *Mohammed and Charlemagne,* Allen and Unwin, London.

Polak, J.J. (1943), *The National Income of the Netherlands Indies, 1921–1939,* New York.

Pomeranz, K. (2000), *The Great Divergence*, Princeton University Press, Princeton.

Postan, M.M., *et al.* (eds.) (1963–87), *The Cambridge Economic History of Europe,* vol. I (1966), vol. II (1987) and vol. III (1963), Cambridge University Press, Cambridge.

Potter, J. (1965), "The Growth of Population in America, 1700–1860", in Glass and Everseley.

Prakash, O. (1998), *European Commercial Enterprise in Pre–colonial India,* Cambridge University Press, Cambridge.

Preston, S.H and E. van der Walle (1978), "Urban French Mortality in the Nineteenth Century", *Population Studies,* 32, 2, pp. 275–297.

Procacci, G. (1978), *History of the Italian People*, Penguin Books, London.

Purcell, V. (1965), *The Chinese in Southeast Asia,* Oxford University Press, Kuala Lumpur.

Qaisar, A.J. (1982), *The Indian Response to European Techgnology and Culture, A.D. 1498–1707,* Oxford University Press, Bombay.

Ranis, G. and T.P. Schultz (eds.) (1988), *The State of Development Economics*, Blackwell, Oxford.

Rapp, R.T. (1976), *Industry and Economic Decline in Seventeenth Century Venice*, Harvard University Press, Cambridge, Ma.

Raychaudhuri, T. and I. Habib (1982) (eds.) *The Cambridge Economic History of India*, Cambridge University Press, Cambridge.

Reher, D.S. and R. Schofield (eds.) (1993), *Old and New Methods in Historical Demography*, Clarendon Press, Oxford.

Reid, A. (1988), *Southeast Asia in the Age of Commerce, 1450–1680, Vol. 1, The Lands Below the Winds*, Yale, New Haven.

Reid, A. (1993), *Southeast Asia in the Age of Commerce, 1450–1680, Vol. 2, Expansion and Crisis*, Yale, New Haven.

Reisen, H. and M. Soto (2000), "The Need for Foreign Savings in Post–Crisis Asia" (see Foy, Kim and Reisen) in Braga de Macedo and Chino (Preface by).

Ruoen, R. (1997), *China's Economic Performance in An International Perspective*, OECD Development Centre, Paris.

Riccioli, G.B. (1672), *Geographiae et Hydrographiae Reformatae, Libri Duodecim*, Venice.

Rich, E.E. and C.H. Wilson (1967), *The Cambridge History of Europe*, Vol. IV, Cambridge University Press, Cambridge.

Richards, E.G. (1998), *Mapping Time*, Oxford University Press, Oxford.

Richards, J.F. (1983), *Precious Metals in the Later Medieval and Early Modern Worlds,* Carolina Academic Press, Durham, North Carolina.

Robertson, J. (1984), "Japanese Farm Manuals: A Literature of Discovery", *Peasant Studies*, 11, Spring, pp. 169–194.

Romanelli, G. (ed.) (1997), *Venice: Art and Architecture,* Könemann, Cologne.

Romer, P.M. (1986), "Increasing Returns and Long Run Growth", *Journal of Political Economy*, 94, No. 5.

Rosenblat, A. (1945), *La Poblacion Indigena de America Desde 1492 Hasta la Actualidad*, ICE, Buenos Aires.

Rosenblat, A. (1967), *La Poblacion de America en 1492*, Colegio de Mexico, Mexico D.F.

Rostow, W.W. (1960), *The Stages of Economic Growth*, Cambridge University Press, Cambridge.

Rostow, W.W. (ed.) (1963), *The Economics of Take–Off into Sustained Growth*, Macmillan, London.

Rostow, W.W. (1990), *Theorists of Economic Growth from David Hume to the Present*, Oxford University Press, Oxford.

Rothermund, D. (1999), "The Changing Pattern of British Trade in Indian Textiles, 1701–57", in Chaudhury and Morineau.

