# Wage-stickiness, monetary changes, and real incomes in late-medieval England and the Low Countries, 1300 - 1500: did money matter?

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March 2002

# WAGE-STICKINESS, MONETARY CHANGES, AND REAL INCOMES IN LATE-MEDIEVAL ENGLAND AND THE LOW COUNTRIES, 1300–1500: DID MONEY MATTER?

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## ABSTRACT

*The primary explanation for the marked rise in real wages in both England and Flanders, from the later fourteenth to mid fifteenth centuries, was a combination of institutional wage stickiness and deflation. In both countries, nominal wages had indeed risen after the Black Death (1348), but so had the cost of living, with a rampant inflation that lasted until the late 1370s in England and the late 1380s in Flanders. Thereafter, consumer prices fell sharply but money wages did not – or, in Flanders, not as much as did consumer prices. The other thesis of this paper is that these later medieval price movements were fundamentally monetary in nature.*


**Research in Economic History, Volume 21, pages 185–297.**

**ISBN: 0-7623-0993-8**

# I. NOMINAL WAGE STICKINESS AND THE REAL-WAGE PROBLEM: J. M. KEYNES, ADAM SMITH, AND THE EVIDENCE

Plaguing, so to speak, the current debate about changes in real-incomes in late-medieval western Europe, especially during the so-called "Golden Age of the Laborer," following the Black Death, is the very troubling issue of "wage stickiness." It simply means the long-term inflexibility, especially downward inflexibility, of nominal or money wages – and thus most emphatically not "stickiness" in real wages. The real wage is the physical quantity of goods and services that the artisan, craftsman or laborer can purchase with his or her money wage *plus* all the material fringe benefits that this employee receives in kind as a further payment for his/her labor: in terms of food, clothing, shelter, and other material rewards. In most historical studies, however, the real wage index is presented simply as the quotient of the nominal (money) wage index divided by the consumer price index: i.e. RWI = NWI/CPI; and it thus ignores the presence of any such fringe benefits (Van Zandem, 1999; R. Allen, 2001). Most economists focus much more on the behavior of real wages rather than on money wages in analyzing labor markets and the impact of labor changes upon the economy; and that was even more true of the Classical Economists in the nineteenth and early twentieth centuries. For reasons to be explained later, this study focuses upon the daily money wages paid to building craftsmen in southern England and the southern Low Countries (1300–1500) and upon their cost of living (as measured by "basket of consumables" price indexes).

Those who neglect the significance of money wages and the historical problem of nominal wage stickiness have ignored not only John Maynard Keynes but also Adam Smith, the renowned founder of the Classical School. The former commented that: "the Classical Theory has been accustomed to rest the supposedly self-adjusting character of the economic system on an assumed fluidity of money-wages; and when there is rigidity, to lay on this rigidity the blame of maladjustment" (Keynes, 1936, p. 257). Drawing upon historical evidence, Smith (1776/1937, p. 74) did in fact offer supporting evidence for the view that money wages were not so fluid, cogently observing in the *Wealth of Nations* that:

> The wages of labour do not in Great Britain fluctuate with the price of provisions, [which] vary everywhere from year to year, frequently from month to month. But in many places the price of labour remains uniformly the same sometimes for half a century . . .. The high price of provisions during these ten years past has not in many parts of the kingdom been accompanied with any sensible rise in the money price of labour.

He was not far off the mark. For, in southern England, the money wage of master masons and carpenters had remained fixed at 24d per day (i.e. 2s 0d)

for precisely 40 years, while the well-known "basket of consumables" composite price index of Henry Phelps Brown and Sheila Hopkins (1955, 1956, 1981, p. 178) had risen, over the same 40-year period (1733–1773), by 57.4%.[1] By far the longest period of nominal wage stickiness recorded in English price-history is to be found in the payment records for carpenters and masons at the Oxford colleges. From 1363 to 1536, a period of 174 years, they were paid, with very rare exceptions, a standard wage of 6d per day, or 3s 0d per six-day week, certainly for the summer (Easter-Michaelmas) season. When they then received their first sustained modest increase, to 6.5d and 7.0d per day in 1536–1537, they had already suffered some considerable ravages of inflation: a 50% rise in the price level, from the well-known Price Revolution, which had commenced around 1516–1520.[2]

If the continental evidence fails to provide evidence quite so impressive, nevertheless long-term nominal wage stickiness was clearly also the prevalent feature of labor markets in the Low Countries for the fifteenth and early sixteenth centuries. Thus, in Bruges, the daily money-wage for a civic policemen was fixed at 5d *groot* Flemish (summer and winter) from 1398 to 1476, nominally and initially half the rate for a master mason, though on an annual payment basis about 90% as much.[3] At Mechelen (a Flemish enclave within the neighboring duchy of Brabant), the predominant daily summer wage for master masons and carpenters in the town's employ was an inflexible 12d *groot* Brabant (= 8d *groot* Flemish) from the Burgundian monetary reform of 1434 to 1489 (Table 14). Such wage stability is all the more surprising in view of the virtual doubling of prices during this period, as measured by a similar "basket of consumables" index constructed by Herman Van der Wee (1975, 1978). From 1490 to 1540, with renewed inflation from about 1515, those Mechelen wages were fixed at a constant 13.5d *groot* (= 9d *groot* Flemish). In nearby Antwerp that daily summer wage of 12d *groot* Brabant had prevailed for these building craftsmen for the rather shorter period, from 1442 to 1486 (Table 13).[4]

Consider the implications of these data on wage stickiness and prices. For, if we calculate the real wage index by the aforementioned formula (RWI = NWI/CPI), then obviously changes in the price level – the extent of inflation or deflation – would fundamentally determine the changes in real wages. Adam Smith (1776/1937, p. 74) himself commented that, if "the labouring poor can maintain their families in dear years, they must be at their ease in times of moderate plenty, and in affluence in those of extraordinary cheapness."

The most famous example of affluence was in later-medieval England, and indeed in other parts of western Europe, following the Black Death (1348) –

though, as will be seen, some considerable time after the several onslaughts of bubonic plague. As Thorold Rogers (1903, p. 325) stated so long ago, and as so many others have continually reiterated since: "the fifteenth century and the first quarter of the sixteenth were the Golden Age of the English labourer, if we are to interpret the wages which he earned by the cost of the necessities of life."[5] The accompanying Tables 3–5 clearly indicate for England, at least, that most of this so-called Golden Age was also one of prolonged deflation, with only a few, sporadic spikes of high prices. Even the cross-Channel Low Countries, with a much different monetary history, and one plagued by repeated coinage debasements, experienced two prolonged periods of deflation – with rising real wages – from c.1390 to c.1420 and again from c.1440 to c.1470 (Tables 3–4, 8–15).

Although southern England's subsequent experience with real wages, into the early-modern era, was not replicated, for example, in the cross-Channel Low Countries, surely this historic pattern of real-wages is a most remarkable experience, and one that poses serious theoretical problems for both economists and historians. As Keynes has reminded us (1936, p. 5), one of the most basic postulates of Classical Economics is that "the wage is equal to the marginal product of labour;" and of course by that statement he meant the real wage. Are we really to believe, through much of later-medieval and early-modern English economic history, that a combination of wage-stickiness and a fluctuating price level had a more powerful impact on real wages than did changes in the productivity of labor and capital?[6] As this study will reveal, however, the impact of wage stickiness proved to be much more powerful during periods of deflation, if only because during prolonged inflations, nominal wages were rather less sticky, especially in the Low Countries. But even there, during the Price Revolution era, the frequently rising money wages often did lag behind consumer prices, and then became far more sticky during the deflationary seventeenth century.[7]

### *Commodity Price Indexes and Their Problems*

There are of course several intractable measurement problems with all these price and wage indexes. The prices in the Phelps Brown and Hopkins "basket of consumables" for southern England, and in the other two "baskets" used here, for Brabant (Van der Wee, 1975, 1978/1981) and Flanders (Munro, 1984a), both modelled on the English index, are generally those paid by institutions, often wholesale for bulk lots, and not retail prices paid by the typical artisan consumer in the market place. Furthermore, these indexes are far more heavily weighted with the prices of primary products than of finished goods. Thus, prices for

farinaceous goods and drink are those of just their constituent grains (wheat, rye, barley, peas), because, for this period, we simply lack adequate price series for flour, bread, cereals, and beer. Indeed, in medieval England, local governments regulated the sales of both bread and beer (ale), ostensibly fixed in price, by quantity (size, weight, capacity), which officially was to vary inversely with the price of their component grains.[8] As Nef (1937) and more recently R. Allen (2001) have noted, the price changes for bread, flour, and beer were undoubtedly of a much lower amplitude than were those for grains, principally because labor and marketing costs accounted for a much higher proportion of their prices than for those of the raw grains. Consequently, price indexes heavily weighted with grains – 42.50% in the Phelps Brown and Hopkins index – exaggerate the rise of real wages during periods of falling grain prices, as in the deflationary fifteenth century, and the fall of real wages during periods of rising grain prices, as in the inflationary sixteenth century. But wage stickiness also meant that labor costs accounted for a higher proportion of the total prices for these finished food products during deflationary than inflationary periods.

Furthermore, one might reasonably object that these indexes are too heavily weighted with foodstuffs, even if the other products – such as fish, meat, butter, and cheese – are "finished' consumer goods. As Table 1 indicates, foodstuffs account for 80% of the component weights in the English and Flemish price indexes, and for almost 75% in the Brabant index. But Phelps Brown and Hopkins justified their index weights, especially for the fifteenth century base period (1451–1475 = 100), with the expenditure records of a contemporary Dorset household; and Van der Wee (1966) found similar records to justify his weighting for foodstuffs, closely approximating the English index weights.[9]

If these price indexes are vastly preferable to the older ones based on grains alone, one may yet complain that the range of commodities contained is still too narrow. No allowance, for example, has been or can be made for rents and related household costs. There are also other unfortunate omissions, because of lacunae in the extant data. The Phelps Brown and Hopkins index, for example, ceases to use prices for dairy products after 1430, so that thereafter meat and fish prices (mutton and herrings) must carry the entire weight for that sub-index (37.5%).[10] While the Flemish and Brabant indexes do contain butter and cheese prices throughout, the former lacks any prices for meat and fish, while the latter lacks prices for wheat and peas; and in the Flemish index, the only industrial prices are for woolen fabrics.[11]

Perhaps the chief criticism to be made is that, for the period of this study, the fixed weights for the components in all three "baskets" do not properly reflect the ability of most consumers to respond to changing relative prices by making product substitutions. At the same time, the method of assigning such

weights in the Brabant and Flemish "basket" differs significantly from that chosen for the English "basket," even though it served as the model for the two Low Countries' price indexes. For Phelps Brown and Hopkins constructed their composite price index with fixed, unvarying expenditure shares: i.e. 42.5% for grains; 37.5% for meat, fish, dairy products; and 20% for industrial products. In that respect, their "basket" resembles a geometric index, though it was not computed in this fashion. The actual quantities of the component commodities that they specify in their article (1956/1981, p. 20) for the later-medieval and early modern eras are in fact valid only for the base period 1451–1475. But those specific commodities listed in the Phelps Brown and Hopkins "basket" for this period provide an unvarying quantity base for the two Low Countries' "baskets," which are thus much more the standard Laspeyres-type price indexes.

The annual values of the basket are computed by multiplying the mean annual prices (in pence *groot* of Brabant and of Flanders respectively) for each commodity in the basket by that quantity; and the base 1451–1475 = 100 was calculated by dividing the sum of those annual basket values by 25. The expenditure shares for the various commodity groups in three baskets are roughly comparable, as noted in Table 1, for this base period. But thereafter, while the expenditure shares for each commodity group in the English "basket" remained constant over time, those in the Brabant and Flemish "baskets" changed with the rise or fall in the relative prices of the component commodities. Thus, for example, as Table 8 indicates for the Flemish price indexes, grains account for 55% of the total value of the "basket" during the Black Death era (1348–1350) and again during the war-torn and plague-ridden period 1436–1440, but for only 37% during the peaceful, grain-abundant, and also deflationary years 1496–1500. In that respect, the two Laspeyres baskets for the Low Countries provide a better approximation of expected consumer expenditures. As R. Allen (2001, pp. 423–425) has recently noted, however, no alternative price indexes are likely to change the basic picture and resolve all of these problems.[12]

## II. PLAGUE, PRICES AND REAL-WAGES ACCORDING TO THE DEMOGRAPHIC SCHOOL: THE POSTAN-ABEL MODEL

Avoiding these statistical price- and wage-index problems, most medieval historians have instead found a far simpler and more compelling explanation for the remarkably high level of real wages of later-medieval western Europe: the impact of demographic catastrophes upon agrarian productivity. By far the best known rendition of this view is to be found in the Ricardian-Malthusian

models of Michael Postan (1950, 1951, 1952, 1966, 1972, 1973), Wilhelm Abel (1978, 1980), and Georges Duby (1962/1968).[13] Even the few opponents of their model must now accept as an established fact the very drastic nature of the late-medieval depopulations, especially in England, whose population fell from a peak of at least 4.5 to 5.0 million in the 1290s (if not from 7.2 million, as some have suggested) to about 2.5 or perhaps 3.0 million in 1377, finally reaching a nadir of about 2.25 million in the early 1520s.[14]

Familiar though the Postan-Abel-Duby model may be, its key elements must be briefly reiterated, if only to clarify the arguments that follow. The model's basic supposition is that the drastic decline in population during the fourteenth century, especially after the Black Death and subsequent attacks of bubonic plague, and the consequent alteration in the land-labor ratio, sharply increased the marginal productivity of agrarian labor. In a fundamentally agrarian economy, such changes presumably took place fairly quickly, with the abandonment of many high-cost marginal lands that, with prior population growth, had been subject to diminishing returns. Thus, arable husbandry would have become concentrated on much better quality, higher-yielding lands that produced much more grain and livestock products with proportionately much less labor.

At the same time, agricultural labor itself probably became even more scarce, as former itinerant laborers took up deserted tenancies or sought better employment in the towns. Furthermore, this agrarian reorganisation served to increase real-incomes even more by reducing the relative cost of cereal-grains and other basic foodstuffs, and perhaps also housing costs, with so much more available land. Artisans and laborers, finding that they were enjoying greater disposable real incomes, after meeting the basic necessities of life, evidently chose to increase their spending on meat, dairy products, industrial goods, and semi-luxuries, thus driving up the relative prices of such goods. Prices for manufactured goods should have risen even more, because the continued rise in industrial wages would have accounted for an even greater share of total production costs than did wages in producing grain and livestock products. Such is the classic demographic model for the late-medieval English and indeed West European economy, one that certainly seems both plausible and reasonable.

This emphasis upon the behavior of relative prices – i.e. a change in the price of wheat relative to a change in the price of, say, linen cloth – is crucial for any consideration of the Postan model in particular and of the analytical discussion that follows. In Postan's strongly pronounced views, these demographic changes were almost entirely responsible for late-medieval price movements. Contending that the fall in prices was almost entirely confined to grains, so that they diverged from other prices, many of which were rising, indeed in accordance with the model, Postan (1972, p. 239) concluded that:

> monetary factors could not have been the sole or the main cause of the price changes, for the pure logic of the monetary explanation demands that the effects of changes in the circulating medium should be felt throughout the economy, i.e. in the prices of all the goods bought and sold, since changes in money must be, so to speak, 'neutral' as between different commodities.[15]

Such views about the behavior of late-medieval price-movement are, however, quite misleading. First, as the accompanying Tables 5, 8, 9 and Figs 2–3 on English, Flemish, and Brabantine prices indicate, the component price-indexes for grains, livestock-products, and industrial goods generally tended to rise or fall together, in distinct phases of inflation and deflation, though by no means exactly in tandem, and with varying amplitudes and differing short-term oscillations. Second, no respectable economist would ever contend that, while monetary forces were at work in the economy, demographic and other "real" forces would remain suspended or frozen, in time, i.e. without interacting together, in altering the relative prices of many individual commodities.

Third, monetary changes are not "neutral" in the manner that Postan has suggested. Suppose, for example, that a country's supply of money had increased. The regional distributions of such increased stocks would have benefited some economic sectors more than others, thus allowing some groups or socio-economic strata to gain relatively greater increases in money incomes. The consequent changes in their savings and expenditure patterns, while possibly producing changes in the income velocity of money, would also have altered the prices of a wide variety of individual goods and services through their impact on the price and income elasticities of demand for various commodities and thus also on their elasticities of supply. Furthermore, if those changes in money stocks (even with a possible reduction in the income velocity of money) led to inflation, and if the money incomes of the lower strata of society did not rise correspondingly, many would have been faced with severe budget constraints, thus forcing them to spend proportionately more of their disposable incomes on foodstuffs and necessities and less on other commodities. Such demand shifts would likely have lowered the relative if not the nominal prices of the latter (especially industrial goods).[16]

Suppose further, that this country – or, for the present analysis, most of western Europe after the Black Death – experienced a rapid reduction in its population without, initially, experiencing any corresponding reduction in its aggregate money supply, and, not at least initially, in the income velocity of money. The result would really have been the same: a relative increase in money supplies, relative that is, to a much contracted economy, in which land, so much of which was abandoned, and labor were the chief inputs. Consider this situation in terms of the modernized version of the Fisher Identity: **MV = Py**, in which

the variable **y** represents NNI (real net national income, in place of "T," which cannot be measured). Thus, if **y** fell to a greater extent than did any possible reduction in the volume of money payments (i.e. the product of **MV**), then obviously prices had to rise. The same conclusions are to be drawn in using the much preferable Cambridge "cash balances' approach: so that **M = kPy** (and thus, **k = 1/V**). As will be seen later in this study, the Black Death was indeed followed by rampant inflation throughout most of western Europe, for about three decades.[17]

Postan, to his credit, certainly did understand the distinction between changes in relative prices and shifts in the overall price-level. But he did not observe the now readily available evidence for oscillating price-movements of general inflation and deflation in late-medieval Europe (see Figs 1–3). Many of his disciples, however, subsequently did become quite aware of these longer term price-movements, yet they still incorrectly attributed those price movements primarily to demographic changes. They evidently did so by confusing micro-economics with macro-economics: i.e. by assuming that a perfectly valid explanation for grain price-changes can be applied to the entire economy and its overall price-level. A growth in population that encounters diminishing returns in agriculture will likely cause relative grain prices to rise; but, acting alone, population growth cannot cause all or even most prices to rise. And conversely, a fall in population, while it may well have led to a sharp fall in relative grain prices, could not, by itself, have caused a general fall in prices – and certainly not following the Black Death, when, as just noted, prices instead rose sharply.[18]

In short, demographic forces can influence long-term price movements only by their interaction with other real economic forces, and by their consequences in inducing changes in both money stocks and money flows, including changes in credit. They may also have done so through their impact in inducing or stimulating a growth in real net national output and national income; and such was evidently the case during the "long" thirteenth century (c. 1180 – c. 1320) and again during the sixteenth-century Price Revolution. Ultimately, real economic growth – in turn promoting further population growth and increased settlement and urbanization – might have reduced or even eliminated elements of "slack" (elastic supplies) in the agricultural and natural-resource (forestry, mining) sectors of the economy; and thus the economy might well have failed to sustain a rate of growth comparable to that on the ongoing monetary expansion (in stocks and/or flows). Consequently, under such circumstances, as Keynes himself observed, most prices were bound to rise.[19]

For the wage question itself, there remains one further problem with the Postan model, and indeed with the usual presentation of Classical Theory. For,

in a frictionless market economy, without long-term wage contracts or other institutional impediments, the real wage for any particular occupation or task, defined by time and place, should be determined not just by the marginal product but by the marginal revenue product of labor (MRP): i.e. the extra revenue that the employer derives by selling the last unit of output produced by the last unit of labor added to his fixed stock of land and capital. If, according to the Postan model, the marginal productivity of agricultural labor rose, with the demographic, agrarian, and price shifts so posited for the late-medieval post-Plague English economy, then presumably the marginal revenue from the sale of grain and other arable products so produced on the now chiefly more productive lands should have fallen, with falling prices (or falling relative grain prices). The result, therefore, may have been just a "wash" in real wage changes. If, however, contrary to the Postan model, relative grain prices did not consistently fall, then real agricultural wages may well have risen in later-medieval England.

Though much evidence has been published that purports to show such a continual rise in agricultural wages during the later fourteenth century (in decennial means),[20] the accounts of several Winchester manors do not consistently validate that view. As Beveridge has noted (1936, p. 27), wages on most Winchester manors, after beginning to rise from 1362–1363, were forced down in 1367–1368, evidently at the behest of the new Bishop William of Wykeham; but then the higher rates were restored between 1370 and 1375. The manorial records of Taunton (Somerset) provide the most striking deviation from the presumed norm in the behavior of laborers' wages in later fourteenth-century (Table 7). To be sure, with the onslaught of the Black Death, casual farm-laborers on the Taunton manor had enjoyed a doubling in their money wage, with a substantial increase as well in their real wage, from 1349 to 1356. But thereafter their money and real wages both fell, and from 1362–1363 (i.e. before the election of Bishop William) fell sharply to pre-Plague levels even in money terms. Their real wages fell even more steeply below such levels, recovering only from 1378; but their money wages did not recover before 1412–1413.[21]

Second, recently published research on fourteenth-century agricultural production does not fully support the standard Malthusian-Ricardo-Postan model, which purports to demonstrate that the marginal product of labor had to rise with continued depopulation. To be sure, labor productivity did rise in pastoral farming on many manors: proportionally fewer men were required to manage larger flocks on an increased acreage. But, in several Winchester, Glastonbury, and Ramsey Abbey manors, labor productivity generally fell on the arable, in the seven decades from 1341 to 1421.[22] Indeed, the Malthusian-Ricardian model fails to demonstrate why any rise in industrial productivity should have occurred, especially in the building and textile trades. In woolen-textile manufacturing,

productivity in fact remained quite unchanged from the early fourteenth to the late eighteenth centuries.[23] Some medieval industries did benefit, to be sure, from applications of more complex forms of water-powered machinery; but, in the leading industries – textiles, mining, and metallurgy – most were instituted either long before or a full century after the Black Death (except the blast smelter; Reynolds, 1983; Holt, 1988; Munro, 2003a). For late-medieval industries in general, convincing evidence is lacking to indicate that the forces of later-medieval depopulation led to any positive qualitative changes in the composition, structure, and institutional utilization of the surviving labor force.

Classical economic theory would suggest, however, that any rise in real wages in the agrarian sector would necessarily be translated to the other sectors, lest the latter lose labor to or from the agrarian sector (i.e. in reduced migration to towns).[24] But without real productivity increases, presumably the employment of urban industrial labor would have been restricted to those crafts in which $W_L = MRP_L$. Real urban industrial wages might have risen through a rise in relative industrial prices, if that increased the employer's marginal revenue; and they would have risen further through any fall in the cost of living, chiefly in foodstuffs.

The first lesson to be learned in this study is that real-wage changes in the late-medieval economy were very complex and confusing to the observer, then and now. The other lesson, to be demonstrated later in this study, is not to generalize about prices and real wages from the experience of late-medieval England.

## III. SOME PROBLEMS WITH THE DATA ON LONG-TERM WAGE STICKINESS

### *Are These Wage Data Truly Representative: Do "Sticky" Wages Really Reflect Labor Markets?*

Many historians, of course, have pointed out an even more serious problem: the nature of the available wage data, which seem to be very unrepresentative. For the medieval era, by far the most familiar wage data are those published late in the last century by James E. Thorold Rogers (1866, 1882) and made even more accessible in the famous wage and price indexes of Henry Phelps Brown and Sheila Hopkins (which also includes other sources, from Buckinghamshire, Hampshire, Sussex and Kent). They themselves expressed a few reservations about the validity of these data in truly depicting long-term, downward wage stickiness (1955, 1981, pp. 7–8):

> Certainly our method of taking a representative rate is biased towards stability . . . since for most of our period these payments were made not by employers to wage-earners but by customers to craftsmen working on their own account, and these customers were generally institutions and not private persons who had to put their hands into their own pockets. But after due allowance for these things, the absence of sustained falls and of falling trends remains remarkable. It has been called the elbow-joint or ratchet effect.

Unconvinced by this argument, Lindert (1985, p. 618) accused them of deliberately seeking wage rates that could be regarded as "representative because they were recurrent," and then of constructing their wage series "in such a way as to overstate wage stickiness." Nevertheless, while pleading for historians to produce "other long-term wage series to ease the strain of over-reliance on the classic Phelps Brown-Hopkins series," Lindert himself necessarily still used them, as have Wrigley and Schofield (1981, 1989), and many other historians.

