

Book Reviews

GENERAL AND MISCELLANEOUS

Contours of the World Economy, 1–2030 AD: Essays in Macro-Economic History.
By Angus Maddison. Oxford: Oxford University Press, 2007. Pp. xii, 418. \$99.00, cloth; \$42.95, paper.

Angus Maddison has labored fifty years to provide ever more comprehensive and distant estimates of economic growth. His earliest estimates of GDP began in 1870, the era of modern statistical offices and censuses, and mainly concerned the better documented economies of Europe and North America.¹ But as his fame has grown, Maddison has become ever bolder in the mysteries of his craft. His statistical empire now spans every corner of the globe, and extends over millennia. *Contours of the World Economy* projects a revised set of these estimates, for every country on earth, back to 1 AD.²

Maddison's numbers have found wide currency with economists analyzing long-run growth. Google Scholar records over 12,000 references to his works. Even the most speculative estimates have been employed in high-profile publications, as is discussed below. *Contours of the World Economy* is a magisterial summary of this life project, and a discussion of elements of the derivation of the earlier data. It gives detail down to the level of estimates of population and GDP per capita in Belgium in 1 AD. It has, for example, graphs such as one comparing U.K. and Indonesian GDP per capita, by year, 1500–2003 (p. 132). It reports that the poorest people who ever lived were the Nepalese, whose GDP per capita in 1820 and 1870 is estimated at only \$397 (in 1990 \$) (p. 176). It is also, as the subtitle “essays” warns, a somewhat disjointed explanation of the patterns of history he observes, which includes such intricacies as a discussion of relative income in the provinces of the Roman Empire in 14 AD, and a discussion of the impact of Islam on African growth. The book also finds space for a history of the art of macro-measurement, beginning with the seventeenth-century English “Political Arithmeticians.”

The Maddison numbers suggest that the transition to modern growth had two phases. Before 1000 AD all societies were close to a subsistence minimum GDP per capita, which he takes as \$400 (1990 international prices), and income stagnated for eons.³ Then between 1000 and 1820 there is a period of slow but persistent economic growth in Western Europe, which tripled average real incomes there by 1820. Europe in these years was gaining decisive advantage over Asia in living standards. After 1820 there was the marked acceleration of growth rates associated with the Industrial Revolution, and its spread to the rest of the world. This discovery of a two-phase process of growth has important implications for growth theorists trying to model long-run growth.

There is, however, a problem at the core of the book, and indeed at the core at the whole Maddison project for at least the last ten years. All the numbers Maddison estimates for the years before 1820 are fictions, as real as the relics peddled around Europe in the Middle Ages. Many of the numbers for the years 1820, 1870, and 1913

¹ Maddison, *Economic Growth*.

² It actually revised the estimates provided earlier by Maddison, *World Economy: A Millennial Perspective*.

³ Except, as noted, curiously Nepal, with its \$397 GDP per capita.

are equally fictive. Just as in the Middle Ages, there was a ready market for holy relics to lend prestige to the cathedrals and shrines of Europe—Charlemagne secured for the cathedral in Aachen, his capital, the cloak of the Blessed Virgin, and the swaddling cloths of the infant Jesus—so among modern economists there is a hunger by the credulous for numbers, any numbers however dubious their provenance, to lend support to the model of the moment. Maddison supplies that market.

How exactly Maddison created his numbers for many countries and epochs is never precisely clear. One crucial element is his assumption that the basic subsistence GDP per capita of all societies is \$400 (1990 international prices). This is the fundamental constant in Maddison's world, the basic unit of human existence. Any society without a sophisticated production technology, without significant urbanization, and without a substantial rich class, or just where nothing is known, is assigned this minimum. Thus around 1000 AD the various parts of the world are mostly assumed to have incomes either of \$400 (uncivilized) or \$450 (civilized). Of 27 quotes of income per capita for 1000 AD for individual countries or regions, 26 lie between \$400 and \$450 (p. 382). Those where our ignorance is largely complete all get assigned this \$400: United Kingdom, 1 AD, \$400, United Kingdom, 1000 AD, \$400, and Mexico, 1 AD, \$400.