Rosenzweig, F. (1963), "La economia Novo–Hispaña al comenzar del siglo XIX", *Revista de Sciencias Politicas y Sociales,* UNAM, July–September.

Rozman, G. (1973), *Urban Networks in Ch'ing China and Tokugawa Japan*, Princeton University Press, Princeton.

Russell, J.C. (1948), *British Medieval Population,* University of New Mexico, Albuquerque.

Russell, J.C. (1958), *Late Ancient and Medieval Population,* American Philosophical Society, Philadelphia.

Russell, P. (2000), *Prince Henry "The Navigator": A Life,* Yale University Press, New Haven.

Saito, O. (1979), "Who Worked When: Life Time Profiles of Labour Force Participation in Cardington and Corfe Castle in the Late Eighteenth and Mid–Nineteenth Centuries", *Local Population Studies*, pp. 14–29.

Saito, O. (1996), "Gender, Workload and Agricultural Progress: Japan's Historical Experience in Perspective", in Leboutte.

Saito, O. (1997), "Infant Mortality in Pre–Transition Japan: Levels and Trends", in Bideau, Desjardins and Perez Brignoli.

Salter, W.E.G. (1960), *Productivity and Technical Change*, Cambridge University Press, Cambridge.

Sanchez–Albornoz, N. (1984), "The Population of Colonial Spanish America", in Bethell, vol. 2.

Sanchez–Albornoz, N. (1986), "The Population of Latin America, 1850–1930", in Bethell, vol. 4.

Sarkar, N.K. (1957), *The Demography of Ceylon*, Ceylon Government Press, Colombo.

Schmookler, J. (1966), *Invention and Economic Growth*, Harvard University Press, Cambridge, Ma.

Schofield, R., D. Reher and A. Bideau (1991), *The Decline of Mortality in Europe,* Clarendon Press, Oxford.

Schultz, T.W. (1961), "Investment in Human Capital", *American Economic Review*, March.

Schumpeter, J.A. (1939), *Business Cycles*, McGraw Hill, New York.

Schwartz, S.B., (1985), *Sugar Plantations in the Formation of Brazilian Society*: *Bahià, 1550–1835,* Cambridge University Press, Cambridge.

Scott, M. and D. Lal (eds.) (1990), *Public Policy and Economic Development: Essays in Honour of Ian Little,* Clarendon Press, Oxford.

Sella, D. (1979), *Crisis and Continuity: The Economy of Spanish Lombardy in the Seventeenth Century*, Harvard University Press, Cambridge, Ma.

Shammas, C. (1993), "Changes in English and Anglo–American Consumption from 1550 to 1800", in Brewer and Porter.

Shea, D.E. (1976), "A Defence of Small Population Estimates for the Central Andes in 1520", in Denevan (1976), pp. 157–80.

Simonsen, R.C. (1962), *Historia Economica do Brasil (1500–1820)*, Editora Nacional, São Paulo.

Sivasubramonian, S. (2000), *The National Income of India in the Twentieth Century,* Oxford University Press, New Delhi.

Sivasubramonian, S. (2001), "Twentieth Century Economic Performance of India", in Maddison, Prasada Rao and Shepherd.

Slicher van Bath, B.H. (1963), *The Agrarian History of Western Europe, AD 500–1850*, Arnold, London.

Smith, A. (1776), *An Inquiry into the Nature and Causes of the Wealth of Nations,* University of Chicago Reprint, 1976.

Smith, T.C. (1959), *The Agrarian Origins of Modern Japan*, Stanford.

Smith, T.C. (1969), "Farm Family By-Employments in Preindustrial Japan", *Journal of Economic History,* December.

Smith, T.C. (1977), *Nakahara: Family Farming and Population in a Japanese Village, 1717–1830*, Stanford University Press, Stanford, California.

Smith, T.C. (1988), *Native Sources of Japanese Industrialization, 1750–1920*, University of California, Berkeley.

Smits, J.P., E. Horlings and J.L. van Zanden (2000), *The Measurement of Gross National Product and Its Components, 1800–1913*, Groningen Growth and Development Centre Monograph Series, No. 5.