In medieval economic history, however, beggars seeking statistical data cannot be choosers; and neither Thorold Rogers nor Phelps Brown and Hopkins had much choice. Nor have other historians in subsequent publications. For the only readily available and suitable data are those provided by institutions willing to record them over long periods of time: medieval manors, town governments, hospitals, universities and colleges, guild houses, etc. Apart from the manorial and abbey accounts, which certainly do include some agricultural occupations (not considered in this study), most of the available institutional records provide wage data that are limited to building craftsmen, including carpenters, masons, tilers, plasterers, but also thatchers and street-pavers. By no coincidence, these are the very occupations whose wages were ostensibly regulated by the famous Ordinance (June 1349) and Statute of Labourers (1350–1351), and by most other late-medieval English wage legislation (except the 1388 Statute of Cambridge).[25]

Such wages, it must be noted are time-based, initially by the week and then more frequently by the day. In the later-medieval and early-modern European economies, however, the great majority of laborers and craftsmen, and most especially those in agriculture, textiles, leather-goods, metal wares, etc., received instead piece-work wages, which, when available, are often difficult to interpret, since we usually cannot measure output per day.[26]

In their presentation of daily-wage data, Phelps Brown and Hopkins (1955) differed significantly from not only the older studies on wages, by Thorold Rogers (1866, 1882) and Steffen (1901–1905), but also from those published since by several other historians: in particular, Beveridge (1936–1937, 1955–1956), Knoop and Jones (1933, 1967), Schreiner (1954), and Farmer (1983, 1988, 1991). Together, those studies may convince many readers that medieval wage stickiness was just a myth. For their tables, whether annual or decennial, reveal almost continuous oscillations in wage-rates, sometimes small

but often significant. Seemingly inexplicable, these oscillations disappear when one reads the original sources (manorial and town records) and then realizes that these historians have computed their annual data and decennial means by taking averages of the wage payments or wage rates in each record, thus producing "compositional errors."

Consider, as an example, a building project or manorial repairs employing a dozen carpenters in the year: with three senior master carpenters earning 4.5 and 5.0d per day, seven ordinary master carpenters earning 4.0d per day and two junior, less experienced master carpenters earning 3.5d per day.[27] Their mean wage would then be 4.250d unweighted and 4.083d weighted. If, in the following year, only ten carpenters were employed, with only one senior carpenter, earning 5.0d per day, six earning the standard 4.0d per day, and three earning 3.5d per day, the unweighted mean would now be 4.167d and the weighted mean, 3.950d. An examination of these accounts year after year would reveal that, for each class or status of master carpenters, the wage rates were in fact unchanging – and thus very sticky. Phelps Brown and Hopkins, to their great credit, selected for each year what appeared to be the standard or representative wage, which, admittedly, becomes a more difficult task during periods of transitional wages.

Further proof that the Thorold Rogers' and Phelps Brown and Hopkins' published wage data are indeed representative of the contemporary labor markets may be found in the wage-payment records for craftsmen in such medium-sized towns as Canterbury, Exeter, Dover, Winchester, and York.[28] Certainly, during the later fourteenth and the fifteenth centuries, their wage rates did not significantly differ from those that Thorold Rogers (1866, 1882) found in the Oxford and Cambridge records, with generally the same degrees of long-term wage stickiness, if not for as long a period as for the Oxford craftsmen. Together all these town wage-data for master building craftsmen were or came to be about midway between those for master building craftsmen recorded, at the lower end, in the accounts of the Bishop of Winchester's estates, of the Bishop of Bury St. Edmunds (Redgrave), and of Battle Abbey, and, at the upper end, the wages recorded for London artisans. Thus, during the second half of the fourteenth century, the standard wage for master craftsmen on the Battle Abbey and Winchester rural estates was 4d per day. At Oxford and Cambridge, as noted earlier, the wages for such craftsmen had risen from 5d to 6d per day about 1363, while the wages for such building craftsmen in the other medium-sized towns listed above generally remained at 5d per day until about 1410–1415 (then increased as well to 6d), just before the wage rates for most London building craftsmen had risen from 7.0d or 7.5d to 8.0d per day. About that same time, the manorial wage rates for these building craftsmen also rose, from 4d to 5d per day.

*Was Medieval Wage Stickiness Confined to Long-term, Contractual Institutional Employment?*

The best answer to this question, and one that further reinforces the previous answer on the representative nature of such wage data, can be derived from a comparison of wage payments in various London records, in particular those of: the Tower Bridge Authority (London Bridge Master); the various London guilds (Brewers, Cutlers, Carpenters, Grocers, Ironmongers); Westminster Abbey and its manors; and, finally, the Bishop of Winchester's London manor of Southwark. The Bridge Masters, in maintaining their various buildings and residential tenements, employed many craftsmen who appear to have been virtually "tenured," i.e. continuously employed for many years or decades; but the other three employers generally hired their masons, carpenters and other such craftsmen only on a purely occasional basis, generally for just a few days at a time, on what appears to be virtually a "spot market" for labor. For almost all such building craftsmen, in those fifteenth-century years for which a quadripartite comparison is possible, the wage data are virtually identical, and thus indicate that all four London-based institutions were compelled to pay the same market wages, for both short and long-term employment.[29] It is equally instructive to note that during the early fifteenth century, master carpenters and masons employed on the Southwark manor, across the Thames from the heart of the old City of London (and near the various guild halls), were earning exactly the same daily wage (8d) as were those hired by the nearby guild halls and the London Tower Bridge Authority, and thus from 60% to 100% more than those employed in the Bishop of Winchester's rural manors in southern England.[30] Such evidence therefore also does not support the commonly expressed view that daily wage rates were higher for casual short-term employment than for guaranteed annual employment. It also casts doubt on the view that late-medieval laborers, agricultural workers, and craftsmen came to prefer both the greater individual freedom and higher (real) rates for the former type of discontinuous employment.[31]

For the Low Countries, similar institutional sources, but most especially town government accounts – for Bruges, Ghent, Ypres, Mechelen, Leuven, Antwerp, Aalst (Alost) – and some urban-based abbeys, churches, and hospitals provide even more voluminous daily-wage data to support all of these conclusions: for the very same sets of building craftsmen, and also for some textile artisans and even policemen (in Bruges).[32] The wage data for such craftsmen and policemen throughout the late-medieval Low Countries exhibit patterns very similar to those of the English artisans, as suggested earlier, most especially during periods of stable coinage, even though their governments were sensible enough never

to impose wage ordinances, certainly none as restrictive as the Statute of Labourers. In most, if not in all cases, the craftsmen receiving such wages were similarly not long-term privileged employees, but those working for short periods – often just a few days or weeks – for many and various employers.

In the woolen draperies of the late-medieval Low Countries, their predominant manufacturing industry, daily wages are available only for the fullers, since most other textile workers received piece-work wages or fees (the latter, for shearers and dyers). Most fullers similarly worked for not one but a variety of different master-weaver drapers, for short and discrete periods of time. They were free to change their employers – and they were also capable of going on strike to achieve their collective guild-wage demands, if not always successfully.[33]

### *Was Late-medieval Wage Stickiness the Consequence of State Intervention?*

Many historians, especially British economic historians, believe that, in so far as we may discern such wage stickiness, it was both the consequence of the "wage freeze" imposed by the infamous Ordinance (1349) and Statute of Labourers (1351) and/or an artifice to evade it: i.e. payment records to simulate compliance, when employers were in reality paying more than the recorded amounts.[34] The short answer in response to such charges is that the patterns of long-term wage stickiness were virtually identical in late-medieval England and the Low Countries. In England itself, furthermore, such wage stickiness, and most especially downward wage stickiness, continued to be the prevalent feature for the employment of day laborers and artisans for centuries after such legislation – from the Ordinance of Labourers to the 1563 Statute of Artificers – had become dead letters (Table 2).[35]

Such answers will, nevertheless, not satisfy those historians who believe that the late-medieval records of wage-payments reflect, in some fashion, compliance with these Statutes, all the more so since Putnam (1908), Ritchie (1934), Penn and Dyer (1990), and Hatcher (1994) have all provided convincing evidence that the crown and local authorities did seek to enforce these statutes, at least until the late 1380s. Their arguments and evidence, especially Hatcher's, must be taken very seriously, even if such evidence does not really extend beyond the late fourteenth century. Yet the observer may just as strongly question the longer-term success of such enforcement of wage-rate ceilings by examining more closely the manorial wage records – and thereby acquire greater confidence in their validity.

For virtually all of these manorial accounts demonstrate that most of the recorded wages were substantially above those permitted by the 1349 Ordinance

and the 1351 Statute of Labourers (Table 2); and a fair number of these accounts indicate that some senior, or more highly skilled, craftsmen earned daily wages that were from 25% to 50% in excess of those permitted by statute.[36] Evidently those who maintained these accounts (bailiffs and stewards) had not entertained any fears of prosecution in recording such wages; and it would be difficult to prove that those few who did record wages within the statutory limits did so because of such fears. Possibly the lower wages on the smaller number of "compliant" manors are to be explained by a higher proportion of labor supplied by still customary (servile) tenants and by more isolated rural labor markets (such as at Taunton, in Somerset).

Certainly the later-medieval English towns, with presumably higher living costs, readily permitted wages above those prescribed in the Ordinance and Statute of Labourers, even though these royal writs in no way exempted the towns or tolerated higher rates (Table 2). In blatantly ignoring the 1349 Ordinance, London's civic government issued its wage ordinance the following year (1350) to fix the maximum wage for building craftsmen at 6d per summer and 5d per winter day, i.e. from Easter to Michaelmas (29 September), to Easter. Both were one pence higher than the maximum wages permitted in the previous London ordinance of 1290, but double that permitted in the 1349 royal Ordinance and the 1351 national statute.[37] Not until 1495 did Parliament recognize London's special status within the kingdom, and its much higher cost of living, with legislation to authorize these very same rates of 6d and 5d per day, respectively (but only 4d daily with food and drink), with some minor exceptions (Table 2).[38] In any event, long before then, and certainly by the 1370s, most employers of building craftsmen in London were ignoring not only the Statute of Labourers but also the local civic ordinances on maximum wages, as the evidence just cited clearly shows.[39] Nevertheless the impact of such labor legislation cannot be fully ignored in that it may have served to restrict the full impact of those forces driving up wages, and in particular may have led to the elimination of some seasonal wages, to be discussed in the answer to the following question.

### *Does Institutional Wage Stickiness Reflect Adjustments in the Real Wage by Other Means: By Adjusting Hours of Work and Thus by Substituting More Leisure for Paid Employment?*

Since medieval and early-modern employers, not only in England, but throughout Europe, paid those employees receiving time-work wages commonly by the week and then more commonly by the day, though not by the hour, employers and employees might have bargained to adjust real wages, according

to changing economic circumstances, by altering the length of the work-week or day. Some historians have suggested that, in pre-Industrial societies especially, many artisans, craftsmen, and laborers had a "backward bending supply curve of labor." Thus, such workers, on finding that their real wages had risen to permit them to acquire some desired level of sustenance and comfort, would have preferred to enjoy increased leisure time over further increases in money income; and thus they would have chosen to work less, or to refuse to work for traditionally long hours. Hatcher (1994, pp. 13–19) has suggested that such a substitution of leisure for paid work may have been a component of rising real wages after the Black Death.

Indeed, several years earlier, Blanchard (1978) had provided some evidence for such a "backward bending" supply curve for labor in the late-medieval English mining industry, many of whose rural workers were seasonal, primarily engaging in the agrarian economy. Obviously such circumstances would vary by time, region, and occupation. Yet there is no convincing evidence that such a backward-bending supply curve for labor was a significant feature of employment in the late medieval economy, certainly not in the building and textile trades. Some research done on this very question may be found in a recent publication on seasonal wages and leisure in late-medieval England and the Low Countries (Munro, 1994d). For neither region was there any convincing evidence that urban craftsmen sought to increase their leisure time, even after real wages had peaked in the mid-fifteenth century, by reducing either the work day or the work week, which was usually six full days.

There are, of course, only scant, sporadic data on the actual number of days worked per year, except for the invaluable data that Herman Van der Wee (1963) has provided on employment in the building trades in the Antwerp-Lier region, for each and every year from 1436 to 1600. For the base period employed in this study, 1451 to 1475, the mean number of days so worked was 210 days, precisely the same average in the late sixteenth century. The fewest number so worked, 191 days, occurred during the civil war era (towns vs. Maximilian) from 1483 to 1492 (91.01% of this mean); the highest number, 260 days (124.0% of the mean), during the 1540s and early 1550s. If the scope of these data is restricted to the first full century, 1436–1535, we find absolutely no correlation between real wages and the number of days worked.[40]

Some idea of the length of the normal working day, in this era, may be gleaned from data on seasonal wages. For in medieval and early-modern Europe, such wages were paid in accordance with the basic principle that "man works from sun to sun." Indeed the stipulation that both men and women were required to work at least twelve hours during summer months can be found in the 1495 parliamentary statute on maximum wages. From mid-March to mid-September

all English "artificers and laborers" were to work from 5:00 a.m. to 7:30 p.m., with 30 minutes for breakfast, 30 minutes for *nonemete* (or sleep) and one hour for dinner; and in the other half of the year, they were to work from sunrise to nightfall.[41] Certainly that customary working day and week, if not the law, prevailed in Great Britain, until the enactment of Fielden's Law or the Ten-Hour Day Act in 1847.[42] In the Low Countries, numerous fifteenth-century guild records affirm that the normal paid working day was then identical to the English, with a full six-day working week.[43] Far more so than in England, furthermore, the wage data for this region reveal a clear distinction between summer and winter wages (November to March); and, since the number of hours of daylight during winter months at this latitude (50° N) is about eight hours, the winter wage was generally from two-thirds to three-quarters the summer wage, despite the much higher cost of living during these cold, dark months.

In London, and some other English towns, however, seasonal wages generally disappeared after the Black Death.[44] Quite possibly the payment of a uniform wage rate, i.e. a winter wage equal to the summer wage, came to be an acceptable method of circumventing the Statute of Labourers' wage controls, since the Statute and its enforcement really focused only on the summer maxima.[45] Possibly the combination of the consequently higher wage throughout the entire year may have permitted some such substitution of greater leisure, at least in the summer months, for paid work. In the mid-fifteenth century, however, the London Bridgemaster did introduce a slight differential in seasonal payments (1441), and one that effectively raised the annual wage.[46] In the Low Countries, south and north, where seasonal wages prevailed up to the French Revolution, Bruges was exceptional in generally having a uniform wage rate throughout the year, but only until the 1430s. Thereafter, rather surprisingly, lower winter wages were introduced into the building trades, while summer wages were raised.[47]

### *Does Institutional Wage Stickiness Reflect Adjustments in the Real Wage by Other Means: By Adjusting the Proportion of the Total Wage Package Made "In Kind"?*

According to very commonly held views about medieval and early modern wages, most artisans and laborers supposedly received a significant portion of their total wage package "in kind' or "in truck," so that employers adjusted the real wage by altering the amount paid in the form of food, drink, and clothing amounts. Thus, according to this same view, nominal money-wage stickiness is illusory and/or irrelevant. That some medieval wages were indeed paid partly

in kind, especially in the agrarian sector, is incontestable. Most wage-payment records, including all the English statutes, are perfectly clear, however, in indicating whether the wage was in coined money alone, or "with food' (or other benefits); and for the latter, the money wage was always proportionally less.[48] Most economic historians in publishing wage data have been equally clear in specifying that the payments were in money alone.

In manorial accounts, especially the Winchester accounts, for later medieval England, wage payments in kind were quite common up to the eve of the Black Death, often accounting for 50% of the total wage package; but after the Black Death the component in food and drink fell to a third or less of the total pay package and they became less common in the following generations, except principally at Battle Abbey. The Battle Abbey manorial accounts generally provide two series of wage payments for the same classes of craftsmen and agricultural workers: those paid in both money and kind, and those paid in coined money alone. The sum of the former seems to equal the latter; and the rates for those paid in money alone at Battle Abbey were identical or virtually identical to those for unspecified but presumably "money-alone" wage payments on other manors.[49] One may surmise that when the price of foodstuffs fell sharply in the late fourteenth century (see Table 5), laborers and artisans would have resisted having any substantial portion of their pay package supplied in kind.

There are very few available urban wage data before the Black Death; but the various accounts for later-medieval London and other smaller English towns (Canterbury, Dover, Exeter), do not indicate any significant evidence of payments in kind, other than some allotments of clothing (chiefly for a few master-masons and carpenters in long-term employ at Westminster Abbey).[50] For these reasons, one may conclude that wage payments in kind did not appreciably alter the picture of real wages constructed by using money payments alone, at least not for the later Middle Ages, even if such views are not endorsed in Hatcher's recent and otherwise persuasive article (1994) discussed above.

Across the Channel, in the towns of later-medieval Flanders and Brabant, the town accounts provide virtually no evidence of any significant wage payments made in kind; and, for the rare instances in which they do occur in the records as a *drincgeld,* they account for no more than 1% of the wage packet, and seem to be for special workers hired outside the town.[51] In fifteenth-century Leiden, the fullers' guild ordinances (*keuren),* authorized by the town government (*gerecht*), are quite explicit in forbidding any payments in "truck" (kind), stipulating that payments be made each Saturday in silver coin alone. A remnant of some former partial payment in drink evidently continued in sporadic, occasional payments of *drincgeld*; but this too was paid in silver coin (a *stuiver*,

worth 2d *groot*).[52] Similarly, in their analyses of medieval Flemish and Brabantine wages, Verlinden and Scholliers (1959–1965) and Van der Wee (1963) found little evidence of payments in kind; and thus they also provided data only on money wages.

Nevertheless, the Flemish and Brabantine town accounts, which generally provide the full names and occupations of the craftsmen so paid, do provide evidence that many master masons, carpenters, slate-tilers, and street-pavers were also industrial entrepreneurs who made substantially more money than their daily wages by selling their supplies – bricks, stones, sand, lumber, nails, wire, etc. – to the city government.[53] Indeed, some masters were also drapers, cloth merchants, brewers, or minor civic officials, many of whom so prospered in these roles that they ultimately relinquished their original status as daily-wage earners. Nevertheless many other minor masters and virtually all journeymen (*knapen)* and other assistants did not seem to earn any such extra incomes, though some of them may have had their own small agricultural holdings, either within or just outside the town walls. Those circumstances obviously make a complete and proper estimate of real incomes difficult. As Van Zanden (1999, p. 178) has recently contended:

> This [artisan's household] budget is made up of different sources of income, of which wage income is only one. But we assume it was an important source (and not a marginal one) for the European working classes of the early modern period. Moreover, the wage rate is exogenous for the household: it cannot influence its level in the short or the long run. This means that a rationally acting household will adapt its strategy to this given wage-level.

## IV. THE KEYNESIAN INFLEXIBLE-WAGE MODEL AND THE NATURE OF MEDIEVAL LABOR CONTRACTS

Even if these recorded nominal money-wage data reflect market conditions, and are not institutional artifices, such wages would, however, clearly not be determined in the short-run by the Classical equation: i.e. that $W_L = MRP_L$ – not then and just as certainly not now. As most contemporary macro-economists would agree, if only because of its obvious truth, "nominal wage rates are not determined on a daily basis according to the law of supply and demand . . . even though it is the real wage that determines the demand for and supply of labor;" but not necessarily all of them would find the full solution in "the modern interpretation of the Keynesian inflexible-wage model [which] focuses on the role played by labor contracts," explicit or implicit.[54]

My own current research in the late-medieval era has revealed only one form of explicit long-term wage-contracts produced by formal and arbitrated collec-

tive bargaining between a guild and an association of entrepreneurial employers: those for the aforementioned fullers of Flanders, Brabant, and Holland, whose analyses require a completely separate article (Munro, 2002). As Knoop and Jones (1933, 1936, 1962, 1967), more recently Swanson (1988, 1989) and Blair and Ramsay (1991) have shown, from extensive investigations, medieval English building craftsmen did not enjoy any similar form of guild protection that would have permitted collective bargaining and labor contracts. Nevertheless Knoop and Jones have also demonstrated that for major building projects in later medieval England, France, and Italy, the chief master mason, acting more as a contractor-entrepreneur than as an artisan, often required or obtained written contracts that clearly specified not only the costs of building materials but also the rates of pay for his workers for the duration of the project. Sometimes, however, the contract was in the form of an *opus ad tascam* whose specified sum amounted to pay for piece-work accomplished, rather than daily rates. Some other older master masons rose in status to become wardens or foremen for large building projects, in the service of a secular or ecclesiastical lord, receiving a contract for many years, or even a lifetime, specifying an annual salary, with clothing and other material benefits.

Many other labor contracts may have been unwritten, i.e. the "implicit contracts" (by "invisible hand-shakes," etc.) about which modern macro- and labor-economists and some economic historians have published so extensively. Their analyses, however, cannot be readily applied to the often intractable medieval sources on artisans.[55] We may at least surmise that the long-term and virtually permanent artisan-employees of the London Tower Bridge Authority probably did enjoy at least the privileges of an implicit contract. But, it seems hardly credible that short-term, part-time, itinerant craftsmen, working for a variety of employers (while frequently mixing occupations), for discrete but indeterminate periods, would have benefited from any such form of implicit contracts, even if their wage patterns demonstrated the same degree of wage stickiness. In any event, fully enforceable written contracts would have succeeded, at the most, in fixing wages for only a few years at a time – or for medieval building projects, for their duration. Thus, they can hardly explain these many examples of very long-term wage stickiness lasting for over half-a-century, or as much as 174 years, in that singular Oxford example just cited.

Nevertheless, in the absence of good data and established theory, one may still offer credible (rather than merely plausible) hypotheses to explain at least some forms of wage stickiness. During periods of inflation, most employers were reluctant to award nominal wage increases that matched rising consumer prices and living costs, especially if the prices of their own

products were not rising as steeply as were food prices. Despite the emphasis to be given to deflationary periods in this analysis, certainly continental western Europe, during the Hundred Years War era especially (1337–1453), experienced frequent, if short term, inflations from periodic war-induced coinage debasements. With so many jagged oscillations in prices, we, as modern computer-assisted observers, are better able to detect those trends than were medieval employers.

If periods of late-medieval inflation were relatively brief in duration – in contrast to the sixteenth-century Price Revolution era, most employers would probably have not encountered any strong pressures to raise money wages, despite the short-term decline in real wages. As Keynes noted (1936, pp. 12–13), in citing one of his chief objections to one of the prime "postulates" of Classical theory: "A fall in real wages due to a rise in prices, with money-wages unaltered, does not, as a rule cause the supply of labor available on offer at the current [money] wage to fall below the amount actually employed prior to the rise of prices." Indeed modern macro-economic models convincingly demonstrate that under such inflationary conditions wage stickiness "results in an increase in employment and output," and usually, though not necessarily, in employer profits (Wilton & Prescott, 1987, pp. 216–217).

Conversely, during periods of deflation, most wage-earning employees, whether or not they were truly suffering from a "money-illusion," were and still are extremely hostile to any attempts to reduce their nominal wages, even if, with some inevitable wage reductions, they still ended up better off in real terms. Workers surely had and still do have some legitimate concern that wage rates and other benefits once cut will not readily be restored, without some considerable struggle, once market conditions improve and prices begin to rise again. As Keynes also cogently remarked (1936, p. 15): "Every trade union will put up some resistance to a cut in money-wages, however small."[56]

In late-medieval Flanders and Holland, that is precisely what the fullers did, in the form of organized strikes (*uutgangen*), when faced with wage reductions during periods of monetary reform and deflation.[57] If other late-medieval wage-earning craftsmen, in both England and the Low Countries, did not enjoy similarly strong guild protection, undoubtedly many, with or without less formal organizations, were still able to convey their opposition with sufficient conviction or hostility to prevent any nominal-wage reductions. Obviously those unprotected, such as itinerant or part-time agricultural laborers, were much more likely to suffer nominal-wage cuts during periods of deflation, as seems to have been the case in both late-medieval England and Flanders (see below, pp. 226–227).

## V. MONEY, PRICES, AND WAGES BEFORE THE BLACK DEATH: ENGLAND, 1280–1348

Far more so than any other region in late-medieval Europe, England and the Low Countries (the latter from at least the 1350s) both offer an abundant amount of price and wage data, in virtually unbroken annual series, to investigate the nature of long-term wage-stickiness, and in particular its most interesting aspect: namely, downward wage-stickiness during periods of deflation, and thus what Phelps Brown and Hopkins called the "rachet effect" (see p. 196 above). But not until the later fourteenth century does the evidence support the view that wages exhibited a greater degree of rigidity or "stickiness" during deflations than during intervening periods of inflation.

Therefore, the proper place to commence this aspect of study on historical real wages is in a previous era of deflation, which took place during the second quarter of the fourteenth century (at least, in England). That deflation had followed the era of the Great Famine (1315–1322), which had marked the culmination of the long, generally sustained inflation of the so-called "long thirteenth century." For Postan and many other historians, the end of this era also marked the onset of an incipient Malthusian crisis of "overpopulation," deteriorating living conditions for the lower strata of society, and indeed malnutrition and higher mortalities, even before the onslaught of the Great Famine.[58] It must be noted, however, that the wage and price data compiled by Thorold Rogers (1866, 1882) and Phelps Brown and Hopkins (1955, 1956, 1981) do not indicate any deterioration in the real wages of manorial building craftsmen before the Great Famine; and such evidence shows indeed that nominal wages were rising, and keeping pace with prices until that calamity struck (Tables 5–6).

