

Why and where did modern economic growth begin?

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1 Peer Vries's contributions

Peer Vries does several very valuable things in this book. First he makes clear exactly what must be explained in seeking the origins of modern economic growth. What must be explained is a sustained acceleration in the growth of national income per capita through the adoption and implementation of innovations on a broad front involving energy, materials, transportation, the organization of production, the organization of governance, and industrial processes. That is what happened in Great Britain between 1700 and 1900. Note what is not said here: it was not simply an increase in the production of certain key goods (e.g. iron and cotton). It was not merely an accumulation of capital, or a one-time jump in productivity. It is not the appearance of factories for production, or a shift in patterns of trade, although all of these things happened as well.

Having made clear this explanandum, Vries then spends the rest of the book examining explanations proposed by economic growth theorists, economic historians and global historians. In the process, he hints at his own preferred explanation, although this does not really emerge until one has read through four hundred pages (!) of detailed analysis of the proposed explanations of other scholars. The second valuable thing in this book is the clear separation and presentation of the views of these groups, for often economic growth theorists, economic historians and global historians do not address themselves to each others' arguments, or even problematize the origins of modern economic growth in the same way.

The third valuable thing is Vries's demonstration that neo-classical economic theory and economic growth theory, though they offer plausible models for the onset of modern economic growth, are in fact completely contradicted by the actual historical unfolding of that process. During the

first three quarters of the period 1700-1900, Great Britain was not, for the most part, a neo-classical free market economy, with low taxes and free competition. International trade was tightly controlled through navigation acts; monopolies for trading companies; extensive tariffs on wine, grain, iron, cotton, and other goods; and the royal navy. Taxes were by far the highest known to that point in history, efficiently collected. Key raw materials were provided by slave labor (cotton from the American south). Having once achieved, by extensive government actions to shape and control the economy, a dominant position in global trade by 1850, Great Britain *then* started to champion laissez-faire free market policies. But to anachronistically read back from that point the idea that Great Britain's economy during the formation of modern economic growth was a mainly free-market competitive economy is simply absurd. What Vries does grant is that Great Britain by 1700 had a deeper reliance on wage labor, and thus a more capitalist economy (in the classical Marxist sense of an economy dependent on making profits from deploying wage labor and investments in capital improvement) than any other economy of its day.

Vries also shows that the assumptions behind most endogenous growth theories, especially the Unified Growth Theory, although popular among economists, have absolutely no foundation in historical data. In all versions of Unified Growth Theory, growth in some population group (total population, or educated population) reaches a critical tipping-point that accelerates investment and output. But if this is based on *global population* growth the theory provides no basis for understanding why Britain and Europe, and not another major civilization, was the birthplace of modern economic growth. If this is based on the growth of any specific sub-population, then other civilizations had larger, more urban, and more educated populations rather earlier than Great Britain, in which case the fact that modern economic growth clearly took off in the small island population of Great Britain half a century ahead of similar trends anywhere else renders the theory false. I will not repeat all of Vries's arguments here, but I fully agree with his conclusion: 'Overall its assumptions are so unrealistic and its main claims so easily refutable that one can only wonder why economists would take unified growth theory seriously'.¹

The fourth valuable thing, and here I will stop this list and start another one, is Vries's careful analysis of a large number of factors raised by economic and global historians to account for the Great Divergence. These

¹ Peer Vries, *Escaping poverty. The origins of modern economic growth* (Vienna and Göttingen 2013) 197.

include: (1) Natural resources (type of agriculture, availability of minerals, shortage of timber or cotton); (2) Geography (unity/disunity of political space; urbanization, closeness to the New World, island/continent); (3) Labor (abundance/scarcity, intensity/industriousness, wages, and quality or human capital); (4) Consumption (quantity and items); (5) Capital accumulation; (6) Trade (volume, distance, and items traded); (7) War (military pressures and success/failure, military technology and spending); (8) Institutions (government/property rights); (9) Culture (and religion); (10) State actions (mercantilism, regulation, sponsorship); and (11) Science and technology.

