Roman real wages in context

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Abstract: This paper presents and discusses evidence of real incomes in the Roman period. It shows that real wages rose in response to demographic contractions. There is no evidence that would support the assumption that Roman economic growth raised real wages for workers. However, absence of evidence is not evidence of absence: relevant data are scarce and highly unevenly distributed in time and space.

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Did Roman rule sustain intensive economic growth and deliver higher incomes for workers? In recent years, growing interest in quantifying Roman economic performance has led to several attempts to estimate Roman GDP. Yet in the absence of substantive evidence, this subject is notoriously difficult to address. Real income provides a measure of economic development that is more readily susceptible to empirical investigation. The study of the purchasing power of workers allows long-term and cross-cultural comparison that puts the Roman economy in a wider context.

It is important to define our terms. ‘Roman’ needs to be understood in the broadest possible sense in order to capture all relevant data. For present purposes, this term covers all areas under Roman control up to late antiquity and including the immediate aftermath of Roman rule in the eastern Mediterranean. ‘Real wage’ refers to the value of wage income relative to that of consumer goods. Ideally, the purchasing power of nominal incomes ought to be assessed in relation to the entire bundle of goods and services – what is known as a ‘consumption basket’ – regularly consumed by workers. This procedure, however, requires access to data sets that only very rarely survive from antiquity. Roman Egypt in the first three centuries CE and the tetrarchic price edict of 301 CE are currently the only exceptions.

A cruder but much more widely available alternative is furnished by grain wages, a standardized means of measurement that converts income in cash and/or in a variety of goods into grain equivalents, such as units of wheat. Even if workers did not actually consume all (or any) of their income in the form of wheat, this method is useful because grain prices tend to be more commonly known than the aggregate price of a given ‘consumption basket’. Whereas a focus on real wages defined in relation to ‘consumption baskets’ limits historical comparison to a number of reasonably well attested economies in early modern Europe and Asia, the use of wheat wages enables us to extend the scope of our survey into the more distant past, as far back as the third millennium BCE in the case of Mesopotamia.

In his path-breaking work on real incomes in early modern Europe, Robert Allen has developed standardized ‘consumption baskets’ that cover the demand for food, clothing, shelter, and fuel of a working family of four. He distinguishes between two ideal types, a ‘respectability basket’ based on a level of consumption that was considered appropriate for skilled workers, and a lower-priced ‘bare bones basket’ that delivers the same amount of calories through a less varied and desirable diet together with only minimal non-food resources. Although the actual composition of these baskets differs depending on local ecology and custom, they provide broadly equivalent metrics for a variety of societies.

In 2009, Allen applied his methodology to the information on prices and wages recorded in the edict on maximum prices of 301 CE. He found that the maximum wage allowed for an unskilled worker (operarius) would have been sufficient to purchase 56 per cent of a

This paper will appear in the publication of the Francqui Foundation conference Long-Term Quantification in Ancient Mediterranean History organized by Francois de Callataï (Brussels, Belgium, October 2009).


2 For a comprehensive survey and full references supporting the following statements and comparisons, see Scheidel 2010.


5 Van Zanden 1999; Özmucur and Pamuk 2002; Broadberry and Gupta 2006; Pamuk 2006.


7 Most recently Allen 2009: 332-5, 339-42.
‘respectable’ basket or 110 per cent of a ‘bare bones’ basket for a family of four. These are very modest levels of purchasing power, comparable to those in low-income economies in eighteenth- and early nineteenth-century Europe and Asia and close to physiological subsistence (Fig.1). In 2010, I built on Allen’s work by constructing ‘consumption baskets’ from price data derived from papyri in Roman Egypt. This exercise is feasible for two distinct periods, for the first two thirds of the second century CE and for the decades from the 190s to the 260s CE. In both cases, the wage of an unskilled rural laborer was enough to acquire approximately 30 per cent of a ‘respectable’ or 80 per cent of a ‘bare bones’ basket, even lower rates than those implied by the price edict (Fig.1).  