Why \$400 is the assumed subsistence income is not explained. Maddison has no estimates from 1820 on, where data does exist, for income per person for the types of societies this number is supposed to apply to. The only societies reported to have close to these income levels in 1820 are those of Africa (and Nepal). But they have such incomes not because Maddison has data on their GDP. There is no such data for 1820. It is because in the absence of such data, he assumed that they lay close to his subsistence primitive.

Yet this subsistence assumption is vital to his whole account of the development of the world economy before 1820. Since by 1820, when we get closer to real data, almost all societies are found to have incomes well in excess of this, inevitably we have economic growth between 1000 and 1820. Had Maddison assumed subsistence was \$700, there would be no growth from 1 AD to 1820.

What is that subsistence income in real terms? In 1990 US \$ prices, a pound of white bread cost \$0.70. So Maddison's \$400 is the equivalent of 1.6 lbs of wheaten bread per person per day, or 1,500 kcal.⁴ That is an extraordinarily low income, rarely observed in practice. Since most societies have inequality, the poorest in such a subsistence economy would have lived on the equivalent of much less than that daily 1.6 lbs of bread. So if the poorest people spent nothing on clothing, heat, shelter, light, and consumed only the cheapest form of calories such as bread, they would still be engaging in hard physical labor on a diet well below 1,500 kcal in the Maddison vision of subsistence.

There is ample evidence, however, that incomes even of the most "primitive" societies greatly exceeded the Maddison assumption. Modern anthropologists, for example, have recorded the daily food consumption of surviving hunter-gatherer and shifting cultivation groups. The median consumption per person was 2,340 kcal per day, well above Maddison's assumed subsistence.⁵ Many of these calories came as much more expensive meat. So just measuring the value of their food consumption, hunter-gatherers, the most primitive of the primitives, lived at an income equivalent to at least double Maddison's \$400.

⁴ This is confirmed from historical data. Maddison estimates a U.K. GDP per capita of \$1,706 in 1820. U.K. incomes then supplied the inhabitants with the daily equivalent of 6.4 lbs of wheaten bread, implying 1 lb of bread was equivalent to \$0.73.

⁵ Clark, *Farewell to Alms*, table 3.6, p. 50.

Human heights supply further evidence on early living standards. Heights increase with income, which increases the quantity and quality of foods. Thus the average English male around 1820, when income per capita on Maddison's measure would be \$1,900, was only about 168 cm tall (66 inches), compared to 70 inches for the richest modern societies. In contrast for Indians around 1820, where Maddison reports an income of \$533, average male heights were only 162 cm (64 inches).⁶ What were the heights then of people supposedly living on \$400 a day, who should be smaller even than the Indians and Chinese in the nineteenth century? For modern hunter-gatherers and shifting cultivators, the median is 165 cm. For Mesolithic and Neolithic Europeans, as evidenced by skeletons, it was 169 cm, taller even than the rich English of 1820. For a variety of societies observed for 1000 AD and before, when in Maddison's vision all societies hewed close to the starvation minimum, the median was 166 cm, little less than the prosperous English of 1820.⁷

For the years 1250–1820 there is also ample evidence of real wages across a variety of countries. These wages have been collected in recent years by a whole variety of economic historians: Robert Allen, Jean-Pascal Bassino, Giovanni Federico, Debin Ma, Paolo Malanima, Sevket Pamuk, and Jan Luiten van Zanden. There are also scattered sources on wages in various early localities. Wage payments are typically 50–75 percent of total income in societies. Thus these wage rates can be used to set a lower bound on real GDP in earlier societies.

