

## Princeton/Stanford Working Papers in Classics

### A model of real income growth in Roman Italy

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Abstract: This paper presents a new model of the main exogenous and endogenous determinants of real income growth in Italy in the last two centuries BC. I argue that war-related demographic attrition, emigration and the urban graveyard effect converged in constraining the growth of the freeborn population despite increased access to material resources that would otherwise have been conducive to demographic growth and concomitant depression of real incomes; that massive redistribution of financial resources from Roman elites and provincial subjects to large elements of the Italian commoner population in the terminal phase of the Republican period raised average household wealth and improved average well-being; and that despite serious uncertainties about the demographic and occupational distribution of such benefits, the evidence is consistent with the notion of rising real incomes in sub-elite strata of the Italian population. I conclude my presentation with a dynamic model of growth and decline in real income in Roman Italy followed by a brief look at comparable historical scenarios in early modern Europe. I hope to make it probable that due to a historically specific configuration of circumstances created by the mechanisms of Roman Republican politics and imperialism, the Italian heartland of the emerging empire witnessed temporary but ultimately unsustainable improvements in income and consumption levels well beyond elite circles.

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## 1. Argument

Between the fourth and the first centuries BC, Rome grew from a small city-state in western central Italy into a pan-Mediterranean empire that came to control a territory of about four million square kilometers inhabited by up to one quarter of humanity. Overseas conquest was heavily concentrated in the last two centuries BC, a period in which Italy occupied a privileged position: Roman citizen status was largely limited to free residents of this region; the entire political leadership and most of the military forces hailed from Italy; income from war plunder, provincial tribute, and public and private rents was primarily spent in the peninsula; and the imperial heartland was progressively freed from regular taxation beyond conscription.

The economic impact of Roman imperialism on the mass of Italy's population is still only poorly understood: who benefited, and how? There are no ancient statistics, and quantifiable evidence is uneven in quality and coverage and generally scarce.<sup>1</sup> It is for these reasons that modern accounts can never be more than experimental reconstructions that struggle to reconcile ancient evidence with the predictive assumptions of contemporary scholarship. In the following, I focus on what I consider to be the key elements of an internally consistent model of real income growth in Roman Italy in the last two centuries BC. I argue that war-related demographic attrition, emigration and the urban graveyard effect converged in constraining the growth of the freeborn population despite improved access to material resources that was otherwise conducive to demographic increase and concomitant depression of real incomes (section 2); that massive redistribution of financial resources from Roman elites and provincial subjects to large elements of the Italian commoner population in the terminal phase of the Republican period raised average household wealth and improved average well-being (section 3); and that despite abiding and potentially insuperable uncertainties about the demographic and occupational distribution of such benefits, the evidence is consistent with the notion of rising real incomes in sub-elite strata of the Italian population (section 4). In the concluding sections, I present a simple model of growth and decline in real income in Roman Italy (section 5) followed by a brief look at comparable historical scenarios in early modern Europe (section 6) and a re-statement of the overall purpose of this study (section 7). While anything even approaching conclusive demonstration is bound to remain out of reach, I hope to make it probable that due to a historically specific configuration of circumstances created by the mechanisms of Roman Republican politics and imperialism, the Italian heartland of the emerging Roman empire witnessed temporary but ultimately unsustainable improvements in income and consumption levels well beyond elite circles.

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<sup>1</sup> This is the first attempt to assess the development of real incomes in Roman Italy. (For other periods of ancient history, cf. below, n. 61) Ancient literary sources for this period, composed by aristocrats or their clients, tend to focus on the undesirable consequences of imperial success: 'luxury', social mobility, and civil discord, ultimately resulting in warlordism and autocracy: e.g., K. Bringmann, "Weltherrschaft und innere Krise Roms im Spiegel der Geschichtsschreibung des zweiten und ersten Jahrhunderts v. Chr.," *Antike und Abendland* 23 (1977) 28-49. The modern version of this vision of the corrosive effects of empire was most lucidly enunciated by K. Hopkins, *Conquerors and Slaves* (Cambridge 1978) 1-98, esp. 1-15: foreign wars, fought by peasant conscripts, undermined the viability of the family farm and fuelled urbanization whilst providing the elite with capital and captives that were used to establish large, 'rational' slave estates producing cash crops for urban and overseas markets, a process that ultimately fanned political conflict over access to land that compromised the stability of the political system of the Republic. For the quality of ancient literary tradition, see below, at the end of section 4.

## 2. Demography

Despite its prominent role in the study of more recent economies, population has been consistently neglected by ancient economic historians.<sup>2</sup> With respect to late Republican Italy, scholars have tended to view demographic conditions as a by-product of economic factors whilst ignoring the potential impact of demography on economic development itself.<sup>3</sup> Conversely, I argue that demographic trends were a crucial determinant of intensive economic growth in this period.<sup>4</sup>

The most basic trends are reasonably clear. From the early fourth century BC onward, the Roman state rapidly expanded by enfranchising hundreds of thousands of residents of central peninsular Italy and converting the majority of the Italian population into allies, a process that was essentially completed by the 270s BC. Subsequent landmarks include the conquest of Northern Italy in the early second century BC, the enfranchisement of all free Italians south of the Po in the 80s BC, and the extension of citizenship to northernmost Italy in 49 BC.<sup>5</sup> Growing numbers of slaves were generated by the Italian wars of the fourth and early third centuries BC, and imported on an even larger scale from overseas during the next two centuries, creating a huge slave population.<sup>6</sup> At the same time, the city of Rome underwent rapid growth, and urbanization gradually expanded throughout Italy until there were over 400 (mostly small) towns.<sup>7</sup> The overall picture for this period is one of moderate growth and later stagnation of free population number coupled with high rates of both temporary and increasingly permanent geographical mobility generated by military mass mobilization, rising rates of permanent relocation due to urbanization, and gross population growth sustained by slave imports. Several factors were instrumental in curtailing indigenous population growth.

Military attrition was an important component. The Roman Republic was unusual among tributary empires not merely by maintaining its city-state regime of mass conscription for several centuries after it had vastly outgrown its original city-state format, but also by extending this system of military mobilization to its newly enfranchised citizens and its nominally autonomous Italian allies. As a result, one source was able to claim that in 225 BC, more than three quarters of a million adult men in peninsular Italy were liable to perform military service.<sup>8</sup> Even though in

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<sup>2</sup> M. I. Finley, *The Ancient Economy* (Berkeley 1973, 2<sup>nd</sup> ed. London 1985), the single most influential work in this field, is emblematic of this attitude; see W. Scheidel, "Progress and Problems in Roman Demography", in W. Scheidel (ed.), *Progress and Problems in Roman demography* (Leiden 2001) 1-81, at 72-7. The new *Cambridge Economic History of the Greco-Roman World* is the first project to take due account of demographic factors: see esp. W. Scheidel, "Demography", in W. Scheidel, I. Morris and R. P. Saller (eds.), *The Cambridge Economic History of the Greco-Roman World* (Cambridge 2007) 38-86. Cf. also W. Scheidel, "Demographic and economic development in the ancient Mediterranean world", *Journal of Institutional and Theoretical Economics* 160 (2004) 743-757.

<sup>3</sup> See P. A. Brunt, *Italian Manpower 225 B.C.-A.D. 14* (rev. ed. Oxford 1987) 131-155 for a high-profile example.

<sup>4</sup> I ought to stress at the outset that our evidence for Roman demography and related areas is extremely poor and cannot meet the standards associated with early modern population history. Hence, the customary progression from statistical data to causal analysis is rarely feasible. Modern arguments rely in the first instance on rough or tentative judgments concerning basic trends, and most attempts at quantification perforce remain conjectural. Much the same is true of ancient economic history as a whole. My whole argument must be read with these caveats in mind.

<sup>5</sup> For tentative quantification, see W. Scheidel, "The Demography of Roman State Formation in Italy", in M. Jehne and R. Pfeilschifter, R. (eds.), *Herrschaft ohne Integration?* (Frankfurt 2006) 207-226.

<sup>6</sup> For tentative quantification, see W. Scheidel, "Human Mobility in Roman Italy, II: The Slave Population", *JRS* 95 (2005) 64-79, and below, section 4.

<sup>7</sup> E.g., N. Morley, *Metropolis and Hinterland* (Cambridge 1996).

<sup>8</sup> Polyb. 2.24, an account of dubious value, although it probably indicates the right order of magnitude: see W. Scheidel, "Human Mobility in Roman Italy, I: The Free Population", *JRS* 94 (2004) 1-26, at 3-4.

practice only a small fraction of them could be called up at any given time, this regime encouraged military endeavors that relied very heavily on manpower and wasteful tactics of mass combat fed by readily replaceable low-skill conscripts, and resulted in high levels of attrition. Following the costly subjugation of peninsular Italy in the late fourth and early third centuries BC, net population growth was contained by increasingly massive casualties incurred in the First Punic War (264-241 BC), which featured some of the biggest naval engagements in world history and the loss of several large fleets manned by Romans and (mainly) their Italian allies in disastrous storms,<sup>9</sup> and even more so in the Second Punic War (218-202 BC), with catastrophic battlefield losses early on and steady attrition thereafter.<sup>10</sup> These losses appear to be reflected in contemporaneous census tallies of adult male Roman citizens.<sup>11</sup> After 200 BC, mobilization rates fell from their earlier record levels (Fig. 1) and attrition diminished considerably. Nevertheless, the Roman state on average drafted some 120,000 men each year from 200 to 168 BC and 70,000 from 167 to 133 BC.<sup>12</sup> Excess mortality caused by military service (defined as combat fatalities plus probable rates of additional deaths from wounds and disease) – i.e., deaths that would not have occurred to civilians – has recently been estimated at approximately 4,500 deaths p.a. from 200 to 168 BC and 2,500 p.a. from 167 to 133 BC, compared to an expected annual baseline rate of some 4-5,000 deaths among males in their late teens and twenties in a population of close to three million. This suggests that mortality in this age group may have been between one-and-a-half and two times as high as it would otherwise have been. If anything, given our ignorance about pertinent disease loads, these estimates are more likely to be too low than too high.<sup>13</sup> Military mass mortality soared in the wars against the Germans at the end of the second century BC and especially during the ‘Social War’ between Romans and allies in 91-89 BC and the first civil war of 83-82 BC.<sup>14</sup> In the 80s BC, the Roman state entered a period of prolonged upheaval with civil wars (in 83/82, 77 and 63 BC in Italy, 80-71 BC in Spain, and 49-30 BC all over the Mediterranean), a big slave war (the Spartacus revolt of 73-71 BC), and various foreign wars (most notably 88-85 and 74-63 BC in the Eastern Mediterranean and 59-50 BC in Gaul). Military mobilization levels once again increased greatly, and did not recede until the end of the civil wars in 30 BC (Fig. 1).