Vries spends quite a lot of time on each of these, turning over the arguments of dozens of scholars, mainly economic historians and global historians, but also national and regional historians – indeed one can hardly go wrong taking Vries’s bibliography as an exhaustive and up-to-date list of relevant readings for debates on the Great Divergence and its causes. The main point that Vries makes, however, is easily summarized: It is foolhardy to think of ANY of these factors as THE cause of the Great Divergence; there are just too many different factors acting in conjunction in different ways over time for any account to be satisfactory that depends on identifying a parsimonious few necessary and sufficient conditions for the transition from traditional to modern economic growth.

2 Reasoning poorly about the origins of modern economic growth in the West

One of the main problems in such arguments is that they suffer from a wretched logical fallacy: they reason *backwards* from a known outcome to an observed prior difference and then reconstruct a logical story to connect the two. Yet in fact we find historically there are numerous exceptions and reversals to any such relationships, making them dubious as primary causes of the observed outcome.

Let me offer a few of my favorite examples of this kind of absurd reasoning. Take geography. Eric Jones, for example, although he has since developed more multi-stranded and cultural arguments, had argued in *The European Miracle* that Europe being divided up into various large islands and peninsulas separated by mountains was a factor that led to Europe’s economic miracle, because this led to separate nation-states being maintained, which then engaged in stimulating military competition with each other. Put aside, for the moment, the fact that south and southeast Asia

also consisted of large islands and multiple peninsulas (southern India, Sri Lanka, Siam, Malaysia, Indochina, Java, Sumatra, and others), often divided by mountains, which sustained separate nation-states which engaged in many centuries of military conflict with each other – but no initiation of modern economic growth occurred. Instead, just consider that war was extremely costly and destructive of capital and manpower, exhausted state resources and led to high taxes to maintain armies and navies. If the outcome of history had been that China or India had launched modern economic growth, it would be easy to tell the logical story that the destructive competition of Europe doomed its efforts to escape a Malthusian fate, while the peaceful accumulation of capital, lower taxes, and wide-ranging and unified markets of large empires like China or India were a far more favorable basis for economic take-off. In short, it *may have been the case* that Europe circa 1700 was better placed than other major civilizations to achieve modern economic growth, but simply pointing to the existence of prior state competition in no way explains why. Rather, one would have to carefully tote up all the costs of sustained military competition – economic, fiscal, administrative – and weigh them against the putative gains *and* show that those gains would not have arisen without such competition in order to make a sound argument.

But that is at least a plausible, if difficult task. Even more logically flawed are geographic arguments from the availability or non-availability of natural resources. It is widely admitted that two of the leading sectors of England's launch into modern economic growth were cotton and coal. But while the latter resource was fairly abundant in England, the former could only be obtained by shipping it thousands of kilometers overseas. Why then, would one presume that physical location had anything to do with whether a resource became a key element of early modern economic growth? The bigger question is why China and India, with their abundant supplies of cotton and long histories of cotton production, did not develop ever-more efficient methods of production and beat late-comer England to the punch? Moreover, coal was abundant in many localities in Europe and Asia; why should any one of these have developed more advanced ways to mine and utilize coal than the others?

Vries usefully points out, drawing on the arguments of Georgi Riello and Prasannan Parthasarathi,² that the presence or absence of cotton in Eng-

² Giorgio Riello, *Cotton. The Fabric that Made the Modern World* (Cambridge 2013); Prasannan Parthasarathi, *Why Europe Grew Rich and Asia Did Not: Global Economic Divergence, 1600-1850* (Cambridge 2011).

land or anywhere else meant nothing as such. England needed cotton goods not only for its domestic market – which the East India Company was happy to supply for a profit – but also to trade for slaves in Africa in order to have labor for its (and other Europeans’) sugar and other plantation crops in the New World. Efforts to substitute British-produced textiles in this trade were not successful before 1750, as Africans demanded the color and quality of Indian cottons. So British textile makers sought ways to get British workers to produce cotton goods of acceptable quality and price; to avoid dependence on Indian imports. That led to efforts to build a competitive domestic cotton industry and hence to mechanization of key production processes.