The unskilled wage of preindustrial workers before 1800 is generally far above Maddisonian subsistence. Assume 300 days of work per year, 40 percent of the population working, all wages at the unskilled level, and the wage share in national income as high as 70 percent. Then a society with a GDP per capita of \$400 would have an unskilled day wage of 3.4 lbs of bread. In contrast, the day wages of farm laborers in England in the 1440s were the equivalent of 20 lbs of bread per day, about six times Maddison's subsistence. For the earliest year we have evidence for England, 1209, the implied unskilled day wage was still the equivalent of 15 lbs of bread.⁸ There are only a few societies that ever report real unskilled wages possibly consistent with Maddison's subsistence assumption.

Maddison, conscious of the difficulty of reconciling his assumptions about economic growth between 1 AD and 1820 with this copious preindustrial wage information, simply rejects it all as "primitive" and "almost universally rejected as a proxy for GDP per capita."⁹ Instead he prefers to feel his way, ad hoc, between his GDP estimates for each society from whenever there is actual output data, and the time in the past when GDP was \$400, using estimates where they exist of urbanization, or the labor share in agriculture. Thus for Britain, for example, Maddison just assumes that that the growth rate of GDP per person in 1500 to 1700 was the same as estimated by Nick Crafts and Knick Harley for 1700–1801, which interval of course includes part of the Industrial Revolution.¹⁰ For other European countries, Maddison imposes ad hoc growth rates between 1500 and 1820. Austria, Denmark, Finland, Sweden, and Switzerland have exactly the same rate of growth of GDP per person from 1500 to 1820, 0.170 percent precisely.

For Italy, Maddison lists a GDP per capita of \$1,100 for 1500, 1600, 1700, and \$1,117 in 1820. Maddison presumably preferred to believe that Italian GDP per capita did not decline between the Renaissance and 1820 because Italian urbanization

⁶ *Ibid.*, table 3.8, p. 57.

⁷ *Ibid.*, tables 3.9, 3.10, pp. 59–61.

⁸ Clark, "Farm Wages."

⁹ Maddison, *World Economy: Historical Statistics*, p. 253.

¹⁰ Maddison, *World Economy: A Millennial Perspective*, p. 246.

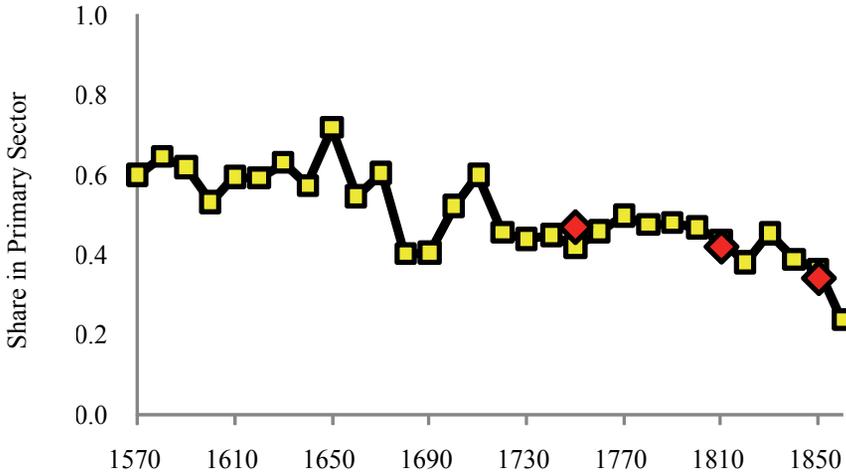


FIGURE 1
THE SHARE OF PRIMARY SECTOR EMPLOYMENT IN ENGLAND FROM WILLS,
1570–1869

Notes: The diamonds show the estimates of Shaw-Taylor and Wrigley. The wide swings in shares 1650–1739 are caused by small sample sizes in these years.

rates changed little over this interval, being around 14 percent throughout.¹¹ Federico and Malanima suggest, however, that real wages in north and central Italy fell by nearly 50 percent between 1500 and 1800.¹²