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<sup>9</sup> J. F. Lazenby, *The First Punic War* (Stanford 1996). The historian Polybius reports the loss of some 650 Roman ships (each of which could in theory carry up to 420 men) in three major disasters between 255 and 249 BC.

<sup>10</sup> The lowest modern estimate is 120,000 military fatalities, although ancient sources allow for higher totals: Brunt, *Manpower* (as in n. 3) 422.

<sup>11</sup> Brunt, *Manpower* (as in n. 3) 13-14.

<sup>12</sup> Brunt, *Manpower* (as in n. 3) 424, 432-3.

<sup>13</sup> N. Rosenstein, *Rome at War* (Chapel Hill and London 2004) 107-140, esp. 136-137 (overall rates), 137-140 (probably too low).

<sup>14</sup> Brunt, *Manpower* (as in n. 3) 685, 696-697 critiques inflated ancient figures (60,000-120,000 killed in 105 BC, 200,000-300,000 from 91 to 82 BC).

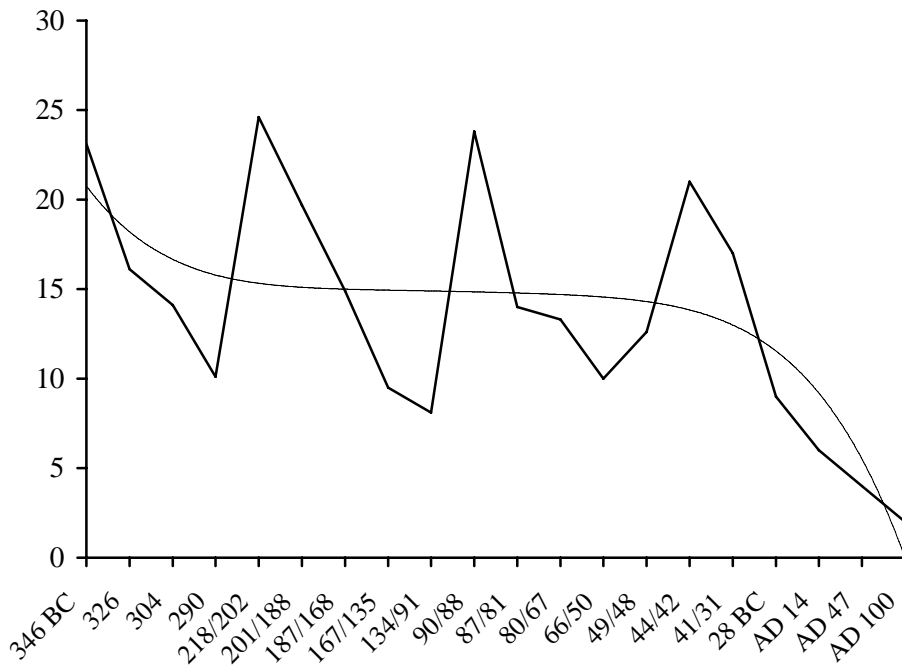


Fig. 1 Parametric reconstruction of approximate military mobilization rates of Roman citizens in Italy, 346 BC-AD 100 (in % of men aged 17+)  
Source: Scheidel, “Demography” (as in n. 5) 222 fig. 8<sup>15</sup>

As these losses occurred among young men, they would have acted on fertility through nuptiality. The only available quantifiable evidence, supplied by epitaphs from predominantly urban environments in the first few centuries AD, strongly suggests that non-elite Roman men did not normally marry until their late twenties.<sup>16</sup> If this finding can also be applied to farmers in Republican Italy, military mortality need not have greatly disrupted existing marriages.<sup>17</sup> In this scenario, military attrition may be considered as functionally equivalent to mass emigration of young men, along the lines observed in early modern Portugal or the Netherlands (see below, section 6). In the absence of analogous attrition among young women, free immigration, or polygynous marriage, male attrition ought to have had a significant impact on the Italian marriage market, but no empirical data are available.<sup>18</sup> We are left to speculate that post-natal sex ratio

<sup>15</sup> The rates from 28 BC onward are revised from W. Scheidel, *Measuring Sex, Age and Death in the Roman Empire* (Ann Arbor 1996) 94-97. The percentage rates are derived from Brunt’s reconstruction of overall citizen numbers: a larger number of citizens (see below, at notes 28-9) would reduce the percentages in this graph without greatly altering its overall shape.

<sup>16</sup> R. P. Saller, *Patriarchy, Property and Death in the Roman Family* (Cambridge 1994) 25-41, with my reconsideration in W. Scheidel, “Roman Funerary Commemoration and the Age at First Marriage”, *CPh* (in press).

<sup>17</sup> Rosenstein, *Rome* (as in n. 13) 82. While we must allow for the possibility of city-country differences, the case of fifteenth-century Tuscany, with much earlier marriage in villages than in towns (D. Herlihy and C. Klapisch-Zuber, *Tuscans and their Families* (New Haven 1985) 203-211), seems uniquely extreme: see Scheidel, “Commemoration” (as in n. 16).

<sup>18</sup> There is no evidence for widespread unions between freeborn women and freed slaves either. Partly due to domestic slavery, employment opportunities for single women seem to have been scarce: J. K. Evans, *War, Women and Children in Ancient Rome* (London and New York 1991) 101-165.

manipulation through the conventional conduits of femicide, exposure and benign neglect might have been employed to pre-empt expected imbalances: although ancient textual sources do not permit us to ascertain the scale of such practices, they do dwell on them with some frequency and suggest that they were legally and culturally condoned.<sup>19</sup>

Emigration from Italy is a related attrition factor that partly overlaps with war-related losses. While Italy had periodically experienced internal relocation programs from the late fourth century BC onward, large-scale emigration was primarily a phenomenon of the period from 48 to 14 BC when the first autocrats, Caesar and Augustus, founded around 100 settlements in the provinces that were peopled with some 300,000 adult males of Italian extraction. The extent of female and juvenile participation is unknown, but some concurrent movement would likely have occurred: thus, even on the most conservative assumptions, at least half a million people must have permanently left Italy in this period.<sup>20</sup> In addition, the creation of a standing army of 28 legions of perhaps 140,000 citizens by Augustus required massive population transfers from Italy to the frontiers: if a legion absorbed 300 new recruits per year and, say, two-thirds of them hailed from Italy, 4,200 men around age 20 needed to depart Italy in any given year, most of them forever, or about 1 in 10 free Italian men who reached that age. However, while service in the legions, by then all deployed outside Italy, and post-discharge resettlement in the provinces continued to be a drain on Italy's demographic resources, Italian military participation rates gradually fell to very low levels over the next few generations as provincial recruits took over.<sup>21</sup> As a result, the attendant constraints on Italian population growth weakened very considerably over the course of the first two centuries AD.

Urbanization was the third major factor that curtailed demographic growth. Once again, quantification cannot rise above the level of educated guesswork. In an undoubtedly overschematic parametric model, I have assumed that the free Italian-born population of Rome rose from perhaps 150,000 in 200 BC to around 500,000-600,000 in the late first century BC (out of a gross total of around 1 million), and that at the same time, the free Italian-born population of the other cities may have doubled from 300,000 to 600,000, although a stronger increase from a lower base to a higher total is equally possible.<sup>22</sup> In the context of weak free population growth, this shifted the balance of Italian settlement in favor of urban populations. Given ancient disease loads and lack of means of disease prevention, progressive urbanization would have raised average mortality levels and may also have interfered with reproductive opportunities. Schematic guesstimates of probable rates of urban excess mortality of 10 in 1,000 in Rome and 5 in 1,000 in other towns need not be wide of the mark, even though the application of Wrigley's estimate of early modern London's excess mortality of 10 in 1,000 to ancient Rome may well be too conservative: the Roman capital was notoriously unhealthy owing to the presence of hyperendemic falciparian malaria that synergistically exacerbated other diseases such as pulmonary tuberculosis and gastro-enteric infections. The role of infrastructural provisions must not be overrated: the scarcity of water mains for private homes and the use of unchlorinated water in public baths reduced the benefits of the city's costly system of aqueducts.<sup>23</sup> An urban

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<sup>19</sup> J. Boswell, *The Kindness of Strangers* (New York 1988) 53-94 is the most detailed discussion. I will address this problem in W. Scheidel, "Femicide and Sex Ratios in the Ancient Mediterranean World" (in progress).

<sup>20</sup> For tentative quantification, see Scheidel, "Mobility" (as in n. 8) 10-12, based on Brunt, *Manpower* (as in n. 3).

<sup>21</sup> Scheidel, *Measuring* (as in n. 15) 93-7.

<sup>22</sup> See Scheidel, "Mobility" (as in n. 8) 17-19 for the underlying calculations.

<sup>23</sup> The disease environment of ancient Rome has been reconstructed by R. Sallares, *Malaria and Rome* (Oxford 2002) 201-234, and W. Scheidel, "Germs for Rome", in C. Edwards and G. Woolf, (eds.), *Rome the Cosmopolis* (Cambridge 2003) 158-176. Cf. E. A. Wrigley, *People, Cities and Wealth* (Oxford and New York 1987) 135 for early modern London. A. Scobie, "Slums, Sanitation, and Mortality in the Roman World", *Klio* 68 (1986) 399-433 discusses deficient hygiene.

population of 1.2 million Italian-born free residents would have required the annual transfer from the countryside of 9,000 live births, or of perhaps half as many young adults, merely in order to maintain the existing population. Preceding urban net growth must have imposed an even greater burden on the source population: if Rome grew from 150,000 to 375,000 in the second century BC and twice as fast, from 375,000 to 600,000, in the first half of the first century BC, and the other Italian cities grew from 300,000 to 450,000 to 600,000 BC in same periods, net urban growth would have required over 8,000 annual transfers per year in the first period and 15,000 in the second. Hence, in the second century BC, net urban growth plus urban excess mortality may have required annual transfers of 3 per 1,000 from the Italian countryside to the cities, compared to 5 per 1,000 in the first half of the first century BC. These movements would consequently have absorbed natural growth rates from 0.3 to 0.5% per year, broadly equivalent to eighteenth-century Italy's mean annual growth rate of 0.37%.<sup>24</sup> Military attrition would have raised aggregate transfer requirements to even higher levels, once again primarily for much of the first century BC, thereby further reducing capacity for net growth. As noted above, once urban expansion subsided, about 9,000 annual transfers may have been sufficient to maintain a free Italian-born urban population of 1.2 million, equivalent to 2-3 per 1,000 of the rural free population. In conjunction with diminishing military attrition, this would have lowered overall absorption rates well below the standards of the last century BC and strengthened the potential for net population growth in the Italian countryside.

