Economic History Working Papers No: 184/2013

Accounting for the Great Divergence

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LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE
DEPARTMENT OF ECONOMIC HISTORY
WORKING PAPERS
NO. 184 - NOVEMBER 2013

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Abstract

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

Keywords: Great Divergence; living standards; measurement; explanation

Acknowledgements: This paper is based on the Figuerola Lecture delivered at the Fundación Ramón Areces in Madrid, 22 October 2012. I gratefully acknowledge the financial assistance of the Leverhulme Trust (Reference Number F/00215AR) and the Collaborative Project HI-POD supported by the European Commission's 7th Framework Programme for Research, Contract Number SSH7-CT-2008-225342 for the underlying research, which was carried out jointly with Jean-Pascal Bassino, Bruce Campbell, Johann Custodis, Kyoji Fukao, Hanhui Guan, Bishnnupriya Gupta, Alexander Klein, David Li, Mark Overton, Masanori Takashima and Bas van Leeuwen. I am grateful to Bob Allen, Jean-Pascal Bassino, Bruce Campbell, Giovanni Federico, Leigh Gardner, Mark Koyama, Debin Ma, Paolo Malanima, Ulrich Pfister, Leandro Prados de la Escosura, Jaime Reis, Tirthankar Roy, Osamu Saito, Bas van Leeuwen and seminar/conference participants at Copenhagen, LSE, Odense, Perugia, Washington and Warwick, for helpful comments and discussions.

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31 October 2013

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I. INTRODUCTION

The debate over the Great Divergence of productivity and living standards between Europe and Asia has had a remarkable impact on the economic history profession. For more than a century, economic historians had worked within a general framework where the Industrial Revolution was seen as the culmination of a process of gradual improvement, beginning in the late middle ages and continuing through the early modern period. As Europe transformed its institutions and accumulated capital, Asia stagnated and began to fall behind. The Industrial Revolution and nineteenth century colonialism were seen as accelerating this process of divergence, but were not seen as its fundamental causes. Pomeranz (2000) questioned what he saw as the Eurocentric bias of this account, claiming that as late as 1800, the Yangzi Delta region of China was as developed as Britain and Holland, the richest parts of Europe. Other parts of Asia were also seen as equally developed at the end of the eighteenth century. This chimed with the work of Frank (1998) and other economic historians working in California, and became known as the California School. Parthasarathi (1998) has claimed parity of living standards with Britain for South India during the late eighteenth century, while Hanley (1983) has argued for high living standards in nineteenth century Japan.

However, one feature of this work was that it was not generally based on systematic analysis of data, despite the fundamentally quantitative nature of the revisionist claims being made. The last decade has seen tremendous progress in the extension of quantitative economic history both back in time and across space to cover Asia as well as Europe, and this paper draws on this work to provide an account of the Great Divergence. The word "accounting" is used in two ways in this paper, embracing both measurement and explanation. The firmest conclusions will be in the area of measurement, because that is

where most progress has been made recently, but there have also been advances in understanding the explanatory factors leading to the Great Divergence.

This paper argues that the revisionist authors of the California School have massively exaggerated the development level of the most advanced Asian economies in 1800, so that their most striking claim turns out to be false. Nevertheless, the California School has had an enduring effect on economic history. It would now be impossible to make a serious comparison between Europe and Asia without emphasising regional variations within both continents. Much of this paper hinges on regional differences within both continents, and these differences were barely visible in the literature as recently as a decade ago. Although the Great Divergence between Europe and Asia had its origins in the late medieval period and was already well under way in the early modern period, as in the traditional economic history literature, there was a great deal of regional diversity, as suggested by the California School. Within Europe, there was a massive reversal of fortunes between the North Sea Area and Mediterranean Europe. This is sometimes known as the Little Divergence, and involved Britain and Holland overtaking Italy and Spain. Within Asia, there also seems to have been a reversal of fortunes with Japan overtaking China and India in another Little Divergence. Although this account therefore suggests some similarities between Japan and the North Sea Area, which seems consistent with the views of the California School, it is important to bear in mind that Japan started from a lower level and grew at a slower rate than the North Sea Area, and thus continued to fall behind until after the Meiji Restoration of 1868. This means that a Great Divergence was occurring between Europe and Asia at the same time as the Little Divergences within both continents.

As well as quantifying the timing of the Great Divergence in terms of GDP per capita comparisons, this paper also offers an account of the Great Divergence, in the sense of explanation. The framework adopted here is to see the divergences as arising from the differential impact of shocks hitting economies with different structures. The first structural factor is the mixed agriculture with a large pastoral component that helped to put the North Sea Area on a path to high-value-added, capital-intensive, non-human-energy-intensive production (Broadberry, Campbell, Klein, Overton and van Leeuwen, 2011). The second structural factor is the high female age of first marriage in the North Sea Area, which led to lower fertility and more investment in human capital (de Moor and van Zanden, 2011). The third factor is the flexibility of labour supply. Although it is possible to point to an "industrious revolution" in the North Sea Area, which helps to explain the Little Divergence within Europe, the term was first coined in the context of Japan during the Tokugawa Shogunate, and thus has less role in explaining the Great Divergence between Europe and Asia (de Vries, 2008; Hayami, 1967). The fourth structural factor is institutions, with the role of the state helping to explain the success of the North Sea Area through the growth of state capacity, but balanced by constraints on the executive (Epstein, 2000; O'Brien, 2011; Acemoglu, Johnson and Robinson, 2005). Two shocks played an important role in the process of divergence. First, the Black Death of the mid-fourteenth century led to a permanent upward shift of per capita incomes in the North Sea Area, which did not occur in the rest of Europe or Asia (Epstein, 2000; Allen, 2001). Second, the new trade routes which opened up from Europe to Asia and the Americas accelerated the process of divergence. Both shocks had long-lasting effects through their interaction with structural features of the different economies.