Snodgrass, D.R. (1966), *Ceylon: An Export Economy in Transition*, Irwin, Illinois.

Snooks, G.D. (1993), *Economics Without Time*, Macmillan, London.

Snooks, G.D. (1996), *The Dynamic Society: Exploring the Sources of Global Change*, Routledge, London.

Snooks, G.D. (1997), *The Ephemeral Civilisation*, Routledge, London.

Solow, R.M. (1956), "A Contribution to the Theory of Economic Growth", *Quarterly Journal of Economics*, February.

Solow, R.M. (1960), "Investment and Technical Progress", in Arrow, Karlin and Suppes (eds.) *Mathematical Methods in the Social Sciences*, Stanford University Press.

Solow, R.M. (1962), "Technical Progress, Capital Formation and Eonomic Growth", *American Economic Review*, May.

Spooner, F.C. (1972), *The International Economy and Monetary Movements in France, 1493–1725*, Harvard University Press, Cambridge, Ma.

Spulber, N. (1966), *The State and Economic Development in Eastern Europe*, Random House, New York.

Steckel, R.H. and R. Floud (1997), *Health and Welfare during Industrialisation,* University of Chicago Press, Chicago.

Steensgaard, N. (1972), *Carracks, Caravans and Companies,* Copenhagen.

Stone, R. (1997), *Some British Empiricists in the Social Sciences 1650–1900*, Cambridge University Press, Cambridge.

Studenski, P. (1958), *The Income of Nations: Theory, Measurement and Analysis: Past and Present*, New York University Press, Washington Square.

Subrahmanyam, S. (1997), *The Career and Legend of Vasco de Gama,* Cambridge University Press, Cambridge.

Suh, S.C. (1978), *Growth and Structural Changes in the Korean Economy, 1910–40*, Harvard University Press, Cambridge, Ma.

Summers, R. and A. Heston (1991), "The Penn World Table (Mark 5): An Expanded Set of International Comparisons 1950–1988", *Quarterly Journal of Economics*, May, supplemented by January 1995 diskette of P.W.T. Mark 5.6.

Szereszewski, R. (1965), *Structural Changes in the Economy of Ghana*, Weidenfeld and Nicolson, London.

Szereszewski, R. (1968), *Essays on the Structure of the Jewish Economy in Palestine and Israel*, Falk Project, Jerusalem.

Szirmai, A., B. van Ark and D. Pilat (eds.) (1993), *Explaining Economic Growth: Essays in Honour of Angus Maddison*, North Holland, Amsterdam.

Taeuber, I.B. (1958), *The Population of Japan*, Princeton University Press, New Jersey.

Tawney, A.J. and R.H. (1934), "An Occupational Census of the Seventeenth Century", *Economic History Review*, October.

Taylor, G.R. (1964), "American Economic Growth Before 1840: An Exploratory Essay", *Journal of Economic History*, December, pp. 427–444.

Temple, W. (1693), *Observations upon the United Provinces of the Netherlands,* Tonson, London.

Terrise, M. (1975), "Aux origines de la méthode de reconstitution des familles: les Suédois d'Estonie", *Population*, numéro spécial.

Thirsk, J. (1978), *Economic Policies and Projects: The Development of a Consumer Society in Early Modern England*, Oxford University Press, Oxford.

Thomas, R.P. (1965), "A Quantitative Approach to the Study of the Effects of British Imperial Policy upon Colonial Welfare: Some Preliminary Findings", *Journal of Economic History,* December.

Thomas, R.P. (1968), "The Sugar Colonies of the Old Empire: Profit and Loss to Great Britain", *Economic History Review*.

Thornton, R. (1987), *American Indian Holocaust and Survival: A Population History since 1492*, University of Oklahoma, Norman.

Tibbetts, G.R. (1981), *Arab Navigation in the Indian Ocean before the Coming of the Portuguese,* Royal Asiatic Society of Great Britain and Ireland

Tracy, J.D. (ed.) (1990), *The Rise of Merchant Empires: Long Distance Trade in the Early Modern Period, 1350–1750,* Cambridge University Press.