What matters most is that regardless of their precise scale, all these factors pulled in the same direction. Military mortality, emigration and urbanization converged in depressing the reproductive capacity of the indigenous Italian population. The likely demographic impact of these processes was unevenly distributed over time: while military casualties peaked in parts of the third century BC and again before and after 100 BC, attrition caused by emigration and urbanization surged in the first century BC. Thus, these combined constraints were somewhat relaxed for much of the second century BC and once again – and increasingly so – from the late first century BC onward. Under these circumstances, we would expect to observe some net free population growth in the second century BC and more markedly after the end of the civil wars in 30 BC. This prediction is consistent with what little information can be gleaned from ancient population counts. Literary sources report a number of census tallies for adult male Roman citizens. While individual figures may have been corrupted by the manuscript tradition or may otherwise be atypical, a general trend is clearly discernible. Dips in the 250s and the late third century BC are most likely the result of catastrophic war mortality (see above). Recovery and some net expansion occurred in the second century BC, although the final boost may be an artifact of changed registration practices.

Unfortunately, developments in the first century BC are more difficult to gauge owing to the enfranchisement of the previously excluded allied polities of Italy and to uncertainties surrounding the meaning of the few census totals that are reported for the early monarchical period: tallies jump from 910,000 in 69 BC (a number that already includes enfranchised former allies) to 4,063,000 in 28 BC, 4,233,000 in 8 BC, 4,937,000 in AD 14, and 5,984,072 in AD 47.<sup>25</sup> Given that the initial surge cannot possibly reflect natural increase, this dramatic increase, taken at face value, would suggest either extremely deficient registration up to 69 BC and/or indiscriminate mass naturalization between 69 and 28 BC, neither of which is documented or at all plausible. Therefore, an intervening change in recording practices, modelled on concurrent provincial censuses and implemented by the new monocratic regime, that caused census totals to comprise all citizens instead of adult males only offers the best explanation, not least because the presence of several million adult men in Italy would imply implausibly high gross population

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<sup>24</sup> Scheidel, "Mobility" (as in n. 8) 17-19; L. del Panta, 'L'Italie', in J.-P. Bardet and J. Dupâquier (eds.), *Histoire des populations de l'Europe II* (Paris 1998) 513-32, at 515 (Italy).

<sup>25</sup> Phlegon *FGrHist* 257 F 12; *RGDA* 8; *Tac. Ann.* 11.25.

totals of up to 20 million in the first and second centuries AD and cannot easily be reconciled with either ancient or modern comparative evidence for the geographical area covered by the Roman empire as a whole.<sup>26</sup> This reading establishes largely neutral net growth trends until the late first century BC followed by significant expansion, conceivably up to the so-called ‘Antonine Plague’ of the 160s AD.<sup>27</sup>

An alternative reading, suggested in forthcoming work by Saskia Hin, prefers to interpret the Republican and early monarchical census tallies as head counts of citizens who were *sui iuris*, which comprised adult men without living fathers, orphans, and widows, as well as emancipated individuals: in this scenario, the main difference between the Republican and later numbers would lie in the exclusion of orphans and widows from the Republican samples.<sup>28</sup> This reconstruction, which has yet to be worked out in detail, would produce somewhat higher overall population numbers for Roman Italy and allow for a measure of net growth in the Italian citizenry in the late Republican period. However, even under these circumstances, the multiple attrition factors surveyed above would have depressed actual growth well below those rates that might otherwise have been attained. Moreover, some of the increase in the number of citizens from AD 14 to 47 must have occurred in Italy, and would presumably have gradually petered out afterwards rather than stopped abruptly in the mid-first century AD.<sup>29</sup> Thus, most readings of the census figures are consistent with the view that Italian population growth was a protracted process that stretched out from a nadir at the end of the Second Punic War up into the first and probably even into the second century AD. In the first half of this period, slave imports almost certainly made a much greater contribution to overall demographic expansion than in the latter half, when indigenous population growth would have been the principal driving force. This scenario is logically compatible with the notions of strong demand for slave labor in the last two centuries BC as capital grew and free population growth – constrained by the various attrition factors discussed in this section – lagged behind, and of rising real incomes in this period and their subsequent decline (sections 4-6).

### 3. Redistribution

When we consider Italy as a whole, the traditional mechanism of asset redistribution in the form of the confiscation and re-assignment of conquered Italian farm land, common from the fourth to the second centuries BC, resulted in a zero-sum game, as ownership was merely transferred from one group (defeated enemies of rebellious allies) to another (victorious Romans and loyal allies) without improving overall land/labor ratios. The inflow of tribute and rents from overseas

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<sup>26</sup> This case has been made in detail in Scheidel, “Mobility” (as in n. 8) 5-9, against the ‘high count’ recently revived by Elio Lo Cascio, e.g. in E. Lo Cascio, “Population of Roman Italy in Town and Country”, in J. Bintliff and K. Sbonias, (eds.), *Reconstructing Past Population Trends in Mediterranean Europe (3000 B.C.-A.D. 1800)* (Oxford 1999) 161-171; G. Kron, “The Augustan Census Figures and the Population of Italy”, *Athenaeum* 93 (2005) 441-495; E. Lo Cascio and P. Malanima, “Cycles and Stability: Italian Population before the Demographic Transition (225 B.C. – A.D. 1900)”, *Rivista di Storia Economica* 21.3 (2005) 197-232.

<sup>27</sup> For the nature of this epidemic, probably smallpox, see R. J. Littman and M. L. Littman, “Galen and the Antonine Plague”, *AJPh* 94 (1973) 243-253; for its likely scale (25% mortality?), see Y. Zelener, “Smallpox and the Disintegration of the Roman Economy after 165 A.D.” (unpub. dissertation Columbia University 2003).

<sup>28</sup> S. Hin, “Demographic Developments in Italy 202-88 BC” (unpub. dissertation University of Leiden, in progress). I am indebted to Saskia Hin for sharing her thoughts with me.

<sup>29</sup> W. Scheidel, “Roman Population Size: The Logic of the Debate”, paper delivered at the conference “Peasants, Citizens and Soldiers: The Social, Economic and Demographic Background to the Gracchan Land Reforms”, University of Leiden, June 2007.

territories changed the equation by providing growing net benefits to residents of Italy. Provincial exploitation permitted the discontinuation of direct taxation (*tributum*) of Roman citizens in 167 BC and the abolition of Italian harbor dues in 61 BC. Intracommunal tributes among the Italian allies ceased upon their enfranchisement in the 80s BC. Leased-out state-owned land (*ager publicus*) was converted into private land in the 130s/120s and 50s BC. Thus, over time, virtually all state revenues came to be drawn from outside Italy, and were disbursed in the first instance for the benefit of Italian civilian workers and military personnel. Civilian spending was strongly concentrated in the capital, where public construction projects provided employment on a grand scale.<sup>30</sup> Starting in 123 BC, grain sold in Rome was subsidized at varying rates, and from 58 BC rations were handed out free of charge to large numbers of metropolitan residents: the number of recipients peaked at 320,000 in the mid-40s BC and subsequently appears to have fluctuated between 150,000 and 200,000.<sup>31</sup> State-sponsored road construction extended benefits into rural areas, albeit on a much diminished scale. For the rural population, military service constituted the main means of access to state monies.

Base-level infantry stipends of around 120 denars per year from the mid-second to the mid-first centuries BC are usually considered modest by modern observers. However, in so far as army pay was spent overseas, its purchasing power may have been quite considerable: one second-century BC source hints at very low commodity prices in peripheral regions.<sup>32</sup> In more developed areas, such as the eastern Mediterranean seaboard, requisitioning and quartering boosted to de facto income.<sup>33</sup> In addition, Roman soldiers traditionally received a share of the booty. In a sample of 16 occasions from 201 to 167 BC, recorded disbursements to common infantry soldiers range from 7 to 200 denars, with a mean of 40.8 and a median of 25 denars, relatively small amounts compared to the annual stipend.<sup>34</sup> However, spending practices changed dramatically with the onset of internal armed conflict. In preparation for civil war in Italy in the mid-80s BC, the general Sulla spent indeterminate but very considerable sums that he had seized in the Aegean on his troops. In the following decades, the growing autonomy of military commanders and ensuing warlordism precipitated an arms race of cash incentives. Campaign bonuses for common soldiers rose from 800 denars in 69 BC (7 times annual pay) to 1,500 in 61 BC (13 times) to 5,000 in 46 BC (22 times the newly doubled stipend of 225 denars/year), with multiples assigned to cavalymen and officers. Base bonuses of 5,000 denars were again promised in 43 and 42 BC, and actually paid out on the latter occasion.<sup>35</sup>

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<sup>30</sup> A single aqueduct built in 144-140 BC cost 45 million denars (Frontin. *Aqu.* 1.7), probably somewhere around 200-400,000 tons of wheat equivalent, enough to feed 1-2 million people for a year. T. Frank, *An Economic Survey of Ancient Rome I* (Baltimore 1933) 145, 228 estimates total state spending on construction from 200-90 BC at 5-6 times that amount.

<sup>31</sup> G. Rickman, *The Corn Supply of Ancient Rome* (Oxford 1980) 156-197.

<sup>32</sup> In the second century BC, Polyb. 2.15.1 and 34.8.7 claimed that 1 *medimnos* (52 liters) of wheat cost 4 obols (0.67 denars) in northern Italy and 9 obols (1.5 denars) in Lusitania (modern Portugal). If true, the annual military base stipend would translate to 4.2 or 9.8 tons of wheat equivalent, enough to feed 20-50 people for a year. Even allowing for literary hyperbole and higher prices near troop concentrations, this suggests that even base stipends need not have been particularly modest in terms of actual purchasing power.

<sup>33</sup> Although this factor necessarily defies quantification, it is worth noting that in the 50s BC, the cities of Cyprus paid 1.2 million denars per year to the Roman authorities to avoid winter quartering of troops (Cic. *Att.* 5.21.7): given possible deployments of 5-10,000 troops, this works out at 120-240 denars per soldier, or 1-2 times the annual base stipend. Although the soldiers did not receive these payments, this amount gives us an idea of the likely order of magnitude of the costs of winter quartering and its de facto benefits to the troops.

<sup>34</sup> A. Alföldi, *Oktavians Aufstieg zur Macht* (Bonn 1976) 101.

<sup>35</sup> *Ibid.* 103-16.