2. MEASURING ECONOMIC GROWTH BEFORE 1870

Until recently, most accounts of economic growth before 1870 were largely qualitative. That changed with Maddison's (2001), *The World Economy: A Millennial Perspective*, published shortly after Pomeranz's (2000) *The Great Divergence*. However, there is a large amount of "guesstimation" in the Maddison (2010) data set, with a number of observations set at or close to $400 in 1990 international prices. This is equivalent to most people living at "bare bones subsistence", or the World Bank poverty level of $1 per day, with a small rich elite on top. Furthermore, Maddison provides his conjectural estimates only for a small number of years. Table 1 sets out Maddison's estimates for the four European countries and the three Asian countries which will be the focus of attention in this paper. The four European countries have been chosen to include the richest parts of Europe in the late middle ages (Italy and Spain) and in the modern period (Holland and Britain). Similarly, the Asian economies have been chosen to include the richest parts of Asia in the early part of the second millennium (China) and in the modern period (Japan). Recently, however, economic historians have begun to produce estimates of per capita income in a national accounting framework, based on hard data, and a firmer picture has begun to emerge of the contours of long run growth and development in both Europe and Asia. This is possible because medieval and early modern Europe and Asia were much more literate and numerate than is often thought, and left behind a wealth of data in documents such as government accounts, customs accounts, poll tax returns, parish registers, city records, trading company records, hospital and educational establishment records, manorial accounts, probate inventories, farm accounts, tithe files. With a national accounting framework and careful cross-checking, it is possible to reconstruct population and GDP back to the medieval period.

2.1 Europe's Little Divergence

For some European countries, abundant quantitative information has survived, so that historical national accounts can be constructed on a sectoral basis in great detail. Britain and Holland have the best data, with historical national accountants able to build on decades of detailed data processing by generations of scholars as well as well-stocked archives (Broadberry, Campbell, Klein, Overton and van Leeuwen, 2011; van Zanden and van Leeuwen, 2012). For other countries, where information is more limited, or where there has been less processing of existing data, Malanima (2011), Álvarez-Nogal and Prados de la Escosura (2013) and others have developed a short-cut method for reconstructing GDP. In the short-cut method, the economy is first divided between agriculture and non-agriculture. In the agricultural sector, output is estimated via a demand function, making use of data on population, real wages and the relative price of food, together with elasticities derived from later periods and the experience of other less developed economies. An allowance can also be made for international trade in food. For the non-agricultural sector, output is assumed to have moved in line with the urban population, but with some allowance made for rural industry and the phenomenon of agro-towns. This output-based GDP is helpful in bridging the gap between the macro approach of growth economists and the sectoral approach of much economic history.

The new estimates based on historical national accounting, presented here in Table 2, revise upwards the level of per capita GDP in the medieval period. Medieval western Europe was substantially richer than Maddison thought, and subsequent growth therefore more gradual. The British data from Broadberry, Campbell, Klein, Overton and van Leeuwen (2011) cover the territory of England before 1700 and Great Britain after 1700, while the Dutch data from van Zanden and van Leeuwen (2012) cover the territory of Holland before 1807 and the Netherlands after 1807. The Italian data from Malanima (2011) cover central

and northern Italy, excluding the south, while the data of Álvarez-Nogal and Prados de la Escosura (2013) cover the territory of modern Spain.

Note that before the Black Death in 1348, per capita incomes were substantially higher in Italy and Spain than in England and Holland. There then followed a reversal of fortunes between the North Sea Area and Mediterranean Europe, so that by 1800 per capita incomes were substantially higher in Great Britain and the Netherlands than in Italy and Spain. Note that Italy, England and Holland all experienced a substantial increase in per capita incomes across the Black Death, as population fell sharply. However, Spain did not share in this Malthusian response to the Black Death, and although Italian incomes increased in the short run, they fell back to pre-Black Death levels as population growth returned after 1450. The Little Divergence then occurred with a surge of per capita incomes in the North Sea Area, led initially by Holland during its Golden Age of the sixteenth and seventeenth centuries, then by Britain during its Industrial Revolution of the eighteenth and nineteenth centuries.

One other point is worth noting from the annual data plotted in Figures 1 and 2. This is the alternation of periods of positive and negative growth, with growth booms typically followed by growth reversals, leaving little or no long run progress in the level of per capita incomes over the long run. This is particularly clear in the cases of Italy and Spain in Figure 1, where per capita GDP fluctuated without trend between 1270 and 1850. For the cases of Britain and Holland in Figure 2, although there are alternating periods of positive and negative growth until the eighteenth century, there is also a clear upward trend, with the gains following the Black Death being retained, and the growth reversals eventually disappearing with the transition to modern economic growth. It should be noted that the apparent

downward jump in the level of Dutch GDP per capita in the early nineteenth century is purely the result of a discontinuity in the data, switching from the territory of the province of Holland to the whole of the Netherlands. One way to think about Europe's Little Divergence, and also the Great Divergence, is therefore not so much the beginnings of growth, but rather the weakening and ending of growth reversals.

