

# GDP per capita or real wages? Making sense of conflicting views on pre-industrial Europe <sup>☆</sup>

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## Abstract

This paper studies the apparent inconsistency between the evolution of GDP per capita and real wages in pre-industrial Europe. We show that these two measures will diverge when any of the three following factors are present: changes in income distribution, changes in labour supply per capita and changes in relative prices. We propose a methodology for measuring the effects of these three factors and apply it to the case of 18th century England. For this particular episode the gap between the growth of GDP per capita and real wages can be successfully explained and the main explanatory factor is changes in labour supply per capita. Some further conclusions are drawn from the experience of England during the 19th century and Europe during the early modern period.

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## 1. Introduction

How are we to regard the evolution of economic well-being over the pre-industrial period? Were pre-industrial economies stuck in a long term equilibrium characterized by a level of economic well-being that showed no trend over several centuries? Or did pre-industrial economies experience sustained growth which, despite being at much slower rates than those we are currently used to, led over the course of the centuries to large and significant rises in living standards?

These difficult questions have occupied social scientists at least since Adam Smith and Thomas Malthus. Unfortunately, notwithstanding a large and insightful literature, we seem to be as far away from a consensus today as we were two centuries ago. An important reason for this is the fact that different measures of economic well-being seem to tell surprisingly different stories about pre-industrial economies. Thus, what one believes will inevitably be conditioned by what measure one is inclined to trust.

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There are essentially two measures of economic well-being for which we have long time series extending well before the 19th century: the real wage and GDP per capita.<sup>1</sup> Each can lay claim to a long history of scholarly effort and important improvements in their methodologies over time, and surprisingly, each of them shows a very different trend over the pre-industrial period.

Real wage estimates consistently show no evidence of a positive trend over the centuries going from the late middle ages to the industrial revolution. Authors have computed real wage series for several European countries and cities and, more recently, for some non-European societies.<sup>2</sup> The most common outcome of these estimates is actually an overall *fall* in real wages between the Renaissance and the Industrial Revolution. Only the most successful European economies, namely England and the Netherlands, were able to maintain their real wages over this period. This description is remarkably consistent across the estimates of different authors, allowing for relatively modest quantitative differences.

Estimates of GDP and GDP per capita over the pre-industrial period are available for fewer countries and extend over a shorter time interval.<sup>3</sup> These estimates have a somewhat larger degree of uncertainty than those for real wages, as less work has been done on them and authors may disagree about their values. There have been at least two attempts at summarizing the overall picture for Europe: the work of Maddison (2001, 2003) and Van Zanden (2001).

Maddison (2001) is by far the most optimistic, proposing that European GDP per capita was on a persistent positive trend over as long as eight centuries prior to the Industrial Revolution. Van Zanden (2001) presents a less optimistic picture but still estimates considerable increases in GDP per capita in certain European countries over relatively long periods of time. It is thus difficult to escape the conclusion that real wage and GDP per capita estimates for pre-industrial Europe contradict each other.

Let us illustrate this conflict with the case of England. Fig. 1 shows three recent estimates of the English real wage from the early 14th century to the late 19th century from Allen (2001) and Clark (2005, 2007).<sup>4</sup> It is readily apparent that English real wages followed several low-frequency cycles, some of which clearly reflect contemporaneous changes in population. The Black Death, which wiped out as much as 60% of the English population in the mid-14th century (Benedictow, 2004), was followed by a steep rise in the real wage. The ensuing population recovery over the 15th and 16th centuries was accompanied by a secular fall in real wages.<sup>5</sup> The most notable feature of Fig. 1 is the absence of any positive trend over the pre-industrial period. Real wages at the turn of the 19th century were not much different from what they had been over the preceding six centuries.

Contrast the message from Fig. 1 with the estimates of the evolution of English GDP per capita over the period 1500–1800 provided in Table 1. An increase of GDP per capita of 153% (Maddison, 2001) or 92% (Van Zanden, 2001) over these three centuries would denote a large improvement in economic well-being.<sup>6</sup> This

<sup>1</sup> There are other, less direct, indicators of well-being for which we have more sparse data; for example data on people's height and probate inventories.

<sup>2</sup> The seminal reference is Phelps Brown and Hopkins (1981). More recent contributions that we will be using are Allen (2001), Clark (2005), Clark (2007) and van Zanden (1999). For recent estimates of real wages in pre-industrial Asia see Allen (2005) and Allen et al. (2005).

<sup>3</sup> Estimates of the growth of GDP (or of some of its components) in the pre-industrial period exist for Belgium (Blomme et al., 1994), the Netherlands (van Zanden, 1993; de Vries and van der Woude, 1997), Spain (Yun, 1994), Italy (Malanima, 1994) and, particularly, England (see the next section for references).

<sup>4</sup> Allen (2001) and Clark (2007) calculate yearly estimates of the real wage, and we add a 25 years centered moving average to smooth out short term fluctuations. Clark (2005) presents his results in decadal averages. To ensure comparability, we calculate a 20 years moving average every 10 years (for example, for 1720 we calculate the average of the decades 1710–1719 and 1720–1729). Much of this data can be found at UC-Davis' "Global Price and Income History Group", at <http://gpih.ucdavis.edu/>.

<sup>5</sup> The real wage evidence has been used to support a Malthusian interpretation of pre-industrial Europe. Clark and Hamilton (2006) present evidence supporting the existence of some Malthusian mechanisms in England.

<sup>6</sup> For the 18th century both Maddison and van Zanden use the work of N.F.R. Crafts as their source for GDP growth [Crafts and Harley (1992) for Maddison, Crafts (1985) for van Zanden]. They arrive to very similar values: an increase of 37% for Maddison and one of 31% for van Zanden. For the 16th and 17th centuries the authors could not rely upon direct measures of GDP growth and had to use some working assumption. Maddison (2001) finds that it is "reasonable to assume that the Crafts–Harley rate of growth of per capita income for 1700–1801 was also valid for 1500–1700" (p. 246). Van Zanden (2001) proceeds by using the estimates of Overton and Campbell (1997) for the productivity per capita in English agriculture. By assuming that labour productivity in the rest of the economy was growing at a rate either equal (scenario one) or double (scenario two) of the growth rate in agriculture he is able to construct estimates of GDP per capita that differ considerably from the ones of Maddison (2001).

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