Table 1 Major military bonuses, 69 to 29 BC

Year	Amount (denars)	Recipients	Total (million denars)
69 BC	800	15,000	12
63 BC	950	15-20,000?	14-19
61 BC	1,500	40,000	60
49 BC	500	50,000	25
46 BC	5,000	50,000	250
43 BC	500	25,000	12.5
	500	25,000	12.5
	500	20,000	10
	2,500	40,000	100
42 BC	1,000	20-30,000	20-30
	5,000	80,000	400
36 BC	500	< 150,000?	< 75
30 BC	250	? (50,000+)	(12.5+)
29 BC	1,000	120,000	120
Total		c.400,000?	c.1,100

Source: 69 BC: Plut. *Luc.* 29. 63 BC: *ibid.* 37. 61 BC: Plin. *NH* 37.2. 49 BC: Suet. *Caes.* 38. 46 BC: App. *BC* 2.102. 43 BC: *ibid.* 3.40, 48, 94; Dio 45.13. 42 BC: Plut. *Brut.* 44, *Ant.* 23. 36 BC: App. *BC* 5.129. 30 BC: Dio 50.10. 29 BC: *RGDA* 15. The probable number of recipients has been estimated on the basis of Brunt, *Manpower* (as in n. 3) 452-512.<sup>36</sup>

Thanks to increasingly high mobilization levels at the end of the Republican period, the resultant payouts were extremely large in terms of regular state revenue and even overall GDP. While the total amount cannot be established with precision, the ancient sources, even on a deliberately conservative reading, point to aggregate disbursement in excess of 1 billion denars in a 41-year period from 69 to 29 BC (Table 1). The sum of 1.1 billion denars, which translates to 350 tons of coined gold or 4,000 tons of coined silver, equals at least ten times the regular annual state income of no more than 100 million denars around 50 BC or very roughly one-half of probable GDP of the Roman empire at that time.<sup>37</sup> The total number of recipients cannot be determined with precision either because some soldiers received multiple awards; 400,000 seems

<sup>36</sup> Smaller known handouts have been omitted; others may have been substantial but remain completely unknown (most notably the provisions, if any, for the 20+ triumviral legions, or 80,000+ soldiers, which did not take part in the battle of Philippi in 42 BC). Octavian controlled some 150,000 soldiers in 36 BC but we cannot tell how many of them received the reported payout.

<sup>37</sup> Frank, *Survey* (as in n. 30) 322-4 (budget); P. Temin, "Estimating GDP in the Early Roman Empire", in E. Lo Cascio (ed.), *Innovazione tecnica e progresso economico nel mondo romano* (Bari 2006) 31-54 (for an imperial GDP of 2.5 billion denars around AD 100, which needs to be reduced to account for the sizeable contribution of Egypt after 30 BC and intervening growth). Disbursement necessitated the large-scale minting of bullion stocks, the reminting of provincial silver coin, and the introduction of gold coins, all of which are well attested for this period: K. W. Harl, *Coinage in the Roman Economy, 300 B.C. to A.D. 700* (Baltimore 1996) 52-60, 71-72.

like a defensible estimate.<sup>38</sup> The implied mean of 2,750 denars is very generous in comparison to regular incomes. It equals 12 times the annual base army pay (after its doubling in 46 BC), or – admittedly a much shakier guesstimate – perhaps 14 times mean annual adult labor compensation in Italy as estimated by Peter Temin.<sup>39</sup> As mean life expectancy at ages 20 to 30 can be put at about 25 to 30 years, a common soldier who was paid the maximum bonus of 5,000 denars in effect received the equivalent of a lifetime’s worth of income in a single lump sum. The multiplier effect was enormous: 400,000 adult male recipients schematically translate to 1.6 million beneficiaries including wives and children, equivalent to perhaps as much as one-third of the entire Roman citizenry of this period, the majority of them based in Italy proper. These transfers supplied the commoner population with an unprecedented infusion of cash that must have raised their nominal household wealth well above customary levels and necessarily percolated into the wider population of non-recipients via purchases and loans. While we cannot tell with confidence whether or to what extent this process triggered price inflation that eroded purchasing power, there is no indication of anything resembling the ‘price revolutions’ known from later periods of European history.<sup>40</sup> Thus, it seems that the enhanced productive capacity of the imperial heartland, sustained by efficient slave estates and workshops and by rapid urbanization, in conjunction with growing overseas trade, facilitated the absorption of the increased money supply (and, probably, circulation velocity) by boosting supply.<sup>41</sup>

The net benefits of these disbursements were greatly enhanced by the way in which the necessary funds were obtained by the Roman warlords: by seizing sequestered wealth in the form of state reserves and temple treasures; by confiscating the assets of some members of the Roman elite and by imposing extraordinary taxes on the others; and above all by extorting funds from provincial communities. In the 80s BC, Sulla set the tone by demanding 120 million denars from the province of Asia (now western Turkey) and confiscating the property of over 1,600 Roman aristocrats. In 43 BC, the Caesarian faction confiscated the estates of more than 2,000 members of the ruling class and imposed a levy of up to one year’s income on real estate as well as a 2% capital tax on everyone who owned more than 100,000 denars, while their Republican opponents extorted some 100 million denars in the eastern provinces, if necessary by destroying and plundering uncooperative provincial cities or compelling residents to sell their families into slavery to raise the specified contributions. The following year, the victorious side imposed nine year’s worth of tribute payable in two years on the province of Asia. In Italy, they levied a special tax on slaveowners of 25 denars per slave, and, in 39 BC, a tax of 12.5 denars per slave plus an inheritance tax. In 31 BC, Octavian introduced a 25% income tax and a 12.5% capital tax for ex-slaves worth 50,000+ denars. Overall, predation in the provinces was much more widespread than can be documented here.

By comparison, ordinary citizens in Italy suffered little loss of property: the main exceptions are the complete or more often partial expropriation of a number of cities (probably around 20) by Sulla in 81 BC, and the takeover of 16 cities by Octavian in 41 BC to provide land allotments for large number of veterans, followed by lesser seizures in 30 BC. These actions, whilst necessarily disruptive and painful for the dispossessed, represented zeros-sum transfers that could not greatly affect the overall distribution of wealth. Rather, the tremendous net cost of

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<sup>38</sup> Brunt, *Manpower* (as in n. 3) 511 reckons with 500,000 recruits from the 50s to 32 BC. Not all of them survived to receive bonuses or joined the right side.

<sup>39</sup> Temin, “GDP” (as in n. 37).

<sup>40</sup> Cf. D. H. Fischer, *The Great Wave* (Oxford 1996). Grain prices in Italy/Sicily (outside Rome) do not seem to have changed dramatically between the 70s BC and the first century AD: Rickman, *Supply* (as in n. 31) 145-8; but the data are very poor.

<sup>41</sup> This squares with the fact that a five- to tenfold increase in the Roman money supply from c150-50 BC (i.e., prior to the largest disbursements) did not result in a commensurate rise in prices. For overall economic development in Italy in this period, see section 4.

maintaining and demobilizing the great citizen armies of the civil wars were borne by the top echelons of the Roman-Italian elite and more indiscriminately by all strata of the subject population of the Mediterranean provinces.

Moreover, despite episodic shocks, residents of Italy were able to benefit from warlordism without experiencing commensurate depredations among the civilian population. The incidence of armed conflict in the imperial heartland greatly declined in the late Republic: in the last two centuries BC, peninsular Italy witnessed merely 12 years of significant and at least in part narrowly localized combat. After Hannibal's departure in 203 BC and not counting the conquest of northern Italy in the early second century BC (then enemy territory), major military operations against non-Romans on Italian soil were limited to the German incursion of 102/1 BC (in the Po Valley), the war with the Italian allies in 91-89 BC, and the Spartacus slave uprising of 73-71 BC. As far as internal conflicts are concerned, after some fierce fighting during Sulla's invasion of Italy in 83/82 BC, civil war operations in Italy were confined to generally very brief campaigns in 77, 63, 49, 43 and 41/40 BC. These latter episodes were dwarfed by large-scale civil war campaigning in Spain (80-71 and 45 BC), North Africa (46 BC), Macedonia and Greece (49/48, 42, 32/1 BC) and Sicily (36 BC) that involved the deployment of hundreds of thousands of (mostly Italian) soldiers and the brutal requisitioning of vast amounts of goods and civilian labor.<sup>42</sup> By externalizing much of the direct and indirect cost of civil war, the Roman leadership greatly boosted the economic benefits that accrued to the general population of Italy.

Redistributional resource flows diminished very considerably after the end of the civil wars in 30 BC. The successful creation of a stable monarchical regime obviated the need for competitive military spending. Although recruitment rates in Italy initially remained high, the expansion of veteran settlement in the provinces greatly reduced the number of soldiers who eventually returned with their savings and discharge bonuses. (We have no evidence for remittances.) In the first century AD, the Italian contribution to the armed forces greatly contracted, reducing benefits even further. Large elements of Italy's commoner population had been the net beneficiaries of the predation and violent redistribution that accompanied the failure of the aristocratic republic. Domestic peace, overseas colonization, and gradual demilitarization deprived the imperial heartland of further profits. In the final analysis, redistribution could not generate sustainable growth because it was an exogenous factor that temporarily raised per capita consumption without improving labor productivity.

#### 4. Economic growth, inequality, and the nature of the evidence

The nature of intensive economic growth in late Republican Italy is difficult to ascertain, although perhaps less so than for most other parts of the ancient world.<sup>43</sup> The abundant evidence for aggregate growth in the volume of output and exchange provides a suitable starting point.<sup>44</sup> The distribution of dated shipwrecks in the Mediterranean serves as a powerful index of commercial development: the number of wrecks surged by 140% between the third and the second centuries BC, followed by another 20% increase – presumably greater if we allow for the

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<sup>42</sup> For a brief discussion, see F. Millar, "The Mediterranean and the Roman Revolution: Politics, War, and the Economy", *P&P* 102 (1984) 3-24, repr. in id., *Rome, the Greek World, and the East, I: The Roman Republic and the Augustan Revolution* (Chapel Hill and London 2002) 215-237.

<sup>43</sup> R. Saller, "Framing the Debate over Growth in the Ancient Economy", in W. Scheidel and S. von Reden (eds.), *The Ancient Economy* (Edinburgh 2002) 251-269 and again in J. G. Manning and I. Morris (eds.), *The Ancient Economy* (Stanford 2005) 223-238, provides an incisive discussion of the problems involved in estimating Roman economic growth. For ancient Greece, see below, n. 61.