2.2 Asia's Little Divergence

Data are available in abundance for some Asian economies for some time periods, but there has been relatively little work so far processing this material. Much Chinese data still needs to be processed, but it is now possible to produce annual estimates of GDP from the output side, apart from during dynastic changes (Broadberry, Guan and Li, 2013). Japan also has a wealth of data, but at this stage the estimates are closer in spirit to the short-cut methods used for Italy and Spain than to the full output-based estimates for Britain and Holland (Bassino, Broadberry, Fukao, Gupta and Takashima, 2012). Indian data are less abundant, and it has so far only been possible to produce estimates back to 1600 (Broadberry, Custodis and Gupta, 2013). Apart from Abū 'l-Fazl's [1595] remarkable document, *The Ā' īn–i-Akbarī*, from the highpoint of the Mughal Empire, most of the information about India comes from the records of the European East India Companies and the British Raj.

The results for Asia in Table 3, like those for Europe in Table 2, suggest an upward revision of early GDP per capita compared with Maddison's estimates. However, Japan had very low levels of per capita GDP at the start of the second millennium, then experienced modest but steady growth at 0.06% per annum through to the mid-nineteenth century. Japan's more dynamic growth after the Meiji Restoration of 1868 thus built on this earlier progress. China's per capita GDP, by contrast, was on a downward trajectory from its high-point

during the Northern Song Dynasty, when China was the world's per capita income leader. On these estimates, Japan overtook China during the seventeenth century. India shared in the Chinese pattern of declining per capita GDP from 1600, at the height of the Mughal Empire under Akbar. However, Japan was already slightly ahead of India by the time the Indian series starts in 1600.

The Asian Little Divergence thus parallels the European Little Divergence quite closely. Indeed, if the North Sea Area economies of Britain, Holland and Belgium (Flanders) are aggregated together, they show a continuous upward trajectory from the mid-fourteenth to the mid-nineteenth century, much as in Japan, led initially by a growth surge in Flanders, followed by surges in Holland and then in Britain. And just as stagnation and decline characterised Europe outside the North Sea Area at this time, so too there was stagnation and decline in Asia outside Japan. Of course, China is a large economy, and it would be desirable to disaggregate further, in the spirit of the California School, to see whether the Yangzi Delta was on a par with Japan until the nineteenth century, for example.

Li and van Zanden (2012) have produced a comparison of GDP per capita in the Yangzi Delta and the Netherlands in the early nineteenth century, finding per capita incomes in the Yangzi Delta to be 53.8 per cent of the level in the Netherlands during the 1820s. This suggests a per capita GDP figure of around $1,050 for the Lower Yangzi, in 1990 international dollars, slightly above the Japanese level at this time. Note also that a recent paper by Roy (2010) produces an estimate of GDP per capita for Bengal, the first part of India to fall under British control. Roy finds that per capita incomes in Bengal were around 20 per cent of the British level in the 1760s. This is a bit lower than the average suggested by Broadberry, Custodis and Gupta (2012) for India as a whole, falling from 34 per cent in 1750

to 27 per cent by 1801. However, this would be expected for a relatively poor region such as Bengal.

2.3 The Great Divergence

Table 4 puts together the new GDP per capita estimates for Europe and Asia from Tables 2 and 3, to provide a focus on the Great Divergence. Although China was richer than England in 1086, it must be remembered that England was a relatively poor part of Europe in the eleventh century. Comparing China with the richest part of medieval Europe, it seems likely that Italy was already ahead by 1300. However, care needs to be taken here, since a smaller region of China such as the Yangzi Delta may still have been on a par with Italy in 1500, which would be consistent with the accounts given in the earlier, qualitative literature. This would only require per capita incomes in the Yangzi Delta to have been around 54 per cent higher than in China as a whole, which is broadly consistent with the scale of regional differences within China during the nineteenth century.

However, with the rise of Holland during its Golden Age, there can be little doubt that the Great Divergence was already well underway during the sixteenth and seventeenth centuries. By this stage, the discrepancy between the aggregates for China and Holland is too large to be bridged by regional variation. It is worth noting that Pomeranz (2011) now accepts that his earlier claim of China on a par with Europe as late as 1800 was exaggerated, and he now settles for the earlier date of 1700, when Table 4 suggests that allowing for regional variation would still put the Yangzi delta substantially behind a large part of Western Europe.

But the key finding to emphasise from Table 4 is that Japan was following a similar trajectory to the North Sea Area, but at a much lower level, and with a slower rate of growth,

so that Japan continued to fall behind the West until after the Meiji Restoration in 1868. This means that there was a Little Divergence within Europe led by the North Sea Area and Little Divergence within Asia led by Japan. But since the frontier was moving out faster in Europe than in Asia, the Great Divergence between the two continents was also occurring.

3. EXPLAINING EUROPE'S LITTLE DIVERGENCE

The second way of accounting for the Great Divergence is to provide an explanatory framework. Armed with the estimates of economic growth before 1870 from Table 4, this paper now turns to explanation. A common framework of shocks and structural factors will be adopted for analysing the Little Divergences within Europe and Asia, as well as the Great Divergence between the two continents. The key shocks were the Black Death of the mid-fourteenth century, and the new trade routes that opened up from Europe to Asia and the Americas around 1500. They had differential effects on different European economies because of four structural factors: the structure of agriculture; marriage patterns and fertility; the flexibility of labour supply; institutions and the role of the state.

3.1 Agriculture

The success of the North Sea Area may be linked to the structure of its agriculture, which was more animal oriented than on the rest of the continent, with a large pastoral farming component. The data for England are shown in Table 5. In current prices the share of the pastoral sector was already above 50 per cent after the Black Death, and was more than 60 per cent by the mid-fifteenth century. Although the share declined between the 1450s and the 1650s, much of this was due to an increase in the relative price of grain following the return of population growth. In constant 1700 prices, there was an upward trend in the share of the pastoral sector, with just a gentle setback between the mid-fifteenth and mid-seventeenth

centuries. To put things in perspective, the pastoral share of agricultural value added in India in the early twentieth century was around 20 per cent (Sivasubramonian, 2000).