At the same time a mere *desire* to create an efficient domestic cotton textile industry did not mean that the *means* to meet that desire would be discovered. One also has to ask why the idea of spinning cotton by mechanized rollers and powering such machinery by ever more efficient water wheels and later steam engines was developed, perfected, and implemented in Great Britain? Here so many factors played a crucial role in making this particular outcome possible that one has to build complex, multi-layered explanations.

There had to be a culture that valued innovation, a mechanical view of nature that suggested human actions could be mimicked by the action of machines, economic rules and regulations that allowed entrepreneurs to profit from their inventions and not be suppressed by political or religious authorities or guilds or other economic competitors, engineers who could design complex mechanisms and measure energy efficiency and improve it, and artisans who could build and maintain the complex and delicate mechanisms. There had to be affordable, disciplined and manageable labor (including proletarian women and workhouse orphans), and transport and trade to bring in raw materials and sell finished ones but with tariffs to keep out competitive finished products. To overcome the limits of water-power, there had to be an understanding of atmospheric pressure and vacuums to begin the process of building steam-engines by starting with atmospheric pumps, and that understanding had to be diffused to a large stratum of workmen and mechanics as well as elites.

Only Britain in the eighteenth century had *all* of these conditions. While other countries had some of them in various combinations, it appears that all had to come together at once, and if they *did* all come together they created a capacity for rapid innovation and development of new technologies on a broad front. This is especially important for arguments such as that of Robert Allen, who seems to make a critical factor the relatively high

wages and low capital costs that prevailed in England in the eighteenth century. I shall present data below that casts doubt on whether the relative factor prices Allen cites in fact were truly exceptional in England – but even if they were, and even if those relative factor prices were important for explaining why England mechanized cotton production earliest, those factor prices would *not* explain why England was also the first to develop atmospheric engine pumps (which replaced horse-powered chain pumps, and horses were *capital*); why England was first to develop mass-market pottery and metal wares; why England developed coke-fired smelting; why England developed Europe's best navy; why England developed Macadam road-making techniques; why England was the first to develop more efficient steam-engines (which were designed to save expensive coal, odd if coal's initial use in engines was because it was unusually readily available); or why England first developed and implemented the locomotive. In short, single-factor explanations get stretched to the breaking point (or the point of ridiculousness) in trying to cover the enormous range of innovations and new products and production processes that arose in the emergence of modern economic growth.

3 Toward a better, multi-causal explanation: pro and anti-Vries

I strongly agree with Vries that a complex explanation addressing culture, science/technology, political organization, military technology, overseas trade, and other factors is necessary to uncover why in Britain, and only in Britain, modern economic growth emerged in the eighteenth century. I might put more emphasis than he does on shifts in European scientific culture that I believe had no parallel in other cultures, and a bit less on state-directed development, on which there was more similarity. I would also place much more emphasis on a series of 'great reversals' that took place over the period 1500-1850: these include the shift in relative wealth and military power with northwest Europe overtaking Spain, Italy, and Venice over this period, reversing the location of economic success in Europe; the reversal in relative wealth in the Americas with the United States and Canada emerging as world powers while formerly richer and more dominant Mexico, Brazil and Peru became relatively poorer and weaker than their northern neighbors; and the reversal in the locus of innovation, global economic and military and trading prowess from the eastern (China, India) to the western (Amsterdam, Britain) portion of Eur-

asia. I think these multiple great reversals are too complex to be fully summed up in the notion of the Great Divergence. But for the most part I agree with Vries and would argue that he has advanced our understanding of the problem and solutions to understanding the onset of modern economic growth.

There is one issue, however, on which I disagree with him strongly. That is the question of the starting point itself. Vries takes issue with the Californian position that the economic, political, and social conditions of Great Britain and Europe were not so radically different from those in China or India at the outset of the eighteenth century as to make it clear that the former had a great advantage over the latter for further acceleration of economic growth. In the Californian position, both the West and leading civilizations of Asia were agrarian states or empires ruled by tax-supported monarchs; both used technologies based on organic fertilizers and animal power and water power for production; both had similar patterns of family size and rates of long-term population growth; and both had similar levels of overall economic output per capita.

