

Introduction and Summary

The Contours of World Development

Over the past millennium, world population rose 22-fold. Per capita income increased 13-fold, world GDP nearly 300-fold. This contrasts sharply with the preceding millennium, when world population grew by only a sixth, and there was no advance in per capita income.

From the year 1000 to 1820 the advance in per capita income was a slow crawl — the world average rose about 50 per cent. Most of the growth went to accommodate a fourfold increase in population.

Since 1820, world development has been much more dynamic. Per capita income rose more than eightfold, population more than fivefold.

Per capita income growth is not the only indicator of welfare. Over the long run, there has been a dramatic increase in life expectation. In the year 1000, the average infant could expect to live about 24 years. A third would die in the first year of life, hunger and epidemic disease would ravage the survivors. There was an almost imperceptible rise up to 1820, mainly in Western Europe. Most of the improvement has occurred since then. Now the average infant can expect to survive 66 years.

The growth process was uneven in space as well as time. The rise in life expectation and income has been most rapid in Western Europe, North America, Australasia and Japan. By 1820, this group had forged ahead to an income level twice that in the rest of the world. By 1998, the gap was 7:1. Between the United States (the present world leader) and Africa (the poorest region) the gap is now 20:1. This gap is still widening. Divergence is dominant but not inexorable. In the past half century, resurgent Asian countries have demonstrated that an important degree of catch-up is feasible. Nevertheless world economic growth has slowed substantially since 1973, and the Asian advance has been offset by stagnation or retrogression elsewhere.

The Purpose of this Study

The purpose of this book is to quantify these long term changes in world income and population in a comprehensive way; identify the forces which explain the success of the rich countries; explore the obstacles which hindered advance in regions which lagged behind; scrutinise the interaction between the rich countries and the rest to assess the degree to which their backwardness may have been due to Western policy.

There is nothing new about long-term surveys of economic performance. Adam Smith had a very broad perspective in his pioneering work in 1776. Others have had an equally ambitious vision. There has been spectacular progress in recent years in historical demography¹. What is new in this study is systematic quantification of comparative economic performance.

In the past, quantitative research in economic history has been heavily concentrated on the nineteenth and twentieth centuries when growth was fastest. To go back earlier involves use of weaker evidence, greater reliance on clues and conjecture. Nevertheless it is a meaningful, useful and necessary exercise because differences in the pace and pattern of change in major parts of the world economy have deep roots in the past.

Quantification clarifies issues which qualitative analysis leaves fuzzy. It is more readily contestable and likely to be contested. It sharpens scholarly discussion, sparks off rival hypotheses, and contributes to the dynamics of the research process. It can only do this if the quantitative evidence and the nature of proxy procedures is described transparently so that the dissenting reader can augment or reject parts of the evidence or introduce alternative hypotheses. The analysis of Chapters 1, 2 and 3 is underpinned by six appendices which are intended to supply the necessary degree of transparency.

Explaining Economic Performance

Advances in population and income over the past millennium have been sustained by three interactive processes:

- a) Conquest or settlement of relatively empty areas which had fertile land, new biological resources, or a potential to accommodate transfers of population, crops and livestock;
- b) international trade and capital movements;
- c) technological and institutional innovation.

a) Conquest and Settlement

One important instance of this process was Chinese settlement of the relatively empty and swampy lands south of the Yangtse, and introduction of new quick-ripening strains of rice from Vietnam suitable for multicropping. This process occurred between the eighth and thirteenth centuries, during which population growth accelerated, per capita income rose by a third, and the distribution of population and economic activity were transformed. In the eighth century only a quarter of the Chinese population lived south of the Yangtse; in the thirteenth, more than threequarters. The new technology involved higher labour inputs, so productivity rose less than per capita income².