Twitchett, D. and F.W. Mote (eds.) (1998), *The Cambridge History of China*, Vol. 8, *The Ming Dynasty,* Part 2, *1368–1644*, Cambridge University Press, Cambridge.

Ubelaker, D.H. (1976), "Prehistoric New World Population Size: Historical Review and Current Appraisal of North American Estimates", *American Journal of Physical Anthropology*, pp. 661–6.

Unger, R.W. (1980), *The Ship in the Medieval Economy, 600–1600,* Croom Helm, London.

Unger, R.W. (1992), "The Tonnage of Europe's Merchant Fleets, 1300–1800", *The American Neptune (52),* pp. 247–61.

UN Population Divison (1973), *The Determinants and Consequences of Population Trends,* New York.

UN Population Divison (1999), *World Population Prospects: The 1998 Revision*, New York.

Urlanis, B.Ts. (1941), *Rost Naselennie v Evrope*, Ogiz, Moscow.

Vallin, J. (1991), "Mortality in Europe from 1720 to 1914", in Schofield, Reher and Bideau.

Vamplew, W. (ed.) (1987), *Australians: Historical Statistics,* Cambridge University Press, Cambridge.

Van Der Eng, P. (1998), "Exploring Exploitation: The Netherlands and Colonial Indonesia, 1870–1940", *Revista de Historia Economica* XVI, 1, pp. 291–320.

VAUBAN, S. (1707), *La disme royale* (1992 edition, with introduction by E. Le Roy Ladurie, Imprimerie nationale, Paris).

VERLINDEN, C. (1963), "Markets and Fairs", in POSTAN *et al.* (eds.) Vol. III, pp. 126–136.

VERLINDEN, C. (1972), "From the Mediterranean to the Atlantic", *Journal of European Economic History,* pp. 625-46.

VISARIA, L. AND P. VISARIA (1983), "Population: 1757–1947", IN KUMAR AND DESAI.

VOGEL, W. (1915), "Zur Grösse der europaischen Handelsflotten im 15., 16. und 17. Jahrhundert", in D. Schäfer (ed.) *Forschungen und Versuche zur Geschichte des Mitelalters und der Neuzeit*, Fischer, Jena.

VON GLAHN, R. (1996), *Fountain of Fortune: Money and Monetary Policy in China, 1000–1700,* University of California Press, California.

VRIES, J. DE (1974), *The Dutch Rural Economy in the Golden Age, 1500–1700*, Yale.

VRIES, J. DE (1976), *Economy of Europe in an Age of Crisis, 1600–1750*, Cambridge University Press, Cambridge.

VRIES, J. DE (1984), *European Urbanization 1500–1800*, Methuen, London.

VRIES, J. DE (1985), "The Population and Economy of the Preindustrial Netherlands", *Journal of Interdisciplinary History*, XV:4, pp. 661–82.

VRIES, J. DE (1993), "Between Purchasing Power and the World of Goods: Understanding the Household Economy in Early Modern Europe", in BREWER AND PORTER.

VRIES, J. DE AND A. VAN DER WOUDE (1997), *The First Modern Economy: Success, Failure and Perseverance of the Dutch Economy, 1500–1815*, Cambridge University Press, Cambridge.

WAKE, C.H.H. (1979), "The Changing Pattern of Europe's Pepper and Spice Imports, ca 1400–1700", *Journal of European Economic History,* vol. 8(2), pp. 361–403.

WAKE, C.H.H. (1986), "The Volume of European Spice Imports at the Beginning and End of the Fifteenth Century", *Journal of European Economic History, vol* 15(3), pp. 621–35.

WALL, R. (1983), "The Household: Demographic and Economic Change in England, 1650–1970", in WALL *et al*.

WALL, R., J. ROBIN AND P. LASLETT (1983), *Family Forms in Historic Europe*, Cambridge University Press, Cambridge.