Of course, the Californians concede there were differences in detail: China had mainly stem family households while northwestern Europe had nuclear households; the Netherlands had more advanced windmill and land reclamation technologies; Britain and the Netherlands had a more capital-intensive and higher labor productivity agriculture while China had a more labor-intensive and higher land productivity agriculture. In addition, European states engaged more in intercontinental trade; European states had hereditary service nobilities dominate key government positions while China had an exam-selected bureaucratic elite; and Western states managed standing national debts while China's state rarely if ever borrowed or ran a deficit. What the California school claims is that such differences did not provide any general economic advantages for Britain and the West that were evident as late as 1700.

Vries argues instead that there were so many differences, which were so significant, and so evident from an early date (1700 or sooner) that the California position that the basic economic situation of leading areas of Europe and China was similar at the outset of the eighteenth century is false. Rather than the divergence being relatively late and sudden, as California school historians claim, Vries argues that even before modern economic growth appears in Europe in the eighteenth century, England had a substantial head start in output per capita, a much greater deployment of wage labor at much higher wages, and a much more actively mercantilist

state. In sum, Vries states, ‘firm doubts that Britain was wealthier [before the onset of modern economic growth] no longer exist’.³

In making this definitive statement, Vries is clearly swayed by the work of Robert Allen and his colleagues, and of Jan Luiten van Zanden and his co-authors, whose reconstructions of the wages of laborers in major urban areas in varied regions have been published since the major California School works appeared. These remarkable works of scholarship generally show that wages in London and Amsterdam – the core of the northwestern regions in which the ‘take-off’ into modern economic growth began – were substantially higher than wages in other urban areas in Europe and Asia, often by ratios of two-to-one or higher, in the early eighteenth century. Thus, QED, these regions had a major economic advantage over other areas prior to industrialization.

Yet this seems to me quite mistaken in several ways. First, there is the question of the data itself, which I do not find to tell quite so unambiguous a story as Vries (or Allen or others) claim. Let me suggest that wages in *London* are not the most relevant gauge of general income. If we ask why higher wages or incomes are supposed to be an advantage for the emergence of an innovation-led broad-based pattern of growth, I can only think of three reasons: (1) higher wages allow greater savings and capital investment for future growth; (2) higher wages support consumption of more and newer products which make investment in new production processes profitable; (3) higher wages hurt profits and lead manufacturers to seek labor-saving innovations.

For pathway (1), Vries already many times notes that the amount of capital required to invest in early industrial machinery (spinning frames, water-wheels, and puddling/rolling mills) is quite small – far less than was required to outfit a regiment or a major naval vessel, and so well within the capability of the merchants who outfitted the East India company or operated whaling or slaving ships. London wages are irrelevant for the capacity of London merchants to afford industrial investments. For pathway (3), London wages would be relevant only if merchant-manufacturers mainly drew upon London wage-workers in setting up innovative higher-productivity enterprises. In fact, they did not – early cotton mills were located mainly in Lancashire, iron works were set up in the midlands, coal mines in the northeast and tin mines in Cornwall, and chemical and pottery works in other regions well outside the capital. Access to raw materials and water-power were more important than location in the capital to all of

3 Vries, *Escaping poverty*, 43.

these enterprises, which therefore drew on labor from workers in smaller rural towns. As London wages were typically (in Allen's own data) much higher than those in the smaller towns, it is the latter that should be used in estimating merchants' wage bills. Finally, for pathway (2), creating a general market for consumption of goods would depend on a larger mass of consumers than just the population of a single city, even a vast one like London; otherwise mass manufacturing and economies of scale would be of little value. Consumers all across Great Britain consumed cotton goods, tea, metal buttons, pottery, and the like. If a general consumption revolution or broadly higher income per capita is supposed to be what elevated Britain's economic opportunities, then that should be visible in a general wage/income advantage around the nation.

