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## The tortoise and the hare: Economic growth in Britain and the Netherlands c. 1500 - 1800

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**The Tortoise and the Hare: Economic Growth in  
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The Tortoise and the Hare: Economic Growth in  
Britain and the Netherlands c. 1500-1800<sup>1</sup>

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## The Tortoise and the Hare: Economic Growth in Britain and the Netherlands c. 1500-1800

For much of the seventeenth century the most significant commercial and military rivalry in Europe was that between Great Britain and the Dutch Republic. The rivalry resulted in a series of vicious, mainly naval wars between 1652 and 1684. Although in the long run Britain's beggar-my-neighbour commercial policies prevailed over the Dutch, for decades travellers to Holland and leaders of British public opinion marvelled at Dutch ingenuity and success. A well-informed contemporary noted how the Dutch Republic's 'prodigious growth in Riches, Beauty, extent of Commerce, and number of Inhabitants' had made it 'the Envy of Some, the fear of others, and the Wonder of all their Neighbours' (Temple 1673: Preface). The population of Amsterdam surged from 30,000 in 1550 to 175,000 by 1650, making it the fourth city in Europe by the latter date (after London, Paris, and Naples) (de Vries 1984: 271). Historians (e.g. Schama 1987; Israel 1989) celebrate Dutch 'precocity' and 'primacy in world trade' during the Golden Age (c. 1580-1670). The ability of a small nation – with a population of only 1.5 million people in 1600, compared to Britain's six million and France's 18.5 million – to thrive on such a thin natural resource base was the envy of its rivals.

Dutch supremacy was not to last, however. By the late eighteenth century it was the British economy that attracted the headlines. Dutch retardation was linked to its earlier success, in two senses. First, Dutch

economic precociousness attracted the attentions of rapacious rent-seeking neighbours. Even the accession of William III to the English throne in 1689 did not relieve the Dutch of the burdens of the Navigation Acts. Second, the Netherlands' relative precociousness the seventeenth century gave rise to a set of institutions that did not serve it well after 1800 or so (van Zanden and van Riel 2004). This sense that the Netherlands paid a price for being an 'early starter' suggests the case for taking a longer perspective in assessing the performance of the early modern Dutch economy, and for treating the period 1500-1800 or so as a unit. Here changes in national incomes in the Netherlands and in Great Britain over that period are compared.

### *1. Dutch 'Modernity' during the Golden Age*

Three decades ago Jan de Vries described the Netherlands of the Golden Age era as a 'high-level traditionalist' economy, which by the eighteenth century had sunk 'into a complacent stagnation'. Others support this assessment; van Zanden recently dubbed the growth of the Golden Age era 'pre-modern' because it failed to generate significant gains in living standards and was not sustainable in the long run. Against this, however, the Dutch made pioneering and enduring contributions in the realms of agriculture, financial institutions, shipping, social welfare, and public finance. More recently, de Vries and van der Woude have described the early modern Dutch economy as the first to experience 'modern economic growth' (de Vries 1976: 251, 252; Soltow and van Zanden 1998:

31; de Vries and van der Woude 1997; McCants 1997; see too Goldstone 2002).

Political arithmetician Gregory King's national accounts imply that in the late seventeenth century the Dutch Republic was the richest economy in Europe. He reckoned that Dutch income per head exceeded that of England by ten to fifteen per cent at the end of the Dutch Golden Age. This gap is much less than that allowed by Maddison, who implies that for over three centuries the Dutch enjoyed higher GDP per head than anywhere else, and that in 1700 Dutch GDP per head was 1.7 times the United Kingdom level (de Vries 1974: 242-3 (citing King); Maddison 2000: Table B-21).

Maddison's data imply that the Dutch and British economies had roughly the same GDP per head c. 1500. Then the Netherlands forged ahead of its great rival, only to lose ground from the late seventeenth-century on, and to be overtaken during the Industrial Revolution.