Thereafter, in the decades following the Great Famine, we witness one of the most striking and puzzling phenomena in all of England's recorded monetary and price history: a severe, indeed dazzling, plunge in English mint outputs, still entirely in silver; and, following that, an almost equally drastic deflation, reflected in the 35% fall in the Phelps Brown-Hopkins price index, from 138 in 1321–1325 to just 90 in 1341–1345, on the eve of the Black Death (Fig. 1; Tables 3–5).

Postan, of course, evidently wanted to attribute the fall in at least the grain-price index to the demographic consequences of the Great Famine, or rather to a more general Malthusian crisis of overpopulation in a relatively primitive agrarian economy: "when the poorer lands, no longer new, punished the men who tilled them with failing crops and with murrain," so much so as "to send the population figures tumbling down."[59] Lawrence Poos has recently provided evidence to indicate significant population decline in rural Essex after the Great

Famine and on into the post-Plague era.[60] For Europe more generally one can cite evidence for regional depopulations in early-fourteenth century Provence and Tuscany, though evidently related to the horrendous warfare then afflicting these regions.[61] Campbell (1983a, 1983b, 1984), however, has provided equally compelling evidence of continued population growth in post-Famine Norfolk, while also demonstrating that late-medieval English agriculture was far less primitive and far less prone to Malthusian pressures than Postan had suggested. Smith (1991) has provided a masterful survey of demographic developments in rural England, from 1300 to 1348, which, while inconclusive, documents complex regional variations in demographic decline, with continued if slow growth, or stagnation; and thus it does not lend any support to Postan's drastic views.[62] Nor does the recorded fall in nominal wages, from 1337–1338 (see below, p. 209) logically support a depopulation hypothesis. Furthermore, the decline in prices was general, and not limited to just grains (see Table 5).

### *Some Monetary Causes of Deflation*

This prolonged fall in prices was instead genuine deflation, for which monetary reasons must be sought. The true explanation for an evidently stark monetary contraction and consequent deflation, apparent also from the Tuscan price data,[63] remains a mystery that cannot satisfactorily be resolved. Possibly it was due to a relative scarcity of precious metals, if, as several historians have asserted, the major German and Central European silver mines had begun to experience not just diminishing returns but serious physical depletion by the early fourteenth century, while the European economy continued to grow, and with it, the aggregate demand for coined money.[64] Indeed, as Mayhew (1974) has also demonstrated, contrary to another of Postan's assertions, coined money is perishable to some considerable degree: from wear, tear, and normal loss in circulation, from shipwrecks, unrecovered hoards, conversion into jewellery and plate, etc., so that the money supply will indeed contract if not continually replenished with fresh minting.[65] For England itself, some historians have also suggested that the crown's foreign military expenditures (under both Edward II and Edward III) had led to major outflows of bullion, though the fall in mint-outputs and the onset of deflation seems to precede the evidence for any such drastic bullion outflows.[66] Finally, since England in this era was minting only silver, and no gold before January 1344 (none since 1257), the very dramatic rise in the bimetallic ratio, from about 12.0 : 1 in the 1290s to 14.2 : 1 in the mid-1320s may have instigated a large outflow of silver coinage to acquire the higher valued gold. Indeed, such bullion movements may have been necessary

to permit England's inauguration of an effective gold coinage in the period 1344–1352, though with a then falling bimetallic ratio.[67]

Some very general indication of possible bullion outflows from England and a relative scarcity of specie during the second quarter of the fourteenth century may be found in the coinage-output statistics (Tables 3–4). The mean annual values of those outputs (all in silver) fell from a peak of £125,836 sterling in 1306–1310 to a nadir of £381 in 1326–1330; recovering to a mean of only £7,091 in 1346–1350, at the outbreak of the Black Death.

Such mint-accounts provide, however, only a very general and very tenuous guide to current monetary conditions. They can be of some value in that years with very low mint outputs were generally followed by prolonged deflation (marked as well by complaints about the scarcity of specie); and, conversely, years of very high mint outputs generally coincide with eras of sustained inflation. But extrapolating a nation's current money supply from these accounts is an enterprise fraught with great dangers, for many complex reasons, the most important of which is that mint-accounts combine stocks and flows in unpredictable and unquantifiable fashions.[68] Nevertheless, some brave historians believe that a 30-year running average of such outputs may provide an acceptably reliable indication of the coined money stock. Recently, two economic historians have used a combination of mint accounts and coin hoards to show that the English money supply probably contracted by over one half in this era.[69]

What is especially striking and peculiar about this deflation, though affording further evidence that it was a genuine deflation (Tables 4–5), was the marked decline in nominal wages shown in Table 6. From about 1337 to 1340, the mean money wage of a master building craftsmen in southern England fell from 4d per day to 3d per day, a decline of 25%; and that very low mean wage-rate was maintained until early 1351, i.e. several years after the Black Death (Fig. 4).[70] As Phelps Brown and Hopkins have indicated (1955/1981, pp. 11–12), the only other period in recorded English price-history with any such decline in the nominal wages of building craftsmen, came almost six-centuries later: the post-World War I slump of 1920–1923 (31.3% decline) and the early depression years of 1929–1934 (8.3% decline). In the earlier part of this early-fourteenth century period, before this fall in nominal wages, i.e. with continued nominal wage rigidity,[71] real wages did rise, though the brief rise appears to be dramatic only because of the recovery from the drastic nadir of the Great Famine years. When the real-wage of those master craftsmen peaked in 1334–1335, it was not appreciably higher than in the very early years of the century (1303–1307). Then their real wages suffered a sharp fall, as also shown in Table 6; indeed they fell quite steeply before the Black Death, with the initial

recovery of the price level from 1344, and especially with the inflation that soared immediately after the Black Death, one that endured for a full generation.

## VI. ENGLAND FOLLOWING THE BLACK DEATH (1348): MONEY, WAGES, AND THE STATUTE OF LABOURERS

That is why the Ordinance (1349) and Statute of Labourers (1350–1351) were so very unreasonable and cruel, but also so difficult to enforce: in attempting to fix money-wages at the pre-Plague level, when both money and real wages had been so unusually low (Tables 2, 5, 6).[72] Thus, specifically forbidding anyone to offer or accept any wages higher than those prevailing in 1346, the Statute of Labourers set the maximum summer wages (Easter to Michaelmas) for master masons, carpenters, and tilers, "without meat or drink," at 3d per day; for their servants and laborers, at 1.5d a day; but it also permitted a rate of 4d per day for master free-masons.[73] This harsh statute remained in force (reconfirmed numerous times), ostensibly on a national basis, until the parliament of 1444–1445, which finally raised the maximum daily rate for such craftsmen to 5.5d for summer and 4.5d for the winter season, without food and drink (or: 4d and 3d, respectively, with food and drink).[74] As noted earlier in this study, London had independently, in 1350, established its own maximum wage of 6d per summer and 5d per winter day for these same craftsmen (Table 2);[75] and such rates were already in force at Westminster Abbey, for master building craftsmen in 1349.[76]

Thereafter, but *not* immediately after the Black Death, money wages did rise, certainly for these urban-based craftsmen.[77] At Oxford, where most building craftsmen had not suffered the nominal wage cuts in the 1330s, the prevailing daily wage rate rose from 4d to 5d during the 1350s; in other small-sized towns the rate rose from 3d to 5d by the end of the decade. Not until 1363, as noted earlier (p. 187), did Oxford masons and carpenters gain the daily rate of 6d, at least for summer work, that London had authorized in 1350; and not until about 1407–1409 did the mean daily rate for craftsmen in the other smaller towns achieve the same 6d level, i.e. the mean rate for the Phelps Brown and Hopkins index, unchanged until 1536.[78]

In many, indeed evidently most, of the Winchester manors and at Battle Abbey, the daily wage for such building craftsmen, while soon rising back to the 4d level that had prevailed from about 1310 to 1337, remained fixed at that truly low level – even if 25% above that stipulated by the Statute of Laborers, with some occasional exceptions for senior craftsmen at 5d daily, until about c.1410–c.1425. [79] Such evidence may lend support to the oft-cited contention

of Holmes (1975, p. 115), with some support from Britnell (1990), that by the eve of the Peasants' Revolt, in the later 1370s, the landlords, and especially the great landed magnates, had succeeded in obtaining a greater share of the national income than they had enjoyed before the Black Death.

Some post-Revolt judicial records do provide evidence for the payment of higher wage rates in some Essex manors, though largely for agricultural workers. From these records, Nora Kenyon Ritchie concluded that aggressive new leaseholders of former domain (demesne) lands were more willing to offer higher wages to attract labor than were traditional manorial lords. Rather surprisingly, no one has pursued or investigated this intriguing thesis since the publication of her article, in 1934.[80]

London's own 1350 wage ordinance was soon if not immediately allowed to lapse. For when the Tower Bridge accounts commence in 1381, the prevailing daily rate then ranged from 7.0d to 7.5d, and indeed for winter months as well as for the summer. At Westminster Abbey, however, the rate was less, at 6.667d per day, though with some extra material benefits not given to the Tower Bridge craftsmen. In the Bishop of Winchester's Southwark manor, from as early as 1406, and in most London guild houses by 1420, that rate had increased to 8d daily (without food and drink); and that same rate had become uniform in the Tower Bridge Master's accounts from June 1425, though not at Westminster Abbey until 1439–1440 (perhaps because of those extra benefits given to some craftsmen).[81]

## VII. MONETARY CHANGES, INFLATION, AND REAL WAGES, AFTER THE BLACK DEATH, 1348–1375

These rather complex data indicate that the commonly expressed views about post-Plague wages in England are much oversimplified, in particular the comment in a recent article by Penn and Dyer (1990, p. 356): that "the evidence for a rise in both cash wages and real wages . . . coinciding with the sudden and sustained population decline after the Black Death of 1348–1349 has been well established." What must be challenged in this statement is the verdict on real wages, for the very simple reason that the Black Death, throughout western Europe, was followed by a horrendous inflation that endured for the ensuing quarter-century in England, and for an even longer period in Flanders and Tuscany.[82] Thus, as the Tables 4–10 clearly indicate, its initial consequence was to swamp the rise in nominal wages for most workers, and most especially for Flemish craftsmen. Note from Table 8 that the Flemish price level soared from a mean of 50.57 in 1349–1350 to a peak of 124.72 in 1386–1390, an overall rise of 146.6%. Table 10 provides both the nominal and real wage

indexes (with the same base: 1451–1475 = 100) for master building craftsmen in Bruges, in quinquennial harmonic means, and also the mean number of "commodity baskets" that a master mason or carpenter could have purchased with his estimated annual money-wage income (for an estimated working year of 210 days). Despite more than a doubling in nominal wages over this period (in Bruges, from 5d in 1349 to 12d per day in 1387), the real wage index for Bruges building craftsmen thus fell from a harmonic mean of 89.88 in 1349–1350 (equivalent to 16.440 commodity baskets a year) to one of just 62.31 in 1356–1360 (11.397 commodity baskets), then rose, only to fall again to 65.90 in 1381–1385 (12.053 baskets), but partially recovering to 77.38 in 1386–1390 (14.152 baskets), with the final increase in money wages. Even so, real wages for Flemish building craftsmen in the late 1380s were still below those of the Black Death era itself (Fig. 5).[83]

In England, urban craftsmen in the small to middle-sized towns, and certainly most of the manorial craftsmen and other artisans, also did not fare that well immediately following the Black Death, though certainly they did not fare as badly as the Flemish craftsmen. As Table 6 indicates, the real wage index for master masons and carpenters at Oxford, Cambridge and other small to medium size towns in southern England (Canterbury and Exeter, etc., but excluding London) did indeed fall in the immediate aftermath of the Black Death: from a harmonic mean of 55.52 in 1341–1345 to one of just 44.56 in 1351–1355. Shortly after, however, real wages did recover, reaching an index of 59.01 in 1356–1360, but then fell again to 56.83 in 1361–1365, while rising thereafter. But even in 1371–1375, the real wage index of 61.61 was still below the mean index of 63.26 achieved in 1336–1340. Indeed the significant, sustained rise in this real wage index did not really commence until the later 1370s (Fig. 4).

In many manorial estates, however, especially those of the far-flung rural holdings of the Bishop of Winchester, building craftsmen had to wait until the early fifteenth century to achieve a significant gain in their real incomes (at least those measured in terms of wages given without food and drink): at Hinderclay, Ecchinswell (Itchingswell), Overton, Taunton, Esher, Wycombe; and also Battle Abbey, Redgrave manor (Bishop of Bury St Edmonds), and at Winchester College, to name only a few.[84]

### *Monetary Factors in the Post-Plague Inflations*

The post-Plague European inflation was again clearly a monetary phenomenon. Depopulation, after all, according to some disciples of the Postan school, is supposed to cause deflation, not the opposite. The monetary reasons – if we properly relate monetary and real variables – are not difficult to seek. As Herlihy

(1967, p. 125) so aptly commented, "men were dying, but coins were not" (at least not so quickly). Thus, whatever the current status of western European precious-metal mining, the effect of such drastic depopulations, perhaps as much as 40% of the total inhabitants, from bubonic and pneumonic plagues, if not so much from warfare, was undoubtedly to augment dramatically the per capita supplies of coined money.

Secondly, the fiscal consequences of warfare in western Europe (including the concurrent Italian wars), of increased taxes and other levies, evidently also induced some considerable dishoarding. At the same time the French, Flemish, Brabantine, Aragonese, and various Italian governments, to mention only a few, sought both to finance and to facilitate the necessary cash flows for warfare by engaging in drastic coinage debasements, some severe enough to promote a veritable "flight from coinage." The English crown, however, was a singular exception, by not engaging in these monetary manipulations, which indeed were so drastic in both France and Flanders: for it undertook only one minor weight-reduction in its silver coins, in 1351, thereafter maintaining a perfectly stable coinage, in both metals, until 1411–1412 (Tables 3–4; Fig. 1).[85]

Thirdly, some historians have suggested that the socio-psychological consequences of both plague and warfare, especially with such devastating and arbitrary death tolls, was to foster a fatalistic yet hedonistic spending spree, facilitated all the more by suddenly inherited cash balances. In support of that thesis they cite the evidence from paintings, architecture, adornments in dress, and examples from Italian literature – e.g. Boccaccio's *Decameron*.[86] The overall consequence, for England and Flanders, as demonstrated in the Tables 3–4, was to produce a truly momentous increase in coinage outputs, whose inflationary consequences can hardly be disputed. One will note from Tables 5 (England) and 8 (Flanders) that all three major price series, and not just those for grains, rose during this quarter-century period following the Black Death: to the late 1370s in England; and to the 1380s in Flanders, whose far more drastic and regrettably frequent debasements continued until the 1389–1390 monetary reform.

## VIII. "BULLION FAMINES" AND PERIODIC DEFLATIONS: IN THE LATER FOURTEENTH AND FIFTEENTH CENTURIES

Thereafter, during the final quarter of the fourteenth-century, much of western Europe – certainly including England, the Low Countries, Tuscany, and Aragon-Navarre – experienced an equally dramatic deflation that lasted until well into the fifteenth century (Tables 4, 5, 8, Figs 2–3).[87] Then with the resumption of

intensive warfare, from the Battle of Agincourt in 1415 to the dénouement of the Hundred Years' War in the 1440s, another era of inflation ensued in much of north-western Europe, especially in France and the Low Countries, which consequently experienced severe coinage debasements. With the end of the Hundred Years War, and indeed even earlier, from the early 1440s, that war-induced inflationary era was succeeded by yet another era of deflation, this time as prolonged, and by the 1460s, as pronounced as that of the late fourteenth century. Though temporarily disrupted by warfare, by other "supply shocks," and again by severe coinage debasements, especially in the Low Countries during the 1480s, this deflationary trend lasted until about 1515. Its subsequent reversal marked the beginning of the Price Revolution era. Again, as in all the previous inflationary and deflationary cycles, the three major price-indexes in both England and the Low Countries rose and fell more or less together, if by no means exactly in tandem, during all these fifteenth-century cycles (Tables 4, 5, 8).[88]

As Tables 3–4 and Figs 1–3 clearly, show these periods of very pronounced deflation, in the later fourteenth and mid-fifteenth century in particular, were accompanied by severe slumps in the gold and silver coinage outputs in both England and Flanders, almost as severe as those for early fourteenth-century England, while the brief intervening periods of inflation were similarly accompanied by upsurges in mint outputs.[89] If these brief, periodic bouts of late-medieval inflation can be attributed to a combination of expansionary war-induced fiscal and monetary policies, and especially, in the Low Countries, by severe coinage debasements, the longer periods of deflation are much more difficult to explain.

Complicating any such analysis is the now large, contradictory, and often confusing literature on the so-called "Bullion Famines" of this era, from the 1370s to the 1470s. The most favoured theories advanced by proponents of the "bullion famine" thesis are the following three. First, that western Europe experienced a severe worsening of the late-medieval mining slump, so that even the opening of some new mines in Serbia and Sardinia failed to compensate for the sharp decline in outputs elsewhere, and indeed a veritable cessation of silver mining in some regions. Second, that western Europe suffered a steadily worsening of balance-of-payments deficit with Asia, with consequent bullion outflows via the Levant and the eastern Baltic; and third that this deficit was aggravated by a severe diminution, though not a complete cessation, in European gold imports from the Italian trade with North Africa.[90]

Nevertheless, if Ashtor has provided some impressive evidence for Venice's large silver exports to the Levant in the later fifteenth century, there is no concrete evidence to show that an overall European balance-of-payments deficit had been worsening from a full century earlier.[91] Indeed, a major factor that helped to end

the so-called "bullion famine" era was the Central European silver-copper mining-boom, which began during the very nadir of deflation in the 1460s, when the consequently high value of silver induced a veritable revolution in mining technology (in chemical and civil engineering). That boom augmented European silver production by over five-fold by the 1540s; and without such large increases in its silver stocks, Venice would never have been able to conduct such an increased volume and value of trade with the Levant in the 1490s.[92] The fact, moreover, that even before that mining boom had commenced, mints in England, France, and the Low Countries had all succeeded in reviving, if not in fully recovering, former levels of coinage outputs, in the 1420s and early 1430s, suggests that there was no downward linear trend indicating any general drainage of European bullion to the "East." Thus, additional, if not alternative, explanations for periodic bullion scarcities should be sought for this era.

Such an explanation may be found in examining the behavior of bullion flows rather than of monetary stocks: specifically, in two sets of adverse changes in the income velocity of money, or in the demand for idle cash balances, that may be related to the pernicious effects of warfare and plagues, from the 1370s. First, the now chronic and even more devastating warfare throughout so much of Europe, combined with drastic depopulations, produced severe dislocations to established patterns of international trade, while sharply raising transaction costs in that commerce, thus even more reducing flows of both commodities and bullion. Worse, responses to the ancillary manifestations of that warfare, in terms of commercial blockades, confiscations, and especially coinage debasements, radically reduced bullion flows even more. In particular, most west European rulers, in defending themselves against aggressive debasements by their neighbors, necessarily banned the domestic circulation of most foreign coins, especially silver coins (all the more subject to surreptitious debasements); and such bans also stipulated that all or most foreign coin be surrendered as bullion to the ruler's mints. More important, in seeking to attract more bullion to their own mints, to increase coinage outputs and their seigniorage revenues, virtually all rulers banned its export. Even when enforcement of those bans failed to prevent international exchanges of precious metals, they still depressed monetary and trade flows by raising transaction costs.

Finally, the noxious combination of such warfare, famines, plagues, the imposition of higher taxes and such monetary policies, defensive or aggressive, and the consequent commercial disruptions led to periodic but often severe economic depressions, certainly commencing by the late 1370s and 1380s. Such conditions also bred a more general climate of insecurity and pessimism that further discouraged spending and investment, increased hoarding, and further aggravated those depressions. Thus, by the 1370s, that post-Plague social climate

of hedonistic spending-sprees had given way to much more pervasively gloomy and pessimistic outlooks amongst the populace in general, one that increased their demand for idle cash-balances, i.e. elevated their tendency to hoard.[93] While fourteenth-century England has provided an unusual number of extant coin hoards, their survival may be accidental and their evidence is inconclusive.[94] Better evidence of late-medieval hoarding, especially following the Black Death, can be found in the greatly increased use of gold and silver ornamentation in the form of plate, jewellery, brocaded textiles, belt buckles, wall hangings, and furniture. Such ostentatious artistic display provided not only aesthetic satisfaction but also a feasible means of storing precious metals that could readily be restored to coinage, when so needed.[95]

Hoarding is obviously a self-justifying deflationary phenomenon; for, as prices fell from all combined circumstances of monetary contraction, the rational response of the money-holding populace would have been to save rather than to spend in the present, in anticipation of even lower prices in the future. Furthermore, the general forces of more gentle, less disruptive population decline, with smaller communities and smaller families, may also have acted to curb the income-velocity of money, i.e. to increase the relative demand for real cash balances.

Finally, for England itself, one may cite a particularly significant monetary change: the fact that the overwhelming bulk of the coinage, sometimes as much as 95% by value, was struck in gold rather than silver – and gold coinages are necessarily undertaken at the expense of silver (Table 3).[96] For if the smallest circulating gold coin, the quarter-noble, worth 20d or 20 current silver pence could purchase 20 gallons of ale or loaves of bread, one can readily imagine that its velocity in circulation would have been very low, compared to that of a silver pence or halfpence.

## IX. THE QUESTION OF LATE-MEDIEVAL CREDIT: AND THE EFFECTIVE MONEY SUPPLY

Nevertheless, according to many historians, a supposed growth in the use of credit during the later Middle Ages should have fully offset or counteracted those deflationary forces: particularly through the agency of deposit-and-transfer banking and bills-of-exchange banking. Yet neither was an innovation in this era, and both saw their most rapid initial diffusion in the last half-century of the preceding Commercial Revolution era (c.1180–c.1320). The reasons why credit instruments largely failed to provide a sufficient remedy for periodic monetary contractions in late-medieval Europe are very complex, but may be briefly summarized here.

First, late-medieval Europe experienced very few additional innovations; and most credit instruments were still far from being effective substitutes for coined money, with the possible though still dubious exceptions to be found in a few West-European towns whose commerce was dominated by Italian merchant-bankers. Second, much more widespread and more powerful forces, economic and political, involving increased hostility from both Church and state, seriously impeded the employment or circulation of credit, with a multitude of examples to be cited in England, France, the Low Countries, and many Hanse towns, if not so much in Italy itself. Indeed, in both England and the Low Countries, late-medieval nationalist monetary policies effectively prevented the emergence of deposit-banking in the former, and virtually closed down such banks in the latter, following the Burgundian unification of the Low Countries, in a series of ever more severe ordinances (1433–1435, 1467, 1480 and 1489). Furthermore, various Burgundian ordinances, both ducal and municipal, also sought to restrict pawnbroking (1442, 1451, 1457, 1473, 1477).[97]

Third, because of those increasingly hostile attitudes from state-dominated legal institutions, despite the growth of a more independent and international Law-Merchant, the enforcement of debt repayments, especially those involving (non-notarized) holograph documents, became even more costly and ineffective, thus restricting credit instruments to a small circle of merchants, chiefly Italian, who knew and trusted each other. Fourth, most European states and principalities, even in Italy, had failed to provide the legal institutions and sanctions for true negotiability: the conversion of a debt instrument into cash or goods, or to be used in place of cash, as the fundamentally necessary condition to permit credit instruments effectively to augment the money supply (Munro, 1994b, 2000). Fifth, consequently and in sum, credit instruments were far from being divorced from the use of coined money. Spooner (1972, pp. 3, 53–71), Mueller (1984), Spufford (1986, pp. 346–348), and Nightingale (1990) have all effectively demonstrated that credit either expanded or contracted with the coined money supply in the late-medieval and early-modern economies, usually in a non-proportional fashion. As Mayhew (1987, p. 121) so aptly commented as well: "credit reflected the supply of coin rather than compensated for it."

## X. THE LATE-MEDIEVAL DEFLATIONS, WAGE STICKINESS, AND THE COURSE OF REAL WAGES: ENGLAND, 1376–1500

With the onset of this general and very widespread deflation,[98] wage stickiness now assumed a significance never before revealed in European economic history. For in England, at least, unlike its experience in the second quarter of

the fourteenth-century, most money wages did not decline (Fig. 4). Beveridge (1936, p. 31) was the first to call attention to this phenomenon, commenting that "from 1290 to 1379, money wages and the price of wheat move decade by decade always in the same direction, rising and falling together; thereafter they part company completely." To explain this striking dichotomy, he argued that the socio-economic consequences of the Black Death and subsequent plagues were to transform money wages from their original institution "as a substitute either for customary service or for allowances in kind," both tied to living costs, into true payments determined by the actual labor market.[99] The previously noted fall in the proportion of the wage typically paid in kind, from about one-half before the Black Death to one third thereafter, provides some support to Beveridge's thesis.