Yet in fact, we do not find that in Allen's data. Let us look at one of the most recent and comprehensive of Allen's publications,⁴ reproduced in Vries.⁵ This provides 'welfare ratios', a comprehensive adjusted ratio of income to subsistence living costs for ordinary laborers in Europe, America, and Asia for fifty-year intervals from 1500 to 1849. Table 1 shows the welfare ratios for the periods 1640-1649 and 1650-1699, the last century prior to Britain's eighteenth century launching of such innovations as the atmospheric steam pump (1700), seed drill (1701), coke-smelting (1709), Newcomen steam engine (1712) cementation steel-making (1720), the flying shuttle and roller spinning (1733), new sulfuric-acid making processes (1736), the Leyden jar (1740), use of iron rails for carts (1738), and crucible steel (1740).

The first set of five cities compares major commercial capitals of imperial powers. By this time both London and Amsterdam were centers for international marine trade with the New World and East Asia; Antwerp remained one of Europe's largest ports; and Vienna was the center of Danube trade and capital of the Austrian empire, although it suffered terribly from its territories being at the heart of the Thirty Years War from 1618-1648. Thus in the first half of the seventeenth century, Vienna's welfare ratio was far below that of the other capitals. However, though Amsterdam had the highest ratio by a substantial margin, welfare ratios in London, Antwerp, and Delhi were indistinguishable. In the second half of the century, Vienna recovers and come close to the welfare levels of Antwerp. However, both Vienna and Antwerp are left behind by the Atlantic trade-

4 Robert C. Allen, Tommy E. Murphy and Eric B. Schneider, 'The Colonial Origins of the Divergence in the Americas: A labour market approach', *The Journal of Economic History* 72:4 (2012) 863-894, Online Appendix, page 31, Table 4.

5 Vries, *Escaping poverty*, 42-43.

driven growth of London and Amsterdam. Delhi sits in the middle, its workers' welfare ratio almost exactly half-way between London and Antwerp. But it is Amsterdam that stands out in this half-century; its workers' welfare ratio exceeds that of London by far more (.84) than London exceeds that of Delhi (.50). There is nothing in these numbers to suggest that Britain would have an overwhelming advantage after 1700 compared to other societies with similar commercial capitals; rather London is closer to Delhi than to Amsterdam in its welfare ratio throughout this century.

Table 1 Welfare ratios of ordinary workers in the 17th century

	1600-1649	1650-1699
London	2.83	3.49
Antwerp	2.98	2.48
Amsterdam	3.84	4.33
Delhi	2.96	2.99
Vienna	1.52	2.35
South English Towns	1.65	2.03
Valencia	1.7	1.87
Florence	1.52	2.35
Milan	1.82	1.99
Lower Yangzi	0.78	2.17

4 Welfare before the Great Divergence

If we take what I believe are the more relevant centers for a welfare-driven theory of economic advantage, namely broader regions or smaller urban centers outside the major imperial/commercial capitals, we should look at the lower set of five places. Here we see that in 1600-1649, welfare ratios in south English towns were wholly unremarkable, and within less than 10 percent of levels in Valencia, Florence, and Milan. Welfare levels in the Lower Yangzi were depressed, but as with Vienna in this period, this region was at the heart of a massive social upheaval and conflict, namely the Ming-Qing transition, marked by uprisings of agricultural workers, abandonment of fields, and marauding armies. After 1650, during a period of recovery under the early Qing, Allen finds that welfare ratios for ordinary workers in the lower Yangzi were among the *highest* in this group, higher than in south English towns, Valencia and Milan, and less than 10 percent behind the highest welfare ratio in this group, that of Florence. For the entire

century 1600-1699, again there is nothing in these numbers to suggest that English towns were poised to host a transition to modern economic growth for, in the latter half of the century welfare ratios were higher in Florence and in the Yangzi region than in south English towns, and had grown more rapidly from the first to the second half of the century as well.