[Table 1 about here]

Van Zanden's reconstructions of Dutch GDP imply a very different trajectory before c. 1820. Whereas Maddison's numbers imply only a small Dutch advantage over the United Kingdom c. 1500, van Zanden's imply an advantage of nearly three-fifths. And while Maddison reckons that real GDP per head in the Netherlands rose by 140 per cent between 1500 and 1820, van Zanden's best guess is that the rise was about one-third that (Maddison 2001 Table B-21; van Zanden 2001; compare Federico 2002). The contrasting Maddison and van Zanden trajectories are summarized in Table

1. Meanwhile de Vries and van der Woude (1997: 709-710), wisely perhaps, refuse to 'venture an estimate' of the growth rate of the Dutch economy before the 1660s. Nonetheless they are confident that income per capita rose, pointing to significant productivity increases in agriculture, services, and shipping, the big rise in energy consumption in the previous two centuries or so. It is enough to point out here that if van Zanden's estimate for 1500 is correct, then the Anglo-Dutch gap would have opened up earlier and all that the calculations that follow will be underestimates of the gap.

In the debate about incomes in the early modern Netherlands and Britain, wage data only muddy the waters further. Recent estimates by Allen (2001), shown in Figure 1, suggest that building labourers (*BL*) and building craftsmen (*BC*) in London (*L*, representing England) were better paid than their counterparts in Amsterdam (*A*, representing the Netherlands) in the first half of the sixteenth century, but that they lost their lead thereafter and did not regain it for a century or more. Allen's data also suggest that real wages in Amsterdam were about one-fifth higher in 1750-99 than they had been in 1550-49, while in London they were about the same in both periods. Meticulous research by John Munro (2001), on which Table 2 below is based, corroborates Allen's findings for the early sixteenth century. It reveals that wage earners in England c. 1500 had the edge over wage earners in the Antwerp region – generally conceded to be at least as economically advanced as Holland at this time – but that they lost it during the following few decades. Such data are not so readily squared with van Zanden's claim that Dutch GDP per head was 1.58 times British c. 1500, nor with the assertion that 'real wages declined a lot between 1500

and 1800' (van Zanden 2001; 2002: 154); but they are not so easily reconciled either with the almost three-fold rise in GDP per head indicated by Maddison over the same period. Van Zanden concedes that English GDP per head in 1650 was unlikely to be 'only about half the Dutch level' (2001: 78-9).

[Figure 1 and Table 2 about here]

In the present paper, I work with an amended version of Maddison's estimates, which imply that GDP per head in the Netherlands and the United Kingdom were roughly equal c. 1500, and again in the 1840s. In-between, the Dutch built up a lead over the British that reached its peak in proportional terms in the 1690s; from then on the gap in GDP per head was slowly whittled away. However, since the historiography is really about Anglo-Dutch rivalry, I have adjusted Maddison's GDP per head data to exclude Ireland. The adjustment matters because Irish GDP per head was much less than British in this period, and Irish population a significant proportion of the United Kingdom total, rising from about one-fifth c. 1500 to one-third c. 1820 (Ó Gráda 1997). I assume, rather arbitrarily, that Irish GDP per head was one-half that of Britain throughout. Figure 1 plots the trends in Dutch, United Kingdom, and British GDP per head between 1500 and the late 1840s, as inferred from Maddison's data.



## *2. The Dutch Tortoise and the English Hare*

For all its earlier successes the Dutch economy was widely deemed a failure by the early nineteenth century. Mokyr in his pioneering comparative study of the Low Countries offers an overview of ‘the non-event of [Dutch] economic stagnation’ in the early nineteenth century (1976: 84; see too Drukker and Tassenaar 1997). As noted earlier, some historians link Dutch ‘failure’ relative to industrialising Britain or, indeed, Belgium to its own earlier success. They blame the institutional sclerosis of a high wage economy encumbered by a generous social welfare regime, unable to cope with competition from poorer latecomers (de Vries 1973; Mokyr 1976; de Vries and van der Woude 1997; van Zanden 2002a, 2002b; van Zanden and van Riel 2004). The rather sombre historiography of the post-Golden Age economy is supported by Maddison’s national account estimates, which have Dutch GDP rising by only seven per cent between 1700 and 1820, while Belgium’s doubled and the United Kingdom’s more than trebled. Over the same period, Dutch GDP per head fell.

By Maddison’s reckoning, the Dutch GDP per head overtook UK GDP per head in the mid-1510s and maintained its edge until late 1840s (at D in Figure 2). However, if Ireland is excluded the Dutch advantage vanishes sooner, in the mid-1790s (at A in Figure 2). Still, this means that for almost three centuries the Dutch enjoyed higher output per head than the British. How much was the extra Dutch output worth? Between 1514/5 and 1794/5 the average gap was one-fifth of Dutch GDP per head. Alternatively, adding together the annual gaps between those dates yields a sum equivalent to 52 times 1795 GDP per head!<sup>2</sup>

It would take a long time before faster British growth ‘recouped’ the accumulated Dutch advantage. By 1850 only about 12 per cent of the accumulated gap in annual GDPs per head had been ‘recouped’. Six decades or so later, only three-fifths of the gap had been made up.