<sup>44</sup> Much of the textual evidence was collected by Frank, *Survey* (as in n. 31) ch. 3-5. The most recent discussion is W. V. Harris, "The Late Republic", in Scheidel, Morris and Saller, *History* (as in n. 2) 511-539.

likelihood of growing ship size – in the first century BC. This process stalled in the first century AD and subsequently went into reverse.<sup>45</sup> This can be interpreted as a (one-off) consequence of Mediterranean unification under Roman rule and the resultant imbalances in resource allocation caused by Roman tribute-taking that encouraged exchange between core and periphery, such as imports of grain, slaves and luxury goods to Rome and Italy and the export of cash crops such as wine and olive oil to the provinces. This dramatic late Republican-period upswing is mirrored by a concurrent increase in the volume of lead deposits in ice cores from Greenland caused by soaring mining and smelting activity, especially in Roman Spain.<sup>46</sup> Recent numismatic studies agree that the volume of Roman silver coinage in Italy grew between five and ten times between the mid-second and the mid-first century BC, and there are strong indications that the concomitant expansion of credit money further reinforced this increase.<sup>47</sup> In the most general terms, the gradual diffusion of improved production technology and the spread of more sophisticated financial intermediation arrangements were likewise conducive to economic development, as were the benefits of lowered transaction costs in a unified Mediterranean and the resultant strengthening of market institutions.<sup>48</sup>

Taken together, all these features clearly demonstrate considerable extensive economic growth in this period and, in view of Italy's dominant position in this process and its demographic development, are strongly indicative of significant mean per capita growth in this region. At the same time, the distribution of benefits remains obscure. On the one hand, numerous records of palatial mansions and lavishly endowed country estates, the accumulation and conspicuous consumption of luxury items, soaring property prices at the high end of the housing market, and the growth of slave retinues leave no doubt that the top tier of Roman society became vastly richer than it had been before, and make it at the very least highly likely that its members derived disproportionately large profits from empire.<sup>49</sup> On the other hand, the character, scale and distribution of corresponding benefits for sub-elite groups remains largely impervious to investigation. Most importantly, our evidence does not permit an empirical assessment of real incomes.<sup>50</sup> While commodity prices are only rarely recorded but at least not completely

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<sup>45</sup> A. J. Parker, *Ancient Shipwrecks of the Mediterranean and the Roman Provinces* (Oxford 1992) esp. 549 fig. 3. Due to uneven exploration coverage, these data are disproportionately concentrated in the western Mediterranean, and therefore work best as an index of changes in the volume of Italy-centered commerce, which is precisely what matters here.

<sup>46</sup> For summaries of recent scientific research, see A. Wilson, "Machines, Power and the Ancient Economy", *JRS* 92 (2002) 1-32, at 25-27; F. de Callataÿ, "The Graeco-Roman Economy in the Super-long Run: Lead, Copper, and Shipwrecks", *JRA* 18 (2005) 361-372.

<sup>47</sup> D. Backendorf, *Römische Münzschätze des zweiten und ersten Jahrhunderts v. Chr. vom italienischen Festland* (Berlin 1998); K. Lockyear, "Hoard Structure and Coin Production in Antiquity – An Empirical Investigation", *NC* 159 (1999) 215-243. W. V. Harris, "A Revisionist View of Roman Money", *JRS* 96 (2006) 1-24 stresses the importance of credit arrangements.

<sup>48</sup> On technology, see Harris, "Republic" (as in n. 44) 536 table 19.2. P. Temin, "Financial Intermediation in the Early Roman Empire", *JEH* 64 (2004) 705-733 argues that 'financial institutions in the early Roman Empire were better than those of eighteenth-century France, albeit not as developed as those of eighteenth-century England and Holland' (729); this finding also encompasses the late Republican period. For Roman shares, see U. Malmendier, "Roman Shares", in W. N. Goetzmann, and K. G. Rouwenhorst (eds.), *The Origins of Value* (Oxford 2005) 31-42. E. Lo Cascio, "La "New Institutional Economics" e l'economia imperiale romana", in M. Pani (ed.), *Storia romana e storia moderna* (Bari 2005) 69-83, at 78-80 briefly considers lowered transactions costs. On market transactions in general, see P. Temin, "A Market Economy in the Early Roman Empire", *JRS* 91 (2001) 169-181.

<sup>49</sup> I. Shatzman *Senatorial Wealth and Roman Politics* (Brussels 1975) is the most comprehensive collection of the elite-related evidence.

<sup>50</sup> Rudimentary direct measurements are possible only for classical Athens and Roman Egypt, and tentative investigation of change over time is feasible only for the latter: M. M. Markle, "Jury Pay and Assembly Pay at Athens", in P. Cartledge and F. D. Harvey (eds.), *Cruce* (Exeter 1985) 265-297; W. Scheidel, "A Model

unknown, civilian wage levels are generally irrecoverable. As indicated in section 3, the basic infantry stipend of  $\frac{1}{3}$  of a denar per day cannot be related to civilian sector wages because of price differentials between recruitment and deployment areas, non-wage sources of income, and deferred benefits; likewise, we cannot tell if its doubling in 46 BC was meant to accommodate price increases or constituted a genuine raise. Modern assumptions of a putative unskilled day laborer's wage of  $\frac{3}{4}$ –1 denars a day in Rome and/or Italy rest on shaky grounds,<sup>51</sup> and we are unable to gauge urban-rural wage differentials beyond the truisms that higher prices in the capital must have driven up nominal wages and that the sheer scale of immigration implies higher real incomes in the cities. Regarding the latter, recent scholarship has finally begun to privilege 'pull' factors over the traditional 'push' scenario of an erosion of family farms through conscription and a shift to large 'rational' slave estates. Archaeological field surveys have established a bewildering complexity of trends in land use, with a decline of small farms in some areas and their spread in others.<sup>52</sup> Probabilistic quantification of the overall size of the market for key products of slave estates – wine and olive oil – has made it seem improbable that more than a tiny proportion of Italian farmland (perhaps as little as 2%) was used for this purpose.<sup>53</sup> As noted in section 2, the draft may have been sustained in the first instance by unmarried adolescent sons whose absence need not have ruined their families' farms.<sup>54</sup> Finally, the conclusion that urban growth was driven by opportunity is also buttressed by a forthcoming formal economic model.<sup>55</sup> However, none of this can rule out the possibility that urban wages were rendered attractive by

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of Demographic and Economic Change in Roman Egypt after the Antonine Plague”, *JRA* 15 (2002) 97-114, and “Real Slave Prices and the Relative Cost of Slave Labor in the Greco-Roman World”, *AncSoc* 35 (2005) 1-17.

<sup>51</sup> The discussions by Frank, *Survey* (as in n. 31) 384-385 and S. Mrozek, *Lohnarbeit im klassischen Altertum* (Bonn 1989) 85, 111-112 show that there is simply no usable wage information for the city of Rome in particular. The most popular prop, Cic. *Rosc. Com.* 28, in an overtly rhetorical context, claims that an unskilled slave could hardly have brought in  $\frac{3}{4}$  of a denar per day: apart from the possibility of (downward) exaggeration, we cannot tell if this was supposed to refer to gross or net income derived from slave hire; if the latter, the high cost of living in Rome (even for a slave) means that gross pay may well have been considerably higher. Later daily wages of 1 denar for a town scribe in Spain (*ILS* 6087.62), for the proverbial worker in the vineyard (*NT Matt.* 20) in the eastern Mediterranean, and for a cistern supervisor in North Africa (*AE*= 1925.103), and of 1 denar plus bread for a worker in Pompeii (*CIL* 4.6877), logically suggest higher incomes in the city of Rome. For notably high costs of living in the capital, see R. Duncan-Jones, *The Economy of the Roman Empire* (2<sup>nd</sup> ed. Cambridge 1982) 345-346, and cf. below, on Suet., *Caes.* 38. For a new indirect method of estimating free wages, see W. M. Jongman, “The Early Roman Empire: Consumption”, in Scheidel, Morris and Saller, *History* (as in n. 2) 597-618, at 601-602, who, drawing on the manumission fees recorded in first-century BC Delphi (Greece) of 7 tons of wheat equivalent per adult male slave, argues that at 10% annual financing and depreciation costs, slave labor must have yielded 700 kg of wheat equivalent per year in excess of subsistence, and that free labor ought to have commanded a comparable premium. The main problems are that we do not know how representative these freed slaves were (as they may have been skilled and thus more valuable), and how their manumission fees related to purchase prices.

<sup>52</sup> For a brief overview, see S. L. Dyson, *Community and Society in Roman Italy* (Baltimore 1992) 30-31. Closer consideration of the nature of staple crop production on large slave estates has led to an appreciation of the symbiotic nature of permanent slave labor and seasonal free labor, much of which was probably provided by neighboring peasants: W. Scheidel, *Grundpacht und Lohnarbeit in der Landwirtschaft des römischen Italien* (Frankfurt 1994) 153-224, esp. 159-164.

<sup>53</sup> W. M. Jongman, “Slavery and the Growth of Rome: The Transformation of Italy in the Second and First Centuries B.C.E.”, in Edwards and Woolf, *Rome* (as in n. 23) 100-122, at 112-115. The scale of large-scale slave-run livestock raising should not be exaggerated either: J. S. Thompson, “Transhumant and Sedentary Sheep-raising in Roman Italy, 200 BC-AD 200” (unpub. dissertation Cambridge University 1989); P. Garnsey, *Peasants, Cities and Food in Classical Antiquity* (Cambridge 1998) 166-179.

<sup>54</sup> Rosenstein, *Rome* (as in n. 13), esp. 63-106. Cf. above, n. 17.

<sup>55</sup> TBA, ‘The impact of globalization in the Roman Empire, 200 B.C.-A.D. 100’, *JEH* (forthcoming).

declining rural incomes, and that in real terms many Romans in Italy might have been worse off than before.

Proxy indicators of absolutely improving real incomes are required to address this problem. By far the most powerful indirect evidence is provided by the massive growth of chattel slavery in the last two centuries BC. In the absence of empirical tallies, credible orders of magnitude can only be very roughly extrapolated from probable levels of aggregate demand: this method suggests a total of perhaps 1 to 1.5 million slaves in Italy at the end of the Republic, well below earlier free-floating guesses of 2 to 4 million but still accounting for around one-fifth of the total population of the region. If this estimate is accepted, overall imports from outside Italy in the last two centuries BC can be put at anywhere between 2 and 4 million depending on our choice of parameters such as sex ratio, age structure and manumission rates.<sup>56</sup> Regardless of the inherent fragility of such conjectures, the underlying phenomenon – massive inflows and net growth of the servile population – is not in doubt. This process logically implies not only the accumulation of capital among the slave-purchasing elite (which is well attested) but likewise concomitant strong demand for at least certain kinds of labor, which in turn signals rising real wages. In fact, as slave labor was regularly employed in every conceivable sector except the military, from domestic servants, farm hands and shepherds to teachers and business managers, demand for labor was clearly not narrowly confined but fairly generalized in occupational terms, which may be taken to imply a ratio of labor supply to labor demand in large parts of the economy that was conducive to real income growth.<sup>57</sup> In the most general terms, urbanization, which was strong (see section 2), may also serve as a rough index of per capita growth.<sup>58</sup>

By contrast, potential indicators of improvements in sub-elite consumption levels are scarce and difficult to interpret, in part because modern research has only just begun to focus on this issue and in part because of inadequate levels of resolution of the available data. In what is currently the most promising attempt, Willem Jongman has been able to show that archaeological evidence of meat consumption in Italy soared dramatically in the first centuries BC and AD, and argues that due to the inelasticity of consumption (in the sense that elites could not eat infinitely more meat) this finding is suggestive of improved living standards among commoners.<sup>59</sup> This argument is also consistent with the spread of *macella*, market buildings that were arguably solely dedicated to the sale of meat, in Italy at this time, in a region where vegetable foods have traditionally dominated commoners' diets and meat consumption may be considered a mark of affluence.<sup>60</sup> Other approaches are less rewarding. Ian Morris's recent attempt to measure intensive economic growth in the ancient Greek world from 800 to 300 BC with the help of skeletal data for life expectancy, stature and deficiency diseases, and of archaeological evidence for average house size, has produced interesting findings in favor of per capita growth but would

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<sup>56</sup> Scheidel, "Mobility" (as in n. 6) 65-71 (numbers), 71-79 (imports).