It is true that if we start looking at welfare ratios in the eighteenth century, English towns outside of London start to show a considerably higher welfare ratio than the Yangzi. Yet the California school argument does not depend on welfare being comparable in England and China during the century that modern economic growth takes off. I have written that England enjoyed a period of efflorescent pre-industrial economic growth in the early eighteenth century, borne by improvements in agriculture, low population growth, and the expansion of industriousness and regional and international trade (to use Jan de Vries's terminology).⁶ At the same time, the Yangzi delta was already starting to pass its early eighteenth century peak, as a burst of rapid population growth and stagnation of agricultural technology combined with an adverse shift in regional terms of trade for raw cotton vs. woven textiles (more on this below) undermined its economy. I have estimated that output per agricultural worker in the Yangzi was considerably ahead of that in England in the early eighteenth century, but considerably behind by 1800.⁷ None of this, however, has much to do with the fact that very early in the eighteenth century, as shown in preceding list of innovations, Britain was already becoming a place of unusually frequent breakthrough innovations in manufacturing processes, and that there is nothing in Allen's data on seventeenth century living standards to suggest why this might be so.

The same caution is vital in examining the recent data by Bozhong Li and Jan Luiten van Zanden on productivity in the Yangzi delta and the Netherlands.⁸ Li and Van Zanden show that in the early nineteenth century, the Netherlands had a substantially greater GDP/capita than the Yangzi delta region. Using the best available data for a specific six-year period (1823-1829), in comparing the GDP/capita in the Netherlands with

6 Jack A. Goldstone, 'Efflorescences and Economic Growth in World History: Rethinking the 'Rise of the West' and the British Industrial Revolution', *Journal of World History* 13 323-389.

7 Jack A. Goldstone, forthcoming: 'Farm Productivity before the Great Divergence: England and the Lower Yangzi compared'. Proceedings of the 50th anniversary conference of the Cambridge Population History Group.

8 Bozhong Li and Jan Luiten van Zanden, 'Before the Great Divergence? Comparing the Yangzi Delta and the Netherlands at the Beginning of the Nineteenth Century', *The Journal of Economic History* 72:4 (2012) 956-989.

a similarly urbanized and commercial area of the Yangzi delta (the Hua-Lou region), they find that the GDP/capita in the Netherlands was 86 percent higher. This was despite the fact that both regions had similar levels of agricultural productivity per capita; however the Netherlands had far higher productivity in manufacturing while in the Yangzi a much larger proportion of its workforce was in its far lower productivity manufacturing sector.

I would object that first, the 1820s were definitively *not* 'Before the Great Divergence', but well over a century after it had begun. But more importantly, as Li and Van Zanden clearly state, the cotton textile trade in the early nineteenth century was suffering from a major crisis. The cotton trade had grown in the seventeenth century through the special advantages of the Yangzi as a region where high humidity and high agricultural productivity freed up wives of farmers to spin and weave cotton. The main cotton-growing regions in the north of China had weather too dry for cotton spinning (the threads became brittle and broke). So these regions exported raw cotton to the lower Yangzi, where it was spun and woven into cloth. The cloth was exported north in exchange for raw cotton and bean cake fertilizer (which helped boost farm yields in the south freeing wives for full-time textile work), and further exported internationally and regionally in exchange for additional rice and other regional products. Because the lower Yangzi had a near monopoly on production of quality cotton cloth and other cotton-growing regions could do little but sell it, the terms of trade were very favorable to Yangzi farming/spinning/weaving households.

This began to change in the eighteenth century when northern households discovered that by digging cellars they could create humid environments that allowed local cotton to be spun. This began a change in the terms of trade. Things deteriorated further when British cotton-spinning and weaving became mechanized in the late eighteenth and early nineteenth centuries, weakening international export demand. As Li and Van Zanden point out, between the 1810s and the 1823-1829 period, the prices of raw cotton probably doubled while the price of cotton cloth declined by 40 percent. The result of this rapid scissors was to squeeze productivity (the value added by buying raw cotton, spinning and weaving it into cloth, and selling the cloth) to almost nothing. Yet farm families in the region had few options. The major portion of family income was provided by males farming small and highly productive plots; as late as 1820 men's productivity in agriculture was about the same as in the Netherlands. So families stayed put. Yet the income they earned from women's home spinning and weav-

ing plummeted, and women could not readily leave their household or shift into other higher productivity activities. As a result, productivity in the textile sector fell to about one-sixth the level of productivity in agriculture, and total GDP/capita fell sharply. And this was only the result of the last phase of what had already been a long-worsening shift in the terms of trade between raw materials and finished products.