Fig. 1  Purchasing power of unskilled wages in terms of ‘bare bones’ consumption baskets
(‘Egypt’ = Roman Egypt 100-260s CE, ‘Edict’ = Roman Empire 301 CE)
Source: Allen 2009; Scheidel 2010

While the Egyptian data refer only to a single region (albeit one that may have housed not much less than one-tenth of the imperial population), the price edict at least in theory purports to apply to the entire empire, thereby raising the possibility that low real wages were more widespread. If taken at face value, none of these data sets supports an optimistic view of Roman real incomes in the second and third centuries CE. It merits attention that the higher European real wages of the fifteenth and sixteenth centuries CE displayed in Fig.1 were in the first instance a function of the massive demographic contraction caused by the Black Death and therefore by no

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8 Allen 2009: 337, 340. Cf. Scheidel 2010: 432 n.15 and 433 for marginally lower rates of 51% and 100%, respectively (used in Fig.1).
9 Scheidel 2010: 430 table 1, 434 table 2.
means representative of pre-modern economies in general. It is the lower rates in the following centuries that are more typical of economies characterized by population pressure – that is, an unfavorable ratio of land to labor – and (at least where evidence exists) widening income inequality.

As already noted, wheat wages support more wide-ranging comparison. Fig. 2 plots a variety of data points from Mesopotamia in the eighteenth century BCE to parts of Europe and Asia up to 1800 CE.

![Image of scatter plot](image)

**Fig. 2** Daily wages of unskilled laborers in Afroeurasia, 1800 BCE to 1800 CE, in liters of wheat equivalent

Source: Özmucur and Pamuk 2002; Broadberry and Gupta 2006; Scheidel 2010

More detailed review of these data shows that in the 3,000 years prior to the Black Death, most wheat wages fell in a range from 3.5 to 6.5 liters per day, a value that is best expressed as 5 liters +/- 30%. Outliers are rare. In the sixth century BCE, elevated real wages are reported in Babylonia during the Neobabylonian and early Achaemenid periods. The reason for this is unclear, but this phenomenon may have something to do with the preceding dislocations of the late seventh century BCE that could well have reduced the population. If true, this would align this development with later instances of rising real incomes driven by demographic contractions (see below). The high data points for the fifth and fourth centuries BCE shown in Fig. 2 originate from classical Athens, an economy whose precocious success is increasingly being recognized.

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10 E.g., Pamuk 2007: 297-301.
11 For inequality, see Hoffman et al. 2005.
12 Scheidel 2010: 452-3.
13 Scheidel 2010: 440-1. For the economic flourishing of Babylonia in the sixth century CE, see now esp. Jursa forthcoming. I am indebted to participants at the Brussels colloquium for suggesting that a demographic explanation may be worth considering.
and linked to its unusual institutional arrangements.\textsuperscript{14} High Athenian real wages are echoed by the high data point for the third century BCE, representing conditions in Hellenistic Delos.

The remaining data points for the period from third century BCE to the fifth century CE pertain either specifically to Egypt or more generally to the eastern Mediterranean.\textsuperscript{15} Low daily wheat wages of 4.9 liters in Egypt for much of the second and third centuries CE are commensurate with the low purchasing power of workers’ wages in terms of ‘consumption baskets’ that has been established above: the two data sets are mutually consistent.\textsuperscript{16}

Even so, a focus on wheat wages may obscure a moderate, if temporary, improvement in overall real incomes indicated by the movement of prices of a wider range of goods. As I have argued on different occasions, in the aftermath of the so-called ‘Antonine Plague’ of the 160s CE prices and wages in Roman Egypt changed in ways that are logically consistent with a demographic contraction: labor costs (represented by the wages of workers as well as the cost of draught animals) rose relative to the price of wheat and even more so relative to those of non-essential goods, and land values – expressed in prices and rents – dropped even more (Fig.3).\textsuperscript{17}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{Fig3.png}
\caption{Changes in real prices and rents between 100-160s and 190s-260s CE (all values standardized at 100 for the first period; wheat price standardized at 100 for both periods to reflect the intervening jump in nominal prices)}
\end{figure}