An even more dramatic case was the European encounter with the Americas. The existence of this continent was unknown to Europeans before the 1492 voyage of Columbus³. The discovery opened up an enormous area, for the most part thinly populated. Mexico and Peru were the most advanced and densely settled, but they were easily conquered and three quarters of their population was wiped out by diseases which the Europeans inadvertently introduced. The new continent offered crops unknown elsewhere — maize, potatoes, sweet potatoes, manioc, chilis, tomatoes, groundnuts, pineapples, cocoa and tobacco. These were introduced in Europe, Africa and Asia, and enhanced their production potential and capacity to sustain population growth. There was a reciprocal transfer to the Americas, which greatly augmented its potential. The new crops were wheat, rice, sugar cane, vines, salad greens, olives, bananas and coffee. The new animals for food were cattle, pigs, chickens, sheep and goats, as well as horses, oxen, asses and donkeys for transport.

The major initial attractions of the Americas were the rich silver resources of Mexico and Peru, and development of plantation agriculture with imports of slave labour from Africa. The neo-European economies of North America and the southern cone of Latin America developed later. The population of the Americas did not recover its 1500 level until the first half of the eighteenth century. The full potential of the Americas began to be realised in the nineteenth century with massive European immigration and the western movement of the production frontier made possible by railways.

The present variation in economic performance within the Americas — between the United States, Latin America and the Caribbean — is partly due to variations in resource endowment, but there are institutional and societal echoes from the past. In North America and Brazil the relatively small indigenous population was marginalised or exterminated, in former Spanish colonies the indigenous population remained as an underclass, and in all the areas where slavery was important their descendants have also remained an underprivileged group. Quite apart from this, there were important differences in the colonial period between Iberian institutions and those of North America. These continued to have an impact on subsequent growth performance⁴.

b) International Trade and Capital Movements

International trade was important in the economic ascension of Western Europe, and much less significant in the history of Asia or Africa.

Venice played a key role from 1000 to 1500 in opening up trade within Europe (to Flanders, France, Germany and the Balkans) and in the Mediterranean. It opened trade in Chinese products via the caravan routes to ports in the Black Sea. It traded in Indian and other Asian products via Syria and Alexandria. Trade was important in bringing high value spices and silks to Europe, but it also helped the transfer of technology from Asia, Egypt and Byzantium (silk and cotton textile production, glassblowing, cultivation of rice in Italy, cane sugar production and processing in the Venetian colonies of Crete and Cyprus). To a significant degree the maritime expansion of Venice depended on improved techniques of shipbuilding in its Arsenal, use of the compass and other improvements in navigation. Institutional innovations — the development of banking, accountancy, foreign exchange and credit markets, creation of a solvent system of public finance, creation of a competent diplomatic service were all instrumental in establishing Venice as the lead economy of that epoch. Venice played an important part in fostering the intellectual development of Western Europe. It created manuscript libraries and pioneered in book publishing. Its glass industry was the first to make spectacles on a large scale. It played a leading role in the Renaissance by making Greek works known in the West. The University of Padua was a major centre of European learning, with Galileo as one of its distinguished professors.

Venetian contacts with Asia were eventually blocked by the fall of Byzantium, the rise of the Ottoman Empire, the collapse of the crusader states in the Levant and the Mameluke regime in Egypt. In the second half of the fifteenth century, a much more ambitious interaction between Europe and the rest of the world had started in Portugal.

Portugal played the main role in opening up European trade, navigation and settlement in the Atlantic islands, in developing trade routes around Africa, into the Indian Ocean, to China and Japan. It became the major shipper of spices to Europe for the whole of the sixteenth century, usurping this role from Venice. Its navigators discovered Brazil. Its diplomacy was astute enough to persuade Spain to endorse its territorial claim there, and to let it have a monopoly of trade with the Moluccan spice islands and Indonesia. Although Spain had a bigger empire, its only significant base outside the Americas was the Philippines. Its two most famous navigators were Columbus who was a Genoese with Portuguese training, and Magellan who was Portuguese.