Urbanization is used as an indicator of per capita GDP since it is presumed to be a measure of the share of the population employed outside the primary sector. For example, for England in the years 1550 to 1800 there is a well-attested rise in the urbanization rate from 3.5 percent to 20.3 percent of the population, with in the same period no gain in rural or urban real wages.¹³ The presumption from the low urbanization rate in 1550 is that the share of the population employed in the primary sector must be 70–80 percent, with a consequently low implied GDP per capita. However, it is possible to estimate the share of people employed in the primary sector for England from 1570–1860 using men's wills, which often state the testator's occupation. Figure 1 shows the implied share in primary production by decade 1570s–1860s. Also shown are recent extensive estimates by Leigh Shaw-Taylor and Anthony Wrigley for 1755, 1817, and 1851. In the decades of overlap, the estimates coincide well. But the wills show that England back in 1570, with a 3.5 percent urban share, had only 60 percent of men employed in the primary sector, compared to 46 percent by 1800. The vast majority of those in secondary and tertiary occupations were located in the countryside. Urbanization in the preindustrial world consequently is not the reliable predictor of consumption and employment patterns, and hence of income, that Maddison presumes.

England 1209–1800 is probably the best documented of all preindustrial economies. Yet we see above that even in England there is still debate about how much, if any, economic growth there was between 1209 and 1800. Those who believe there

¹¹ Share in towns of more than 10,000 people.

¹² Clark, *Farewell to Alms*, figure 3.3, p. 47.

¹³ de Vries, *European Urbanization*, p. 39.

was significant growth in the years 1300–1800 in England have been forced to reconcile this with the contrary evidence of high early real wages by positing an “Industrial Revolution,” for which there is minimal direct evidence, which dramatically increased work hours per person.¹⁴ If the path of GDP per person even in England between 1300 and 1800 is a matter of ongoing dispute, no consensus is possible on what it was in Finland, China, India, Africa, Nepal, or anywhere else. Maddison also presents detailed population estimates, and estimates of total GDP, for the years before 1820. The population estimates are largely drawn from Colin McElvedy and Richard Jones’s *Atlas of World Population History*. Inspection of that source reveals that it is similarly largely a work of imagination in these earlier years. This book, for example, happily quotes estimates of the population of the Indian subcontinent for the years 1820 and earlier. Yet examination of the sources reveals there are essentially no data on population for India, at present, for the years 1820 and before. All this material is suitable for use only in the most general and qualified way.

Despite these numbers on GDP per capita, by country, have been widely used to lend support to theoretical models. Maddison’s data for the years 1820 and earlier has been cited as tests of the theories expressed in papers published in the *American Economic Review*, *Quarterly Journal of Economics*, *Journal of Monetary Economics*, *Journal of Economic Growth*, and this JOURNAL, among others.¹⁵ Somehow the Maddison numbers have an imprimatur that is completely out of line with their dubious provenance. The authors using them are happily employing as “data” what is not data at all, but the expression of one man’s unexamined theory of what must have happened in the last two millennia of human history.

The interpretive essays in *Contours of the World Economy* cover a vast range of history, but mainly consist of summaries of the economic history of various parts of the world, in the light of the new GDP estimates, without any particular theme or underlying model. Thus they are not a noteworthy attraction of the book. Maddison’s latest set of numbers, laid out in the tables of this book, are his claim to fame. For the reasons given above, however, any economist with enough street savvy to resist fabulous riches offered by unknown Nigerians over the internet will equally want to steer clear of these estimates.

¹⁴ de Vries, *Industrious Revolution*; and Broadberry et al., “British Economic Growth.”

¹⁵ See, for example, Acemoglu, Johnson, and Robinson, “Rise of Europe” and “Reversal of Fortune”; Boucekine, de la Croix, and Licandro, “Early Mortality Declines”; Falkinger and Grossman, “Institutions and Development”; Mokyr, “Long-Term Economic Growth”; Ngai, “Barriers”; and Sylla, “Financial Systems.”