<sup>57</sup> This scenario, in turn, is consistent with weak-to-stagnant free population growth (section 2) and disruptive commitments among the free citizenry (section 3, and below).

<sup>58</sup> For this conjecture, cf., e.g., P. A. David, "The Growth of Real Product in the United States before 1840: New Evidence, Controlled Conjecture", *JEH* 27 (1967) 151-197; L. A. Craig and D. Fisher, *The European Macroeconomy* (Cheltenham 2000) 113-118; and see Temin, "GDP" (as in n. 37) for an application to the Roman empire.

<sup>59</sup> Jongman, "Consumption" (as in n. 51) 613-614, based on the surveys of A. King, "Diet in the Roman World: A Regional Inter-site Comparison of the Mammal Bones", *JRA* 12 (1999) 168-202, and M. MacKinnon, *Production and Consumption of Animals in Roman Italy* (Portsmouth, RI 2004).

<sup>60</sup> C. De Ruyt, "Exigences fonctionnelles et variété des interprétations dans l'architecture des *macella* du monde romain", in E. Lo Cascio (ed.), *Mercati permanenti e mercati periodici nel mondo romano* (Bari 2000) 177-186, at 178-179. See also C. M. Holleran, "The Retail Trade in the City of Rome" (unpub. dissertation University of Manchester, 2005) 141.

be hard to replicate for Roman Italy:<sup>61</sup> private homes outside showcase locales such as Pompeii remain poorly studied, and in urban environments many people were housed in complex mansions (*domus*) or, especially in Rome but also in Ostia, came to live in multi-story apartment buildings, which hampers comparative assessments. Skeletal anthropometric data have recently been marshalled to argue that average adult male body height in ancient Italy (168.3 cm) exceeded that of Italian recruits born prior to the 1930s and that of many other European populations prior to the early-to-mid twentieth century: however, they are spread out over an entire millennium from 500 BC to AD 500 and therefore of little use for the study of medium-term economic change.<sup>62</sup> Ongoing work by Geertje Klein Goldewijk and Willem Jongman that aims for more precise chronological resolution has only begun to produce tantalizing glimpses of a possibly significant increase in average heights in the late Republican and/or early imperial period, but we still await firm results.<sup>63</sup> It is possible that a new collaborative effort that seeks to establish criteria by which to identify the levels of integration and growth in the economy of the Roman empire (focusing on agriculture, trade and commerce, mining and metal supply, and urbanization and demography) will make progress in quantifying the extent of intensive growth and elucidating distributional issues, but the prospects for major breakthroughs remain poor.<sup>64</sup>

Labor market segmentation is the crucial variable. Economic development as observed in late Republican Italy implies strong demand for skilled labor (especially craftsmen) and promising preconditions for both rationalized and specialized food production, offering higher real incomes for those in a position to exploit these opportunities. In the Roman case, slaves and ex-slaves were prominent in both spheres: freedmen and –women dominate the epigraphic record for skilled craftsmen, while slave-staffed estates produced cash crops for urban and export markets.<sup>65</sup> However, while it is clear that this enabled slave-owning elites to capture much of the profits, the extent to which the indigenous freeborn population shared in higher real incomes remains debatable. Two ideal type scenarios illustrate the range of possible outcomes. In one version, the most profitable labor markets were dominated by elites and their unfree and freed retainers to the extent that most free workers were marginalized as unskilled urban laborers, migrant harvesters for slave estates, or insulated family farmers; military service would have been the only realistic avenue of upward mobility. In this scenario, manumission – a vital incentive for skilled slaves – would have produced a sizeable population of technically free beneficiaries of high real wages but would have gravely disadvantaged the indigenous Romans who accounted for the bulk of the Italian population. This outcome is compatible with the notion that slave imports were not merely driven by labor/worker ratios but also by the fact that military service and migration were responsible for a ‘thinning’ of the free labor market: in an environment of high turnover risk, investment in captive labor was an attractive option as long as new slaves and

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<sup>61</sup> I. Morris, “Economic Growth in Ancient Greece”, *Journal of Institutional and Theoretical Economics* 160 (2004) 709-742, and “Archaeology, Standards of Living, and Greek Economic History”, in Manning and Morris, *Economy* (as in n. 43) 91-126.

<sup>62</sup> G. Kron, “Anthropometry, Physical Anthropology, and the Reconstruction of Ancient Health, Nutrition, and Living Standards”, *Historia* 54 (2005) 68-83. Incidentally, Roman livestock was also uncommonly big, an indication of increased productivity: G. Kron, “Archaeozoological Evidence for the Productivity of Roman Livestock Farming”, *MBAH* 21.2 (2002) 53-73.

<sup>63</sup> W. M. Jongman, “They Never Had It So Good: The Rise and Decline of Roman Living Standards”, Paper delivered at Stanford University, January 16, 2007, with reference to G. Klein Goldewijk and W. M. Jongman, “They Never Had It So Good: Roman Stature and the Biological Standard of Living” (in progress).

<sup>64</sup> “The Economy of the Roman Empire: Integration, Growth and Decline”, directed by A. Bowman and A. Wilson, Oxford, 2005-2009, funded by the Arts & Humanities Research Council (UK).

<sup>65</sup> E.g., S. R. Joshel, *Work, Identity, and Legal Status at Rome* (Norman 1992) (trades); Morley, *Metropolis* (as in n. 7) 55-142, esp. 81-82 (farming for urban market).

capital were readily available and commercial development was booming.<sup>66</sup> This squares with the fact that Roman-style slavery, which facilitated the manumission, enfranchisement and social integration of skilled slaves whose potential could best be exploited by administering reward incentives, was conducive to investment in the training of slave workers.

A more benign scenario would envision more substantial participation of freeborn Romans in profitable, high real wage occupations: in urban trades and crafts, and as farmers supplying cities. The fact that unfree and freed artisans dominate the epigraphic record has now been recognized as an artifact of commemorative practice that need not reflect demographic realities.<sup>67</sup> While family farmers near Rome may well have been under pressure from the slave estates that were concentrated in central Italy, there is nothing to suggest that they were not instrumental in supplying the several hundred towns located in less developed parts of Italy. Free village craftsmen are known to have provided services to slave estates.<sup>68</sup> Our sources do not permit us to ascertain how many freeborn Romans were ‘middlingly’ well-off. Evidence for sub-elite stratification is poor primarily because elite sources fail to differentiate among economic strata within the general population: aristocratic observers indiscriminately denounce the commoner population of the capital as filth, bilge and scum, and evidently non-proletarian groups such as craftsmen and retailers were readily subsumed within that category.<sup>69</sup> In reality, considerable diversity must have prevailed.<sup>70</sup> Some sense of actual opportunities is provided by the Roman census system which, by classifying citizens according to wealth, implies that large numbers of sub-elite Romans owned assets on a scale that is commensurate with income of several times average per capita GDP.<sup>71</sup> Moreover, the sheer scale of the military payouts in the terminal phase of the Republic discussed in section 3 would inevitably have enlarged and fortified this element of the citizenry. It also merits attention that when Caesar remitted one year’s rents in the capital up to 500 denars, he would have targeted sub-elite residents:<sup>72</sup> this points to the existence of a sizeable if indeterminate number of ordinary households which earned several denars per day and were able to pay rents of several hundred denars on top of their other living expenses. It may also be relevant that we seem to lack textual or archaeological evidence of the

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<sup>66</sup> W. Scheidel, “The Comparative Economics of Slavery in the Greco-Roman World”, in E. Dal Lago and C. Katsari (eds.), *Slave Systems, Ancient and Modern* (Cambridge 2007, in press), drawing on C. Hanes, “Turnover Cost and the Distribution of Slave Labor in Anglo-America”, *JEH* 56 (1996) 307-329.

<sup>67</sup> S. Treggiari, “Urban Labour in Rome: *mercennarii* and *tabernarii*”, in P. Garnsey (ed.), *Non-slave Labour in the Greco-Roman World* (Cambridge 1980) 48-64, at 55-56; Joshel, *Work* (as in n. 65) 124-128; and cf. now more generally H. Mouritsen, “Freedmen and Decurions: Epitaphs and Social History in Roman Italy”, *JRS* 95 (2005) 38-63. C. Hawkins, “Work in the City: Roman Artisans and the Urban Economy” (unpub. dissertation University of Chicago 2006) is the first proper study of this topic. For the huge range of attested professions, see Treggiari’s paper.

<sup>68</sup> F. Kudlien, “*Anniversarii vicini*: zur freien Arbeit im römischen Dorf”, *Hermes* 112 (1984) 66-84.

<sup>69</sup> E.g., Cic. *Flacc.* 18 (‘craftsmen and retailers and all those dregs’); more references in W. Will, *Der römische Mob* (Darmstadt 1991) 184 n. 183.

<sup>70</sup> Cf. N. Purcell, “The City of Rome and the *plebs urbana* in the Late Republic”, in J. A. Crook *et al.* (eds.), *The Cambridge Ancient History IX* (2<sup>nd</sup> ed. Cambridge 1994) 644-688, for the complexity of the late Republican metropolitan populace.

<sup>71</sup> The property thresholds were set at 25,000 denars for the first class, 18,750 for the second, 12,500 for the third, and 5,000 for the fourth, with a very low limit for the fifth class. At 5-6% annual return on capital, even fourth-class citizen would have earned between 250 and 750 denars a year, or two to six times the traditional basic army stipend; and income from crafts and trades may well have generated higher income relative to assets than farming. The overall number of such citizens is unknowable but likely to have ranged in the 100,000s: see W. Scheidel, “Stratification, Deprivation and Quality of Life”, in M. Atkins and R. Osborne (eds.), *Poverty in the Roman World* (Cambridge 2006) 40-59, at 48-52, for discussion and guesstimates.