The importance of pastoral agriculture in the North Sea Area had a number of important implications for future growth. Although this did not create more kilocalories per person, it meant that food was more processed than in other societies (Allen, 2009; Broadberry, Campbell, Klein, Overton and van Leeuwen, 2011). North Sea Area agriculture thus had a number of characteristics that were important for future growth (Broadberry, Campbell, Klein, Overton and van Leeuwen, 2011). First, this was a high-value-added agriculture; even if it did not produce many more kilocalories per head than arable agriculture, the food was more highly processed. Second, this was a highly capital-intensive agriculture, with animals making up a large share of the capital stock. Third, this was an agriculture which was highly intensive in the use of non-human energy. The North Sea Area pulled ahead of Mediterranean Europe as high-value-added, capital-intensive, non-human-energy-intensive techniques spread from agriculture to industry and services and as industry and services became more important with structural change.

3.2 Marriage patterns and fertility

Hajnal (1965) argued that northwest Europe had a different demographic regime from the rest of the European continent, characterised by later marriage and hence limited fertility. Although he originally called this the European Marriage Pattern, later work established that it applied only to the northwest of the continent. This can be linked to labour market opportunities for females, which de Moor and van Zanden (2010) link in turn to pastoral agriculture. Fewer children are associated with more investment in human capital, both for the females engaged in market activity before marriage, and for the children because of the

“quantity-quality” trade-off (Voigtländer and Voth, 2010). Development in the North Sea Area was characterised by human- as well as physical-capital intensity (Baten and van Zanden, 2008).

3.3 Flexibility of labour supply

Another difference between northwest Europe and southern Europe which has received attention in the literature is the flexibility of the supply of labour by individuals. This idea can be traced back originally to Max Weber (1930) and the protestant ethic. However, its most recent variant is the “Industrious Revolution”, a term widely associated with de Vries’s (1994) work on Europe, but actually coined by Hayami (1967) working on Japan. The basic idea is that people worked harder to obtain new goods made available by long distance trade and industrial innovation. Following the Reformation, the number of holidays in Europe was reduced by around 50 per year, and during the Industrial Revolution, St Monday, the practice of tolerating people not turning up for work on the first day of the week, disappeared, removing another 50 holidays per year. Table 6 sets out the empirical evidence on annual days worked per person in England, which approximately doubled from around 165 in the fifteenth century to around 330 in the nineteenth century. This can be seen as increasing labour intensity in the short run, but as incomes increased, savings also rose, providing funds for investment and thus allowing an increase in capital intensity in the long run.

3.4 Institutions and the role of the state

Acemoglu, Johnson and Robinson (2005) explain the success of Britain and Holland after 1500, together with the failure of Spain and Portugal, through institutional constraints on executive power. In Britain and Holland, constraints on rulers were sufficient to ensure that they were unable to act arbitrarily in their dealings with merchants. In Spain and Portugal, by

contrast, rulers were sufficiently strong to prevent a strong merchant class from constraining their powers to intervene in business matters. This view is not universally accepted, however. For example, Epstein (2000) argues that state power was fragmented in the medieval period, with market integration hindered by the "freedoms" granted to interests such as towns and guilds, so that what was needed for growth was centralisation of state power and expansion of state capacity rather than constraints on the executive. The two views can be reconciled once it is recognised that a balance is needed between having a state that is strong enough to enforce property rights but not so strong that can it can appropriate all the gains from trade.

There is empirical evidence to back up both aspects of the role of state institutions in the European Little Divergence. Early modern Britain and Holland dominated Spain and Portugal in terms of both the control exercised by mercantile interests over the state through parliament and the ability of the state to raise taxes that allowed for an expansion of state capacity. Table 7 shows very different patterns of parliamentary activity in the North Sea Area and Mediterranean Europe from the twelfth to the eighteenth centuries. The index of parliamentary activity constructed by van Zanden, Buringh and Bosker (2012) is based on the calendar years per century in which parliament met. During the first half of the second millennium, Parliamentary activity was higher in Spain and Portugal than in the North Sea Area. However, activity then peaked in the fifteenth or sixteenth century in Spain and Portugal before going into decline. In the North Sea Area, by contrast, although parliamentary activity was slow to get going, it continued to increase after 1500, reaching very high levels during the seventeenth and eighteenth centuries. Table 8 on the ability of the state to raise fiscal revenue per capita shows a similar pattern of divergence between northwest Europe and the rest of the continent during the seventeenth and eighteenth centuries, with England and the Dutch Republic forging ahead.

3.5 The Black Death

The catching-up process of the North Sea Area with Mediterranean Europe started with the arrival of the Black Death in the mid-fourteenth century, which led to an increase of per capita incomes in most European countries. However, this typically Malthusian response to the mortality crisis was not experienced in Spain, and as per capita incomes declined with the return to population growth in Italy, they remained on a plateau in Britain and Holland as the North Sea Area broke out of the Malthusian trap.

Álvarez-Nogal and Prados de la Escosura (2013) explain the absence of a per capita income increase in Spain by the high land-to-labour ratio in a frontier economy during the Reconquest. Instead of reducing pressure on scarce land resources, Spanish population decline destroyed commercial networks and further isolated an already scarce population, reducing specialisation and the division of labour. Thus Spain did not share in the general west European increase in per capita incomes after the Black Death. This is related to both the structure of agriculture and the capacity of state institutions.