In partial mitigation, Britain’s population grew faster than Dutch over the period. In an era when most economies were struggling to keep the Malthusian wolf away from the door, assessment of relative economic performance should also take account of extensive growth. Comparing growth rates in real GDP rather than GDP per capita weighs intensive and extensive growth equally. In Figure 2, the *nl(\*)* schedule tracks Dutch GNP per head, weighted by an index that sets Dutch population relative to British in 1500 at unity. British population-weighted GDP per head overtakes Dutch in the late 1760s (at C in Figure 2). Allowing for differences in population growth attenuates the Dutch advantage somewhat, to 39 times 1795 GDP per head. When population growth is factored in, the British also subsequently ‘recoup’ more quickly, by 1858.<sup>3</sup>

[Table 3 here and Figure 2 about here]

### *3. Allowing for urbanisation.*

The Dutch economy’s precocity was founded on the productivity of its agriculture and the strength of its commercial sector and its cities. However, as Wrigley *et al.* (1997: 204) warn, ‘the severity of the urban penalty should not be underestimated’. Figure 3 describes urbanisation

rates (where 'urban' includes towns and cities of ten thousand or more) in the Netherlands, Great Britain, and France c. 1500-1900. Dutch urbanisation rates, unparalleled in early modern Europe, imposed a toll in terms of morbidity and life expectancy. Although it remains unclear whether the nutritional status of urban populations generally was inferior to that of their rural cousins, we know for sure that they suffered from congestion, poor sanitation, adulterated food, and endemic diseases (Riley 2001: 161-3). Urbanites everywhere were also smaller in stature. Many rich citizens, aware of the increased mortality risk, left the cities for their rural retreats during the summer. The poor did not have that choice.

In 1673 England's former ambassador at the Hague described the Dutch 'as generally not so long-liv'd as in better Airs; and begin to decay early, both men and women, especially in *Amsterdam*'. He singled out 'Diseases of the Climate [which] all hot and dry Summers bring...that are infectious among them, especially into Amsterdam and Leyden' (Temple 1673: 161). Alas, in demographic terms, the pre-1800 Netherlands remains somewhat of a statistical dark age. How Amsterdam achieved its remarkable population growth in the century or so after 1580 remains a mystery, although the high proportions of widowed household heads in Dutch towns and cities and the Dutch obsession with cleanliness in the Golden Age era are consistent with the presumption that mortality was high in a congested, damp environment (van Strien 1993: 212-3, 231n95; van de Woude 1972: 311-13; Schama 1987: 375-84).<sup>4</sup> However, hard evidence on immigration, on mortality, and the main causes of death are lacking. Their absence has prompted some 'controlled conjectures' (de Vries 1985: 664;

van der Woude 1983: 197-209; de Vries and van der Woude 1997; van Leeuwen and Oeppen 1997).

An important contribution by Alter reports life expectancies at birth of 25.3 years for the lives of nominees in the Amsterdam life annuities of 1586-90 and 30.0 years for those of 1672-74 (Alter 1983: 33). The disappearance of plague was the main cause of the improvement between the two dates.<sup>5</sup> Plainly, the social rank of the annuitants and their residence in Amsterdam are factors: these were prosperous people living in a port city. Although some claim that because infectious disease did not discriminate between rich and poor, mortality differed less by class in early modern Europe than later, <sup>6</sup> evidence cited below suggests that Alter's estimates should be taken very much as an upper bound of life expectancy in the Netherlands at the time. The low life expectancies yielded by the trickle of evidence from local studies are corroborative. Noordam, for instance, reports a strikingly low life expectancy of 26.5 years in the Maasland region (south Netherlands) in 1730-59, while Paping found life expectancies of just over thirty years in five Catholic populations living in the northern clay lands around Groningen in 1731-70 (Noordam 1986; Paping 1988).