GREGORY CLARK, *University of California, Davis*

REFERENCES

- Acemoglu, Daron, Simon Johnson, and James Robinson. “Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution.” *Quarterly Journal of Economics* 117, no. 4 (2002): 1231–94.
- _____. “The Rise of Europe: Atlantic Trade, Institutional Change, and Economic Growth.” *American Economic Review* 95, no. 3 (2005): 546–79.

- Allen, Robert C. "The Great Divergence in European Wages and Prices from the Middle Ages to the First World War." *Explorations in Economic History* 38, no. 4 (2001): 411–48.
- Bassino, Jean-Pascal, and Debin Ma. "Japanese Wages in International Perspective, 1741–1913." *Research in Economic History* 23 (2005): 229–48.
- Boucekkine, Raouf, David de la Croix, and Omar Licandro. "Early Mortality Declines at the Dawn of Modern Growth." *Scandinavian Journal of Economics* 105, no. 3 (2003): 401–18.
- Broadberry, Stephen et al. "British Economic Growth, 1300–1850: Some Preliminary Estimates." Working Paper, University of Warwick, Department of Economics, 2009.
- Clark, Gregory. "The Condition of the Working Class in England, 1209–2004." *Journal of Political Economy* 113, no. 6 (2005): 1307–40.
- _____. *A Farewell to Alms: A Brief Economic History of the World*. Princeton, NJ: Princeton University Press, 2007.
- _____. "Farm Wages, Population, and Economic Growth, England, 1209–1869." *Economic History Review* 60, no. 1 (2007): 97–136.
- de Vries, Jan. *European Urbanization, 1500–1800*. London: Methuen, 1984.
- _____. *The Industrious Revolution: Consumer Behavior and the Household Economy, 1650 to the Present*. Cambridge: Cambridge University Press, 2008.
- Falkinger, Josef, and Volker Grossman. "Institutions and Development: The Interaction Between Trade Regime and Political System." *Journal of Economic Growth* 10, no. 3 (2005): 231–72.
- Federico, Giovanni, and Paolo Malanima. "Progress, Decline, Growth: Product and Productivity in Italian Agriculture, 1000–2000." *Economic History Review* 57, no. 3 (2004): 437–64.
- Maddison, Angus. *Economic Growth in the West*. London: Allen and Unwin, 1964.
- _____. *The World Economy: A Millennial Perspective*. Paris: OECD, 2001.
- _____. *The World Economy: Historical Statistics*. Paris: OECD, 2007.
- _____. *Contours of the World Economy, 1–2030 AD: Essays in Macro-Economic History*. Oxford: Oxford University Press, 2008.
- McEvedy, Colin, and Richard Jones. *Atlas of World Population History*. London: A. Lane, 1978.
- Mokyr, Joel. "Long-Term Economic Growth and the History of Technology." In *Handbook of Economic Growth*, edited by Philippe Aghion and Steven Durlauf. Amsterdam: Elsevier, 2005.
- Ngai, L. Rachel. "Barriers and the Transition to Modern Growth." *Journal of Monetary Economics* 51, no. 7 (2004): 1353–83.
- Pamuk, Sevket. "Urban Real Wages Around the Eastern Mediterranean in Comparative Perspective, 1100–2000." *Research in Economic History* 23 (2005): 213–32.
- Shaw-Taylor, Leigh, and E. A. Wrigley. "The Occupational Structure of England c.1750–1871: A Preliminary Report." Cambridge, England: Cambridge Group for the History of Population and Social Structure, 2008.
- Sylla, Richard. "Financial Systems and Economic Modernization." *This JOURNAL* 62, no. 2 (2002): 277–92.
- Van Zanden, Jan Luiten. "Wages and the Standard of Living in Europe, 1500–1800." *European Review of Economic History* 2 (1999): 175–97.