In the case of Italy, although per capita incomes did increase after the Black Death, the gains disappeared again after the return to population growth from 1450, in contrast to the consolidation of the gains in the North Sea Area. This can be linked to the lower age of marriage and higher fertility in Italy, as well as to the absence of an industrious revolution which might have sustained per capita incomes in the face of falling daily wages. Perhaps most importantly, however, Epstein (2000) attributes it to the weakness of the fragmented Italian states, which failed to provide an integrated market.

3.6 New trade routes

The reversal of fortunes within Europe pivots around 1500, when per capita incomes were approximately $1,500 in both Italy and Holland. The North Sea Area forged ahead after 1500, led initially by Holland during its Golden Age during the sixteenth and seventeenth centuries, and then by Britain during the Industrial Revolution. Economic historians have long pointed to long distance trade as playing an important role in this post-1500 Little Divergence, following the opening up of new trade routes to Asia around the south of Africa, and to the New World after Europe's encounter with the Americas. It might be expected that Spain and Portugal would have been the gainers from these changes, since they were the pioneers and both had Atlantic as well as Mediterranean coasts. However, as noted above, early modern Britain and Holland dominated Spain and Portugal in terms of institutional structures, including both the ability of the state to raise taxes to finance the expansion of state capacity and the control exercised by mercantile interests over the state through parliament (O'Brien, 2011, Karaman and Pamuk, 2010; van Zanden, Buringh and Bosker, 2012).

4. ASIA'S LITTLE DIVERGENCE

Although the idea of Chinese decline since the Song Dynasty is not new, and Japanese post-Meiji growth is widely seen as building upon foundations laid in the Tokugawa Shogunate, there is no literature on an Asian Little Divergence (Needham, 1954; O'Brien, 2009; Hayami, Saito and Toby, 2004). Here, the parallels with the European Little Divergence are drawn out.

4.1 Agriculture

Agriculture was much less animal oriented in both China and Japan than in Europe, so this factor would seem better suited to explaining the Great Divergence between Asia and Europe

rather than to accounting for the differing performances of China, Japan and India during the Asian Little Divergence.

4.2 Marriage patterns

Marriage patterns do have an important role to play in explaining the Asian Little Divergence as well as the Great Divergence. Hajnal (1965) pointed to the different marriage pattern in northwest Europe compared with the rest of Europe, and although the female age of first marriage in China and India was much lower, Japan was an intermediate case, closer to the experience of northwest Europe, as can be seen in Table 9. The average age was 22.1 in Tokugawa Japan, compared with 25.4 in early modern England, but 18.6 in late Ming and Qing China and just 13.0 in modern India.

4.3 Flexibility of labour supply

This later marriage in Japan can also be linked to the labour force participation of women, which underpinned an industrious revolution. This may at first sight seem surprising, given the small scale of pastoral agriculture in Japan compared with the North Sea Area. However, in the case of Japan, the labour market opportunities for women were provided by protoindustrial work, particularly in the silk industry, and later in cotton textiles. Although de Vries (1994) was influenced by Hayami's (1967) work on Tokugawa Japan when arguing for an industrious revolution in Europe, on closer inspection, Hayami's interpretation is a bit different for Japan. Indeed, Hayami and Tsubouchi(1989) generalised the idea to an East Asian industrious revolution, based on rice cultivation, which was seen as the basis of an alternative to western capital-intensive industrialisation. This idea was picked up by Pomeranz (2000: 91-106), who argued for a Chinese industrious revolution. However, Huang (2002) argues that this is a misinterpretation of what he calls "involution". For Huang,

Chinese over-population led to smaller landholdings, driving women to work in proto-industry just to remain at subsistence. This leaves out the crucial demand side of de Vries's notion of an industrious revolution, with people working harder to be able to consume luxury goods. In Western Europe and Japan, harder work brought rising household incomes and consumption per head.

4.4 Institutions and the role of the state

Asian states are usually portrayed as more centralised and autocratic than European states, and thus holding back Asian economic development (Jones, 1981; Landes, 1998). Within Asia, however, it would be difficult to attribute Japanese overtaking of China to the success of Japanese merchants in imposing constraints on the executive, as Acemoglu, Johnson and Robinson's (2005) analysis would seem to imply. Similarly, it would be difficult to attribute India's decline to the failure of merchants to tame powerful rulers, given the weakness of Indian states during the early modern period (Parthasarathi, 2011). Indeed, it seems clear that merchants in the Indian Ocean trade operated in an environment where states were unable to enforce basic property rights, and where piracy was a major problem (Prange, 2011). The Asian evidence thus seems to be more consistent with the concerns of Epstein (2000) and O'Brien (2011) over the need to build up state capacity rather than Acemoglu, Johnson and Robinson's (2005) concerns over the need to impose constraints on the executive. Indeed, comparative data assembled by Sng and Moriguchi (2013) suggest substantially higher per capita tax revenue and provision of local public goods in Tokugawa Japan than in China between 1650 and 1850. However, it is clear that the success of Japan in expanding state capacity was not counterbalanced by an equivalent expansion of Parliamentary activity along European lines until after the Meiji restoration of 1868.

4.5 The Black Death

There are no signs of a positive effect from the Black Death on per capita incomes in Asia, in contrast to Europe. This is not surprising in the case of Japan, which is known to have remained isolated from the Black Death. However, there was a large decline in China's population during the fourteenth century, which did not have a positive effect on per capita GDP. The reason for this seems to be that this period coincided with the Mongol interlude, which destroyed the institutional framework that had underpinned the high per capita incomes of the Northern Song Dynasty. This reduced specialisation and the division of labour, so that China's experience was closer to that of Spain than to that of England or Holland.