[Tables 4 and 5 and Figure 3 about here]

The paucity of Dutch data means that the evidence from urban communities in neighbouring countries is also worth considering. Data from England, reported in Table 4 below, imply that the urban penalty in terms of life expectancy must have been substantial before 1800 (Woods 2001; see too Szreter and Mooney 1998). The shifting rural premium in London is of particular interest. Table 4 implies a huge gap between the average life span in London and in England as a whole in the early eighteenth century.<sup>7</sup> Thereafter the gap dwindled almost without interruption (though at an accelerating rate towards the end of the nineteenth century).

Comparing life expectancy of Londoners in general with that of London Quakers, a largely middle-class group, implies that social class affected mortality too. The average Quaker might expect to live 28.8 years in 1650-99, 24 years in 1700-49, 29.8 years in 1750-99, and 35.5 years in 1800-49 (Landers 1993: 158). This implies a gap of 6-7 years between the Quakers and the average Londoner in the eighteenth century, although London Quakers still died younger than the average rural Englishman and Englishwoman. Perrenoud's findings for seventeenth-century Geneva reveal just as steep a class gradient as in London. In 1650-84, the life expectancy of Genevan workers, male and female together, was 20.5 years; that of the middle class was 26.0 years, and that of the elite 36.8 years (cited in de Vries 1984: 184; see Perrenoud 1975).<sup>8</sup> In the light of such data, Alter's estimates for Amsterdam annuitants' middle-class nominees must entail very short lives indeed for the inhabitants of Amsterdam. A six-year gap between the middle-class and the population as a whole would indicate life

expectancies in the cities of less than twenty years in the 1580s and 23-25 years in the 1670s.

Given the high rate of Dutch urbanization at a time when the urban mortality disadvantage was very striking indeed<sup>9</sup>, it is surely not farfetched to assume that urbanization reduced the average lifespan in the Netherlands by an average of two years below British levels over the *longue durée* analyzed here.

A widely used measure (Usher 1973; Williamson 1984) of the impact of changing life expectancy affects human wellbeing is:

$$G_{\hat{C}} = G_C + (1/\beta).G_L$$

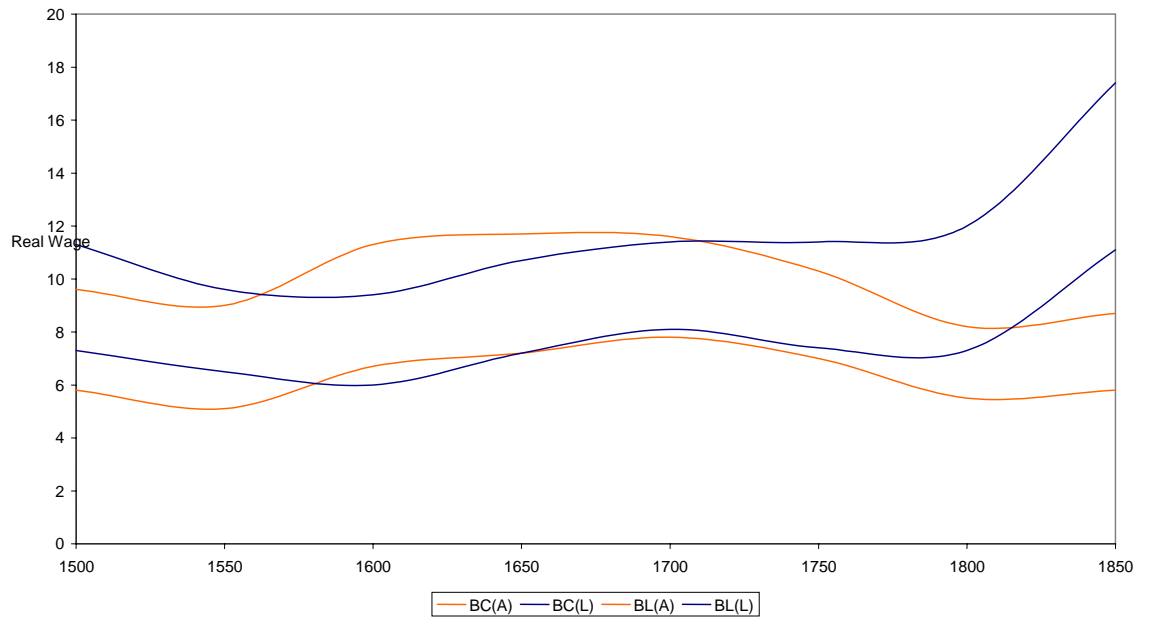
where  $G_{\hat{C}}$  represents growth rate of  $\hat{C}$ , the ‘true’ standard of living after taking the change in life expectancy into account,  $G_C$  the growth rate of GDP per head,  $\beta$  the elasticity of utility with respect to GDP per head, and  $G_L$  the change in life expectancy. An even simpler but serviceable way of dealing with the issue is that proposed by Lichtenberg (2003).<sup>10</sup> He defines expected individual lifetime wellbeing (*EILW*) as  $Y_A.e_A$ , where  $Y_A$  is average income and  $e_A$  is expectation of life at birth in Economy A. Relative *EILW* at a point in time then is measured as:  $[Y_A.e_A]/[Y_B.e_B]$ . This amounts to assuming that the marginal utility from additions to  $Y$  and  $e$  is constant. In effect Lichtenberg’s measure of ‘true’ change implies  $\beta = 1$ , so it yields a lower return on improved life expectancy than the Usher-Williamson measure, which assumes  $\beta < 1$ .