In his now classic article on the Black Death, however, Bridbury (1973) came to a strikingly different conclusion: namely, that the initial mortality from that disaster "was quite incapable of altering the social and economic relationships because so much of the population was surplus by the fourteenth century;" that the Plague was "more purgative than toxic;" and that not until the later 1370s did cumulative depopulation succeed in fundamentally altering the land : labor ratio to raise labor productivity and thus real wages. Though his arguments should not be dismissed out of hand, they are not really supported by the wage and price evidence, nor by economic theory and logic.[100]

In fact, what one now witnesses, from the late 1370s, is the nominal and real-wage pattern that will prevail, certainly in Western Europe, for the next six centuries.[101] With a few but significant exceptions, to be noted later (pp. 226–230), real wages in England, and then subsequently in the southern Low Countries as well, began a century long rise that was fundamentally if not exclusively due to wage stickiness with prolonged deflation. Again with just a few exceptions, the only significant retreats in this onward march of rising real wages, were similarly the result, and sole result, of some periodic and generally brief inflations, which were far more prominent in the Low Countries than in England (Tables 5–6, 8–14).

Yet it would be wrong to rule real factors entirely out of court; and one may justifiably postulate that the Classical theory does retain some merit. Possibly the high real wages recorded in England and Flanders during the mid-fifteenth century, during these prolonged conditions of both deflation and wage stickiness, were justified, in "clearing labor markets," so to speak, if there had been some accompanying rise in the marginal revenue product of the artisans enjoying such high wages. How in particular are we to explain the undoubtedly widespread rise in nominal wages during the early to mid-fifteenth century, in both England and then in Flanders, despite generally

prevailing low prices, thus further increasing the real wages, without some productivity increases?

In the southern Low Countries real-wages for building craftsmen reached their medieval peak in the mid-1460s (Tables 10, 13, 14, Figs 5–6) and in southern England that peak occurred a decade later: in 1477, when RWI = 123.76 (harmonic mean of 111.04 for 1476–1480: Table 6, Fig. 4). Shortly after that peak, however, those English real wages fell quite sharply, to a harmonic mean of 78.51 in 1481–1485, because of a sharp rise in the price level (to 127.38: Table 5). Why it did so, however, is more difficult to explain than the contemporaneous though more prolonged rise in the Flemish and Brabantine price level (Tables 8–9), which was primarily due to drastic coinages debasements and supply shocks from warfare (see below, pp. 224–226). Thereafter, English prices fell sharply to a mean of just 96.70 in 1496–1500, thus producing a rise in the craftsmen's real wage index to 103.41. Not until 1516–1520, with the swift onset of the Price Revolution in England, did they sustain a sharp fall, to just 83.03 (harmonic mean); and then, during even the initial phases of the Price Revolution, their real wages continued to plunge swiftly (to 50.78 in 1551–1555). But that phenomenon is beyond the scope of this current study, which must terminate in 1500.

## XI. DEFLATION, WAGE STICKINESS AND THE COURSE OF REAL WAGES IN FLANDERS: THE CASE OF THE FULLERS, 1375–1430

As just suggested, late-medieval Flanders and Brabant provide both fascinating comparisons and contrasts with the contemporary English experience in real wages. The first and certainly the most interesting comparison concerns the fate of Flemish textile artisans, with a case study of the fullers, and then of building craftsmen, during the equally sharp deflation of the very late fourteenth and early fifteenth centuries. In Flanders itself, as Tables 3–4 and 8 clearly indicate, the steep decline in coinage outputs and fall in the price-level had commenced about a decade after such phenomena had become apparent in England, from the very late 1380s. Despite a recoinage, with full-scale monetary reform in the early 1390s, coin outputs fell throughout that decade, ending in 1402 with a complete closure of the mints (Table 3). At the same time, Flanders' composite price level (1451–1475 = 100) fell from a peak of 133.93 in 1387 to just 82.12 in 1405, a fall of 38.7% (Table 5). Aggravating this steep deflation, though by no means solely responsible for it, was Duke Philip the Bold's dramatic monetary reform of 1389–1390, a *renforcement* that strengthened the silver coinage by 31.6% – i.e. in reminting the current debased coinage into fewer

coins, but with a much higher silver content. That ordinance also altered the mint ratio in favor of silver (from 10.41 : 1 to 9.68 : 1), thereby reducing the value of the Flemish gold noble from 102d to 72d *groot*.[102]

Almost immediately, in 1390, the Burgundian ducal government, along with many town governments, stipulated a proportional reduction in wages and some other money-of-account payments, in order to accommodate these changes, and in particular to compensate those merchants, textile industrialists, and financiers who had depended upon payments in gold nobles. Indeed, a wage reduction inversely proportional to the silver *renforcement* of 31.6% would have been exactly 24.0%.[103] Thus, in Bruges, the daily money-wages of building craftsmen, which had risen during the inflationary 1380s, though not by as much as the extent of general inflation, were abruptly and arbitrarily cut by 25%: from 12d to 9d *groot*, for masters; and from 6.0d to 4.5d, for journeymen.[104] According to some contemporary reports, such wage reductions did produce riots and considerable social unrest in Bruges and other Flemish cities.[105]

In retrospect, civil disturbances in Flanders were rather less pronounced than might have been expected. But presumably only the guild artisans, a minority, were in position to voice strong objections; and evidently many, if not all of them, grudgingly accepted the argument that their new wages, while nominally lower, were being paid in the new "strong" rather than the old "weak" money.[106] Quite evidently wage reductions were imposed much more easily under conditions of a publicly promulgated coinage *renforcement,* when the public could readily perceive the physical differences between the new and old coinages, than under deflationary conditions without any such coinage changes.[107]

Nevertheless the various attempts by Flemish weaver-drapers to impose similar wage cuts during the early 1390s did produce some labor strife in the Flemish cloth industry. Only the fullers, however, have left us any concrete records of concerted opposition, and only in three drapery towns: Ghent, Wervik, and Kortrijk. That opposition of course depended upon the relative strength of their *ambachten* or guilds.

The weakest were evidently the Ghent fullers, who, in 1361, had lost both their representation in the town government and the right to select their own leaders.[108] In 1373, their weaver-draper employers had brutally crushed a fullers' strike; but Count Louis de Male – no friend of the weavers – nevertheless awarded them a wage increase: to 45d *groot* Flemish, for a master and two journeymen, in fulling a *maerclaken* broadcloth in three days (the earlier wage is unknown). Thereafter, unlike the building craftsmen in Bruges, they failed in all attempts to gain further wage increases.[109] Then, with the implementation of the 1390 monetary reform, they evidently accepted, without protest, a 29% reduction in their combined money wage, to 32d *groot*.[110] Since the inflationary

conditions of the 1380s still prevailed, that meant that their real wage was 41.4% lower than what they had earned in 1373 – but only for that year. As Tables 8 and 11 reveal, rapid deflation soon came to their rescue, so that their mean real wage – as measured in the number of Flemish commodity baskets acquired with their annual money wage income – in 1396–1400 (6.913 baskets) was 7.2% higher than a decade earlier (6.451 baskets in 1386–1390), though still 9.3% lower than what they had enjoyed in 1373–1375 (7.620 baskets).

Not until 1423, after a renewed, debasement-induced inflation and another prolonged strike, would the Ghent fullers obtain any further raise in their money wages, to 40d *groot* per cloth. Even so, their real wage in 1426–1430 (mean of 6.589 baskets) was still below that earned in the late 1390s, and 13.5% below that of 1373–1375 (Table 11; Munro, 2002). Thus, during the later fourteenth and early fifteenth centuries, the Ghent fullers experienced not a Golden Age but an almost continuous decline in their real wages, apart from some stabilization during the very deflationary 1390s.

Somewhat more successful were the fullers in the small drapery town of Wervik, now a major leader of the younger, more aggressive, so-called *nouvelles draperies*, which were faring rather better than the traditional draperies of the *drie steden* – those of Ghent, Ypres, Bruges – especially in Mediterranean markets (Melis, 1962; Munro, 1999). Soon after the 1390 *renforcement*, the seigneur and bailiff of Wervik's feudal seigneury decreed an immediate reduction of 27% in the fullers' pay: from 48d to 35d *groot* per cloth, which still left them better off than the Ghent fullers. Nevertheless, in May 1392, the Wervik fullers' guild, after threatening to go on strike, appealed this decree to the ducal Council of Flanders. The ducal council, however, ruled in favor of the Wervik drapers and their bailiff, forcing the fullers to accept this new wage rate, which was subsequently ratified by the new Wervik drapery *keuren* in October 1397.[111]

Of the three recorded disputes, the Kortrijk fullers, employed by a *nouvelle draperie* that rivalled Wervik's in importance, fared the best, perhaps because they had responded much earlier and much more vigorously in their protests. Like the Ghent fullers, they also had not received any increase in money wages since 1374, despite the subsequently severe inflation (Tables 8, 12).[112] When the Kortrijk weaver-drapers attempted to impose a cut in their wages, though a more modest one of 22%, from 41d to 32d *groot* per broadcloth (the same rate imposed at Ghent), the fullers guild appealed to Duke Philip's councillors for arbitration. In imposing a new wage of 36d *groot*, and thus a relatively minor 12% reduction in the nominal wage, Duke Philip's councillors split the difference between the weaver-drapers and the fullers.[113]

The real winners of this Kortrijk labor contract were surely the fullers, who, despite that reduction, soon found themselves much better off because of the

stark deflation that quickly ensued, from the early 1390s (Tables 8, 12). As indicated earlier, the fall in the mean Flemish price index over the 1390s was somewhat greater than the extent of the *renforcement*: i.e. 29.0% vs. 24.0%.[114] Thus, by 1396–1400 the mean purchasing power of wages for the Kortrijk journeymen fullers, expressed in terms of commodity baskets, was 26.2% higher than it had been during the debasement years, in the quinquennium 1386–1390. In 1399, their real-wage was 58.4% above what they had been earning in 1390 when their contract had been imposed (i.e. 8.479 commodity baskets a year vs. 5.352 baskets); and their mean real wage in the 1390s was the highest that they had achieved (at least since the Black Death). But they, too, experienced a deterioration in the real wages after renewed coinage debasements and the consequent inflation from 1416. Thus, in 1426–30, despite having gained a money wage increase in 1429 (from 36d to 40d *groot* per cloth), these Kortrijk fullers were receiving a real wage (mean of 6.432 baskets) that was also lower than that earned during the early 1390s, by 10.6% (Table 12).

## XII. DEFLATION, INFLATION, AND REAL WAGES: OTHER URBAN CRAFTSMEN IN FLANDERS AND BRABANT, 1370–1500

In Flanders, the building craftsmen of Ghent and Bruges, and the policemen in the latter town, did fare considerably better during the very end of the fourteenth and early fifteenth centuries; though clearly, even for them, the fifteenth century as a whole was also far from being a consistent Golden Age. Only the Bruges wage data are shown, in Table 10 and Fig. 5, because the craftsmen's wages in the two towns were virtually identical throughout the fifteenth century (or to the late 1480s, when the accounts cease recording daily wages for individual craftsmen); and they of course demonstrate the same relative degree of wage stickiness.

Initially, with the abrupt 25% cut in nominal wages with the 1390 monetary reform, from 12d to 9d *groot,* the Bruges building craftsmen did suffer a very brief if substantial drop in real income, of 30.2%, before the aforementioned deflation became more pronounced. During the 1390s, their real wage rose by 76.0%; and in the latter part of the decade it did so because, in 1396–1397, these craftsmen received a partial restoration of their former nominal wage: masters, to 10d *groot*; and journeymen, from 4.5d to 5.0d *groot*. Their real wage index peaked in 1399, at 110.37 (= 20.187 commodity baskets); but that was only 6.5% more than the amount earned in 1388 (18.953 baskets). However, the quinquennial wage for 1396–1400, measured in such commodity baskets (18.241 = RWI 99.73) was substantially higher, by 28.89%, than the

mean number of 14.152 baskets (RWI = 77.38) earned a decade earlier in 1386–1390.[115]

During the early 1390s, the Bruges policemen fared somewhat better than did the building craftsmen and fullers because their wages had not been reduced (Table 11, Fig. 5) – after all, they were expected to maintain social order with the arbitrary pay cuts. Furthermore, though paid only 6d per day, they were paid for the full year (i.e. 365 days), rather than for the estimated mean of 210 days for a master building craftsmen. Thus, their annual real wage in 1390 was substantially higher, with an estimated purchasing power of 13.288 baskets, compared to 11.468 baskets for a master carpenter or mason. Finally, in 1398, they did suffer a delayed reduction in their money wages, though only 16.7% (to 5d); but unlike the craftsmen their money-wages were never again restored (for the duration of the wage records, to 1476). In 1399, their annual real wage income, having peaked in 1393, was also now just 87% of that earned by master masons and carpenters: 17.037 vs. 20.187 baskets; but that was still well more than double the amount earned that year by journeymen fullers (7.537 baskets in Ghent; and 8.479 baskets in Kortrijk). The real wages for Bruges policemen continued to remain fairly high, until just before the Battle of Agincourt (14.613 baskets in 1414, but 18.161 baskets in 1411).

Thereafter, with Burgundian involvement in the resumption of more serious warfare in northern France, and with renewed debasements in and after 1416 (Munro, 1973, pp. 65–126), their real wages and those for Bruges' master building craftsmen once more began to fall, and then fell sharply. The reason is quite simple to comprehend: prices rose with the coinage debasements (1416–1433), and then, during the 1430s, with costly warfare as well, from a mean index of 95.31 in 1411–1415 to one of 140.166 in 1436–1440, while their money wages remained generally fixed, at 10d for building craftsmen and 5d for policemen. From 1432, however, some craftsmen began receiving higher wages of 11d and 12d; but that was hardly enough to offset the ravages of inflation, so that, over this entire period, from 1411–1415 to 1436–1440, the real wage index of Bruges craftsmen fell from a harmonic mean of 95.38 (17.446 commodity baskets) to one of 69.45 (12.703 baskets). Indeed, in the worst year, 1439, with plague, famine, and war, their real wage index (47.57 = 8.702 baskets) was only 75.87 per as much as in the previous *annus horribilus,* 1390 (RWI = 62.70 = 11.468 baskets).

According to many (if not all) economic historians, the ensuing three decades were an era of very severe commercial, financial, and agrarian depression for both England and the southern Low Countries. To be sure, the latter still remained by far the wealthiest and most economically advanced region in northern Europe – a veritable "promised land," in the eyes of many contemporaries;

but at this very time, the southern Low Countries were also experiencing, and largely independently of the current depression, the rapid decline of their traditional luxury woolens industry, in the face of relentless English competition in European cloth markets.[116] Nevertheless, in this same period, the real wage index for Bruges building craftsmen soared once again, by a remarkable 169.75%: from 45.57 in 1439 (8.702 baskets) to reach a high of 128.33 (23.472 commodity baskets) in 1464 – just before the next round of debasements. Again real wages had risen so strongly, principally, because this was a period of stark deflation, and, as noted, of very low mint outputs, sometimes with only a bare trickle of coinage – one factor, though not the only one, that precipitated the renewal of debasements in 1466 (Tables 3–4, 8–10; Figs 3, 5). But this time, the Bruges craftsmen had also gained from an increase in their mean nominal wage: by about 1440, most craftsmen were receiving a summer wage of 12d – and some throughout the year – but a reduced winter wage of 10d, so that the median wage had risen from 10.0d to 10.8d and then to 11d *groot*.

The subsequent era of war-inspired and debasement-induced inflations again brought real wages tumbling down, as Table 10 indicates; but unfortunately the Bruges wage payment series terminate in the mid-1480s.[117] In the mid-sized town of Aalst, to the east of Ghent, however, the daily wage rates for master masons and carpenters remained fixed at 6d *groot* per day until well into the early sixteenth century, though some senior craftsmen were earning 7d to 8d daily; but after 1510–1511, more and more such craftsmen were earning these higher rates of 7d and 8d (up to the 1530s).[118]

In the neighbouring duchy of Brabant, to the east, the price and wage history of the towns was, not surprisingly, similar to that of Flanders, following the Burgundian monetary unification and reform of 1434–1435. But before the Burgundian acquisition of Brabant in 1430, and that monetary reform, their monetary, price, and thus wage history had been quite different, as Tables 9, 13–14 and Figs 5–6 show (employing the same base, 1451–1475 = 100, for prices and wages). With far more drastic coinage debasements in early fifteenth-century Brabant (under Dukes Antoine, Jan IV, and Philip van Sint-Pol, 1406–1430), the real wages of Antwerp's master masons and carpenters had plunged by about one-third, in the three decades from 1410 (Table 13): from a mean of 100.30 in 1401–1405 (10.262 commodity baskets per work year of 210 days, seasonally adjusted for the winter wage) to a mean of just 66.437 in 1436–1440 (6.840 commodity baskets per year; with a nadir of 5.281 such baskets in 1437).[119] Thereafter, as in Flanders, their real wage index soared strongly, well more than doubling, to peak at a harmonic mean of 109.81 in 1461–1465 (11.156 commodity baskets for both Antwerp masons and Mechelen carpenters; but 11.404 baskets for Mechelen masons, with a higher winter wage: Tables 13–14).

The mid-century deflation reached its very nadir in this same quinquennium, which, as noted earlier, also marks the peak period of real wages for master building craftsmen in Bruges (RWI = 112.733); but the latter continued to enjoy a substantially higher level of real wages, which would have purchased a mean of 20.619 Flemish commodity baskets in that quinquennium (Table 10).

Subsequently, as Tables 13–14 and Fig. 6 show, the real wages for master building craftsmen in Antwerp and Mechelen plunged severely, with the series of inflationary coinage debasements undertaken by Archduke Maximilian of Austria during his wars with France and the very destructive civil wars in the now Habsburg Netherlands (from 1477 to 1493: see Tables 3–4). Consequently the real-wage index for Antwerp's master masons fell to a low of 61.883 in 1486–1490 (a harmonic mean of 6.316 commodity baskets), even though they were now earning a mean daily summer wage of 12.9d; for Mechelen's masons, earning a lesser mean daily wage of 12.3d, the real wage index fell to 58.587 (for an equivalent annual income of 6.099 commodity baskets).[120]

The Peace of Senlis in May 1493 (with France), permitting a much need coinage *renforcement*, brought monetary stability and renewed deflation, though this time with somewhat greater economic prosperity, certainly for Brabant (Van der Wee, 1963, Vol II, pp. 113–142). Real wages thus recovered, and this time even more strongly in Mechelen, to 97.53 in 1496–1500 (= 10.276 commodity baskets), because in 1490 its town masons had received a more substantial rise in their daily summer wage: to 13.5d. The daily summer wage for Antwerp masons was increased to only 12.5d, and only in 1497, so that in 1496–1500 their RWI was only 89.522 (or the seasonally adjusted annual equivalent of 9.039 commodity baskets). Thereafter, the real wages of building craftsmen in Brabant drifted slowly downwards, and then, with the onset of the Price Revolution, from c. 1515, rather more rapidly. Thus, the RWI for Antwerp masons in 1521–1525 was just 71.548 (harmonic mean). Nevertheless, during the subsequent history of the Price Revolution, lasting until the 1640s, building craftsmen in the major towns of Brabant did not, in general, experience the same drastic fall that their brethren did in southern England, as noted earlier (see pp. 188, 219). That history, of course, lies entirely beyond the scope of this study.

But if the wage experience of the Brabantine building craftsmen differed so markedly from the English during the Price Revolution, so it did as well for much of the fifteenth century, thus illuminating again the dangers of viewing the changing fortunes of late-medieval European craftsmen merely through an English lens. Only during the middle decades of the fifteenth century were the experiences of such craftsmen reasonably similar in both England and the Low Countries. But if prolonged deflation thus allowed so many craftsmen in both countries to experience a Golden Age, those who benefited from wage-stickiness,

one must not forget that it was also an era of severe economic depression (see above, pp. 223–224).

## XIII. SOME FIFTEENTH-CENTURY ANOMALIES: WAGE FLEXIBILITY AND FALLING REAL WAGES IN (CHIEFLY) RURAL AREAS IN THE LOW COUNTRIES AND ENGLAND

Yet even these decades were far from being a "Golden Age" for all craftsmen, artisans, and laborers. We may doubt that many artisans and workers in the now rapidly declining woolen cloth industries were enjoying much prosperity; but we lack adequate wage data for any textile artisans from the 1440s. We do, however, possess abundant wage data for craftsmen and laborers, in the smaller towns and rural areas of both countries; and they also do not indicate that all of them shared in this so-called Golden Age. The most illuminating are those to be found in some Flemish villages to the east of Ghent (Table 15). By the 1420s, the daily summer wage rates for many carpenters, masons, and thatchers, in Afsne, St. Denijs (Maalte), and Destelbergen, had risen to 10d *groot* Flemish, as in Bruges and Ghent; and those rates prevailed for the next three decades, to surpass indeed the wages earned by similar craftsmen in Antwerp and Mechelen (from 1434: 10d *groot* Flemish = 15d *groot* Brabant). But during the deflationary 1450s and 1460s, the wage-rates for many of these village craftsmen fell. At Afsne, St. Denijs (Maalte), and Destelbergen, those for carpenters and thatchers fell by 30%: to 8d, then 7.5d, and finally to 7.0d, by 1470. The decline in nominal wages for thatchers at Zaffelare was about 25%, from the late 1430s to the late 1450s (rising thereafter); and at Zevergem, only about 20% (Table 15), and only from the later 1450s. Despite the strong deflation of this era, their real-wages also finally did decline, though of course to a much lesser extent. Measured by the number of commodity baskets purchased with the annual money wage, carpenters and thatchers of Afsne and St. Denijs suffered the sharpest fall: from 15.12 baskets in 1446–1450 to 12.06 baskets in 1466–1470. For all craftsmen in all six villages, this real-wage measure fell from a mean 12.492 baskets in 1431–1435 to 10.857 baskets in 1436–1440, then rose to 13.893 baskets in 1451–1455, and again fell sharply to 10.025 baskets in 1456–1460, recovering to just 12.222 baskets in 1466–1470. Such evidence may support Van der Wee's contention (1963, Vol. II, pp. 61–73) that the agricultural sector suffered the most severely from this mid-fifteenth century "depression."

But even in the urban sector, some building craftsmen enjoyed rather less wage-stickiness and suffered some reduction in at least their nominal wages,

as can be seen in Table 14, for Mechelen. Thus, the master carpenters employed by Mechelen's *Onse Lieve Vrouw* Hospital, after having received a raise in their daily summer wages, from 9d to 12d (= 8d *groot* Flemish) in 1441, had those wages cut back to 9d in 1448; and the former rate of 12d rate was restored only in 1458 (and then prevailed until 1498). Day labourers working for this same hospital suffered by far the worst wage cuts in this deflationary era: from a peak of 8d *groot* Brabant in 1444 to a low of 5d in 1458, a decline of 38%. Measured in commodity baskets, their mean real wage declined from a peak of 6.348 units per year in 1446–1450 to a mean of 4.724 units in 1466–1470, a fall of 25.6%.

Nor were such nominal wage cuts in the midst of the fifteenth-century deflationary Golden Age limited to the Low Countries. For England during this era, Mate (1986) has provided some similar evidence for rural workers in Kent and Sussex: with nominal wage-reductions up to 30% for mowers at Barton, Kent, in the 1440s (enduring to the 1470s); cuts of 20% for ploughmen at Wye, in Sussex, in the 1440s; and of 20% for carpenters at Lullington, Sussex, in the 1450s. Furthermore, even earlier, during the deflation of the later fourteenth-century, the various decennial means of English wages published by Thorold Rogers (1866, 1882, 1903), Steffen (1901–1905), and Beveridge (1936, 1955) indicate that many rural workers then also evidently suffered some reductions in their daily wages from 1380 to 1400: as much as 29.4% for wheat threshers in S.E. England and 26.9% for Westminster farm laborers. But doubts about the statistical methods used to compile these means, especially when direct comparisons are made with the actual manorial accounts, prevent one from asserting that the nominal wages for each class and grade of worker fell, or fell as much as portrayed in these decennial indexes.[121]

## XIV. SOME CONCLUSIONS ON LATER-MEDIEVAL WAGE STICKINESS AND REAL WAGES

From this study of the behavior of both nominal and real wages in late-medieval England and the Low Countries, one may draw a number of conclusions that significantly alter some standard perceptions about living standards for English and indeed west European craftsmen and laborers during this era. First, the Black Death did not immediately usher in a "Golden Age of the Laborer." Even in England, which escaped the ravages of war that plagued so much of late-medieval Europe, and which enjoyed greater economic, social, and monetary stability than most regions, there is no evidence for a pronounced and sustained rise in real wages for craftsmen and laborers until about a quarter-century after the Black Death; indeed many wage earners had suffered some fall in real

wages in the decade following the Black Death. In the Low Countries, a similar pronounced and sustained rise in real wages did not commence until the 1390s, after an even more drastic fall in real wages after the Black Death (Table 10).