\textbf{Source: Scheidel in press}

Given Egypt’s status as a major exporter of wheat, in this particular case wheat prices may well have been propped up by outside demand. Therefore, wheat wages alone do not allow

\textsuperscript{14} Scheidel 2010: 441-2. For convergent indicators and discussion, see esp. Morris 2004; 2005; Ober 2010.
\textsuperscript{15} Scheidel 2010: 443-7.
\textsuperscript{16} Scheidel 2010: 436 table 3, and above, at n.9.
\textsuperscript{17} Scheidel 2002 and in press. Fig.3 is taken from Scheidel in press, a revision of my earlier argument undertaken in response to Bagnall 2002.
us to trace these changes, an observation which serves as a valuable reminder of the limits of the wheat wage as a proxy of ‘true’ real incomes.

The notion that epidemics were capable of improving real incomes receives further support from Egyptian data from the late sixth to the early eighth centuries CE (represented by the elevated data point for the seventh century CE in Fig.2). This temporary increase in real wages for unskilled workers – mirrored by those for skilled workers who are not covered in this survey – may be associated with the demographic consequences of the so-called ‘Justinianic Plague’, a plague pandemic that repeatedly struck western Eurasia from the 540s to the mid-eighth century CE.\textsuperscript{18} This event appears to have reduced the labor supply and driven up real wages in much the same way as the Black Death did in late medieval Europe, a process that accounts for the elevated early modern wage rates visible on the left hand side of Figs. 1 and 2.\textsuperscript{19}

What does all this tell us about ‘Roman’ real incomes? In as much as we are able to say anything at all, there is no sign of historically elevated real wages during the Roman period that were driven by economic development rather than population loss. However, the geographical and chronological distribution of the evidence raises doubts about the representative nature of these findings. Egypt and the East dominate the record; data from areas of potentially dynamic economic development such as Roman Italy and the western provinces are missing. Early modern evidence shows that real wages could, at least in rare instances, greatly diverge between neighboring regions.\textsuperscript{20}

The severe limitations of the ancient evidence may encourage the use of alternative means of gauging real wages. Willen Jongman has argued that slave prices can shed some light on the price of free labor.\textsuperscript{21} This assumption is problematic because the largest collection of data, references to the fees charged for the manumission of slaves at Delphi, may well overstate overall slave prices if privileged (i.e., skilled or otherwise popular) slaves are overrepresented in this particular context.\textsuperscript{22} Even so, if we were, if only for the sake of argument, to accept that manumission fees from Delphi and a handful of slave prices from Roman Italy may legitimately be used as proxies of wage levels, the results are sobering. An annual free wage of around 1,400 liters of wheat equivalent, as conjectured by Jongman, would not significantly exceed the annual wheat wage of around 1,200 liters for an unskilled rural laborer working not more than 250 days a year found in Roman Egypt and implied by the price edict of 301 CE.\textsuperscript{23} All these tallies are well within the baseline range for ancient and early medieval economies and fall far short of genuinely elevated wheat wages such as those reconstructed for sixth-century BCE Babylonia (2,000-3,000 liters), classical Athens (2,200-3,900 liters), or early medieval Egypt (2,000-3,400 liters).\textsuperscript{24}

It is tempting to make a more general connection between slave labor and real wages. The massive imports of slaves into Italy in the later stages of the Republican period logically implies high demand for labor, which in turns suggests that real wages for workers were also (relatively) high.\textsuperscript{25} Unfortunately, due to the lack of representative slave prices or usable civilian

\textsuperscript{18} Scheidel 2010: 448-9 (data), 456-7 (plague). This substantiates the theoretical prediction of Findlay and Lundahl 2006.