In Table 5 I report the implications of factoring in the value of life for  $\beta = 0.45$  and  $\beta = 1$ . Even assuming  $\beta = 1$  reduces the cumulative gains built up between 1515 and 1795 considerably. When differential population growth is also allowed for, assuming  $\beta = 0.45$  erodes most of the Dutch advantage though it does not eliminate it.

## CONCLUSION:

Economic historians tend to have less time than their colleagues in political and military history for past heroics or even for past genius. They are used to their entrepreneurs being replaceable, to social savings being ‘small’, and to economic growth during the Industrial Revolution being ‘modest’. Their answers to ‘how big is big?’ are conditioned by a belief in Harberger triangles and a confidence that inputs, both animate and inanimate, are highly substitutable. Against such a historiographic tradition, the ‘savings’ or ‘costs’ of the alternative routes described in this paper are very significant. The benefits of Dutch economic precociousness in the sixteenth and seventeenth centuries, even when set against later retardation, were considerable.<sup>11</sup>

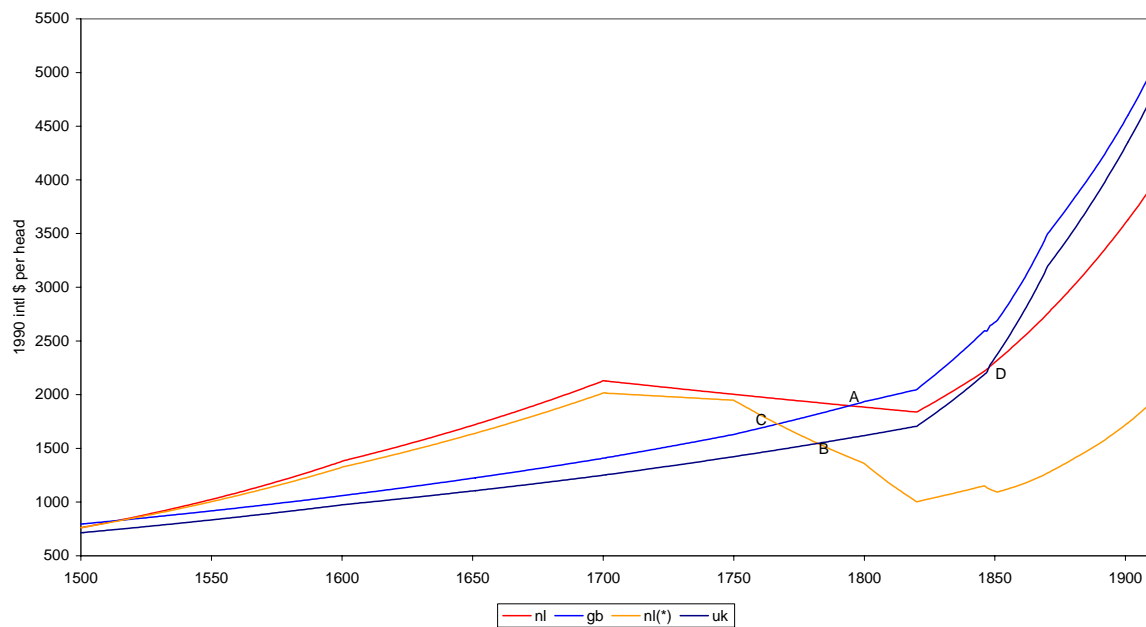
Fig. 1. REAL WAGES IN AMSTERDAM AND LONDON, 1500/49-1850/99