Portugal had major advantages in developing its overseas commerce and empire. There was a clear strategic benefit in being located on the South Atlantic coast of Europe near to the exit of the Mediterranean. Deep-sea fishermen provided an important part of the Portuguese food supply and developed an unrivalled knowledge of Atlantic winds, weather and tides. The value of these skills was greatly enhanced by crown sponsorship of Atlantic exploration, research on navigation, training of pilots, and documentation of maritime experience in the form of route maps with compass bearings (rutters) and cartography. Portuguese shipbuilders in Lisbon and Oporto adapted the design of their ships in the light of increasing knowledge of Atlantic sailing conditions. The biggest changes were in rigging. At first they concentrated on lateen sails, then added a mix of square sails and lateen for deeper penetration into the South Atlantic, with further changes for the much longer route round the Cape. Another element in Portuguese success was the ability to absorb “new Christians” — Jewish merchants and scholars who had played a significant role in Iberia during Muslim rule. They were driven out of Spain, but many took refuge and increased the size of the community in Portugal. They were required to undergo proforma conversion and were subject to a degree of persecution, but they provided important skills in developing Portuguese business interests in Africa, Brazil and Asia, in scientific development, as intermediaries in trade with the Muslim world and in attracting Genoese and Catalan capital to Portuguese business ventures.

Portugal was responsible for transferring cane sugar production and processing technology into the Atlantic islands of Madeira and São Tomé, and later to Brazil. It inaugurated the slave trade to provide a labour force for the industry in the New World. It carried about half of the slaves who were shipped to the Americas from Africa between 1500 and 1870. In the fifteenth century, sugar was a very rare and expensive commodity in Europe; by the end of the eighteenth century it was an item of popular consumption, having grown much more in volume than trade in any other tropical product.

At the time Portugal was pioneering these worldwide linkages, trade relations between different parts of northern Europe were intensified by the phenomenal development of Dutch maritime activity. In 1570, the carrying capacity of Dutch merchant shipping was about the same as the combined fleets of England, France and Germany. Per head of population it was 25 times as big as in these three northern countries.

Development of shipping and shipbuilding, the transformation of Dutch agriculture into horticulture, the creation of a large canal network, use of power derived from windmills and peat made the Netherlands the most dynamic European economy from 1400 to the middle of the seventeenth century. It pushed international specialisation much further than any other country. Shipping and commercial services provided a large part of its income. It imported cereals and live cattle, exported herring and dairy products. In 1700 only 40 per cent of the labour force were in agriculture.

Until 1580 the Netherlands was part of a bigger political entity. It included Flanders and Brabant — the most prosperous industrial area in Europe and a centre for banking, finance and international commerce which was a northern counterpart to Venice. The whole area was under Burgundian control until the late fifteenth century, then fell into the hands of the Habsburgs who were also rulers of Spain. The Dutch revolted against their predatory empire because of its excessive fiscal demands, political and religious repression. They created a modern nation state, which protected property rights of merchants and entrepreneurs, promoted secular education and practised religious tolerance.

Most of the financial and entrepreneurial elite and many of the most skilled artisans of Flanders and Brabant emigrated to the new republic. The Dutch blockaded the river Scheldt and the port of Antwerp for more than 200 years, and destroyed the Iberian monopoly of trade with Africa, Asia and the Americas.

Dutch experience from 1580 to the end of the Napoleonic wars provides a dramatic demonstration of the way in which Western Europe interacted with the world economy in that epoch.

The initial economic success of the Dutch Republic, and its maritime and commercial supremacy, depended to a substantial extent on success in war and beggar–your–neighbour commercial policy in competition with Portugal and Spain. By the eighteenth century it had lost this supremacy, because two new rivals, England and France, had greatly increased their maritime strength, and used the same techniques to push the Dutch out of the markets they sought to dominate. The volume of Dutch foreign trade dropped 20 per cent from 1720 to 1820. During this period, UK exports rose more than sevenfold in volume, and French by two and threequarters. From 1700 to 1820, Dutch per capita income fell by a sixth, British rose by half and French by a quarter.