4.6 New trade routes

China adopted a restrictive closed door policy towards long distance trade after the "voyages to the western oceans" that had occurred between 1405 and 1433, which had shown China to be technologically ahead in shipbuilding (Fairbank, 1992: 137-140). However, following an initial period of openness to relations with European traders, Tokugawa Japan adopted a policy of *sakoku* or "seclusion" from the 1630s, so any Japanese advantage from the earlier Chinese turn inwards was short lived (Tashiro, 1982). Although recent work has tended to question the extent to which trade really was closed off by these policies, the contrast with the outward orientation of the European states which sponsored the voyages of discovery from the fifteenth century remains striking (van der Wee, 1990). This suggests that the new trade routes are of more importance in explaining the Great Divergence between Europe and Asia, than the Little Divergence within Asia.

With early modern China and Japan turned inwards, India was the most open to trade, with its major export business in cotton textiles (Chaudhuri, 1978). However, this did not lead to Indian prosperity because of the low levels of state capacity and its consequences for the enforcement of property rights (Prange, 2011; Parthasarathi, 2011).

5. THE GREAT DIVERGENCE

Putting together the above analysis of the European and Asian Little Divergences produces an explanatory framework for the Great Divergence that is sensitive to the regional variations within both continents, thus taking account of one of the hallmarks of the California School. The approach adopted here sees the divergences as arising from the interaction of a number of structural factors with two important shocks.

The main structural factors can be listed as follows. First, different agricultural systems mattered. The large share of pastoral farming in agriculture put northwest Europe on a path to high-value-added, capital-intensive, non-human-energy-intensive production. These production characteristics then spread from agriculture to industry and services, which accounted for a growing share of output. Second, marriage patterns also mattered. The high female age of first marriage in northwest Europe led to lower fertility and more investment in human capital. Although female marriage was early in India and China, Japan was an intermediate case. Third, flexibility of the labour supply was more important in explaining the Little Divergences within Europe and Asia than the Great Divergence, since there were similarities between the industrious revolutions of the North Sea Area and Japan. Fourth, institutions were important in explaining the Great Divergence as well as the Little Divergences within Europe and Asia. In the North Sea Area, state capacity was able to expand, but at the same time merchants were able to exercise control over the state through

parliamentary activity. Although there was no parallel to this parliamentary control over the state in Asia before the late nineteenth century, Japan did succeed in building up state capacity.

There were two key shocks which interacted with the structural differences to produce the Little and Great Divergences. First, the Black Death led to a permanent upward shift of GDP per capita in the North Sea Area, which did not occur in the rest of Europe or Asia. Second, the new trade routes that emerged around 1500 accelerated the divergences. Whereas European states encouraged the voyages of discovery, in Asia China and Japan turned inwards. Although India remained open, it lacked state capacity, so this did not lead to Indian prosperity.

4. CONCLUSIONS

This paper sets out to "account" for the Great Divergence between Europe and Asia, covering issues of both measurement and explanation. Dealing with measurement issues, there are a number of firm conclusions: (1) The traditional view, in which the Great Divergence had late medieval origins and was already well under way during the early modern period, is confirmed (2) However, revisionists are correct to point to regional variation within both continents (3) There was a Little Divergence within Europe, with a reversal of fortunes between the North Sea Area and Mediterranean Europe. (4) There was a Little Divergence within Asia, with Japan overtaking China and India. However, Japan started at a lower level of per capita income than the North Sea Area and grew at a slower rate, so continued to fall behind until after the Meiji Restoration of 1868.

The Little and Great Divergences are explained by the differential impact of shocks hitting economies with different structures. The structural factors include: (1) The large share of pastoral farming in agriculture, which helped to put the North Sea Area on the path to high-value-added, capital-intensive, non-human-energy intensive production. (2) Late marriage in the North Sea Area, which lowered fertility and encouraged human capital formation. (3) The flexibility of labour supply, with an industrious revolution helping to explain the Little Divergences within both Asia and Europe. The two key shocks were: (1) The Black Death, which led to a permanent per capita income gain in the North Sea Area, but not in the rest of Eurasia. (2) The new trade routes which opened up from Europe to Asia and the Americas around 1500.

More research is still needed, however. Although historical national accounting has now made a substantial contribution to understanding the Great Divergence, there is more to be done: (1) Historical national accounts are needed for more countries, reaching further back in time (2) More regional disaggregation is needed within large countries. (3) Much more work is needed to assemble comparative data on the explanatory variables (4) More attention needs to be paid to the case of Japan, the first Asian country to achieve modern economic growth, but which has been overshadowed in the Great Divergence debate by the focus on China.

TABLE 1: Maddison's estimates of GDP per capita in Western Europe and Asia, 1000-1870 (1990 international dollars)

	UK	NL	Italy	Spain	Japan	China	India
1000	400	425	450	450	425	466	450
1500	714	761	1,100	661	500	600	550
1600	974	1,381	1,100	853	520	600	550
1700	1,250	2,130	1,100	853	570	600	550
1820	1,706	1,838	1,117	1,008	669	600	533
1870	3,190	2,757	1,499	1,207	737	530	533