Source: Allen 2001

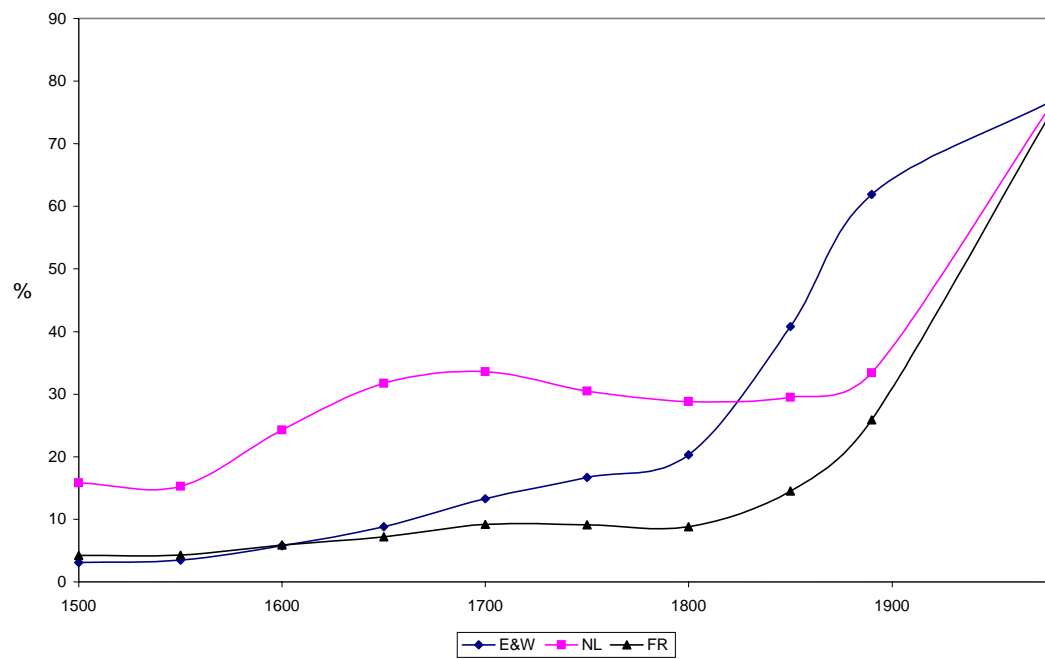


Figure 2. Economic Growth in NL, GB, and UK 1500-1910



Source: see text

Fig. 3. Urbanisation Rates in E&W, FR, and NL, 1500-1980



Source: de Vries 1984: 39, 45-46.

*Table 1. Estimates of Dutch GDP per head, 1500-1820*

<i>Year</i>	<i>[1] Maddison</i>	<i>[2] Van Zanden</i>	<i>[2]/[1]</i>
c. 1500	761	1,252	1.65
c. 1650	1,700	2,411	1.42
c. 1700	2,100	2,386	1.14
c. 1750	1,985	2,337	1.28
1820	1,838	1,838	1.00

Source: Maddison 2001 (for 1500, 1700, and 1820); van Zanden 2001: Table 4.3; Maddison 2005: 25; my interpolations for Maddison c. 1650, and c. 1750.

*Table 2. Wages in Southern England and Belgium c. 1500-1540*

<i>Item (Quantity per daily wage)</i>	<i>England 1501-05</i>	<i>Antwerp 1501-05</i>	<i>Ratio (England/ Antwerp)</i>
Wine (litres)	3.47	2.92	1.19
Herrings (no.)	43.32	48.45	0.89
Peas (litres)	40.27	19.70	2.05
Wheat (litres)	22.25	19.84	1.12
Sugar (kilos)	0.94	1.02	0.92
<i>Item (Quantity per daily wage)</i>	<i>England 1536-40</i>	<i>Antwerp 1536-40</i>	<i>Ratio (England/ Antwerp)</i>
Wine (litres)	2.64	3.49	0.76
Herrings (no.)	38.17	45.48	0.84
Peas (litres)	30.50	21.38	1.43
Wheat (litres)	21.90	17.15	1.28
Sugar (kilos)	0.39	0.74	0.52

Source: Munro (2001: Table 16)

*Table 3. Population and GDP per head in the Netherlands and Great Britain*

Year	Population (1,000)		GDP per head (1990 international \$)	
	NL	GB	NL	GB
1500	950	3,142	754	795
1600	1,500	5,700	1,368	1,060
1700	1,900	6,640	2,110	1,408
1820	2,355	14,139	1,821	2,048

*Source:* NL and FR are taken from Maddison 2001, Tables B-10 and B-21. For GB see text.