\textsuperscript{19} The data clustering on the right hand side of Fig.2 makes it difficult visually to disentangle divergent trends. In some advanced economies, wheat wages remained high (in England and the Netherlands, as in Fig.1) whereas in others they dropped, albeit not as smoothly as real incomes did according to Fig.1. The overall direction of movement of wheat wages and ‘consumption-basket’-derived real wages was the same in most but not all European economies.

\textsuperscript{20} See above, Fig.1, for real wages in Amsterdam. Real wages in London deviated even more widely from the default pattern: see the work cited in n.3.


\textsuperscript{22} For the problems of using these data to establish trends in slave prices, cf. Duncan-Jones 1984.


\textsuperscript{24} Scheidel 2010: 453 table 4.

\textsuperscript{25} Scheidel 2007a: 336; Scheidel 2008: 42-3.
wage data from this environment, it is impossible to put any numbers on this overtly plausible correlation.

Because quantitative data are so spatially restricted, it would be tremendously useful to be able to identify credible proxies for real incomes. Physical well-being as expressed in body height is a possible candidate. As a new project shows, osteological evidence supports a Malthusian interpretation of the Roman economy: heights generally tended to fall under Roman rule, a process that was not reversed until the empire started to unravel, mostly in the fourth century CE but in some cases even later.\(^2^6\) This points to an inverse correlation between population density and stature. Consequently, both stature and real wages rose in response to population losses, both at the end of antiquity and after the Black Death.\(^2^7\) It is doubtful whether we would be justified in inferring falling real wages from stature reductions during much of the Roman period: there is no clear-cut correlation between real incomes and body height.\(^2^8\) Even so, in the most general terms, a model of rising population densities and disease loads under Roman rule that (at least in the long run) depressed real wages (by altering the ratio of land to labor) as well as stature (mediated by changes in income and hence nutrition and/or epidemiological conditions) can readily be reconciled with the admittedly fragmentary evidence we have. This process is better visible in its reversal, as falling population improved both real incomes and stature. However, the case of archaic and classical Greece, where both population and real incomes are often thought to have risen concurrently, casts doubt on straightforward correlations: the potential impact of institutional arrangements precludes mechanistic extrapolations from demographic and biological proxies to real incomes.\(^2^9\)

The observation that there is no empirical evidence of historically elevated real wages in the Roman empire is therefore of limited significance: absence of evidence is not evidence of absence. What little evidence we do have strongly suggests that Roman rule failed to deliver substantial benefits to workers in developed parts of the Mediterranean. Conversely, it seems reasonable to assume a rise in real incomes in the imperial core during the period of expansion, when assets were violently redistributed to Rome and Italy. As for the initially less developed northern and western parts of the empire, we are left speculating about the trade-offs between the benefits accruing from lowered transaction costs and the concurrent pressure of a growing population. The most we can say is that the existing evidence does not conflict with what from a comparative historical perspective is the most plausible working hypothesis, a Malthusian model of Roman economic development – Roman peace raised output, thereby encouraging population growth and decreasing returns on inputs in the long run. In this scenario, improvements in real wages would have been confined to the early stages of development in the western half of the empire – where direct evidence is lacking – and to subsequent demographic contractions, as in the wake of the ‘Antonine’ and ‘Justinianic Plagues’. In that respect, Roman economic development would not have differed greatly from that of most other pre-modern economies.\(^3^0\)

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\(^2^6\) I owe this (preliminary) information to the ongoing dissertation project of Geertje Klein Goldewijk (Groningen).


\(^2^8\) For the determinants of stature, see most recently Steckel 2009.

\(^2^9\) See above, n.14. Ancient Greek body height is greatly in need of serious study, along the lines of what has recently been accomplished for the Roman world: see above, n.26-7.

\(^3^0\) For further development of this argument, see Scheidel 2007b: 50-66; Scheidel 2009: 67-70 and forthcoming; Temin forthcoming.
Bibliography