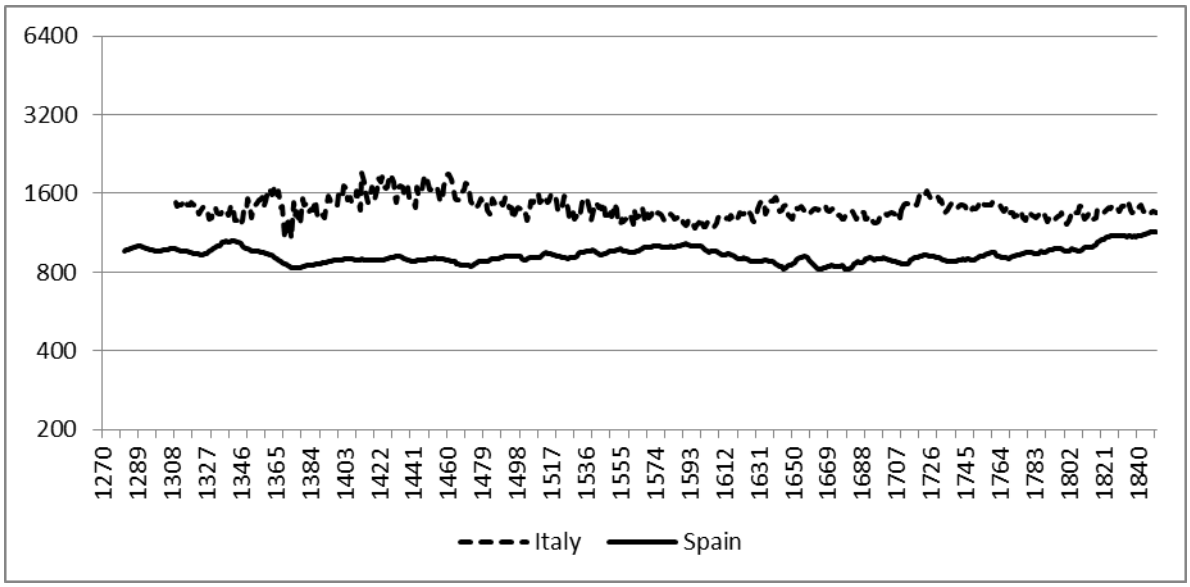
Sources and notes: Maddison (2010). The estimates are for countries within their modern boundaries, and hence cover the United Kingdom rather than Great Britain or England and the Netherlands rather than Holland.

TABLE 2: GDP per capita levels in Europe (1990 international dollars)

	England/ GB	Holland/ NL	Italy	Spain
1086	754			
1270	759			957
1300	755		1,482	957
1348	777	876	1,376	1,030
1400	1,090	1,245	1,601	885
1450	1,055	1,432	1,668	889
1500	1,114	1,483	1,403	889
1570	1,143	1,783	1,337	990
1600	1,123	2,372	1,244	944
1650	1,100	2,171	1,271	820
1700	1,630	2,403	1,350	880
	1,563			
1750	1,710	2,440	1,403	910
1800	2,080	2,617	1,244	962
		1,752		
1820	2,133	1,953	1,376	1,087
1850	2,997	2,397	1,350	1,144

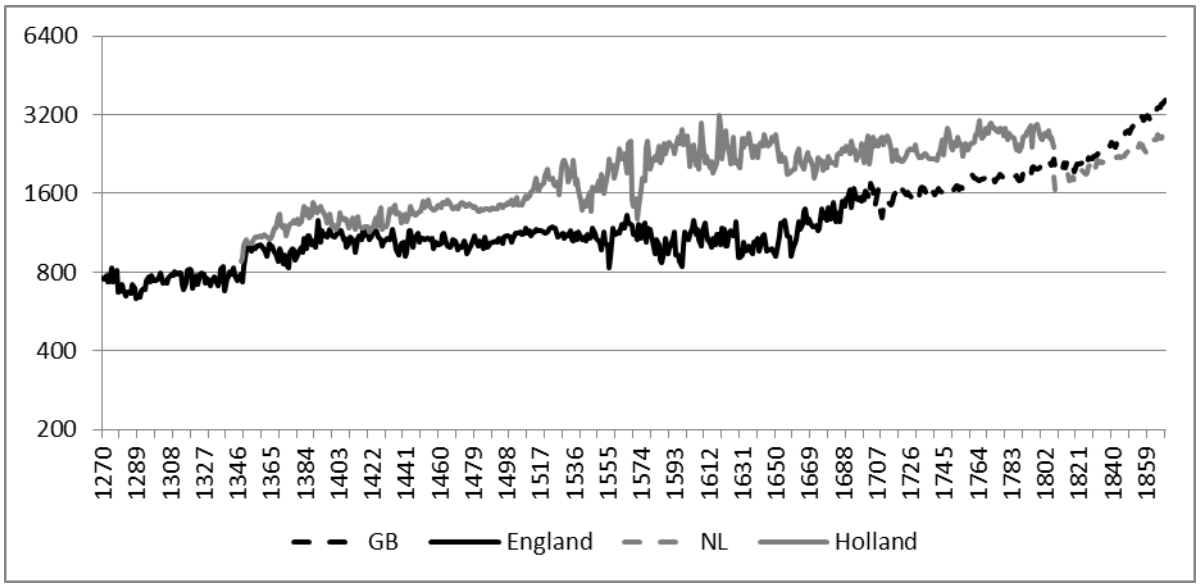
Sources and notes: England/Great Britain: Broadberry, Campbell, Klein, Overton and van Leeuwen (2011); Broadberry and van Leeuwen (2011); Holland/Netherlands: van Zanden and van Leuwen (2012); Italy: Malanima (2011); Spain: Álvarez-Nogal and Prados de la Escosura (2013). Figures are for 10-year averages starting in the stated year (i.e. 1270-79, 1300-09,…) apart from 1348, which refers to the pre-Black Death years 1339-48.