Li and Van Zanden attempt to see what Yangzi incomes might have been if they corrected for this shift in the terms of trade in textiles. They also correct for the fact that females dominated textile making in the Yangzi, while men worked in the trade in the Netherlands (using machine-assisted weaving to create cloth from imported yarn), so that the amount of labor effort input in textiles was probably lower in China. Their result is that 'labor productivity in industry recalculated in this way is 92 percent of labor productivity in the economy as a whole' as opposed to the 22 percent in the main calculation.⁹ This adjustment, if only partially representative of the situation that would have held earlier in the eighteenth century before terms of trade shifted so sharply against the Hua-Luo households, suggests that overall GDP/capita ratios would have been much closer, perhaps twenty or thirty percent instead of 86 percent in favor of the Netherlands. In my view, the Li and Van Zanden results, showing that agricultural productivity per person in the lower Yangzi as late as the 1820s was comparable to that in the Netherlands, at a time when the latter had not only one of the highest agricultural productivity levels in all of Europe, but also gained from selling its agricultural surplus into urban areas of Europe whose purchasing power had already been boosted by a century of modern economic growth, shows that the core of China's economy – agriculture – was likely at least as productive as any in Europe well into the eighteenth or even early nineteenth century. Where there clearly was a divergence was in manufacturing productivity. Yet by looking at a period at the end of a disastrous shift in both regional and international terms of trade for female cotton weavers in this region (a shift which had actually been advantageous for cotton workers elsewhere in China), they find a large portion of the Hua-Luo population producing a trivial income from textile production, in contrast to much higher incomes earned by (mainly men) in Holland using nineteenth century methods of production. Dare I say this tells us little about the situation that might have prevailed c. 1700, when Hua-Luo had a privileged position in cotton production in China and mechanized spinning and weaving had yet to affect productivity in Eur-

9 Ibidem, 978.

opean textiles? Indeed, it seems to me that any plausible correction, based on a gap in GDP/capita of only 86 percent in the 1820s, would suggest that the gap between advanced portions of the Yangzi basin and the Netherlands c. 1700 would be far smaller. Add to this the fact that c. 1700, according to Allen's data, the Netherlands were still ahead of England in income, the gap between England and the lower Yangzi c. 1700 would have been trivial. That in fact completely corresponds with Allen's data on the lower Yangzi vs south English towns in 1650-1699, as shown in Table 1.

In sum, I do not share Vries's belief that it is established that incomes in England were substantially greater than those in the Yangzi delta well before the onset of modern economic growth. I feel the latest data in fact strengthens the case for comparable incomes in both regions. Where I do agree strongly with Vries is that the differences that did exist – in state mercantilism, in trajectories in science and culture, in the structure of agriculture and the gender division of labor, and other factors – need to be explored in all their complexity and related to a nuanced and wide-ranging process of social change, in order to understand why modern economic growth began in a particular place and time, one that seemingly had no apparent advantages in prior income levels or prior rates of economic growth compared to other commercial centers in Europe or in Asia.

About the author

Jack A. Goldstone (PhD. Harvard) was one of the original *California School* world historians, undertaking pioneering comparative studies of economic history and political dynamics in China and the West in such publications as *Revolution and Rebellion in the Early Modern World* (1991), winner of the ASA Prize for Distinguished Scholarship; 'The Problem of the 'Early Modern' World', *Journal of Economic. and Social History of the Orient* 1998; 'The Rise of the West -or Not? A Revision to Socio-economic History', *Sociological Theory* 2000; and 'Efflorescences and Economic Growth in World History', *Journal of World History* 2002, winner of the Arnaldo Momigliano Prize of the Historical Association. He has taught at Northwestern University, the California Institute of Technology, the University of California at Davis, and currently is Hazel Professor of Public Policy at George Mason University and Director of the International Research Laboratory on Political Demography at the Russian Academy of National Economy, Moscow. See: <http://jackgoldstone.gmu.edu>.

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