WALTER, J. AND R. SCHOFIELD (1989), *Famine, Disease and the Social Order in Early Modern Society,* Cambridge University Press, Cambridge.

WARMINGTON, E.H. (1928), *The Commerce Between the Roman Empire and India,* Cambridge University Press, Cambridge.

WESTERGAARD, H. (1932), *Contributions to the History of Statistics*, King, London (Kelley reprint, 1969).

WHITE, L. (1962), *Medieval Tehnology and Social Change, Clarendon Press,* Oxford.

WHITWORTH, C. (ed.) (1771), *The Political and Commercial Works of Charles Davenant*, 5 vols., Horsefield, London.

WILLCOX, W.F. (1931), "Increase in the Population of the Earth and of the Continents since 1650", in W.F. WILLCOX (ed.) *International Migrations*, Vol. II, National Bureau of Economic Research, New York, pp. 33–82.

WILLIAMS, E. (1970), *From Columbus to Castro: The History of the Caribbean 1492–1969,* Deutsch, London.

WILLIAMSON, J.G. (1995), "The Evolution of Global Markets Since 1830: Background Evidence and Hypotheses", *Explorations in Economic History*, 32, pp. 141–196.

WILSON, C. AND G. PARKER (eds.) (1977), *An Introduction to the Sources of European Economic History, 1500–1800*, Weidenfeld and Nicolson, London.

WOLF, J. (1912), *Die Volkswirtschaft der Gegenwart und Zukunft*, Deichert, Leipzig, 19l2.

WORLD BANK (2000), *Global Development Finance,* Washington, D.C.

WRIGLEY, E.A. (1967), "A Simple Model of London's Importance in Changing English Society and Economy 1650–1750", *Past and Present*, July, pp. 44–70.

Wrigley, E.A. (1988), *Continuity, Chance and Change*, Cambridge.

Wrigley, E.A. and R.S. Schofield (1981), *The Population History of England 1541–1871*, Arnold, London.

Wrigley, E.A., R.S. Davies, J.E. Oeppen and R.S. Schofield (1997), *English Population History from Family Reconstitution 1580–1837*, Cambridge University Press, Cambridge.

Wyckoff, A.W. (1995), "The Impact of Computer Prices on International Comparisons of Labour Productivity", *Economies of Innovation and New Technology,* vol. 3, pp. *277–93*.

Xu, Xianchun (1999), "Evaluation and Adjustments of China's Official GDP by the World Bank and Prof. Maddison", *Journal of Econometric Study of Northeast Asia*, Vol. 1, No. 2.

Yamada, S. and Y. Hayami (1979), "Agricultural Growth in Japan, 1880–1970", in Hayami, Ruttan and Southworth, pp. 33–48 and 230–64.

Yamamura, K. (1974), *A Study of Samurai Income and Entrepreneurship*, Harvard.

Yamamura, K. (1981), "Returns on Unification Economic Growth in Japan, 1550–1650", in Hall *et al*.

Yamamura, K. and T. Kamiri (1983), "Silver Mines and Sung Coins — A Monetary History of Medieval and Modern Japan in International Perspective", in Richards.

Yasuba, Y. (1987), "The Tokugawa Legacy: A Survey", *Economic Studies Quarterly,* December, pp. 290–308.

Yolton, J.W. (ed.) (1969), *John Locke: Problems and Perspectives.*

Yoshida, T. (1911), *Ishinshi Hachi Ko*, Fuzanbo, Tokyo.

Yun, B. (1994), "Proposals to Quantify Long–Run Performance in the Kingdom of Castile, 1550–1800", in Maddison and van der Wee.

Zambardino, R.A. (1980), "Mexico's Population in the Sixteenth Century: Demographic Anomaly or Mathematical Illusion?", *Journal of Interdisciplinary History*, pp. 1–27.

Zanden, J.L. van (1987), "De economie van Holland in de periode 1650–1805: groei of achteruitgang? Een overzicht van bronnen, problemen en resultaten", *Bijdrage en Mededelingen Geschiedenis der Nederlanden*.

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