Second, the prime if not the complete explanation for the sustained rise in real wages, in both England and the Low Countries, that did commence in the later fourteenth century was a combination of institutional wage-stickiness with prolonged, deep deflation. Third, institutional wage-stickiness itself became a prevalent feature of labor markets in both England and the Low Countries only during and from that final quarter of the fourteenth century. Thus, during the steep deflation that struck England in the quarter-century before the Black Death, many if not all money wages did in fact fall, though most fell less than did commodity prices, so that many building craftsmen then did enjoy some increase in real wages. After the Black Death, furthermore, in both England and the Low Countries, nominal wages did of course rise; and they were thus not particularly sticky during the severe inflation that ensued for about a quarter century (for four decades in Flanders), even if money wages did not fully keep pace with prices for much of that era. In the fifteenth century, however, wages for many building craftsmen, in both England and the Low Countries, were quite sticky even during the two major periods of inflation, which was generally more severe in the latter region. But, in a much longer historical perspective, from the late fourteenth to late nineteenth centuries, money wages were generally much more sticky during deflationary than inflationary periods, because of the so-called "ratchet effect."

Fourth, even if nominal wage stickiness became all the more pronounced and widespread during the fifteenth century, in both England and the Low Countries, it never became universal, and was to be found much more frequently in large towns than in villages and the countryside. Not surprisingly, urban craftsmen in the building trades, and especially those employed by town governments or large institutions, were far more likely to enjoy conditions of downward wage stickiness than were the presumably less well organized and less well protected rural and especially agricultural workers. Even so, some urban exceptions are to be noted: in particular, as shown in this study, employees of Mechelen's *Onse Lieve Vrouw* hospital. Why wage stickiness became so much more pronounced from the later fourteenth century but never became universal are subjects for further research.

Finally, if the central conclusion of this study remains valid, namely that the most pronounced rise in real wages occurred during strongly deflationary eras and chiefly by those enjoying such nominal wage-stickiness, we cannot totally rule out the role of productivity changes in elevating those real wages, even if they are difficult to discern.

The more fitting conclusion would be to return to the Keynesian view of such wage rigidity during periods of inflation, at least according to some standard macroeconomics textbooks, namely a situation that "results in a higher real wage and a *reduction* in the demand for labor," so that "employment declines and so does output"; and so very often, "a decline in demand leads to a prolonged recession" (Wilton-Prescott, 1987, pp. 216–218). The available evidence does not permit us to ascertain whether such conditions, especially in the depression era of the mid-fifteenth century, led to increased unemployment – apart from evident unemployment in the declining Flemish and Brabantine cloth industries (Munro, 1983b, 1994, 1995, 1999a). Some evidence, discussed above, does suggest that employment for most craftsmen, was normally discontinuous or "discrete" in this late-medieval era; and such conditions may well have reduced the number of days in which they secured paid employment. On the other hand, as suggested either, such unemployment may have been more voluntary than involuntary, if they were satisfied to accept more days of leisure.[122]

One should also note that, under such deflationary conditions, the typical employer faced and still faces not only a potential rise in his real labor costs, but even more certainly a rise in the cost of borrowing capital. For the effect of such deflation is to increase *real* interest rates (i.e. the nominal rate minus the inflation rate, or plus the deflation rate), all the more so, since the historical evidence rarely if ever indicates a commensurate fall in nominal interest rates. Rash, however, would be the economic historian who would contend that every deflationary period that also experienced downward wage stickiness for much of the labor force was also one of recession or depression. Two such periods in the modern era with these characteristics were the so-called "Great Depressions" of 1873–1896 and 1929–1939. But if economic historians now doubt that such a label can justifiably be fixed to the first of these, despite some cyclical downswings, certainly the latter was a true Great Depression.

Interpreting real-wage trends is also fraught with other dangers. Thus, even if the amount of labor (L) was diminishing, relative to the employed stock of land and capital (whose sum is K), as evidently did occur in late-medieval Europe, and even if labor then enjoyed a rise in real wages, the European labor force may not have gained an increased share of the national income. That would have occurred only if the elasticity of substitution between L and K, as the ratio of the marginal products of land + capital and of labor ($y_K/y_L$) had been less than unity:[123] that is, if: $y_K/y_L = S_{KL} < 1$.

Finally, a word of caution and a plea for some historical perspective. As important and as vexing as is the question of real-wage trends in the late-medieval economy, we must remember that real-wages, and most especially

evidence on wage-rates, do not allow us to deduce levels of real income for even the lower orders of society. Penn and Dyer (1990, p. 356) have commented that "at least one-third of the population of late medieval England gained all or a part of their livelihood from earning wages."[124] This statement might be more persuasive if the word order were changed to read: "gained part or all," or better "part if not all" of their livelihood. Surely, those who lived strictly by money-wages alone, and who were unable to supplement their annual incomes from agricultural holdings, or from private gardens with urban dwellings, and especially by practicing more than one craft, were still a minority of late-medieval English society, if undoubtedly a rather larger proportion of the economically more advanced Flemish society.

# TABLES AND FIGURES

***Table 1.*** Basket of Consumables Commodity Price Indexes for England, Brabant, and Flanders: mean of 1415–1475 = 100.

| Commodity | England | | | | Brabant | | | | | Flanders | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Farinaceous: | Amount | Unit | Metric Measure | Percent | Amount | Unit | Value in d gr. Brabant | Value in d gr. Flemish | Percent | Amount | Unit | Value in d gr. Flemish | Percent |
| | | | | | | | | | | 45.461 | l. | 13.279 | 10.51% |
| Wheat | 1.250 | bu | 45.461 | | | | | | | | | | |
| Rye | 1.000 | bu | 36.369 | | 126.000 | l. | 42.404 | 28.269 | 18.24% | 36.369 | l. | 7.062 | 5.59% |
| Barley | 0.500 | bu | 18.184 | | | | | | | 18.184 | l. | 2.867 | 2.27% |
| Peas | 0.667 | bu | 24.243 | | | | | | | 24.243 | l. | 7.341 | 5.81% |
| Sub-total | 3.417 | bu | 124.257 | 20.00% | 126.000 | l. | 42.404 | 28.269 | 18.24% | 124.257 | l. | 30.549 | 24.19% |
| *Drink:* | | | | | | | | | | | | | |
| Barley (or malt) | 4.500 | bu | 163.659 | 22.50% | 162.000 | l. | 39.712 | 26.475 | 17.08% | 163.659 | l. | 25.805 | 20.43% |
| Total Farinaceous | 7.917 | bu | 287.917 | 42.50% | 288.000 | l. | 82.116 | 54.744 | 35.32% | 287.917 | l. | 56.354 | 44.62% |
| *Meat, Fish, Dairy:* | | | | | | | | | | | | | |
| Sheep | 1.500 | no. | 1.500 | | | | | | | | | | |
| Beef | | | | | 23.500 | kg | 54.704 | 36.469 | 23.53% | | kg | | |
| Herrings | 40.000 | no. | 40.000 | | 40.000 | no. | 9.988 | 6.659 | 4.30% | | no. | | |
| Butter | 10.000 | lb. | 4.536 | | 4.800 | kg | 19.728 | 13.152 | 8.48% | 13.610 | kg | 36.087 | 28.57% |
| Cheese | 10.000 | lb. | 4.536 | | 4.700 | kg | 5.968 | 3.979 | 2.57% | 13.610 | kg | 8.578 | 6.79% |
| Sub-total | | | | 37.50% | | | 90.388 | 60.259 | 38.87% | 27.220 | kg | 44.665 | 35.37% |
| *Industrial:* | | | | | | | | | | | | | |
| Charcoal | 4.250 | bu | 154.567 | | 162.000 | l. | 10.568 | 7.045 | 4.54% | | l. | | |
| Candles | 2.750 | lb. | 1.247 | | 1.333 | kg | 7.608 | 5.072 | 3.27% | | kg | | |
| Lamp Oil | 0.500 | pt | 0.284 | | | | | | | | | | |
| Canvas/Linen | 0.667 | yd | 0.610 | | 1.800 | m. | 17.000 | 11.333 | 7.31% | | m. | | |
| Shirting | 0.500 | yd | 0.457 | | | | | | | | | | |
| Coarse Woolens | 0.333 | yd | 0.304 | | 1.125 | m. | 24.844 | 16.563 | 10.68% | 1.225 | m. | 25.276 | 20.01% |
| Sub-total | | | | 20.00% | | | 60.020 | 40.013 | 25.81% | | | 25.276 | 20.01% |
| TOTAL | | | | 100.00% | | | 232.524 | 155.016 | 100.00% | | | 126.295 | 100.00% |

*Notes*: bu = bushels; lb = pound; pt = pint; yd = yard; l. = liter; kg = kilogram; m. = meter.
*Sources*: Phelps, Brown and Hopkins (1955, 1981), Van der Wee (1963, 1975, 1978); Munro (1984a), Verlinden and Schoilliers (1959–1965, Vol. I, pp. 44–45, 52–53; Vol. II:i, pp. 3–70); Stadsarchief Gent, Stadsrekeningen, 1350–1351 to 1499–1500.

***Table 2.*** Wage Regulation in Medieval England. Official Maximum Wages for London and for the Kingdom of England (1290 to 1515) in pence (d) sterling.

| | London | | | | England | | | |
|---|---|---|---|---|---|---|---|---|
| Year | Summer Wages in coin only | Summer Wages with food | Winter Wages in coin only | Winter Wages with food | Summer Wages in coin only | Summer Wages with food | Winter Wages in coin only | Winter Wages with food |
| 1290 | 5.0 | 2.0 | 3.0 | 1.0 | | | | |
| 1290[a] | 4.0 | 1.5 | 4.0 | 1.5 | | | | |
| 1350–1351 | 6.0 | | 5.0 | | 3.0 | | [less][b] | |
| 1350–1351[c] | | | | | 4.0 | | | |
| 1360[d] | | | | | 4.0 | | [not stated] | |
| 1362 | 6.0 | | 5.0 | | | | | |
| 1372 | 6.0 | | 5.0 | | | | | |
| 1382 | 6.0 | | 5.0 | | | | | |
| 1444–1445 | | | | | 5.5 | 4.0 | 4.5 | 3.0 |
| 1495 | | | | | 6.0 | 4.0 | 5.0 | 4.0 |
| 1495[e] | | | | | 7.0 | 5.0 | 7.0 | 5.0 |

[a] 1290: from Michaelmas (29 September) to Martinmas (12 November) and from Candlemas (Purification: 2 February) to Easter.
[b] from Michaelmas: "less according to the rate and discretion of the justices."
[c] Rates of 4d per day for master free-masons; and 3d per day for other master masons and carpenters.
[d] 4d for the chief master masons and carpeners; but 3d or 2d per day for others, "according as they be worth."
[e] The higher rate of 7d per day for those master masons and carpenters having charge of six or more men; 5d daily with food and drink, summer and winter (for both rates).
*Sources*: Tomlins and Raithby (1810–1822, Vol. I, pp. 311–312; Vol. II, pp. 337–339, 585–587); Riley (1860, Vol. I, pp, 99–100; Vol. II, pp. 541–543; 1868, pp. 253–255); Sharpe (1905, pp. 148, 301; 1907, p. 184).

***Table 3.*** Aggregate Mint Outputs of England and the Low Countries, 1290–1520. Gold and Silver Coinage Outputs in kilograms of fine metal and in current pounds sterling (England) and groot (Flanders/Low Countries).*

| Years | England Gold in kg. | England Gold in £ ster. | England Silver in kg. | England Silver in £ ster. | England Total in £ ster. | England Percent Gold | England Percent Silver |
|---|---|---|---|---|---|---|---|
| 1281–1285 | | | 21,913.31 | 68,548.73 | 68,548.73 | 0.00% | 100.00% |
| 1286–1290 | | | 17,280.60 | 54,056.78 | 54,056.78 | 0.00% | 100.00% |
| 1291–1295 | | | 1,552.35 | 4,856.03 | 4,856.03 | 0.00% | 100.00% |
| 1296–1300 | | | 12,071.42 | 37,761.55 | 37,761.55 | 0.00% | 100.00% |
| 1301–1305 | | | 16,017.47 | 50,105.48 | 50,105.48 | 0.00% | 100.00% |
| 1306–1310 | | | 40,226.55 | 125,835.83 | 125,835.83 | 0.00% | 100.00% |
| 1311–1315 | | | 10,706.71 | 33,492.50 | 33,492.50 | 0.00% | 100.00% |
| 1316–1320 | | | 7,275.68 | 22,759.61 | 22,759.61 | 0.00% | 100.00% |
| 1321–1325 | | | 1,780.11 | 5,568.49 | 5,568.49 | 0.00% | 100.00% |
| 1326–1330 | | | 121.86 | 381.19 | 381.19 | 0.00% | 100.00% |
| 1331–1335 | | | 209.06 | 665.13 | 665.13 | 0.00% | 100.00% |
| 1336–1340 | | | 429.49 | 1,551.60 | 1,551.60 | 0.00% | 100.00% |
| 1341–1345 | 240.01 | 9,859.48 | 5,077.46 | 17,710.47 | 27,569.96 | 35.76% | 64.24% |
| 1346–1350 | 675.84 | 27,123.30 | 1,991.05 | 7,090.87 | 34,214.17 | 79.28% | 20.72% |
| 1351–1355 | 1,939.78 | 83,567.73 | 17,442.91 | 67,245.28 | 150,813.01 | 55.41% | 44.59% |
| 1356–1360 | 1,726.70 | 74,406.84 | 4,423.02 | 17,081.46 | 91,488.31 | 81.33% | 18.67% |
| 1361–1365 | 2,415.24 | 104,077.76 | 1,630.81 | 6,298.11 | 110,375.86 | 94.29% | 5.71% |
| 1366–1370 | 1,729.03 | 74,507.35 | 293.82 | 1,134.73 | 75,642.08 | 98.50% | 1.50% |
| 1371–1375 | 802.61 | 34,586.02 | 316.97 | 1,224.11 | 35,810.13 | 96.58% | 3.42% |
| 1376–1380 | 235.33 | 10,140.85 | 356.90 | 1,378.32 | 11,519.17 | 88.03% | 11.97% |
| 1381–1385 | 161.84 | 6,973.80 | 317.41 | 1,225.83 | 8,199.63 | 85.05% | 14.95% |
| 1386–1390 | 504.81 | 21,753.33 | 247.51 | 955.89 | 22,709.22 | 95.79% | 4.21% |
| 1391–1395 | 626.55 | 26,999.15 | 193.49 | 747.25 | 27,746.40 | 97.31% | 2.69% |
| 1396–1400 | 391.14 | 16,855.14 | 175.60 | 678.14 | 17,533.29 | 96.13% | 3.87% |

***Table 3.*** Continued.

| Years | England Gold in kg. | England Gold in £ ster. | England Silver in kg. | England Silver in £ ster. | England Total in £ ster. | England Percent Gold | England Percent Silver |
|---|---|---|---|---|---|---|---|
| 1401–1405 | 168.67 | 7,268.39 | 66.34 | 256.22 | 7,524.61 | 96.59% | 3.41% |
| 1406–1410 | 69.01 | 2,973.57 | 10.59 | 40.91 | 3,014.48 | 98.64% | 1.36% |
| 1411–1415 | 1,870.67 | 89,519.90 | 967.48 | 4,483.34 | 94,003.24 | 95.23% | 4.77% |
| 1416–1420 | 1,035.15 | 49,563.08 | 837.76 | 3,882.48 | 53,445.55 | 92.74% | 7.26% |
| 1421–1425 | 2,557.31 | 122,444.37 | 3,186.02 | 14,765.09 | 137,209.46 | 89.24% | 10.76% |
| 1426–1430 | 599.48 | 28,703.07 | 6,858.61 | 31,785.11 | 60,488.18 | 47.45% | 52.55% |
| 1431–1435 | 220.79 | 10,571.18 | 8,059.55 | 37,350.66 | 47,921.84 | 22.06% | 77.94% |
| 1436–1440 | 132.27 | 6,333.30 | 977.03 | 4,527.86 | 10,861.16 | 58.31% | 41.69% |
| 1441–1445 | 90.78 | 4,346.47 | 130.70 | 605.71 | 4,952.17 | 87.77% | 12.23% |
| 1446–1450 | 64.34 | 3,080.42 | 517.37 | 2,397.68 | 5,478.10 | 56.23% | 43.77% |
| 1451–1455 | 63.53 | 3,041.63 | 1,460.64 | 6,769.09 | 9,810.71 | 31.00% | 69.00% |
| 1456–1460 | 26.72 | 1,279.29 | 1,415.09 | 6,558.02 | 7,837.31 | 16.32% | 83.68% |
| 1461–1465 | 488.12 | 29,731.33 | 3,432.92 | 18,067.35 | 47,798.68 | 62.20% | 37.80% |
| 1466–1470 | 1,288.16 | 83,263.99 | 5,168.09 | 29,938.35 | 113,202.34 | 73.55% | 26.45% |
| 1471–1475 | 538.67 | 34,818.55 | 2,422.65 | 14,034.25 | 48,852.80 | 71.27% | 28.73% |
| 1476–1480 | 404.48 | 26,144.62 | 834.68 | 4,835.25 | 30,979.88 | 84.39% | 15.61% |
| 1481–1485 | 219.45 | 14,184.75 | 995.23 | 5,765.30 | 19,950.05 | 71.10% | 28.90% |
| 1486–1490 | 129.75 | 8,386.73 | 926.79 | 5,368.79 | 13,755.52 | 60.97% | 39.03% |
| 1491–1495 | 268.98 | 17,386.53 | 1,270.84 | 7,361.88 | 24,748.40 | 70.25% | 29.75% |
| 1496–1500 | 278.93 | 18,029.24 | 2,490.94 | 14,429.82 | 32,459.06 | 55.54% | 44.46% |

***Table 3.*** Continued.

| Years | Flanders/ Low Countries Gold in kg. | Flanders/ Low Countries Gold in £ groot | Flanders/ Low Countries Silver in kg. | Flanders/ Low Countries Silver in £ groot | Flanders/ Low Countries Total in £ groot | Flanders/ Low Countries Percent Gold | Flanders/ Low Countries Percent Silver |
|---|---|---|---|---|---|---|---|
| 1336–1340 | 266.77 | 3,975.69 | 3,641.11 | 4,873.43 | 8,849.12 | 44.93% | 55.07% |
| 1341–1345 | 1.32 | 26.60 | 176.76 | 310.86 | 337.46 | 7.88% | 92.12% |
| 1346–1350 | 315.97 | 6,596.36 | 5,553.49 | 11,138.59 | 17,734.96 | 37.19% | 62.81% |
| 1351–1355 | 1,096.66 | 24,811.55 | 5,178.95 | 11,397.25 | 36,208.81 | 68.52% | 31.48% |
| 1356–1360 | 3,191.83 | 80,870.03 | 8,820.73 | 21,251.52 | 102,121.54 | 79.19% | 20.81% |
| 1361–1365 | 2,629.89 | 77,350.49 | 3,992.17 | 11,141.97 | 88,492.46 | 87.41% | 12.59% |
| 1366–1370 | 1,586.50 | 50,200.53 | 10,030.19 | 32,269.76 | 82,470.29 | 60.87% | 39.13% |
| 1371–1375 | 825.21 | 32,921.28 | 2,215.76 | 8,315.15 | 41,236.42 | 79.84% | 20.16% |
| 1376–1380 | 261.20 | 10,555.07 | 915.62 | 3,648.74 | 14,203.81 | 74.31% | 25.69% |
| 1381–1385 | 529.81 | 22,941.63 | 2,816.88 | 11,467.50 | 34,409.13 | 66.67% | 33.33% |
| 1386–1390 | 423.11 | 20,865.91 | 1,787.71 | 7,792.29 | 28,658.20 | 72.81% | 27.19% |
| 1391–1395 | 368.61 | 14,458.24 | 3,676.06 | 14,958.40 | 29,416.64 | 49.15% | 50.85% |
| 1396–1400 | 324.59 | 12,731.42 | 5,791.31 | 23,507.52 | 36,238.94 | 35.13% | 64.87% |
| 1401–1405 | 31.54 | 1,236.90 | 691.66 | 2,826.54 | 4,063.44 | 30.44% | 69.56% |
| 1406–1410 | 19.03 | 636.25 | 1,113.70 | 3,887.99 | 4,524.24 | 14.06% | 85.94% |
| 1411–1415 | 5.88 | 196.76 | 2,484.27 | 8,665.85 | 8,862.61 | 2.22% | 97.78% |
| 1416–1420 | 4.31 | 181.63 | 3,124.47 | 15,052.70 | 15,234.33 | 1.19% | 98.81% |
| 1421–1425 | 41.06 | 2,195.70 | 12,143.55 | 58,804.34 | 61,000.04 | 3.60% | 96.40% |
| 1426–1430 | 1,105.07 | 69,470.41 | 7,999.91 | 43,326.04 | 112,796.44 | 61.59% | 38.41% |
| 1431–1435 | 1,774.87 | 115,353.24 | 6,609.82 | 34,252.10 | 149,605.34 | 77.11% | 22.89% |
| 1436–1440 | 511.94 | 28,534.39 | 5,015.22 | 25,788.39 | 54,322.78 | 52.53% | 47.47% |
| 1441–1445 | 111.93 | 6,466.29 | 102.68 | 527.55 | 6,993.84 | 92.46% | 7.54% |
| 1446–1450 | 2.55 | 148.08 | 5.91 | 40.79 | 188.87 | 78.41% | 21.59% |

***Table 3.*** Continued.

| Years | Flanders/ Low Countries Gold in kg. | Flanders/ Low Countries Gold in £ groot | Flanders/ Low Countries Silver in kg. | Flanders/ Low Countries Silver in £ groot | Flanders/ Low Countries Total in £ groot | Flanders/ Low Countries Percent Gold | Flanders/ Low Countries Percent Silver |
|---|---|---|---|---|---|---|---|
| 1451–1455 | 827.29 | 50,701.69 | 164.61 | 880.32 | 51,582.01 | 98.29% | 1.71% |
| 1456–1460 | 253.14 | 15,513.92 | 64.07 | 408.31 | 15,922.23 | 97.44% | 2.56% |
| 1461–1465 | 6.60 | 404.22 | 0.00 | 0.00 | 404.22 | 100.00% | 0.00% |
| 1466–1470 | 253.59 | 16,400.73 | 4,628.96 | 27,867.69 | 44,268.42 | 37.05% | 62.95% |
| 1471–1475 | 261.20 | 18,927.51 | 7,313.98 | 45,191.72 | 64,119.24 | 29.52% | 70.48% |
| 1476–1480 | 380.05 | 29,208.50 | 9,341.50 | 67,636.25 | 96,844.75 | 30.16% | 69.84% |
| 1481–1485 | 58.54 | 5,216.39 | 6,534.30 | 56,337.18 | 61,553.58 | 8.47% | 91.53% |
| 1486–1490 | 144.64 | 24,136.96 | 6,803.60 | 78,323.90 | 102,460.86 | 23.56% | 76.44% |
| 1491–1495 | 20.32 | 1,336.34 | 2,780.07 | 19,521.10 | 20,857.44 | 6.41% | 93.59% |
| 1496–1500 | 474.63 | 44,464.28 | 5,109.49 | 43,603.01 | 88,067.29 | 50.49% | 49.51% |

* Flanders only until 1420; from 1421–1425 until 1496–1500: Flanders, Brabant, Holland and Zealand, within the Burgundian Low Countries.
*Sources:* England: Brooke, G.C., and E. Stokes (1929); Crump, C. G., and C. Johnson (1913); Challis 1992; Munro (1973, 1981). Flanders and the Low Countries: Munro (1973, 1981, 1983a, 1984a, 1984b, 1988a, 1991b.)