Britain had faster growth in per capita income from the 1680s to 1820 than any other European country. This was due to improvement of its banking, financial and fiscal institutions and agriculture on lines which the Dutch had pioneered, and to a surge in industrial productivity at the end of the period. It also derived great benefits from its rise to commercial hegemony by adroit use of a beggar–your–neighbour strategy.

Sixty years of armed conflict and the restrictive Navigation Acts pushed competitors out of the markets it sought to monopolise. It took over the leading role in shipping slaves from Africa to the Caribbean and created an overseas empire with a population of about 100 million by 1820.

Other European powers were losers in the British struggle for supremacy. By the end of the Napoleonic wars, the Dutch had lost all their Asian territories except Indonesia. The French were reduced to a token colonial presence in Asia, and lost their major asset in the Caribbean. Shortly after the war, Brazil established its independence from Portugal. Spain lost its huge colonial empire in Latin America, retaining only Cuba, Puerto Rico and the Philippines. Britain took over what the French and Dutch had lost in Asia and Africa, extended its control over India, and established a privileged commercial presence in Latin America.

Other losers included the former rulers of India, whose power and income were usurped in substantial part by the servants of the British East India Company. Under their rule, from 1757 to 1857, Indian per capita income fell, but British gains were substantial.

Between 1820 and 1913, British per capita income grew faster than at any time in the past — three times as fast as in 1700–1820. The basic reason for improved performance was the acceleration of technical progress, accompanied by rapid growth of the physical capital stock and improvement in the education and skills of the labour force, but changes in commercial policy also made a substantial contribution. In 1846 protective duties on agricultural imports were removed and in 1849 the Navigation Acts were terminated. By 1860, all trade and tariff restrictions had been removed unilaterally. In 1860 there were reciprocal treaties for freer trade with France and other European countries. These had most–favoured nation clauses which meant that bilateral liberalisation applied equally to all countries.

Free trade was imposed in India and other British colonies, and the same was true in Britain's informal empire. China, Persia, Thailand and the Ottoman Empire were not colonies, but were obliged to maintain low tariffs by treaties which reduced their sovereignty in commercial matters, and granted extraterritorial rights to foreigners. This regime of free trade imperialism favoured British exports, but was less damaging to the interests of the colonies than in the eighteenth century, when Jamaica could only trade with Britain and its colonies, Guadeloupe only with France.

The British policy of free trade and its willingness to import a large part of its food had positive effects on the world economy. They reinforced and diffused the impact of technical progress. The favourable impact was biggest in North America, the southern cone of Latin America and Australasia which had rich natural resources and received a substantial inflow of capital, but there was also some positive effect in India which was the biggest and poorest part of the Empire.

Innovations in communications played a major part in linking national capital markets and facilitating international capital movements. The United Kingdom already had an important role in international finance, thanks to the soundness of its public credit and monetary system, the size of its

capital market and public debt, and the maintenance of a gold standard. The existence of the empire created a system of property rights which appeared to be as securely protected as those available to investors in British securities. It was a wealthy country operating close to the frontiers of technology, so its rentiers were attracted to foreign investment even when the extra margin of profit was small.

From the 1870s onward, there was a massive outflow of British capital for overseas investment. The United Kingdom directed half its savings abroad. French, German and Dutch investment was also substantial.

The old liberal order was shattered by two world wars and the collapse of capital flows, migration and trade in the beggar–your–neighbour years of the 1930s. Between 1913 and 1950, the world economy grew much more slowly than in 1870–1913, world trade grew much less than world income, and the degree of inequality between regions increased substantially, the setback being biggest in Asia.

By 1950 colonialism was in an advanced state of disintegration. With one or two exceptions, the exit from empire was more or less complete by the 1960s. The British imperial order was finished, as were those of Belgium, France, the Netherlands and Japan. In the West, the United States had emerged as the hegemonial power competing with the Soviet bloc for leverage in the newly independent countries of Asia and Africa.