FIGURE 1: Real GDP per capita in Italy and Spain 1270-1850 (1990 international dollars, log scale)



Source: Malanima (2011); Álvarez-Nogal and Prados de la Escosura (2012).

FIGURE 2: Real GDP per capita in Britain and Holland, 1270-1870 (1990 international dollars, log scale)



Source: Broadberry, Campbell, van Leeuwen and van Zanden (2012).

TABLE 3: GDP per capita levels in Asia (1990 international dollars)

	Japan	China	India
725	483		
900	534		
980		1,247	
1020		1,518	
1050		1,458	
1086		1,204	
1120		1,063	
1150	603		
1280	560		
1300			
1400		960	
1450	554	983	
1500		1,127	
1570		968	
1600	791	977	682
1650	838		638
1700	879	841	622
1750	818	685	573
1800	876	597	569
1850	933	594	556

Sources and notes: Japan: Basssino, Broadberry, Fukao, Gupta and Takashima (2012); China: Broadberry, Guan and Li (2013); India: Broadberry, Custodis and Gupta (2013); Chinese data are for 10-year averages starting in the stated year (i.e. 980-89, 1086-95,…), but data for Japan and India are only available for benchmark years.

TABLE 4: GDP per capita levels in Europe and Asia (1990 international dollars)

	England/ GB	Holland/ NL	Italy	Spain	Japan	China	India
725					483		
900					534		
980						1,247	
1020						1,518	
1050						1,458	
1086	754					1,204	
1120						1,063	
1150					603		
1280	679			957	560		
1300	755		1,482	957			
1348	777	876	1,376	1,030			
1400	1,090	1,245	1,601	885		960	
1450	1,055	1,432	1,668	889	554	983	
1500	1,114	1,483	1,403	889		1,127	
1570	1,143	1,783	1,337	990		968	
1600	1,123	2,372	1,244	944	791	977	682
1650	1,110	2,171	1,271	820	838		638
1700	1,563	1,403	1,350	880	879	841	622
1750	1,710	2,440	1,403	910	818	685	573
1800	2,080	1,752	1,244	962	876	597	569
1850	2,997	2,397	1,350	1,144	933	594	556

Sources: Tables 2 and 3.

TABLE 5: Share of pastoral sector in English agricultural value added, 10-year averages (%)

	At current prices	At constant 1700 prices
1270s	39.9	30.8
1300s	48.8	33.6
1350s	51.2	46.7
1400s	53.7	42.5
1450s	61.6	46.9
1550s	41.9	39.5
1600s	41.9	41.2
1650s	35.5	36.0
1700s	40.3	38.5
1750s	42.2	45.4
1800s	51.5	54.7
1850s	55.2	55.8
1860s	60.0	55.7

Sources: (Broadberry, Campbell, Klein, Overton and van Leeuwen, 2011).

TABLE 6: Annual days worked per person in England

Period	Blanchard/Allen and Weisdorf	Clark and van der Werf	Voth
1433	165		
1536	180		
1560-1599		257	
1578	260		
1584	210		
1598	259		
1600-1649		266	
1650-1699		276	
1685		312	
1700-1732		286	
1733-1736		295	
1760			258
1771		280	
1800			333
1830			336
1867-1869		293-311	
1870		318	

Sources and notes: 1433-1598: derived by Allen and Weisdorf (2011: 721) from Blanchard (1978: 24) as the number of days worked in agriculture (135) plus the share of the remaining130 workdays spent in mining; 1560-1599 to 1870: Clark and van der Werf (1998: 838); 1760-1830: Voth (2001: 1078).

TABLE 7: Activity index of European parliaments, 12th to 18th centuries (calendar years per century in which parliament met)

	12th	*13th*	*14th*	*15th*	*16th*	*17th*	*18th*
North Sea Area							
England	0	6	78	67	59	73	100
Scotland	0	0	10	61	96	59	93
Netherlands	0	0	0	20	80	100	100
Mediterranean							
Castile and Leon	2	30	59	52	66	48	7
Catalonia	3	29	41	61	16	14	4
Aragon	2	25	38	41	19	11	1
Valencia	0	7	28	29	12	4	0
Navarre	2	7	17	33	62	30	20
Portugal	0	9	27	47	12	14	0

Source: van Zanden, Buringh and Bosker (2012: online appendix S1).

TABLE 8: Per capita fiscal revenues, 1500/09 to 1780/89 (grams of silver)

	1500/09	1550/59	1600/09	1650/59	1700/09	1750/59	1780/89
Dutch Republic			76.2	114.0	210.6	189.4	228.2
England	5.5	8.9	15.2	38.7	91.9	109.1	172.3
France	7.2	10.9	18.1	56.5	43.5	48.7	77.6
Spain	12.9	19.1	62.6	57.3	28.6	46.2	59.0
Venice	27.5	29.6	37.5	42.5	46.3	36.2	42.3
Austria				10.6	15.6	23.0	43.0
Russia					6.3	14.9	26.7
Prussia			2.4	9.0	24.6	53.2	35.0
Ottoman Empire		5.6	5.8	7.4	8.0	9.1	7.1
Poland	1.5	0.9	1.6	5.0	1.2	0.8	11.2

Source: Karaman and Pamuk (2010: 611).

TABLE 9: Female age of first marriage

	Period	Range	Unweighted average
England	1600-1849	23.4 to 26.5	25.4
Japan	1680-1860	18.8 to 24.6	22.1
China	1550-1931	17.2 to 20.7	18.6
India	1911-1931	12.9 to 13.3	13.0

Sources: Wrigley and Schofield (1987: 255); Mosk (1980: 476); Lee and Wang (1999: 67); Bhat and Halli (1999: 137).

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