***Table 4.*** England and the Low Countries: Mint Outputs and Consumer Price Indexes. Mint Outputs in Constant Pounds Sterling and in Current Pounds Sterling and Pounds Groot Flemish 1281–1285 to 1496–1500: in quinquennial means. Price Indexes: 1451–1475 = 100.

| Years | England: Coinage Outputs in constant £ sterling of 1351–1411 values* | England: Coinage Outputs in current £ sterling | England: Phelps Brown and Hopkins CPI | Low Countries: Coinage Outputs in constant £ sterling of 1351–1411 values* | Low Countries: Coinage Outputs current in £ groot | Low Countries: CPI Flanders | CPI Brabant |
|---|---|---|---|---|---|---|---|
| 1281–1285 | 84,628.07 | 68,548.73 | 104.80 | | | | |
| 1286–1290 | 66,736.77 | 54,056.78 | 80.52 | | | | |
| 1291–1295 | 5,995.10 | 4,856.03 | 107.45 | | | | |
| 1296–1300 | 46,619.19 | 37,761.54 | 102.34 | | | | |
| 1301–1305 | 61,858.62 | 50,105.48 | 92.35 | | | | |
| 1306–1310 | 155,352.87 | 125,835.83 | 109.81 | | | | |
| 1311–1315 | 41,348.77 | 33,492.50 | 115.33 | | | | |
| 1316–1320 | 28,098.28 | 22,759.61 | 161.91 | | | | |
| 1321–1325 | 6,874.68 | 5,568.49 | 137.97 | | | | |
| 1326–1330 | 470.60 | 381.19 | 111.07 | | | | |
| 1331–1335 | 807.36 | 665.13 | 114.12 | | | | |
| 1336–1340 | 1,658.66 | 1,551.60 | 94.32 | 25,557.41 | 8,849.12 | | |
| 1341–1345 | 29,951.44 | 27,569.96 | 90.06 | 739.59 | 337.46 | | |
| 1346–1350 | 36,812.55 | 34,214.17 | 102.70 | 35,062.86 | 17,734.96 | | |
| 1351–1355 | 150,952.61 | 150,813.01 | 132.18 | 67,258.22 | 36,208.81 | 60.65 | |
| 1356–1360 | 91,488.31 | 91,488.31 | 129.46 | 171,607.60 | 102,121.54 | 87.54 | |
| 1361–1365 | 110,375.86 | 110,375.86 | 146.64 | 128,744.99 | 88,492.46 | 94.43 | |

***Table 4.*** Continued.

| Years | England: Coinage Outputs in constant £ sterling of 1351–1411 values* | England: Coinage Outputs in current £ sterling | England: Phelps Brown and Hopkins CPI | Low Countries: Coinage Outputs in constant £ sterling of 1351–1411 values* | Low Countries: Coinage Outputs current in £ groot | Low Countries: CPI Flanders | CPI Brabant |
|---|---|---|---|---|---|---|---|
| 1366–1370 | 75,642.08 | 75,642.08 | 146.10 | 107,101.72 | 82,470.29 | 107.40 | |
| 1371–1375 | 35,810.13 | 35,810.13 | 135.26 | 44,117.12 | 41,236.42 | 115.22 | |
| 1376–1380 | 11,519.17 | 11,519.17 | 110.62 | 14,791.69 | 14,203.81 | 111.66 | |
| 1381–1385 | 8,199.63 | 8,199.63 | 112.90 | 33,709.23 | 34,409.13 | 119.19 | |
| 1386–1390 | 22,709.22 | 22,709.22 | 102.53 | 25,136.55 | 28,658.20 | 124.72 | |
| 1391–1395 | 27,746.40 | 27,746.40 | 106.33 | 30,081.11 | 29,416.64 | 88.51 | |
| 1396–1400 | 17,533.28 | 17,533.28 | 110.84 | 36,352.95 | 36,238.94 | 89.80 | |
| 1401–1405 | 7,524.61 | 7,524.61 | 114.84 | 4,030.06 | 4,063.44 | 88.53 | 64.27 |
| 1406–1410 | 3,014.48 | 3,014.48 | 111.23 | 5,120.88 | 4,524.24 | 105.26 | 68.55 |
| 1411–1415 | 84,347.37 | 94,003.24 | 108.11 | 9,847.65 | 8,862.61 | 95.31 | 73.97 |
| 1416–1420 | 47,842.16 | 53,445.55 | 113.40 | 12,252.19 | 15,234.33 | 107.38 | 80.54 |
| 1421–1425 | 122,504.18 | 137,209.46 | 101.48 | 48,666.93 | 61,000.04 | 112.18 | 90.19 |
| 1426–1430 | 52,320.35 | 60,488.18 | 112.27 | 78,515.09 | 112,796.44 | 117.77 | 100.15 |
| 1431–1435 | 40,639.61 | 47,921.84 | 108.48 | 102,009.51 | 149,605.34 | 123.51 | 102.76 |
| 1436–1440 | 9,473.19 | 10,861.16 | 122.01 | 41,428.85 | 54,322.78 | 140.17 | 125.43 |
| 1441–1445 | 4,416.58 | 4,952.17 | 92.53 | 5,219.91 | 6,993.84 | 113.50 | 105.48 |
| 1446–1450 | 4,770.45 | 5,478.10 | 100.90 | 132.73 | 188.87 | 109.98 | 99.58 |
| 1451–1455 | 8,378.37 | 9,810.71 | 100.25 | 36,285.47 | 51,582.01 | 100.90 | 98.54 |
| 1456–1460 | 6,616.38 | 7,837.31 | 97.06 | 11,155.69 | 15,922.23 | 117.86 | 114.58 |

***Table 4.*** Continued.

| Years | England: Coinage Outputs in constant £ sterling of 1351–1411 values* | England: Coinage Outputs in current £ sterling | England: Phelps Brown and Hopkins CPI | Low Countries: Coinage Outputs in constant £ sterling of 1351–1411 values* | Low Countries: Coinage Outputs current in £ groot | Low Countries: CPI Flanders | CPI Brabant |
|---|---|---|---|---|---|---|---|
| 1461–1465 | 34,291.77 | 47,798.68 | 102.73 | 284.22 | 404.22 | 88.71 | 91.07 |
| 1466–1470 | 75,468.23 | 113,202.34 | 106.75 | 28,804.70 | 44,268.42 | 96.52 | 96.95 |
| 1471–1475 | 32,568.53 | 48,852.80 | 97.76 | 39,501.95 | 64,119.24 | 96.02 | 98.85 |
| 1476–1480 | 20,653.25 | 30,979.88 | 90.06 | 52,453.54 | 96,844.75 | 117.21 | 120.69 |
| 1481–1485 | 13,300.03 | 19,950.05 | 127.38 | 27,757.60 | 61,553.58 | 156.85 | 155.75 |
| 1486–1490 | 9,170.35 | 13,755.52 | 102.77 | 32,508.04 | 102,460.86 | 184.51 | 174.10 |
| 1491–1495 | 16,498.93 | 24,748.40 | 106.80 | 11,612.12 | 20,857.44 | 144.98 | 133.22 |
| 1496–1500 | 21,639.37 | 32,459.06 | 96.70 | 40,185.51 | 88,067.29 | 100.26 | 115.35 |

* Value of 1 kg pure gold in the English mints, in coin, 1351-1411 = £43.0921 sterling; value of 1 kg pure silver in the English mints, in coin, 1351–1411 = £3.862 sterling.

*Sources*: See sources for Tables 1 and 3.

***Table 5.*** Price-Relatives in England, 1266–1270 to 1496–1500. The Phelps Brown & Hopkins "Basket of Consumables" (Adjusted version) in quinquennial means: 1451–1475 = 100.

| Year | Farinaceous: Wheat, Rye, Barley, Peas | Meat & Fish* | Butter & Cheese | Drink: Barley Malt | Fuel and Light | Textiles | Farinaceous [with drink] | Meat, Fish Dairy | Fuel and Textiles | Composite (Adjusted) |
|---|---|---|---|---|---|---|---|---|---|---|
| weight | 20.00 | 25.00 | 12.50 | 22.50 | 7.50 | 12.50 | 42.50 | 37.50 | 20.00 | 100.00 |
| 1264–1265 | 80.00 | 95.00 | 74.00 | 80.00 | | 74.03 | 80.00 | 88.00 | 74.03 | 82.44 |
| 1266–1270 | 84.00 | 64.10 | 101.60 | 104.80 | | 48.40 | 95.01 | 76.60 | 48.40 | 81.25 |
| 1271–1275 | 129.00 | 97.00 | 95.80 | 131.00 | | 36.40 | 130.06 | 96.60 | 36.40 | 103.84 |
| 1276–1280 | 102.20 | 99.80 | 102.80 | 118.20 | | 36.20 | 110.67 | 100.80 | 36.20 | 96.61 |
| 1281–1285 | 110.80 | 92.80 | 94.00 | 154.30 | | 40.90 | 133.83 | 93.20 | 40.90 | 104.80 |
| 1286–1290 | 79.20 | 78.40 | 96.80 | 100.40 | | 34.80 | 90.42 | 84.53 | 34.80 | 80.52 |
| 1291–1295 | 137.80 | 75.00 | 96.80 | 157.60 | | 44.20 | 148.28 | 82.27 | 44.20 | 107.45 |
| 1296–1300 | 107.80 | 89.80 | 95.20 | 138.80 | | 60.20 | 124.21 | 91.60 | 60.20 | 102.34 |
| 1301–1305 | 91.60 | 88.20 | 93.60 | 119.00 | | 52.60 | 106.11 | 90.00 | 52.60 | 92.35 |
| 1306–1310 | 116.80 | 105.40 | 101.70 | 134.80 | | 70.60 | 126.33 | 104.17 | 70.60 | 109.81 |
| 1311–1315 | 114.20 | 116.60 | 134.40 | 126.40 | | 75.60 | 120.66 | 122.53 | 75.60 | 115.33 |
| 1316–1320 | 189.80 | 127.00 | 142.00 | 238.80 | | 68.60 | 215.74 | 132.00 | 68.60 | 161.91 |
| 1321–1325 | 160.00 | 106.40 | 153.40 | 174.80 | 164.20 | 68.40 | 167.84 | 122.07 | 104.33 | 137.97 |
| 1326–1330 | 102.20 | 102.60 | 119.00 | 133.40 | 152.20 | 69.40 | 118.72 | 108.07 | 100.45 | 111.07 |
| 1331–1335 | 112.00 | 100.20 | 113.00 | 148.20 | 147.00 | 65.40 | 131.16 | 104.47 | 96.00 | 114.12 |
| 1336–1340 | 85.20 | 88.20 | 112.40 | 97.00 | 149.00 | 65.40 | 91.45 | 96.27 | 96.75 | 94.32 |
| 1341–1345 | 81.00 | 85.00 | 110.40 | 98.60 | 139.00 | 49.60 | 90.32 | 93.47 | 83.13 | 90.06 |
| 1346–1350 | 102.00 | 87.80 | 120.20 | 120.00 | 147.00 | 58.40 | 111.53 | 98.60 | 91.63 | 102.70 |
| 1351–1355 | 125.40 | 110.80 | 123.40 | 165.60 | 158.60 | 118.60 | 146.68 | 115.00 | 133.60 | 132.18 |
| 1356–1360 | 116.40 | 102.00 | 130.80 | 141.60 | 165.60 | 160.40 | 129.74 | 111.60 | 162.35 | 129.46 |

***Table 5.*** Continued.

| Year | Farinaceous: Wheat, Rye, Barley, Peas | Meat & Fish* | Butter & Cheese | Drink: Barley Malt | Fuel and Light | Textiles | Farinaceous [with drink] | Meat, Fish Dairy | Fuel and Textiles | Composite (Adjusted) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1361–1365 | 132.60 | 122.80 | 125.80 | 200.60 | 168.40 | 127.40 | 168.60 | 123.80 | 142.78 | 146.64 |
| 1366–1370 | 155.00 | 128.00 | 128.40 | 167.20 | 182.40 | 126.00 | 161.46 | 128.13 | 147.15 | 146.10 |
| 1371–1375 | 133.20 | 136.40 | 129.60 | 128.00 | 163.60 | 138.00 | 130.45 | 134.13 | 147.60 | 135.26 |
| 1376–1380 | 96.00 | 105.60 | 118.80 | 113.00 | 162.40 | 100.50 | 105.00 | 110.00 | 123.71 | 110.62 |
| 1381–1385 | 103.60 | 110.20 | 107.00 | 123.60 | 152.40 | 96.10 | 114.19 | 109.13 | 117.21 | 112.90 |
| 1386–1390 | 83.20 | 108.40 | 101.80 | 108.40 | 139.00 | 90.00 | 96.54 | 106.20 | 108.38 | 102.53 |
| 1391–1395 | 96.60 | 102.80 | 102.80 | 123.60 | 133.00 | 85.40 | 110.89 | 102.80 | 103.25 | 106.33 |
| 1396–1400 | 106.20 | 106.40 | 114.20 | 127.40 | 124.40 | 85.80 | 117.42 | 109.00 | 100.28 | 110.84 |
| 1401–1405 | 115.80 | 105.80 | 110.00 | 136.40 | 123.20 | 92.40 | 126.71 | 107.20 | 103.95 | 114.84 |
| 1406–1410 | 109.20 | 105.60 | 114.20 | 119.80 | 120.20 | 102.00 | 114.81 | 108.47 | 108.83 | 111.23 |
| 1411–1415 | 93.00 | 102.60 | 117.40 | 118.80 | 119.00 | 108.20 | 106.66 | 107.53 | 112.25 | 108.11 |
| 1416–1420 | 116.40 | 103.60 | 115.30 | 126.60 | 111.00 | 104.00 | 121.80 | 107.50 | 106.63 | 113.40 |
| 1421–1425 | 94.20 | 92.60 | 97.57 | 118.00 | 111.20 | 99.20 | 106.80 | 94.26 | 103.70 | 101.48 |
| 1426–1430 | 104.60 | 98.80 | 110.42 | 133.60 | 124.60 | 108.40 | 119.95 | 102.38 | 114.48 | 112.27 |
| 1431–1435 | 109.60 | 101.40 |  | 120.80 | 120.00 | 98.80 | 115.53 | 101.40 | 106.75 | 108.48 |
| 1436–1440 | 146.20 | 106.80 |  | 141.80 | 114.20 | 98.00 | 143.87 | 106.80 | 104.08 | 122.01 |
| 1441–1445 | 76.80 | 98.80 |  | 83.60 | 118.40 | 99.40 | 80.40 | 98.80 | 106.53 | 92.53 |
| 1446–1450 | 96.00 | 106.20 |  | 96.40 | 106.80 | 97.40 | 96.21 | 106.20 | 100.93 | 100.90 |
| 1451–1455 | 103.00 | 97.40 |  | 104.00 | 101.00 | 97.20 | 103.53 | 97.40 | 98.63 | 100.25 |
| 1456–1460 | 93.40 | 100.80 |  | 90.80 | 100.60 | 100.80 | 92.02 | 100.80 | 100.73 | 97.06 |
| 1461–1465 | 108.20 | 100.00 |  | 106.00 | 94.40 | 101.30 | 107.04 | 100.00 | 98.71 | 102.73 |
| 1466–1470 | 103.80 | 111.80 |  | 99.40 | 108.60 | 108.40 | 101.47 | 111.80 | 108.48 | 106.75 |
| 1471–1475 | 98.20 | 96.00 |  | 99.60 | 93.40 | 101.60 | 98.94 | 96.00 | 98.53 | 97.76 |
| 1476–1480 | 106.00 | 79.20 |  | 83.80 | 92.00 | 107.20 | 94.25 | 79.20 | 101.50 | 90.06 |

***Table 5.*** Continued.

| Year | Farinaceous: Wheat, Rye, Barley, Peas | Meat & Fish* | Butter & Cheese | Drink: Barley Malt | Fuel and Light | Textiles | Farinaceous [with drink] | Meat, Fish Dairy | Fuel and Textiles | Composite (Adjusted) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1481–1485 | 147.80 | 120.00 | | 143.40 | 98.40 | 105.40 | 145.47 | 120.00 | 102.78 | 127.38 |
| 1486–1490 | 108.00 | 105.80 | | 88.80 | 90.20 | 118.00 | 97.84 | 105.80 | 107.58 | 102.77 |
| 1491–1495 | 110.40 | 111.80 | | 99.00 | 82.20 | 114.80 | 104.36 | 111.80 | 102.58 | 106.80 |
| 1496–1500 | 100.80 | 95.80 | | 91.00 | 83.20 | 111.20 | 95.61 | 95.80 | 100.70 | 96.70 |

* From 1431–1435 the weight assigned to meat and fish becomes 37.5, in the absence of price data for butter and cheese.
*Sources*: See Table 1, and Archives of the British Library of Political and Economic Science, the Phelps Brown Papers Collection.

***Table 6.*** Wages of Master Building Craftsmen and Their Laborers in Southern England in Pence (d) Sterling per Day, with Wage- and Price-relatives from the Phelps Brown and Hopkins indexes in Quinquennial Means, 1266–1270 to 1496–1500: 1451–1475 = 100.

| Years (5) | Nominal Day Wage in d for a Master | Nominal Day Wage in d for a Laborer | Master Nominal Wage Index 1451–1475 = 100 [= 6d daily] | Laborer Nominal Wage Index 1451–1475 = 100 [= 4d daily] | Aggregate Price Index (Adjusted) 1451–1475 = 100 | Real Wage Index Master 1451–1475 = 100 arithmetic mean | Real Wage Index Laborer 1451–1475 = 100 arithmetic mean | Real Wage Index Master 1451–1475 = 100 harmonic mean | Real Wage Index Laborer 1451–1475 = 100 harmonic mean |
|---|---|---|---|---|---|---|---|---|---|
| 1266–1270 | 3.00 | 1.50 | 50.00 | 37.50 | 81.249 | 61.823 | 46.368 | 61.539 | 46.155 |
| 1271–1275 | 3.00 | 1.50 | 50.00 | 37.50 | 103.838 | 48.707 | 36.530 | 48.152 | 36.114 |
| 1276–1280 | 3.00 | 1.50 | 50.00 | 37.50 | 96.605 | 51.810 | 38.858 | 51.757 | 38.818 |
| 1281–1285 | 3.00 | 1.50 | 50.00 | 37.50 | 104.800 | 48.163 | 36.122 | 47.710 | 35.782 |
| 1286–1290 | 3.00 | 1.50 | 50.00 | 37.50 | 80.519 | 62.930 | 47.198 | 62.097 | 46.573 |
| 1291–1295 | 3.00 | 1.50 | 50.00 | 37.50 | 107.454 | 47.222 | 35.417 | 46.532 | 34.899 |
| 1296–1300 | 3.00 | 1.50 | 50.00 | 37.50 | 102.341 | 49.108 | 36.831 | 48.856 | 36.642 |
| 1301–1305 | 3.30 | 1.65 | 55.00 | 41.25 | 92.346 | 59.568 | 44.676 | 59.286 | 44.464 |
| 1306–1310 | 3.60 | 1.80 | 60.00 | 45.00 | 109.814 | 55.244 | 41.433 | 54.807 | 41.105 |
| 1311–1315 | 4.00 | 2.00 | 66.67 | 50.00 | 115.330 | 58.322 | 43.742 | 57.805 | 43.354 |
| 1316–1320 | 4.00 | 2.00 | 66.67 | 50.00 | 161.908 | 44.849 | 33.637 | 41.176 | 30.882 |
| 1321–1325 | 4.00 | 2.00 | 66.67 | 50.00 | 137.970 | 48.869 | 36.651 | 48.320 | 36.240 |
| 1326–1330 | 4.00 | 2.00 | 66.67 | 50.00 | 111.070 | 60.816 | 45.612 | 60.022 | 45.017 |
| 1331–1335 | 4.00 | 2.00 | 66.67 | 50.00 | 114.120 | 59.552 | 44.664 | 58.418 | 43.814 |
| 1336–1340 | 3.60 | 1.80 | 60.00 | 45.00 | 94.315 | 64.226 | 48.169 | 63.259 | 47.444 |
| 1341–1345 | 3.00 | 1.50 | 50.00 | 37.50 | 90.060 | 55.775 | 41.832 | 55.519 | 41.639 |
| 1346–1350 | 3.00 | 1.50 | 50.00 | 37.50 | 102.700 | 49.138 | 36.853 | 48.685 | 36.514 |
| 1351–1355 | 3.60 | 1.80 | 60.00 | 45.00 | 132.185 | 46.514 | 34.886 | 44.557 | 33.418 |
| 1356–1360 | 4.60 | 2.60 | 76.67 | 65.00 | 129.460 | 59.311 | 50.161 | 59.007 | 49.413 |
| 1361–1365 | 5.00 | 3.00 | 83.33 | 75.00 | 146.635 | 57.053 | 51.348 | 56.830 | 51.147 |
| 1366–1370 | 5.00 | 3.00 | 83.33 | 75.00 | 146.100 | 58.129 | 52.316 | 57.039 | 51.335 |
| 1371–1375 | 5.00 | 3.00 | 83.33 | 75.00 | 135.260 | 62.258 | 56.032 | 61.610 | 55.449 |
| 1376–1380 | 5.00 | 3.00 | 83.33 | 75.00 | 110.618 | 77.272 | 69.544 | 75.335 | 67.801 |
| 1381–1385 | 5.00 | 3.00 | 83.33 | 75.00 | 112.898 | 73.892 | 66.503 | 73.813 | 66.432 |

***Table 6.*** Continued.

| Years (5) | Nominal Day Wage in d for a Master | Nominal Day Wage in d for a Laborer | Master Nominal Wage Index 1451–1475 = 100 [= 6d daily] | Laborer Nominal Wage Index 1451–1475 = 100 [= 4d daily] | Aggregate Price Index (Adjusted) 1451–1475 = 100 | Real Wage Index Master 1451–1475 = 100 arithmetic mean | Real Wage Index Laborer 1451–1475 = 100 arithmetic mean | Real Wage Index Master 1451–1475 = 100 harmonic mean | Real Wage Index Laborer 1451–1475 = 100 harmonic mean |
|---|---|---|---|---|---|---|---|---|---|
| 1386–1390 | 5.00 | 3.00 | 83.33 | 75.00 | 102.530 | 81.311 | 73.180 | 81.277 | 73.149 |
| 1391–1395 | 5.00 | 3.00 | 83.33 | 75.00 | 106.330 | 79.526 | 71.573 | 78.372 | 70.535 |
| 1396–1400 | 5.00 | 3.00 | 83.33 | 75.00 | 110.835 | 75.589 | 68.030 | 75.187 | 67.668 |
| 1401–1405 | 5.10 | 3.20 | 85.00 | 80.00 | 114.840 | 75.286 | 71.288 | 73.717 | 68.693 |
| 1406–1410 | 5.80 | 3.80 | 96.67 | 95.00 | 111.235 | 87.562 | 85.887 | 87.067 | 85.527 |
| 1411–1415 | 6.00 | 4.00 | 100.00 | 100.00 | 108.105 | 92.633 | 92.633 | 92.503 | 92.503 |
| 1416–1420 | 6.00 | 4.00 | 100.00 | 100.00 | 113.403 | 89.126 | 89.126 | 88.181 | 88.181 |
| 1421–1425 | 6.00 | 4.00 | 100.00 | 100.00 | 101.476 | 98.867 | 98.867 | 98.546 | 98.546 |
| 1426–1430 | 6.00 | 4.00 | 100.00 | 100.00 | 112.267 | 90.998 | 90.998 | 89.074 | 89.074 |
| 1431–1435 | 6.00 | 4.00 | 100.00 | 100.00 | 108.475 | 92.358 | 92.358 | 92.187 | 92.187 |
| 1436–1440 | 6.00 | 4.00 | 100.00 | 100.00 | 122.010 | 85.413 | 85.413 | 81.960 | 81.960 |
| 1441–1445 | 6.00 | 4.00 | 100.00 | 100.00 | 92.525 | 108.574 | 108.574 | 108.079 | 108.079 |
| 1446–1450 | 6.00 | 4.00 | 100.00 | 100.00 | 100.900 | 99.228 | 99.228 | 99.108 | 99.108 |
| 1451–1455 | 6.00 | 4.00 | 100.00 | 100.00 | 100.250 | 100.064 | 100.064 | 99.751 | 99.751 |
| 1456–1460 | 6.00 | 4.00 | 100.00 | 100.00 | 97.055 | 103.115 | 103.115 | 103.034 | 103.034 |
| 1461–1465 | 6.00 | 4.00 | 100.00 | 100.00 | 102.733 | 99.009 | 99.009 | 97.340 | 97.340 |
| 1466–1470 | 6.00 | 4.00 | 100.00 | 100.00 | 106.745 | 93.723 | 93.723 | 93.681 | 93.681 |
| 1471–1475 | 6.00 | 4.00 | 100.00 | 100.00 | 97.755 | 102.590 | 102.590 | 102.297 | 102.297 |
| 1476–1480 | 6.00 | 4.00 | 100.00 | 100.00 | 90.055 | 111.678 | 111.678 | 111.043 | 111.043 |
| 1481–1485 | 6.00 | 4.00 | 100.00 | 100.00 | 127.380 | 80.745 | 80.745 | 78.505 | 78.505 |
| 1486–1490 | 6.00 | 4.00 | 100.00 | 100.00 | 102.770 | 98.059 | 98.059 | 97.305 | 97.305 |
| 1491–1495 | 6.00 | 4.00 | 100.00 | 100.00 | 106.795 | 93.931 | 93.931 | 93.637 | 93.637 |
| 1496–1500 | 6.00 | 4.00 | 100.00 | 100.00 | 96.700 | 103.510 | 103.510 | 103.413 | 103.413 |

*Sources*: Phelps Brown and Hopkins (1955, 1956, 1981); Archives of the British Library of Political and Economic Science, the Phelps Brown Papers Collection.