The world economy grew very much faster from 1950 to 1973 than it had ever done before. It was a golden age of unparalleled prosperity. World per capita GDP rose nearly 3 per cent a year (a rate which implies a doubling every 25 years). World GDP rose by nearly 5 per cent a year and world trade by nearly 8 per cent a year. This dynamism affected all regions. The acceleration was greatest in Europe and Asia. There was also a degree of convergence between regions, though a good part of this was a narrowing of the gap between the United States and the other advanced capitalist countries (Western Europe and Japan).

There were several reasons for unusually favourable performance in the golden age. In the first place, the advanced capitalist countries created a new kind of liberal international order with explicit and rational codes of behaviour, and institutions for co–operation (OEEC, OECD, IMF, World Bank and the GATT) which had not existed before. There was a very serious East–West split from 1948 onwards, but the split reinforced the harmony of interest between capitalist economies, so the beggar–your–neighbour behaviour of pre–war years did not recur. The United States provided a substantial flow of aid for Europe when it was most needed, fostering procedures for articulate co–operation and liberal trading policies. Until the 1970s it also provided the world with a strong anchor for international monetary stability. North–South relations were transformed from the colonial tutelage of pre–war years to a situation where more emphasis was placed on action to stimulate development. The huge expansion of trade in the advanced capitalist economies transmitted a dynamic influence throughout the world economy.

The second new element of strength was the character of domestic policies which were self–consciously devoted to promotion of high levels of demand and employment in the advanced countries. Growth was not only faster than ever before, but the business cycle virtually disappeared. Investment rose to unprecedented levels and expectations became euphoric. Until the 1970s, there was also much milder inflationary pressure than could have been expected in conditions of secular boom.

The third element in this virtuous circle situation was the potential for growth on the supply side. Throughout Europe and Asia there was still substantial scope for “normal” elements of “recovery” from the years of depression and war. Additionally and more importantly, was the continued acceleration of technical progress in the lead country. Furthermore, the United States played a diffusionist role in the golden age in sharp contrast to its role in the interwar years.

Since the golden age, the world picture has changed a great deal. Per capita growth has been less than half as fast. There has been much greater divergence in the performance of different regions. In Western Europe and Japan, per capita growth fell well below that in the golden age, but was appreciably

better than in 1870–1913. In the countries of “resurgent Asia”, which have half the world’s population, the success was quite extraordinary. Their per capita growth was faster after 1973 than in the golden age, and more than ten times as fast as in the old liberal order.

If the world consisted only of these two groups, the pattern of world development could be interpreted as a clear demonstration of the possibilities for convergence. By success in mobilising and allocating resources efficiently and improving their human and physical capital to assimilate and adapt appropriate technology, the countries of resurgent Asia achieved significant catch-up on the advanced capitalist group.

However, there is another group (168 countries, with about a third of the world’s population) where the deterioration in performance since the golden age has been alarming. In Africa there has been no advance in per capita income in the past quarter century. In Eastern Europe and the former USSR, average per capita income in 1998 was about threequarters of that in 1973. In Latin America and in many Asian countries, income gains have been a fraction of what they were in the golden age. The economies of this heterogeneous group of “faltering economies” have been falling behind instead of catching up. Most of them have not been able to adapt successfully to an international economic order which has changed considerably from that in the golden age.

The way in which postwar order now operates is analysed in detail in Chapter 3. The structure of the analysis is based on Table 3–5 which summarises the comparative performance of the major regions.

c) Technological and Institutional Innovation

From the year 1000 to 1820, advances in technology were much slower than they have been since, but they were nevertheless a significant component of the growth process. Without improvements in agriculture, the increase in world population could not have been sustained. Without improvements in maritime technology and commercial institutions the opening up of the world economy could not have been achieved. Technical advance in important areas was dependent on fundamental improvements in scientific method, experimental testing, systematic accumulation and publication of new knowledge. The long centuries of effort provided intellectual and institutional foundations for the much more rapid advances achieved in the nineteenth and twentieth centuries.