<sup>72</sup> Suet. *Caes.* 38, compared to a 125 denar ceiling in other Italian towns. It is unknown how much of this differential was due to higher rent levels in Rome or to the privileging of the capital.

shantytowns that are typical of the capitals of modern developing countries. All these observations speak against an overly bleak assessment of income distribution in the free population.<sup>73</sup>

It is worth remembering that no comparable analysis can be found in the ancient sources themselves. While the literary tradition provides essential building blocks for modern reconstructions such as my own, it offers little in the way of credible overarching assessments of socio-economic development beyond the obvious facts of unprecedented levels of capital accumulation among the elite, the expansion of chattel slavery, and urban growth (all of which attracted considerable moral opprobrium). What might be taken to be generalizing observations about the living conditions of the bulk of the population grew out of the increasingly heated political rhetoric of an unravelling oligarchy designed to score points and vilify opponents rather than to present objective accounts of reality: Cicero's violently partisan speeches from the last decades of the republic – either panegyrics or invectives, as required by the occasion – are a prime example. Aristocratic feuds and the supporting rhetorical traditions they spawned also underlie the few available historiographical narratives, pieced together from now-lost sources by Greek-speaking provincials several centuries after the fall of the republic, who, remote from the original context, struggled to re-fashion their distant partisan sources into speciously coherent narratives that were meant to entertain and educate their leisured audience and were shaped by the conventional topoi of greed, hybris, and class struggle.<sup>74</sup>

This bias is well captured by Plutarch's indictment of the warlords of the failing republic who “needed armies to fight against one another rather than against the public enemy” and “spent money on making life easy for their soldiers and then, after purchasing their labor in this way, failed to observe that they had made their whole country a thing for sale and had put themselves in a position where they had to be the slaves of the worst sort of people to become the masters of the better” (*Sull.* 12). In a sense, this diatribe is merely a moralizing version of my own observation that political conflict benefited Italian commoners (‘the worst of people’) at the expense of established elites (‘the better’) and, Plutarch might have added, provincials: as he relates elsewhere, his own great-grandfather, along with his entire town in central Greece, had been forced to carry grain for the Roman civil war military (*Ant.* 68). By contrast, the numerous beneficiaries of these events had no voice in ancient literature. Stripped of its rhetorical hyperbole and aristocratic hauteur, Sallust's complaint that “the young men who had maintained a wretched existence by manual labor in the country, tempted by public and private doles had come to prefer idleness in the city to their hateful toil” (*Cat.* 37) could easily be taken to illustrate the thesis that the urban pull factors of labor opportunities and welfare that promised high real incomes precipitated rural-urban migration in late Republican Italy.

Nevertheless, any such readings are ultimately of little value: the cherry-picking of congruent quotes – whilst standard practice in ancient history – makes for poor economic history. My model is in the first instance derived from ancient numerical data, material evidence, and consideration of the logical corollaries of adequately documented features such as conscription, urbanization, emigration, and redistribution. Qualitative textual sources cannot, by their very nature, be employed to verify or falsify this probabilistic reconstruction.

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<sup>73</sup> The – presumably negative – impact of slave income on overall income levels is impossible to ascertain. The most pressing challenge for modern scholarship is to strike the right balance between a model that focuses on elite dominance, which was surely an important factor, and the marginalization of freeborn commoners, which must have occurred, and one that emphasizes more widespread access to profitable enterprise in an environment of tax-free land and businesses and of personal assets that permitted adequate investment even in sub-elite circles, and of upward mobility in the military sector. Future investigations of the late Republican economy must give pride of place to distributional issues.

<sup>74</sup> The muddled tradition about the Gracchan land distribution schemes in the late second century BC is probably the most famous case in point: see K. Bringmann, *Die Agrarreform des Tiberius Gracchus* (Stuttgart 1985) for a trenchant critique.

## 5. A simple model

The evidence presented in sections 2-4 supports a dynamic model of socio-economic development in Roman Italy. At the beginning of the second century BC, following the ravages of the Second Punic War, Italy must have been underpopulated. This phenomenon, in conjunction with growing capital inflows and economic development driven by imperial expansion, precipitated slave imports as well as natural growth in the freeborn population. The latter process, accompanied by reduced attrition from warfare and the still only mild dampening effects of incipient urbanization, resulted in moderate population pressure which, as has recently been argued, can be linked to the land reform programs of the late second century BC.<sup>75</sup> Soon afterwards, mass mortality resumed with large-scale warfare against Germans in the 100s BC and among Italians in the 80s BC. At this point, Italy entered a period of prolonged dislocation characterized by high military mobilization and relocation rates, rapid urbanization and attendant excess mortality, and increasingly permanent population transfers beyond Italy. At the same time, capital inflows continued to grow, boosted by the violent redistribution of financial assets to large segments of the Italian commoner population. As a result, free population growth was contained by a combination of these attrition factors while commercial development progressed and real incomes were likely to rise (Table 2).

Table 2 Proxy variables for assessing the probability of real income growth in Roman Italy (favorable conditions in *italics*)

	300-200 BC	200-100 BC	100-30 BC	30 BC-
Demographic attrition	<i>High</i>	Moderate	<i>High</i>	Moderate
Geographical mobility	Moderate	Moderate	<i>High</i>	Moderate
Net free population growth	<i>Stagnant</i>	Moderate	? <i>Stagnant</i> /Moderate	Moderate
Net expansion of slavery	<i>Increasing</i>	<i>Strong</i>	<i>Strong</i>	?Stagnant
Redistribution	Moderate	Moderate	<i>Strong</i>	Moderate/low
Commercial development	Moderate	<i>Strong</i>	<i>Strong</i>	Slowing
Tributary inflows	Low	<i>Growing</i>	<i>Growing</i>	Shrinking
Preconditions for, and indices of, real income growth	mixed	mixed	good	poor

Source: Attrition and free population growth: above, section 2 (Brunt's 'low' population count implies stagnant demographic development in the late Republic, whereas Hin's reading allows for moderate net growth). Mobility: Scheidel, "Mobility" (as in n. 8) 21 fig. 1. Slavery: Scheidel, "Mobility" (as in n. 6). Redistribution: above, section 3 (after 30 BC, benefits were 'low' outside the city of Rome). Commerce: above, section 4. Tributes: Frank, *Survey* (as in n. 30) 79-80, 126-41, 228-31, 322-6, 336-41. (Net inflows shrank after 30 BC due to the shift of military recruitment, deployment and veteran settlement to the provinces: the biggest budget item – defense funding – was increasingly spent outside Italy.)

<sup>75</sup> L. de Ligt, "Poverty and Demography: The Case of the Gracchan Land Reform", *Mnemosyne* 57 (2004) 725-757.

This dynamic instability abated very considerably with the onset of monarchy in 30 BC: population losses due to military recruitment gradually subsided, outward colonization ceased, and net urban growth slowed and eventually came to an end. As a result, constraints on free population growth were relaxed at the same time as domestic peace forestalled further redistribution and overall commercial development appears to have stalled. Both slavery and income redistribution critically relied on coercive and non-reciprocal transfers of resources such as cash and labor power. While the application of slave labor may have raised productivity, thereby facilitating genuine intensive growth, this process was likely to lose momentum once the net expansion of slavery had run its course. Forcible redistribution was by its very nature an exogenous cause of income growth and, at least on the scale witnessed in the late Republic, necessarily unsustainable in the long run. Judging by final outcomes – i.e., the lack of further development beyond the early imperial period –, endogenous growth resulting from increased division of labor and urbanization was insufficient to contribute to more than a temporary efflorescence. In terms of overall impact on income growth, endogenous intensive economic growth may well have been overshadowed by more ‘archaic’ exogenous inputs provided by predatory asset re-allocation, especially in as much as the former can be defined as a mere by-product of the latter. In this model, external and internal conflict was the principal factor mediating population growth, real income growth, and much of the potential for intensive economic growth. Ultimately, economic development was a direct function of this variable.

However much the literati celebrated the peace, stability and security established by the new monarchy, these conditions were not necessarily conducive to the well-being of ordinary Italians. Elites and provincials, now comparatively more sheltered from arbitrary exploitation, were the main beneficiaries of regime change. Established elites consequently became more entrenched and devoted their resources to the acquisition of real estate and conspicuous consumption, often in the guise of public benefaction.<sup>76</sup> Peace in the provinces allowed the development of export businesses for the supply of Italy, in a process that was necessary to counterbalance centripetal tax and rent flows in the long term.<sup>77</sup> In Italy itself, the concentration of farmland in elite hands in conjunction with net population growth favored the expansion of tenancy, and the concurrent absorption of surplus by landlords. As labor supply increased due to natural population growth and labor markets ‘thickened’ thanks to reduced mobility and attrition, the price of labor fell accordingly, with adverse consequences for real incomes. In brief, conditions in early imperial Italy gradually ‘normalized’ in the sense that it became more susceptible to the typical hazards of agrarian societies: once the peculiar benefits of political-military mobilization and participation had been removed, rising population depressed real wages, ultimately rendering it more vulnerable to disease.<sup>78</sup> By the time a severe epidemic struck in the 160s AD, Italy was not only more densely populated than ever before but may well have been moving towards more pronounced economic inequality.

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<sup>76</sup> The latter habit is well established: see esp. Duncan-Jones, *Economy* (as in n. 51) 120-237 for quantitative data.

<sup>77</sup> For models and analysis, see H. U. von Freyberg, *Kapitalverkehr und Handel im römischen Kaiserreich* (27 v. Chr.-235 n. Chr.) (Freiburg 1989); K. Hopkins, “Rome, Taxes, Rents, and Trade”, *Kodai* 6/7 (1995/6) 41-75, reprinted in Scheidel and von Reden, *Economy* (as in n. 43) 190-230.

<sup>78</sup> For signs of population pressure in this period, see E. Lo Cascio, “Il rapporto uomini-terra nel paesaggio dell’Italia romana”, *Index* 32 (2004) 107-121. As usual, the evidence of field surveys is ambiguous: Dyson, *Community* (as in n. 52) 113-114. For the inverse relationship of population growth and real wages, cf., e.g., R. D. Lee, “Population Homeostasis and English Demographic History”, in R. I. Rotberg and T. K. Rabb (eds.), *Population and Economy* (Cambridge 1986) 75-100. I will explore this issue more generally in “Population, Productivity, and the Limits of Prosperity: A Neomalthusian Perspective on Roman Economic Growth” (in progress).