***Table 7.*** Wages of Hired Day Laborers on the Taunton Manor, in pence per day, 1315–1415.

| Year Harvest | Laborers Number | Labor Days Number | Minimum Wage in d sterling | Maximum Wage in d sterling | Mean Wage Weighted in d | PB & H Price Index 1451–1475=100 | Nominal Wage Index 1451–1475=100 4.0d | Real Wage Index NWI/CPI |
|---|---|---|---|---|---|---|---|---|
| 1315 | 4 | 36.0 | 1.50 | 1.50 | 1.500 | 131.87 | 37.500 | 28.438 |
| 1316 | | | | | | 215.92 | | |
| 1317 | | | | | | 215.14 | | |
| 1318 | | | | | | 153.76 | | |
| 1319 | 1 | 5.0 | 2.00 | 2.00 | 2.000 | 118.57 | 50.000 | 42.170 |
| 1320 | | | | | | 106.16 | | |
| 1321 | | | | | | 121.05 | | |
| 1322 | | | | | | 140.53 | | |
| 1323 | | | | | | 164.80 | | |
| 1324 | | | | | | 137.03 | | |
| 1325 | | | | | | 126.45 | | |
| 1326 | 289 | 289.0 | 1.00 | 1.00 | 1.000 | 124.03 | 25.000 | 20.157 |
| 1327 | | | | | | 95.50 | | |
| 1328 | | | | | | 96.48 | | |
| 1329 | | | | | | 118.93 | | |
| 1330 | | | | | | 120.43 | | |
| 1331 | | | | | | 134.05 | | |
| 1332 | | | | | | 131.08 | | |
| 1333 | | | | | | 110.58 | | |
| 1334 | | | | | | 99.38 | | |
| 1335 | | | | | | 95.53 | | |
| 1336 | | | | | | 100.75 | | |
| 1337 | 31 | 62.0 | 1.00 | 1.50 | 1.137 | 111.48 | 28.427 | 25.501 |
| 1338 | 73 | 82.5 | 1.00 | 1.50 | 1.170 | 84.55 | 29.242 | 34.586 |
| 1339 | | | | | | 78.68 | | |
| 1340 | 3 | 23.5 | 1.00 | 1.00 | 1.000 | 96.13 | 25.000 | 26.008 |

***Table 7.*** Continued.

| Year Harvest | Laborers Number | Labor Days Number | Minimum Wage in d sterling | Maximum Wage in d sterling | Mean Wage Weighted in d | PB & H Price Index 1451–1475=100 | Nominal Wage Index 1451–1475=100 4.0d | Real Wage Index NWI/CPI |
|---|---|---|---|---|---|---|---|---|
| 1341 | 1 | 2.5 | 1.50 | 1.50 | 1.500 | 85.70 | 37.500 | 43.757 |
| 1342 | 1 | 10.0 | 1.00 | 1.00 | 1.000 | 85.10 | 25.000 | 29.377 |
| 1343 | 2 | 6.0 | 1.00 | 1.00 | 1.000 | 84.28 | 25.000 | 29.665 |
| 1344 | 2 | 16.0 | 1.00 | 1.00 | 1.000 | 97.00 | 25.000 | 25.773 |
| 1345 | | | | | 1.000 | 98.23 | 25.000 | 25.452 |
| 1346 | 3 | 15.5 | 1.00 | 1.00 | 1.000 | 87.83 | 25.000 | 28.466 |
| 1347 | 509 | 521.0 | 1.00 | 1.50 | 1.488 | 109.35 | 37.188 | 34.008 |
| 1348 | 1 | 5.0 | 1.00 | 1.00 | 1.000 | 116.25 | 25.000 | 21.505 |
| 1349 | 70 | 71.0 | 1.00 | 2.50 | 2.458 | 97.60 | 61.444 | 62.955 |
| 1350 | 93 | 99.0 | 1.11 | 2.00 | 1.374 | 102.48 | 34.343 | 33.514 |
| 1351 | 7 | 8.0 | 1.50 | 2.00 | 1.875 | 133.58 | 46.875 | 35.093 |
| 1352 | 4 | 2.0 | 2.00 | 2.00 | 2.000 | 159.63 | 50.000 | 31.323 |
| 1353 | 2 | 2.0 | 2.00 | 2.00 | 2.000 | 138.95 | 50.000 | 35.984 |
| 1354 | 7 | 325.5 | 2.00 | 3.00 | 2.478 | 116.80 | 61.943 | 53.034 |
| 1355 | | | | | 2.572 | 111.98 | 64.305 | 57.428 |
| 1356 | 3 | 15.0 | 2.50 | 3.00 | 2.667 | 114.43 | 66.667 | 58.262 |
| 1357 | 5 | 52.0 | 2.00 | 3.00 | 2.077 | 132.83 | 51.923 | 39.091 |
| 1358 | 1 | 1.5 | 2.00 | 2.00 | 2.000 | 139.15 | 50.000 | 35.932 |
| 1359 | 1 | 3.0 | 2.17 | 2.17 | 2.167 | 125.73 | 54.175 | 43.090 |
| 1360 | 1 | 0.5 | 2.00 | 2.00 | 2.000 | 135.18 | 50.000 | 36.989 |
| 1361 | 5 | 11.0 | 1.00 | 2.00 | 1.727 | 130.95 | 43.182 | 32.976 |
| 1362 | 42 | 42.0 | 1.00 | 3.00 | 1.095 | 153.43 | 27.381 | 17.846 |
| 1363 | 38 | 39.5 | 1.00 | 2.00 | 1.013 | 154.95 | 25.316 | 16.338 |
| 1364 | 18 | 18.0 | 1.00 | 1.00 | 1.000 | 151.23 | 25.000 | 16.532 |
| 1365 | 11 | 11.0 | 1.00 | 1.00 | 1.000 | 142.63 | 25.000 | 17.528 |
| 1366 | 21 | 41.0 | 1.00 | 1.00 | 1.000 | 121.15 | 25.000 | 20.636 |

***Table 7.*** Continued.

| Year Harvest | Laborers Number | Labor Days Number | Minimum Wage in d sterling | Maximum Wage in d sterling | Mean Wage Weighted in d | PB & H Price Index 1451–1475=100 | Nominal Wage Index 1451–1475=100 4.0d | Real Wage Index NWI/CPI |
|---|---|---|---|---|---|---|---|---|
| 1367 | 12 | 319.0 | 1.00 | 1.00 | 1.000 | 136.83 | 25.000 | 18.272 |
| 1368 | 43 | 92.5 | 1.00 | 3.00 | 2.054 | 138.90 | 51.351 | 36.970 |
| 1369 | 2 | 156.0 | 1.00 | 1.00 | 1.000 | 149.83 | 25.000 | 16.686 |
| 1370 | 57 | 131.0 | 1.00 | 1.00 | 1.000 | 183.80 | 25.000 | 13.602 |
| 1371 | 87 | 2653.0 | 1.00 | 1.00 | 1.000 | 164.20 | 25.000 | 15.225 |
| 1372 | 41 | 151.0 | 1.00 | 1.00 | 1.000 | 132.03 | 25.000 | 18.936 |
| 1373 | 15 | 37.0 | 1.00 | 1.00 | 1.000 | 130.50 | 25.000 | 19.157 |
| 1374 | 207 | 219.0 | 1.00 | 1.00 | 1.000 | 124.78 | 25.000 | 20.036 |
| 1375 | 44 | 78.0 | 1.00 | 1.00 | 1.000 | 124.80 | 25.000 | 20.032 |
| 1376 | 95 | 102.0 | 1.00 | 1.00 | 1.000 | 146.08 | 25.000 | 17.114 |
| 1377 | 17 | 61.0 | 1.00 | 1.00 | 1.000 | 111.58 | 25.000 | 22.406 |
| 1378 | 65 | 71.0 | 1.00 | 1.00 | 1.000 | 94.98 | 25.000 | 26.323 |
| 1379 | 10 | 15.0 | 1.00 | 1.00 | 1.000 | 94.24 | 25.000 | 26.529 |
| 1380 | 8 | 70.0 | 1.00 | 1.00 | 1.000 | 106.23 | 25.000 | 23.535 |
| 1381 | | | | | 1.000 | 118.19 | 25.000 | 21.153 |
| 1382 | 219 | 235.0 | 1.00 | 1.00 | 1.000 | 111.13 | 25.000 | 22.497 |
| 1383 | | | | | 1.000 | 108.23 | 25.000 | 23.100 |
| 1384 | 227 | 305.0 | 1.00 | 1.00 | 1.000 | 116.20 | 25.000 | 21.515 |
| 1385 | 7 | 13.0 | 1.00 | 1.00 | 1.000 | 110.75 | 25.000 | 22.573 |
| 1386 | 6 | 31.0 | 1.00 | 1.00 | 1.000 | 104.10 | 25.000 | 24.015 |
| 1387 | 3 | 20.0 | 1.00 | 1.00 | 1.000 | 100.28 | 25.000 | 24.931 |
| 1388 | 126 | 142.0 | 1.00 | 1.00 | 1.000 | 102.45 | 25.000 | 24.402 |
| 1389 | 715 | 717.0 | 1.00 | 1.00 | 1.000 | 100.28 | 25.000 | 24.931 |
| 1390 | 20 | 60.0 | 1.00 | 1.00 | 1.000 | 105.55 | 25.000 | 23.685 |
| 1391 | | | | | 1.000 | 132.85 | 25.000 | 18.818 |
| 1392 | 7 | 17.0 | 1.00 | 1.00 | 1.000 | 104.40 | 25.000 | 23.946 |

***Table 7.*** Continued.

| Year Harvest | Laborers Number | Labor Days Number | Minimum Wage in d sterling | Maximum Wage in d sterling | Mean Wage Weighted in d | PB & H Price Index 1451-75=100 | Nominal Wage Index 1451-75=100 4.0d | Real Wage Index NWI/CPI |
|---|---|---|---|---|---|---|---|---|
| 1393 | 8 | 34.5 | 1.00 | 1.00 | 1.000 | 100.50 | 25.000 | 24.876 |
| 1394 | 170 | 195.0 | 1.00 | 1.00 | 1.000 | 100.65 | 25.000 | 24.839 |
| 1395 | 7 | 62.5 | 1.00 | 1.00 | 1.000 | 93.25 | 25.000 | 26.810 |
| 1396 | 28 | 71.0 | 1.00 | 1.00 | 1.000 | 99.18 | 25.000 | 25.208 |
| 1397 | | | | | 1.000 | 116.18 | 25.000 | 21.519 |
| 1398 | 17 | 122.5 | 1.00 | 1.00 | 1.000 | 121.43 | 25.000 | 20.589 |
| 1399 | 55 | 135.5 | 1.00 | 1.00 | 1.000 | 112.93 | 25.000 | 22.139 |
| 1400 | 38 | 131.0 | 1.00 | 1.00 | 1.000 | 104.48 | 25.000 | 23.929 |
| 1401 | 8 | 10.0 | 1.00 | 1.00 | 1.000 | 130.03 | 25.000 | 19.227 |
| 1402 | 27 | 109.0 | 1.00 | 1.00 | 1.000 | 127.28 | 25.000 | 19.643 |
| 1403 | | | | | 1.000 | 118.85 | 25.000 | 21.035 |
| 1404 | | | | | 1.000 | 99.33 | 25.000 | 25.170 |
| 1405 | 99 | 272.0 | 1.00 | 1.00 | 1.000 | 98.73 | 25.000 | 25.323 |
| 1406 | 24 | 36.0 | 1.00 | 1.00 | 1.000 | 99.70 | 25.000 | 25.075 |
| 1407 | | | | | 1.000 | 99.35 | 25.000 | 25.164 |
| 1408 | 275 | 337.0 | 1.00 | 1.00 | 1.000 | 107.23 | 25.000 | 23.315 |
| 1409 | 235 | 571.0 | 1.00 | 1.00 | 1.000 | 119.78 | 25.000 | 20.872 |
| 1410 | 41 | 162.0 | 1.00 | 2.00 | 1.086 | 130.13 | 27.160 | 20.873 |
| 1411 | 960 | 1157.0 | 1.00 | 3.00 | 1.379 | 105.95 | 34.464 | 32.529 |
| 1412 | 12 | 28.0 | 1.00 | 2.83 | 1.196 | 102.83 | 29.911 | 29.089 |
| 1413 | 20 | 60.5 | 1.00 | 4.00 | 1.070 | 108.33 | 26.756 | 24.700 |
| 1414 | 32 | 35.0 | 1.00 | 4.50 | 1.457 | 108.13 | 36.429 | 33.691 |
| 1415 | 2 | 24.5 | 1.00 | 3.00 | 1.500 | 115.30 | 37.500 | 35.524 |

*Sources:* Archives of the British Library of Political and Economic Science, the Beveridge Price and Wage History Collection.

***Table 8.*** Prices in Flanders: The Value of a "Basket of Consumables" in d groot Flemish and in price-relatives in quiquennial means, 1346–1350 to 1496–1500: 1451–1475 = 100.

| Year | Basket Consumables Total Value in d groot Flemish | Grains Group Index 1451–1475= 100 56.354 groot Flemish | Dairy Group Index 1451–1475= 100 44.665 groot Flemish | Textiles Group Index 1451–1475= 100 25.276 groot Flemish | Commodity Basket Index 1451–1475= 100 126.295 groot Flemish | Grains as percent of total basket by value | Dairy as percent of total basket by value | Textiles as percent of total basket by value | Ratio of Grain to Dairy Price Indexes | Ratio of Grain to Textile Price Indexes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1346–1350* | 63.868 | 62.076 | 46.777 | 31.624 | 50.571 | 54.77% | 32.71% | 12.52% | 132.71% | 196.29% |
| 1351–1355 | 76.593 | 68.466 | 63.048 | 38.968 | 60.646 | 50.37% | 36.77% | 12.86% | 108.59% | 175.70% |
| 1356–1360 | 110.558 | 102.100 | 93.151 | 45.160 | 87.540 | 52.04% | 37.63% | 10.32% | 109.61% | 226.09% |
| 1361–1365 | 119.255 | 108.636 | 98.228 | 56.023 | 94.425 | 51.34% | 36.79% | 11.87% | 110.60% | 193.91% |
| 1366–1370 | 135.641 | 126.994 | 101.825 | 73.568 | 107.401 | 52.76% | 33.53% | 13.71% | 124.72% | 172.62% |
| 1371–1375 | 145.519 | 121.901 | 112.359 | 105.388 | 115.222 | 47.21% | 34.49% | 18.31% | 108.49% | 115.67% |
| 1376–1380 | 141.024 | 105.597 | 121.366 | 108.038 | 111.662 | 42.20% | 38.44% | 19.36% | 87.01% | 97.74% |
| 1381–1385 | 150.534 | 110.799 | 135.714 | 108.711 | 119.193 | 41.48% | 40.27% | 18.25% | 81.64% | 101.92% |
| 1386–1390 | 157.514 | 132.745 | 122.655 | 110.470 | 124.719 | 47.49% | 34.78% | 17.73% | 108.23% | 120.16% |
| 1391–1395 | 111.784 | 82.803 | 99.235 | 82.282 | 88.510 | 41.74% | 39.65% | 18.60% | 83.44% | 100.63% |
| 1396–1400 | 113.407 | 92.733 | 92.132 | 79.118 | 89.796 | 46.08% | 36.29% | 17.63% | 100.65% | 117.21% |
| 1401–1405 | 111.810 | 95.190 | 80.675 | 87.565 | 88.531 | 47.98% | 32.23% | 19.79% | 117.99% | 108.71% |
| 1406–1410 | 132.939 | 115.682 | 91.056 | 107.127 | 105.261 | 49.04% | 30.59% | 20.37% | 127.05% | 107.99% |
| 1411–1415 | 120.370 | 93.652 | 92.417 | 104.114 | 95.309 | 43.84% | 34.29% | 21.86% | 101.34% | 89.95% |
| 1416–1420 | 135.616 | 110.755 | 104.677 | 104.636 | 107.381 | 46.02% | 34.48% | 19.50% | 105.81% | 105.85% |
| 1421–1425 | 141.680 | 112.756 | 114.392 | 106.998 | 112.182 | 44.85% | 36.06% | 19.09% | 98.57% | 105.38% |
| 1426–1430 | 148.741 | 122.830 | 114.511 | 112.262 | 117.773 | 46.54% | 34.39% | 19.08% | 107.27% | 109.41% |
| 1431–1435 | 155.989 | 132.917 | 115.130 | 117.353 | 123.512 | 48.02% | 32.97% | 19.02% | 115.45% | 113.26% |
| 1436–1440 | 177.022 | 172.289 | 109.153 | 123.350 | 140.166 | 54.85% | 27.54% | 17.61% | 157.84% | 139.67% |
| 1441–1445 | 143.350 | 111.205 | 113.067 | 119.403 | 113.504 | 43.72% | 35.23% | 21.05% | 98.35% | 93.13% |
| 1446–1450 | 138.904 | 107.703 | 110.051 | 114.952 | 109.984 | 43.70% | 35.39% | 20.92% | 97.87% | 93.69% |
| 1451–1455 | 127.434 | 95.302 | 102.660 | 110.282 | 100.902 | 42.14% | 35.98% | 21.87% | 92.83% | 86.42% |
| 1456–1460 | 148.845 | 131.873 | 107.281 | 105.288 | 117.855 | 49.93% | 32.19% | 17.88% | 122.92% | 125.25% |

***Table 8.*** Continued.

| Year | Basket Consumables Total Value in d groot Flemish | Grains Group Index 1451–1475= 100 56.354 groot Flemish | Dairy Group Index 1451–1475= 100 44.665 groot Flemish | Textiles Group Index 1451–1475= 100 25.276 groot Flemish | Commodity Basket Index 1451–1475= 100 126.295 groot Flemish | Grains as percent of total basket by value | Dairy as percent of total basket by value | Textiles as percent of total basket by value | Ratio of Grain to Dairy Price Indexes | Ratio of Grain to Textile Price Indexes |
|---|---|---|---|---|---|---|---|---|---|---|
| 1461–1465 | 112.030 | 83.052 | 90.737 | 97.721 | 88.705 | 41.78% | 36.18% | 22.05% | 91.53% | 84.99% |
| 1466–1470 | 121.900 | 93.351 | 101.206 | 95.304 | 96.520 | 43.16% | 37.08% | 19.76% | 92.24% | 97.95% |
| 1471–1475 | 121.264 | 96.422 | 98.116 | 91.406 | 96.017 | 44.81% | 36.14% | 19.05% | 98.27% | 105.49% |
| 1476–1480 | 148.034 | 125.644 | 118.347 | 96.410 | 117.213 | 47.83% | 35.71% | 16.46% | 106.17% | 130.32% |
| 1481–1485 | 198.097 | 198.728 | 131.927 | 107.537 | 156.853 | 56.53% | 29.75% | 13.72% | 150.63% | 184.80% |
| 1486–1490 | 233.028 | 190.773 | 187.098 | 165.979 | 184.511 | 46.14% | 35.86% | 18.00% | 101.96% | 114.94% |
| 1491–1495 | 183.104 | 156.841 | 122.174 | 158.841 | 144.981 | 48.27% | 29.80% | 21.93% | 128.38% | 98.74% |
| 1496–1400 | 126.617 | 82.119 | 93.309 | 152.966 | 100.255 | 36.55% | 32.92% | 30.54% | 88.01% | 53.68% |

* data for 1349-50 only.

*Sources*: See sources for Table 1 and Munro (1984a, Table B: 5–6, pp. 104–109); Verlinden and Scholliers (1959–1965, Vol. I, pp. 44–45, 52–53; Vol. II:i, pp. 3–70); Stadsarchief Gent, Stadsrekeningen, 1350–1351 to 1499–1500.

***Table 9.*** Prices in Brabant (Antwerp-Lier-Mechelen-Brussels region) in pence groot of Brabant and price-relatives. Index: mean 1451–1475 = 100.

| Year | Basket of Consumables Total Value in d groot Brabant | Basket of Consumables Total Value in d groot Flemish | Grain Price Index 82.116d 1451–1475 = 100 | Meat-Fish Dairy Index 90.388d 1451–1475 = 100 | Industrial Goods Index 60.020d 1451–1475 = 100 | Composite Index in Brabant gr 232.524d 1451–1475 = 100 | Composite Index in Flemish gr 155.016d 1451–1475 = 100 | Grains as percent of total | Meat-Fish Dairy as percent of total | Industrial as percent of total | Ratio of Grain Prices to Meat-Fish-Dairy Prices Price relative | Ratio of Grain Prices to Industrial Prices: Price relative |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1401–1405 | 149.440 | 149.440 | 50.952 | 69.235 | 75.008 | 64.269 | 96.403 | 28.00% | 41.88% | 30.13% | 73.59 | 67.93 |
| 1406–1410 | 159.400 | 159.400 | 63.593 | 69.744 | 73.542 | 68.552 | 102.828 | 32.76% | 39.55% | 27.69% | 91.18 | 86.47 |
| 1411–1415 | 172.000 | 155.882 | 67.612 | 76.426 | 78.974 | 73.971 | 100.559 | 32.28% | 40.16% | 27.56% | 88.47 | 85.61 |
| 1416–1420 | 187.280 | 164.113 | 68.342 | 84.259 | 91.636 | 80.542 | 105.868 | 29.97% | 40.67% | 29.37% | 81.11 | 74.58 |
| 1421–1425 | 209.720 | 168.089 | 86.293 | 92.734 | 91.703 | 90.193 | 108.433 | 33.79% | 39.97% | 26.24% | 93.05 | 94.10 |
| 1426–1430 | 232.880 | 179.277 | 112.962 | 93.397 | 92.802 | 100.153 | 115.651 | 39.83% | 36.25% | 23.92% | 120.95 | 121.72 |
| 1431–1435 | 238.940 | 175.173 | 103.463 | 100.345 | 105.432 | 102.759 | 113.003 | 35.56% | 37.96% | 26.48% | 103.11 | 98.13 |
| 1436–1440 | 291.660 | 194.440 | 159.238 | 102.646 | 113.496 | 125.432 | 125.432 | 44.83% | 31.81% | 23.36% | 155.13 | 140.30 |
| 1441–1445 | 245.260 | 163.507 | 103.877 | 98.531 | 118.127 | 105.477 | 105.477 | 34.78% | 36.31% | 28.91% | 105.43 | 87.94 |
| 1446–1450 | 231.540 | 154.360 | 102.562 | 95.654 | 101.400 | 99.577 | 99.577 | 36.37% | 37.34% | 26.28% | 107.22 | 101.15 |
| 1451–1455 | 229.140 | 152.760 | 99.031 | 95.367 | 102.666 | 98.545 | 98.545 | 35.49% | 37.62% | 26.89% | 103.84 | 96.46 |
| 1456–1460 | 266.420 | 177.613 | 132.520 | 109.638 | 97.468 | 114.577 | 114.577 | 40.85% | 37.20% | 21.96% | 120.87 | 135.96 |
| 1461–1465 | 211.760 | 141.173 | 77.451 | 97.004 | 100.766 | 91.070 | 91.070 | 30.03% | 41.41% | 28.56% | 79.84 | 76.86 |
| 1466–1470 | 225.440 | 150.293 | 93.770 | 97.823 | 100.000 | 96.953 | 96.953 | 34.16% | 39.22% | 26.62% | 95.86 | 93.77 |
| 1471–1475 | 229.860 | 153.240 | 97.228 | 100.168 | 99.100 | 98.854 | 98.854 | 34.73% | 39.39% | 25.88% | 97.07 | 98.11 |
| 1476–1480 | 280.640 | 187.093 | 131.083 | 117.892 | 110.696 | 120.693 | 120.693 | 38.36% | 37.97% | 23.67% | 111.19 | 118.42 |
| 1481–1485 | 362.160 | 241.440 | 201.349 | 134.819 | 124.892 | 155.752 | 155.752 | 45.65% | 33.65% | 20.70% | 149.35 | 161.22 |
| 1486–1490 | 404.820 | 269.880 | 229.456 | 148.006 | 137.654 | 174.098 | 174.098 | 46.54% | 33.05% | 20.41% | 155.03 | 166.69 |
| 1491–1495 | 309.760 | 206.507 | 157.387 | 117.715 | 123.492 | 133.216 | 133.216 | 41.72% | 34.35% | 23.93% | 133.70 | 127.45 |
| 1496–1500 | 268.220 | 178.813 | 109.723 | 114.595 | 124.192 | 115.352 | 115.352 | 33.59% | 38.62% | 27.79% | 95.75 | 88.35 |

*Sources*: Van der Wee (1963, Vol. I; 1975, 1978).