This process of cumulative advance is clearly demonstrated in the history of maritime technology and navigation. In the year 1000, European ships and navigation were no better than in the Roman Empire. The advance started when Venice created its public shipyard, the Arsenal, in 1104 to build its oared galleys and improve ship design. The introduction of the compass and the sandglass for measuring time at sea helped to double the productivity of ships. They could navigate in bad weather and make two return journeys a year from Venice to Alexandria instead of one. The Portuguese preparations for the passage to India were a major research project involving years of experimentation in shipping technology, improvement of navigational instruments and charts, applied astronomy, developing knowledge of winds, currents and alternative routes. The Dutch created a new type of factory ship for processing the herring catch at sea. They developed mass production of a cheap general purpose cargo vessel (the fluyt). The British government financed and encouraged research into astronomy, terrestrial magnetism, production of the first reliable maritime chronometer and nautical almanacs. They also demonstrated the efficacy of sauerkraut and citrus juice in preventing scurvy.

By the end of the eighteenth century ships could carry ten times the cargo of a fourteenth century Venetian galley, with a much smaller crew. The safety of long distance sea travel was also greatly improved. In their first voyages to Asia, da Gama and Cabral lost half their crew and more than half of their ships. Magellan lost more than 90 per cent of his crew on the first circumnavigation of the globe. Cook’s successful circumnavigation 240 years later approximated modern standards of maritime safety.

Until the fifteenth century, European progress in many fields was dependent on transfers of technology from Asia or the Arab world. In 1405–33, Chinese superiority in shipping technology was evident in seven major expeditions to the “Western Oceans” (see Table 2–11). Chinese ships were much bigger than those of the Portuguese, more seaworthy and more comfortable, with watertight compartments, many more cabins, and a capacity to navigate over large distances to Africa. Thereafter, China turned its back on the world economy, and its maritime technology decayed.

By the end of the seventeenth century, the technological leadership of Europe in shipping and armaments was apparent. There had also been important institutional advances. Banking, credit, foreign exchange markets, financial and fiscal management, accountancy, insurance and corporate governance (by the Dutch and British East India Companies) were more sophisticated than those in Asia, and were essential components of European success in opening up the world economy.

Within Western Europe the diffusion of technology was fairly rapid, and the technological distance between nations was not particularly wide in spite of the frequency of wars. Links were fostered by the growth of humanist scholarship, the creation of universities and the invention of printing.

In the sixteenth and seventeenth centuries, there was a revolutionary change in the quality of western science with close interaction of savants and scientists such as Copernicus, Erasmus, Bacon, Galileo, Hobbes, Descartes, Petty, Leibnitz, Huyghens, Halley and Newton. Many of them were in close contact with colleagues in other countries, or spent years abroad. This type of co-operation was institutionalised by the creation of scientific academies which encouraged discussion and research, and published their proceedings. Much of this work had practical relevance, and many of the leading figures were concerned with matters of public policy.

Diffusion of these advances outside Europe was relatively limited. There were Jesuit scholars in Peking for nearly two centuries, some of them like Ricci, Schall and Verbiest had intimate contact with ruling circles, but there was little curiosity amongst the Chinese elite about intellectual and scientific development in the West. Japanese exposure to western knowledge was more limited than Chinese, but its impact went deeper. The Portuguese and the Jesuits were in Japan for nearly a century, and there was considerable interest in European ships, maps, navigation and guns. After the Portuguese were expelled the only contact Japan had with western learning was with those Dutch East India Company officials who were scientists (Kaempfer, Thunberg and von Siebold). Although these contacts were limited, they helped destroy Japanese respect for “things Chinese” and accentuate their curiosity about “things Western” (see Appendix B).