*Table 4. Life expectancy at birth in London and in England & Wales, 1700s-1860s*

<i>Decade</i>	<i>[1] E&amp;W</i>	<i>[2] London</i>	<i>[1]-[2]</i>
1700s	38.5	18.5	20.0
1730s	31.8	18.2	13.6
1740s	33.5	17.6	15.9
1750s	37.0	20.1	16.9
1760s	34.6	20.5	13.9
1770s	36.9	21.6	15.3
1780s	35.3	25.5	9.8
1790s	37.1	27.5	9.6
1800s	37.2	28.0	9.2
1810s	37.8	32.4	5.4
1820s	39.6	34.4	5.2
1830s	40.5	36.9	3.6
1840s	40.0	36.7	3.3
1850s	40.0	38.0	2.0
1860s	40.8	37.7	3.1

Sources:

*London 1730s-1820s:* Landers 2000: 171

*London 1700s, 1830s-1860s:* Woods 2000: 365

*England & Wales:* Wrigley and Schofield 1981: 230.

Table 5. The Gap in 'True' Living Standards (in multiples of 1795 British GDP per head)

	GDP per head	'True' measure $\beta = 1$	'True' measure $\beta = 0.45$
Gap relative to 1795 GDP per head	52	34	25
Allowing for extensive growth	39	21	9

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## ENDNOTES

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<sup>1</sup> I am grateful to Joel Mokyr and Richard Unger for comments on an earlier draft.

<sup>2</sup> Whether discounting is appropriate here is rather a moot point. Discounting amounts to treating all those who lived in the country for part or whole of the period in question as if they were represented by a lone individual with no thought for the next generation and with ‘no family or friends interested in his (her) survival’ (Williamson 1984: 158). Yet the historical record necessarily involves successive cohorts of individuals, and there is no reason why the average individual living in 1620-50 should be valued more than the average individual living in 1720-50. A second reason for not discounting is time inconsistency: those same young people who tend to heavily discount the future in retrospect regret what seemed like careless over-spending (van den Berg 2002).

<sup>3</sup> During the eighteenth century the Dutch invested in the British capital market, opening a gap between Dutch GDP and GNP. In relative terms, however, the sums involved were small: in the early 1800s foreigners held only 2-3 per cent of British national debt (Neal 1990: 68-72).

<sup>4</sup> De Vries (1995: 669) notes that in the 1730s Amsterdam parish registers recorded an annual average of 3,300 girls born; twenty-five years later, an annual average of 1,410 Amsterdam-born women were wed. The ratio seems to imply high mortality, but this makes no allowance for the relative importance of inward and outward migration, celibacy, and the likely under-registration of births.

<sup>5</sup> These are Alter’s ‘non-select’ estimates, which exclude the first years of each annuity in order to minimize selection bias. In Amsterdam in 1636 the plague killed over seventeen thousand people, or one-seventh of the population; in Leiden and in Haarlem too it killed significant proportions of the inhabitants.

<sup>6</sup> The estimates of life expectancy yielded by van Leeuwen and Oeppen’s Generalised Inverse Projection modeling are generally *higher* than those derived from annuities between the 1670s and 1720s; I do not invoke them here for that reason.

<sup>7</sup> Death-by-age data for London as a whole become available only in the early eighteenth century.

<sup>8</sup> Life expectancy in Geneva grew roughly in tandem with London: from 23.9 years in 1625-49 to 34.3 years a century later and 39.9 years in 1800-1820 (Perrenoud 1978: 223).

<sup>9</sup> If Dutch patterns were typical, high infant and child mortality would have been responsible for most of the urban demographic penalty. Evaluating the costs using, say,  $e(15)$  would reduce the cost of urbanisation considerably.

<sup>10</sup> For more recent applied work on this topic compare Nordhaus (2002) and Becker *et al.* (2003).

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<sup>11</sup> In a rather different vein Robert Lucas has argued, referring to economic growth in the developed world in recent decades, that the gap between a growth path associated with ‘real’ business cycles one which succeeded in eliminating the cycles was small, in the sense that society should have been prepared to pay only a small fraction of output in order to eliminate fluctuations (Lucas 2003).