## 6. Comparative evidence

There are no close historical analogies to the development of late Republican Italy. The ‘citizen-state’ structure of the Roman Republic ensured that burdens such as military service were more narrowly borne by the free inhabitants of the imperial heartland, and benefits such as tributary inflows came to be more widely shared among them, than in more traditional pre-modern empires. The terminal decline of the Republican regime in particular facilitated resource redistribution on a scale that is unknown from other systems. At the same time, late Republican Italy does share critical features with other societies that experienced temporary economic efflorescences, most notably early modern Portugal, the Netherlands, and England.

In the sixteenth century, Portugal experienced massive out-migration of young males in the service of its far-flung colonial empire. In a population that can be estimated at around 1.2-1.4 million in 1527/32, and perhaps around 1.7-1.8 million in 1600 (interpolating from the tally of 2.1-2.2 million in 1700), at least 2,400 and perhaps as many as 3,500 individuals emigrated every year,<sup>79</sup> which translates to an annual rate of around 0.2% p.a. in a mean population of 1.5 million, or 0.6% of adult males. This matches the probable Roman peak emigration rate for adult males in the second half of the first century BC.<sup>80</sup> At the same time, driven by internal migration from the countryside and to a lesser degree by the slave trade, the population of Lisbon grew from 60-65,000 in 1527 to 120,000 in 1590 and 165,000 by 1620, thus increasing its share in the national population from about 5% to closer to 10%.<sup>81</sup> Rome witnessed comparable growth from perhaps 5% in 200 BC to probably somewhat over 10% by 80 BC.<sup>82</sup> Commercial development was centered on Lisbon as the capital turned into a global entrepot.<sup>83</sup> Slave imports from West Africa helped alleviate labor scarcity: on average, some 2,000 slaves may have arrived per year in the first half of the sixteenth century. Even so, labor costs were so high that slave purchases were very rapidly amortized, which suggests high real wages overall.<sup>84</sup> The Portuguese case resembles the late Republican Roman model in terms of rampant emigration that constrained (free rural) population growth in the face of growing incomes and development,<sup>85</sup> urbanization, strong demand for slave labor and its implications for real incomes. The main differences lie in the greater scope for urbanization and the expansion of slave labor in Italy sustained by the superior resources of the Roman state; the lack of capital flight from Roman Italy; and the absence of popular redistributive mechanisms in the Portuguese monarchy.

From 1600 to 1800, the Dutch population grew from 1.5 million to 2.1 million. In the same period, 500,000 men left Holland, 235,000 of them permanently. At almost 1,200 per year, in a mean population of 1.9 million (the tally for 1700), this equals 0.06% of the population or

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<sup>79</sup> Population size: J. J. A. Dias, “A população”, in id. (ed), *Portugal da renascimento à crise dinástica* (Lisbon 1998) 11-52, at 13 and n.10 (census of 1527/32); M. L. R. Pinto, J. D. Rodrigues and A. B. Madeira, “A base demográfica”, in A. de F. de Meneses (ed.), *Portugal da paz da restauração ao ouro do Brasil* (Lisbon 2001), 385-403, at 389, 395 (1700). Migrants: C. R. Boxer, *The Portuguese Seaborne Empire 1415-1825* (London 1969), 52 (2,400); V. M. Godinho, *Os descobrimentos e a economia mundial II* (Lisbon 1975) 606 (3-4,000). For the empire, see Boxer’s book and J. F. Labourdette, *Histoire de Portugal* (Paris 2000) 161-195.

<sup>80</sup> Scheidel, “Mobility” (as in n. 8) 21 fig. 1.

<sup>81</sup> Dias, “População” (as in n.79) 23.

<sup>82</sup> Reckoning with 150,000 and 600,000 urban population and 3 and 4.5-5 million Italians (with slaves and aliens, and the latter including northern Italy).

<sup>83</sup> A. J. R. Russell-Wood, *A World on the Move* (Manchester 1992) 123-134 for a good survey.

<sup>84</sup> A. C. de C. M. Saunders, *A Social History of Black Slaves and Freedmen in Portugal 1441-1555* (Cambridge 1982) 21, 33 (imports), 79 (slaves could earn their price in one year), 88.

<sup>85</sup> For the underpopulation of the Portuguese countryside, see Boxer, *Empire* (as in n. 79) 53 and H. V. Livermore, *A New History of Portugal* (2<sup>nd</sup> ed. Cambridge 1976) 151. On male migration, see Dias, “População” (as in n.79) 23-26.

less than 0.2% of adult men, only one-third the Portuguese rate in the sixteenth century and more similar to the probable Roman Italian rate in the first century AD, when emigration had slowed down but many residents still left to serve in the army. Half a million foreigners, most of them male, settled in the Netherlands during the same period, thereby more than compensating for this drain and resupplying the marriage market.<sup>86</sup> Demographic net growth of 40% over 200 years was lower than in Roman Italy, at perhaps 70% from 200 to 1 BC, but so was the extent of permanent immigration in proportion to the national population. In economic terms, German and Scandinavian immigration may in a sense be regarded as functionally equivalent to Roman slave imports, and in this case we know rather than merely surmise that this process was driven by real income. Real wages for skilled workers rose considerably from the 1580s to the 1620s and from the 1630s to the 1730s. Real wages and population were able to increase concurrently; and as demand for labor became more seasonally concentrated in the second half of the seventeenth century, the VOC absorbed additional emigrants.<sup>87</sup> Despite fundamental differences in the underlying economic systems, it merits attention that the features of muted indigenous population growth, urbanization, substantial immigration of workers, and large-scale access to both temporary and permanent outmigration opportunities for young males are all mirrored by analogous developments in late Republican Italy.

The case of England in the period from 1650-1750 is relevant here in the first instance because of the comparable importance of London and Rome in absorbing population growth. As Tony Wrigley has pointed out, for sustainable economic development to occur, population must not expand too rapidly even as real wages trend upwards, a condition that obtained throughout this period.<sup>88</sup> Needless to say, other vital preconditions were not present in the same way in Roman Italy, and real growth appears to have faltered in a conventional manner.<sup>89</sup>

None of these cases can show that Roman Italy experienced real income growth, or give us a better idea of how it was distributed. They do, however, provide multiple historical examples of specific configurations of variables that facilitated real income growth and can also be observed in late Republican Italy. More precisely, the Roman case amalgamates elements of different scenarios: strong primate urbanization as in early modern England; strong demand for immigrant labor, as in Portugal (met by slaves) and the Netherlands (met by free immigrants); strong incentives for concurrent emigration, again as in Portugal and the Netherlands; and, as a consequence of all these factors, only moderate net population growth for several generations and a redistribution of population in favor of urban environments. These developments, in turn, in conjunction with capital inflows and commercial expansion (as in all three historical comparanda), and with the specifically Roman features of tribute-taking and the politically mediated redistribution of foreign and elite assets to commoners, created an environment that was strongly conducive to real income growth, most notably in the first century BC.

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<sup>86</sup> J. de Vries and A. van der Woude, *The First Modern Economy: Success, Failure, and Perseverance of the Dutch Economy, 1500-1815* (Cambridge 1997) 50, 72, 75. The population of Amsterdam grew from 105,000 in 1622 to 217,000 in 1795, or from 6% to 10% of the national population (ibid. 64), comparable to Lisbon's relative growth in a shorter period of time but well behind Rome's relative growth in the last two centuries BC.

<sup>87</sup> Ibid. 627-647.

<sup>88</sup> Wrigley, *People* (as in n. 23) 152. For London's likely demographic absorption capacity, see ibid. 134-7. Its growth from 200,000 in 1600 to 1 million in 1800 mirrors Rome's probable growth between 200 and 1 BC.

<sup>89</sup> See Scheidel, "Demography" (as in n. 2) for the general premises.

## 7. Objective

The title of this paper is precise: it is my goal to present a logically coherent *model* of changes in real incomes in Roman Italy that can be reconciled with the available data.<sup>90</sup> Owing to the limitations of this evidence, my presentation is more narrowly theoretical and predictive in character than one would ideally wish it to be: some elements of the argument are difficult to test, and at worst may forever remain impervious to empirical falsification. In this somewhat unpromising context, a model is useful to the extent to which it makes explicit the logical corollaries of observed historical processes, signals logically coherent alternatives to received historiographical traditions, and thereby encourages us to rethink established terms of scholarly debates. In the present case, it should prompt us to look at deceptively familiar features in a new way. For example, contemporary scholarship has highlighted strains on the food supply of the city of Rome in the late Republican period, and concomitant disturbances and suffering:<sup>91</sup> yet given the sheer scale and rapid speed of that city's expansion in that period – exceedingly rare in world historical terms – and the absence of organized police forces,<sup>92</sup> would it not make even more sense to concentrate on the economic factors that facilitated this expansion and created a functioning metropolis whose long-term stability and success ought to occasion more surprise than its shortcomings? If the peninsula had teemed with homeless Romans and/or Italian allies who, driven off public land by rapacious aristocrats, wandered about with their wives and children, “lacking even the caves and lairs available to the wild beasts of Italy”,<sup>93</sup> why would wealthy Romans have purchased millions of foreign slaves for hard cash instead of availing themselves of the services of this desperate underclass?<sup>94</sup> If so many Romans were thoroughly impoverished, why was it so tremendously costly to recruit the huge armies of the final civil wars?<sup>95</sup> Viewed through the lens of the present model, these and many related questions will need to be considered afresh, with an open mind, and with due attention to the potential contribution of economics and comparative history.

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<sup>90</sup> I follow Finley, *Economy* (as in n. 2 [1985]) 182 in adopting R. J. Chorley and P. Haggett's (*Socio-economic Models in Geography* [London 1968] 22) poignant definition of a model as ‘a simplified structuring of reality which represents supposedly significant relationships in a generalized form’ which ‘do not include all associated observations or measurements, but as such (...) are valuable in obscuring incidental detail and in allowing fundamental aspects of reality to appear’.

<sup>91</sup> C. Virlouvet, *Famines et émeutes à Rome des origines de la République à la mort de Néron* (Paris 1985); P. Garnsey, *Famine and Food Supply in the Graeco-Roman World* (Cambridge 1988) 198-217; D. Cherry, “Hunger at Rome in the Late Republic”, *EMC* 12 (1993) 433-450.

<sup>92</sup> Scale: for cross-cultural context, see W. Scheidel, “Creating a Metropolis: A Comparative Demographic Perspective”, in W. V. Harris and G. Ruffini (eds.), *Ancient Alexandria between Egypt and Greece* (Leiden 2004) 1-31, esp. 3-18. Police: W. Nippel, *Public Order in Ancient Rome* (Cambridge 1995).

<sup>93</sup> Plut. *Tib. Gracch.* 9. In Appian's version (*BC* 1.7), the expelled men were Italian allies rather than Roman citizens. Does it matter?

<sup>94</sup> See Scheidel, “Economics” (as in n. 66) for the nexus between chattel slavery and demand for labor.

<sup>95</sup> See above, Table 1.