Maddison, Angus: *Contours of the World Economy 1-2030 AD. Essays in Macro-Economic History*. Oxford: Oxford University Press 2007. ISBN: 978-0-19-922721-1; 418 S.

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Angus Maddison has built over many decades a worldwide franchise as „Political Arithmetician," producing estimates of the basic statistics of economic growth on a global scale for the nineteenth and twentieth centuries.[1] While there has been criticism of his methods and results for these post 1800 estimates by scholars such as Leandro Prados de la Escosura[2], these were to be expected in any such ambitious enterprise.

In the past decade, however, Maddison has sought to extend his estimates back into the pre-industrial era, first to the year 1000, and now to 1 AD. Contours of the World Economy projects a revised set of these estimates, for every country on earth, back to 1 AD.[3]

There is, however, a problem at the core of this book, and indeed at the core at the whole Maddison project of the last ten years. The numbers Maddison estimates for the years before 1820 are fictions. They are based not on empirical evidence, but on unsubstantiated and demonstrably implausible theories of the nature of life in pre-industrial societies. Even some of the post 1820 estimates have an equivalently dubious provenance. Having built up some reputational capital for his earlier work, Maddison seems determined to squander it all on this new venture.

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). Income stagnated for eons. Between 1000 and 1820 there is a period of slow but persistent economic growth in western Europe, tripling real incomes there by 1820. Europe in these years gained decisive advantage over Asia in living standards. After 1820 there was the marked acceleration of growth rates associated with the worldwide Industrial Revolution. This discovery of a two phase process of growth has important implications for understanding the nature of the Industrial Revolution.

Though much is obscure about how Maddison's estimates were created, a crucial assumption is that the basic subsistence GDP per capita of all societies is $400 (1990 international prices). This is the fundamental constant in Maddison's world. Any primitive enough society is assigned this minimum. Thus of 27 quotes of income per capita for 1000 AD for individual countries or regions, 26 lie between $400 and $450 (p. 382).

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 USA $ prices, a kilogram of white bread cost $1.55. So Maddison's $400 is the equivalent of 0.75 kg of wheaten bread per person per day, or 1,500 kcal.[4] That is an ex-

[1] This review is an abbreviated version of a longer review in the Journal of Economic History, 69 (2009) 4, p. 1156-1162.

[2] Prados de la Escosura, Leandros, International Comparisons of Real Product, 1820-1990. An Alternative Data Set Explorations, in: Economic History 37 (2000) 1, pp. 1-41.
Prados de la Escosura, 2000.

[3] It actually revises and extends the estimates provided earlier by Agnus Maddison, The World Economy. A Millenial Perspective, Oxford 2001.

[4] This is confirmed from historical data. Maddison estimates a UK GDP per capita of $1,706 in 1820. UK incomes then supplied the inhabitants with the daily equivalent of 3 kg of wheaten bread, implying 1 kg of bread was equivalent to $1.61.

traordinarily 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 0.75 kg 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.

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, compared to 178 cm 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.[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, Jan Luiten van Zanden. There are also scattered sources on wages in various early localities. Wage payments are typically 50-75% 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 pre-industrial workers before 1800 is generally far above Maddisonian subsistence. Assume 300 days of work per year, 40% of the population working, all wages at the unskilled level, and the wage share in national income as high as 70%. Then a society with a GDP per capita of $400 would have an unskilled day wage of 1.55 kg of bread. In contrast, the day wages of farm laborers in England in the 1440s were the equivalent of 9 kg 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 7 kg 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 copious evidence on high pre-industrial wages 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 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

[5] Gregory Clark, A Farewell to Alms. A Brief Economic History of the World, Princeton 2007, table 3.6, p. 50.

[6] Ibid. table 3.8, p. 57.

[7] Ibid. tables 3.9, 3.10, pp. 59-61.

[8] Gregory Clark, Farm Wages, Population and Economic Growth, England, 1209-1869, in: Economic History Review, 60 (2007) 1, p. 97-136.

[9] Agnus Maddison, The World Economy. Historical Statistics, Oxford 2007, p. 253.

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% 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 rates changed little over this interval, being around 14% throughout.[11] Federico and Malanima suggest, however, that real wages in north and central Italy fell by nearly 50% 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% to 20.3% 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%, 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. The wills show that England back in 1570, with a 3.5% urban share, had only 60% of men employed in the primary sector, compared to 46% by 1800. The vast majority of those in secondary and tertiary occupations were located in the countryside. Urbanization in the pre-industrial 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 pre-industrial 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 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 „Industrious 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.

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. Unfortunately, for the reasons given above, these numbers are all worthless for the years before 1820, and highly suspect even for the years after that.

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[10] Maddison, The World Economy. A Millennial Perspective, p. 246.

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

[12] Clark, A Farewell to Alms, figure 3.3, p. 47.

[13] Jan De Vries, European Urbanization, 1500-1800, London 1984.

[14] Jan De Vries, The Industrious Revolution. Consumer Behavior and the Household Economy, 1650 to the Present, Cambridge 2008; Steven Broadberry / Bruce Campbell et al., British Economic Growth, 1300-1850. Some Preliminary Estimates", Warwick University, Department of Economics, Working Paper, 2008.