The East India Company officers who controlled India from 1757 to 1857 had a strong streak of Benthamite radicalism, and a strong urge to modify Indian legal and property institutions. After the Indian Mutiny of 1857 and establishment of direct imperial control, these radical westernising ambitions were dropped. In Indonesia, there were somewhat similar ambitions in the period of British administration during the Napoleonic wars, but Westernisation was abandoned after the Diponogoro revolt in the 1830s.

The only effective overseas transmission of European technology and science by the end of the eighteenth century was to the 13 British colonies in North America. In 1776 they had nine universities for 2.5 million people and an intellectual elite (e.g. Benjamin Franklin and Thomas Jefferson) fully familiar with the activities of their European contemporaries. In the Spanish colonies, Brazil and the Caribbean there were more than 17 million people, but only two universities (in Mexico City and Guadalajara) which concentrated on theology and law.

The reasons for the accelerated growth of technical progress since 1820 are analysed in considerable detail in my earlier study, *Monitoring the World Economy* (1995), particularly in Chapter 2 and pp. 71–3, and are not treated at any length in this volume. However, it is clear that technical progress has slowed down. It was a good deal faster from 1913 to 1973 than it has been since. The slowdown in the past quarter century is one of the reasons for the deceleration of world economic growth. “New economy” pundits find the notion of decelerating technical progress unacceptable and cite anecdotal or microeconomic evidence to argue otherwise. However, the impact of their technological revolution has not been apparent in the macroeconomic statistics until very recently, and I do not share their euphoric expectations⁵.

Notes

1. Wrigley and Schofield (1981) and Wrigley and Associates (1997) used techniques of family reconstitution and inverse projection to exploit church records of births, deaths and marriages. As a result, we now have annual estimates of English population and demographic characteristics since 1541. Bagnall and Frier (1994) used remnants of Roman censuses to reconstruct the demography and economy of third century Egypt. Thanks to the work of de Vries (1984) for Europe and Rozman (1973) for Asia one can measure the proportionate importance of urbanisation for long periods in the past. 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. The work of Perkins encouraged me to write *Chinese Economic Performance in the Long Run* (OECD Development Centre, 1998) which has the same temporal perspective as the present study.
2. See Maddison (1998a), pp. 24–33 for an analysis of the historical development of Chinese agriculture; see Boserup (1965) for a brilliant refutation of the simplistic Malthusian view that population pressure on a fixed stock of natural resources will inevitably produce diminishing returns. She shows how “traditional” Asian agriculture accommodated population pressure by a whole series of changes of technical practice. Intensity of land use progressed from hunter–gatherer activities, to forest fallow, settled farming with improved tools, from dry farming and fallowing to irrigation and multi–cropping. In this process there was probably a significant drop in labour productivity before modern fertilisers and machinery came on the scene.
3. See Morison (1971) on the Norwegian movement from Iceland to Greenland and Leif Ericsson’s trip in 1001 via Baffin island, Belle Isle and the Labrador sea to the northern tip of Newfoundland where there was a very brief and long forgotten settlement at l’Anse aux Meadows.
4. Adam Smith *The Wealth of Nations*, 1776, book IV, Chapter VII, Part II contains a prescient assessment of these institutional differences and their implications for subsequent development. Engrossment of land which hindered its development and transfer, the heavy burden taxes to support the pomp of civil and ecclesiastical government, and official control of markets were the shortcomings in the Spanish colonies which he emphasised. See Chapter 2 of this study for my assessment of the Portuguese influence on Brazil, and the difference between the colonial heritage in Mexico and the United States.
5. See the discussion of US economic performance in Chapter 3, and Box 3–1.

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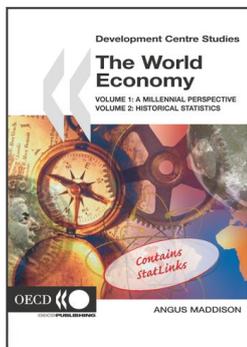
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