***Table 10.*** Prices and Wages in Flanders, 1349–1350 to 1496–1500: The "Basket of Consumables" Price Index and Its Components and the Wages of Master Building Craftsmen in Bruges in Quinquennial Means, Arithmetic and Harmonic (Mean of 1451–1475 = 100).

| Year | Basket of Consum-ables Values in d groot Flemish | Commodity Basket Index 1451–1475 = 100 (126.295d) | Wages of Master Building Craftsmen in Bruges Estimated Median Wage in d gr Flemish | Bruges Nominal Wage Index 1451–1475 = 100 (11d) | Real Wage Index 1451–1475 = 100 NWI/CPI arithmetic | Real Wage Index 1451–1475 = 100 NWI/CPI harmonic | Real Wage in Units of Commodity Baskets per year of 210 days arithmetic mean | Real Wage in Units of Commodity Baskets per year of 210 days harmonic mean |
|---|---|---|---|---|---|---|---|---|
| 1349–1350 | 63.868 | 50.571 | 5.000 | 45.455 | 89.884 | 89.884 | 16.440 | 16.440 |
| 1351–1355 | 76.593 | 60.646 | 5.200 | 47.273 | 78.889 | 77.572 | 14.429 | 14.188 |
| 1356–1360 | 110.558 | 87.540 | 6.000 | 54.545 | 63.230 | 62.309 | 11.565 | 11.397 |
| 1361–1365 | 119.255 | 94.425 | 6.850 | 62.273 | 68.577 | 65.366 | 12.543 | 11.956 |
| 1366–1370 | 135.641 | 107.401 | 8.000 | 72.727 | 68.565 | 67.716 | 12.541 | 12.386 |
| 1371–1375 | 145.519 | 115.222 | 8.000 | 72.727 | 63.684 | 63.120 | 11.648 | 11.545 |
| 1376–1380 | 141.024 | 111.662 | 8.800 | 80.000 | 72.090 | 70.520 | 13.186 | 12.898 |
| 1381–1385 | 150.534 | 119.193 | 8.800 | 80.000 | 68.151 | 65.898 | 12.465 | 12.053 |
| 1386–1390 | 157.514 | 124.719 | 10.867 | 98.788 | 80.335 | 77.375 | 14.694 | 14.152 |
| 1391–1395 | 111.784 | 88.510 | 9.000 | 81.818 | 93.500 | 92.439 | 17.102 | 16.908 |
| 1396–1400 | 113.407 | 89.796 | 9.850 | 89.545 | 100.219 | 99.731 | 18.331 | 18.241 |
| 1401–1405 | 111.810 | 88.531 | 10.000 | 90.909 | 103.150 | 102.687 | 18.867 | 18.782 |
| 1406–1410 | 132.939 | 105.261 | 10.000 | 90.909 | 88.279 | 86.366 | 16.147 | 15.797 |
| 1411–1415 | 120.370 | 95.309 | 10.000 | 90.909 | 96.376 | 95.384 | 17.628 | 17.446 |
| 1416–1420 | 135.616 | 107.381 | 10.000 | 90.909 | 86.463 | 84.660 | 15.814 | 15.485 |

***Table 10.*** Continued.

| Year | Basket of Consum-ables Values in d groot Flemish | Commodity Basket Index 1451–1475 = 100 (126.295d) | Wages of Master Building Craftsmen in Bruges Estimated Median Wage in d gr Flemish | Bruges Nominal Wage Index 1451–1475 = 100 (11d) | Real Wage Index 1451–1475 = 100 NWI/CPI arithmetic | Real Wage Index 1451–1475 = 100 NWI/CPI harmonic | Real Wage in Units of Commodity Baskets per year of 210 days arithmetic mean | Real Wage in Units of Commodity Baskets per year of 210 days harmonic mean |
|---|---|---|---|---|---|---|---|---|
| 1421–1425 | 141.680 | 112.182 | 10.000 | 90.909 | 81.287 | 81.037 | 14.868 | 14.822 |
| 1426–1430 | 148.741 | 117.773 | 10.000 | 90.909 | 77.518 | 77.190 | 14.178 | 14.118 |
| 1431–1435 | 155.989 | 123.512 | 10.800 | 98.182 | 80.106 | 79.378 | 14.652 | 14.519 |
| 1436–1440 | 177.022 | 140.166 | 11.000 | 100.000 | 77.154 | 71.344 | 14.112 | 13.049 |
| 1441–1445 | 143.350 | 113.504 | 11.000 | 100.000 | 89.960 | 88.102 | 16.454 | 16.114 |
| 1446–1450 | 138.904 | 109.984 | 11.000 | 100.000 | 91.907 | 90.922 | 16.810 | 16.630 |
| 1451–1455 | 127.434 | 100.902 | 11.000 | 100.000 | 99.326 | 99.106 | 18.167 | 18.127 |
| 1456–1460 | 148.845 | 117.855 | 11.000 | 100.000 | 85.247 | 84.850 | 15.592 | 15.519 |
| 1461–1465 | 112.030 | 88.705 | 11.000 | 100.000 | 113.700 | 112.733 | 20.796 | 20.619 |
| 1466–1470 | 121.900 | 96.520 | 11.000 | 100.000 | 103.714 | 103.605 | 18.970 | 18.950 |
| 1471–1475 | 121.264 | 96.017 | 11.000 | 100.000 | 104.933 | 104.148 | 19.193 | 19.049 |
| 1476–1480 | 148.034 | 117.213 | 11.000 | 100.000 | 87.978 | 85.315 | 16.092 | 15.605 |
| 1481–1485 | 198.097 | 156.853 | 11.000 | 100.000 | 68.927 | 63.754 | 12.607 | 11.661 |
| 1486–1490 | 233.028 | 184.511 | | | | | | |
| 1491–1495 | 183.104 | 144.981 | | | | | | |
| 1496–1400 | 126.617 | 100.255 | | | | | | |

*Sources*: See sources for Table 1, and Stadsarchief Brugge, Stadsrekeningen 1350–1351 to 1499–1500; Algemeen Rijksarchief, Rekenkamer, reg. nos. 32,461–32,532.

***Table 11.*** Ghent Fullers' Wages (Flanders): Nominal and Real, 1373–1430. Wages for Master and Two Journeymen To Full a Woolen Broadcloth in Three Days: and Wages for Policemen in Bruges: in d groot Flemish, with annual wages expressed in terms of the value of the Flemish "basket of consumables", with price-relatives in quinquennial means: 1373–1375 to 1426–1430.

| Years | Nominal Wage in d groot Flemish 3 days: M + 2J | Nominal Wage in d groot Flemish journeymen per day | Bruges Police-man's Daily Wage | Income for 210 days per fuller journeyman in d groot Flemish | Income for 210 days per fuller journeyman in £ groot Flemish | Value of Commodity Basket in d groot Flemish | Price Index 1451–1475 = 100 | No. of Commodity Baskets for fullers' annual wage arithmetic mean | No. of Commodity Baskets for fullers' annual wage harmonic mean |
|---|---|---|---|---|---|---|---|---|---|
| 1373–1375* | 45.00 | 5.250 | 5.00 | 1102.500 | 4.594 | 144.679 | 114.556 | 7.680 | 7.620 |
| 1376–1380 | 45.00 | 5.250 | 5.20 | 1102.500 | 4.594 | 141.024 | 111.662 | 7.834 | 7.818 |
| 1381–1385 | 45.00 | 5.250 | 6.00 | 1102.500 | 4.594 | 150.534 | 119.193 | 7.388 | 7.324 |
| 1386–1390 | 42.40 | 4.947 | 6.00 | 1038.800 | 4.328 | 157.514 | 124.719 | 6.669 | 6.451 |
| 1391–1395 | 32.00 | 3.733 | 6.00 | 784.000 | 3.267 | 111.784 | 88.510 | 7.094 | 7.014 |
| 1396–1400 | 32.00 | 3.733 | 5.40 | 784.000 | 3.267 | 113.407 | 89.796 | 6.955 | 6.913 |
| 1401–1405 | 32.00 | 3.733 | 5.00 | 784.000 | 3.267 | 111.810 | 88.531 | 7.044 | 7.012 |
| 1406–1410 | 32.00 | 3.733 | 5.00 | 784.000 | 3.267 | 132.939 | 105.261 | 6.028 | 5.897 |
| 1411–1415 | 32.00 | 3.733 | 5.00 | 784.000 | 3.267 | 120.370 | 95.309 | 6.581 | 6.513 |
| 1416–1420 | 32.00 | 3.733 | 5.00 | 784.000 | 3.267 | 135.616 | 107.381 | 5.904 | 5.781 |
| 1421–1425 | 36.80 | 4.293 | 5.00 | 901.600 | 3.757 | 141.680 | 112.182 | 6.374 | 6.299 |
| 1426–1430 | 40.00 | 4.667 | 5.00 | 980.000 | 4.083 | 148.741 | 117.773 | 6.617 | 6.589 |

* data available only for 1373–1375.
M = master fuller;
J = journeymen fullers (2);
d = 12d per shilling and 240d to the pound groot Flemish.
*Sources*: Espinas and Pirenne (1906–1924, Vol. II, No. 492, pp. 535–537), Algemeen Rijksarchief België, Trésor de Flandre, Series I, no. 2208; Rijksarchief van Oost Vlaanderen te Gent, Oostenrijks Fonds, layette 2, Sources for Tables 1 and 8.

***Table 12.*** Nominal and Real Wages of Kortrijk (Courtrai) Fullers, 1349–1450. Kortrijk Fullers' Wages, Nominal and Real: 1349–1450. Wages for Master and Two Journeymen to Full a Woolen Broadcloth in Three Days: in d groot Flemish, with annual wages expressed in terms of the value of a Flemish "basket of consumables," with price relatives in quinquennial means, 1351–1355 to 1446–1450.

| Years (5) | Fullers' Fee: in d groot Flemish | Journeymen's men's Pay in d groot Flemish | Journeymen's men's Pay per day in d groot Flemish | Income for 210 days in d groot Flemish | Value of a Basket of Consumables in d groot Flemish | Flemish Price Index 1451–1475 = 100 | Journeymen Fuller's Annual Income in baskets of consumables arithmetic mean | Journeymen Fuller's Annual Income in baskets of consumables harmonic mean |
|---|---|---|---|---|---|---|---|---|
| 1349–1350 | 15.167 | 5.308 | 1.769 | 371.583 | 63.868 | 50.571 | 5.818 | 5.818 |
| 1351–1355 | 15.167 | 5.308 | 1.769 | 371.583 | 76.593 | 60.646 | 4.915 | 4.851 |
| 1356–1360 | 15.167 | 5.308 | 1.769 | 371.583 | 110.558 | 87.540 | 3.411 | 3.361 |
| 1361–1365 | 15.167 | 5.308 | 1.769 | 371.583 | 119.255 | 94.425 | 3.234 | 3.116 |
| 1366–1370 | 15.167 | 5.308 | 1.769 | 371.583 | 135.641 | 107.401 | 2.774 | 2.739 |
| 1371–1375 | 25.500 | 8.925 | 2.975 | 624.750 | 145.519 | 115.222 | 3.352 | 3.442 |
| 1376–1380 | 41.000 | 14.350 | 4.783 | 1004.500 | 141.024 | 111.662 | 7.138 | 7.123 |
| 1381–1385 | 41.000 | 14.350 | 4.783 | 1004.500 | 150.534 | 119.193 | 6.731 | 6.673 |
| 1386–1390 | 40.000 | 14.000 | 4.667 | 980.000 | 157.514 | 124.719 | 6.280 | 6.197 |
| 1391–1395 | 36.000 | 12.600 | 4.200 | 882.000 | 111.784 | 88.510 | 7.981 | 7.890 |
| 1396–1400 | 36.000 | 12.600 | 4.200 | 882.000 | 113.407 | 89.796 | 7.824 | 7.777 |
| 1401–1405 | 36.000 | 12.600 | 4.200 | 882.000 | 111.810 | 88.531 | 7.924 | 7.888 |
| 1406–1410 | 36.000 | 12.600 | 4.200 | 882.000 | 132.939 | 105.261 | 6.782 | 6.635 |
| 1411–1415 | 36.000 | 12.600 | 4.200 | 882.000 | 120.370 | 95.309 | 7.404 | 7.327 |
| 1416–1420 | 38.400 | 13.440 | 4.480 | 940.800 | 135.616 | 107.381 | 7.127 | 6.854 |
| 1421–1425 | 38.400 | 13.440 | 4.480 | 940.800 | 141.680 | 112.182 | 6.668 | 6.595 |

***Table 12.*** Continued.

| Years (5) | Fullers' Fee: in d groot Flemish | Journeymen's men's Pay in d groot Flemish | Journeymen's men's Pay per day in d groot Flemish | Income for 210 days in d groot Flemish | Value of a Basket of Consumables in d groot Flemish | Flemish Price Index 1451–1475 = 100 | Journeymen Fuller's Annual Income in baskets of consumables arithmetic mean | Journeymen Fuller's Annual Income in baskets of consumables harmonic mean |
|---|---|---|---|---|---|---|---|---|
| 1426–1430 | 39.200 | 13.720 | 4.573 | 960.400 | 148.741 | 117.773 | 6.446 | 6.432 |
| 1431–1435 | 42.200 | 14.770 | 4.923 | 1033.900 | 155.989 | 123.512 | 6.671 | 6.616 |
| 1436–1440 | 40.000 | 14.000 | 4.667 | 980.000 | 177.022 | 140.166 | 5.987 | 5.536 |
| 1441–1445 | 40.000 | 14.000 | 4.667 | 980.000 | 143.350 | 113.504 | 6.981 | 6.836 |
| 1446–1450 | 40.000 | 14.000 | 4.667 | 980.000 | 138.904 | 109.984 | 7.132 | 7.055 |

*Sources*: Espinas and Pirenne (1906–1924, Vol. II, no. 492, pp. 535–537), Algemeen Rijksarchief België, Trésor de Flandre, Series I. Rijksarchief van Oost Vlaanderen te Gent, Oostenrijks Fonds.

***Table 13.*** Wages of Antwerp Masons: Daily Summer and Winter Rates in pence (d) groot of Brabant with estimated annual money wage incomes expressed in equivalent "baskets of consumables" with price-relatives, in quinquennial means: 1401–1405 to 1496–1500.

| Years (5) | Masons: Masters d groot Summer Wage | Masons: Masters d groot Winter Wage | Masons: Masters Mean annual wage* | Value of Brabant Commodity Basket in d groot Brabant | Brabant Price Index 1451–1475 = 100 232.524d | Masons: Nominal Wage Index 1451–1475 = 100 [12d] | Masons: Real Wage Index NWI/CPI harmonic mean | Annual Wage in Commodity Baskets (210 days) harmonic mean | Annual Wage in Commodity Baskets (seasonal)* harmonic mean | Winter Wage as percent of summer wage |
|---|---|---|---|---|---|---|---|---|---|---|
| 1401–1405 | 7.75 | 6.00 | 7.313 | 149.440 | 64.269 | 64.583 | 100.301 | 10.870 | 10.262 | 77.48% |
| 1406–1410 | 8.00 | 6.00 | 7.500 | 159.400 | 68.552 | 66.667 | 97.250 | 10.540 | 9.881 | 75.00% |
| 1411–1415 | 8.00 | 6.00 | 7.500 | 172.000 | 73.971 | 66.667 | 90.126 | 9.767 | 9.157 | 75.00% |
| 1416–1420 | 8.00 | 6.00 | 7.500 | 187.280 | 80.542 | 66.667 | 82.772 | 8.971 | 8.410 | 75.00% |
| 1421–1425 | 8.00 | 6.00 | 7.500 | 209.720 | 90.193 | 66.667 | 73.916 | 8.011 | 7.510 | 75.00% |
| 1426–1430 | 8.00 | 6.00 | 7.500 | 232.880 | 100.153 | 66.667 | 66.565 | 7.214 | 6.763 | 75.00% |
| 1431–1435 | 9.70 | 7.00 | 9.025 | 238.940 | 102.759 | 80.833 | 78.130 | 8.467 | 7.858 | 71.64% |
| 1436–1440 | 10.00 | 8.00 | 9.500 | 291.660 | 125.432 | 83.333 | 66.437 | 7.200 | 6.840 | 80.00% |
| 1441–1445 | 11.40 | 9.00 | 10.800 | 245.260 | 105.477 | 95.000 | 89.287 | 9.677 | 9.192 | 79.36% |
| 1446–1450 | 12.00 | 9.00 | 11.250 | 231.540 | 99.577 | 100.000 | 100.425 | 10.884 | 10.203 | 75.00% |
| 1451–1455 | 12.00 | 9.00 | 11.250 | 229.140 | 98.545 | 100.000 | 101.477 | 10.998 | 10.310 | 75.00% |
| 1456–1460 | 12.00 | 9.00 | 11.250 | 266.420 | 114.577 | 100.000 | 87.277 | 9.459 | 8.868 | 75.00% |
| 1461–1465 | 12.00 | 9.00 | 11.250 | 211.760 | 91.070 | 100.000 | 109.805 | 11.900 | 11.156 | 75.00% |
| 1466–1470 | 12.00 | 9.00 | 11.250 | 225.440 | 96.953 | 100.000 | 103.142 | 11.178 | 10.480 | 75.00% |
| 1471–1475 | 12.00 | 9.00 | 11.250 | 229.860 | 98.854 | 100.000 | 101.159 | 10.963 | 10.278 | 75.00% |
| 1476–1480 | 12.00 | 9.00 | 11.250 | 280.640 | 120.693 | 100.000 | 82.855 | 8.979 | 8.418 | 75.00% |

***Table 13.*** Continued.

| Years (5) | Masons: Masters d groot Summer Wage | Masons: Masters d groot Winter Wage | Masons: Masters Mean annual wage* | Value of Brabant Commodity Basket in d groot Brabant | Brabant Price Index 1451-75= 100 232.524d | Masons: Nominal Wage Index 1451–1475 = 100 [12d] | Masons: Real Wage Index NWI/CPI harmonic mean | Annual Wage in Commodity Baskets (210 days) harmonic mean | Annual Wage in Commodity Baskets (seasonal)* harmonic mean | Winter Wage as percent of summer wage |
|---|---|---|---|---|---|---|---|---|---|---|
| 1481–1485 | 12.00 | 9.00 | 11.250 | 362.160 | 155.752 | 100.000 | 64.205 | 6.958 | 6.523 | 75.00% |
| 1486–1490 | 12.90 | 9.90 | 12.150 | 404.820 | 174.098 | 107.500 | 61.883 | 6.707 | 6.316 | 76.67% |
| 1491–1495 | 12.00 | 9.00 | 11.250 | 309.760 | 133.216 | 100.000 | 75.066 | 8.135 | 7.627 | 75.00% |
| 1496–1400 | 12.40 | 9.00 | 11.550 | 268.220 | 115.352 | 103.333 | 89.522 | 9.702 | 9.039 | 72.60% |

* Seasonal: the summer wage prevailed for nine months and the winter wage for three.

*Sources:* Van der Wee (1963, Vol. I: Statistics, pp. 333–389: Synoptic Tables of Wages and Appendices 27–30; 1975, 1978).

***Table 14.*** Wages of Building Craftsmen in Mechelen in d groot of Brabant: for masons, carpenters, street-pavers and laborers: employed by the town government and the Onse Lieve Vrouw Hospital with estimated annual money incomes expressed in terms of equivalent "baskets of consumables," with price- and wage-relatives in quinquennial means, 1421–1425 to 1496–1500.

| Years (5) | Value of Basket of Cons-umables in d groot Brabant | Masons Masters summer wage Town in d groot Brabant | Masons Master winter wage Town in d groot Brabant | Masons: Real Wage Index 1451–1475 = 100 harmonic mean | Masons: Annual Wage in Commodity Baskets 210 days harmonic mean | Masons: Annual Wage in Commodity Baskets 210 days harmonic mean | Carpenters Masters summer wage Town in d groot Brabant | Carpenters Master winter wage Town in d groot Brabant | Carpenters Annual Wage in Commodity Baskets 210 days harmonic mean |
|---|---|---|---|---|---|---|---|---|---|
| 1421–1425 | 209.72 | 10.00 | 8.00 | 92.395 | 10.013 | 9.513 | 10.00 | 7.00 | 9.262 |
| 1426–1430 | 232.88 | 10.00 | 8.00 | 83.206 | 9.018 | 8.567 | 10.00 | 7.60 | 8.476 |
| 1431–1435 | 238.94 | 10.80 | 8.80 | 86.642 | 9.390 | 8.947 | 10.40 | 8.00 | 8.572 |
| 1436–1440 | 291.66 | 12.00 | 10.00 | 79.724 | 8.640 | 8.280 | 12.00 | 8.00 | 7.920 |
| 1441–1445 | 245.26 | 12.00 | 10.00 | 94.807 | 10.275 | 9.847 | 12.00 | 10.00 | 9.847 |
| 1446–1450 | 231.54 | 12.00 | 10.00 | 100.425 | 10.884 | 10.430 | 12.00 | 9.40 | 10.301 |
| 1451–1455 | 229.14 | 12.00 | 10.00 | 101.477 | 10.998 | 10.539 | 12.00 | 9.00 | 10.310 |
| 1456–1460 | 266.42 | 12.00 | 10.00 | 87.277 | 9.459 | 9.065 | 12.00 | 9.00 | 8.868 |
| 1461–1465 | 211.76 | 12.00 | 10.00 | 109.805 | 11.900 | 11.404 | 12.00 | 9.00 | 11.156 |
| 1466–1470 | 225.44 | 12.00 | 10.00 | 103.142 | 11.178 | 10.712 | 12.00 | 9.00 | 10.480 |
| 1471–1475 | 229.86 | 12.00 | 10.00 | 101.159 | 10.963 | 10.506 | 12.00 | 9.20 | 10.323 |
| 1476–1480 | 280.64 | 12.00 | 10.00 | 82.855 | 8.979 | 8.605 | 12.00 | 10.00 | 8.605 |
| 1481–1485 | 362.16 | 12.00 | 10.00 | 64.205 | 6.958 | 6.668 | 12.00 | 10.00 | 6.668 |
| 1486–1490 | 404.82 | 12.30 | 10.40 | 58.587 | 6.349 | 6.099 | 12.00 | 10.00 | 5.966 |
| 1491–1495 | 309.76 | 13.50 | 12.00 | 84.449 | 9.152 | 8.898 | 13.50 | 12.00 | 8.898 |
| 1496–1500 | 268.22 | 13.50 | 12.00 | 97.528 | 10.570 | 10.276 | 13.50 | 12.00 | 10.276 |

***Table 14.*** Continued.

| Years (5) | Pavers Masters summer wage Town in d groot Brabant | Pavers Masters winter wage Town in d groot Brabant | Pavers Anual Wage in Commodity Baskets Seasonally adjusted harmonic mean | Masons Masters OLV Hospital summer wage in d gr Br | Masons Annual Wage in Commodity Baskets seasonally adjusted harmonic mean | Masons Servants OLV Hospital summer wage in d gr Br | Masons Servants Annual Wage Commodity Baskets seasonally adjusted harmonic mean | Carpenters Master OLV Hospital summer wage in d gr Br | Carpenters Annual Wage in Commodity Baskets seasonally adjusted harmonic mean |
|---|---|---|---|---|---|---|---|---|---|
| 1421–1425 | 8.00 | 6.00 | 7.510 | 8.00 | 7.677 | 5.00 | 4.798 | 9.00 | 8.637 |
| 1426–1430 | 8.90 | 6.80 | 7.548 | 8.00 | 6.913 | 5.60 | 4.746 | 9.00 | 7.778 |
| 1431–1435 | 9.20 | 7.20 | 7.623 | 9.00 | 7.549 | 6.40 | 5.376 | 9.40 | 7.883 |
| 1436–1440 | 10.00 | 8.00 | 6.840 | 10.60 | 7.202 | 6.80 | 4.554 | 10.60 | 7.202 |
| 1441–1445 | 11.00 | 9.00 | 8.990 | 11.60 | 9.430 | 7.60 | 6.115 | 11.40 | 9.172 |
| 1446–1450 | 11.00 | 9.00 | 9.523 | 11.00 | 9.485 | 7.20 | 6.178 | 10.20 | 8.783 |
| 1451–1455 | 11.00 | 9.00 | 9.623 | 10.60 | 9.271 | 6.00 | 5.270 | 10.00 | 8.783 |
| 1456–1460 | 11.00 | 9.00 | 8.276 | 11.20 | 8.362 | 7.60 | 5.638 | 11.20 | 8.362 |
| 1461–1465 | 11.00 | 9.00 | 10.413 | 12.00 | 11.404 | 8.00 | 7.603 | 12.00 | 11.404 |
| 1466–1470 | 11.00 | 9.00 | 9.781 | 12.00 | 10.712 | 8.00 | 7.142 | 12.00 | 10.712 |
| 1471–1475 | 11.00 | 9.00 | 9.593 | 12.00 | 10.506 | 8.00 | 7.004 | 12.00 | 10.506 |
| 1476–1480 | 11.00 | 8.60 | 7.773 | 12.00 | 8.605 | 8.00 | 5.737 | 12.00 | 8.605 |
| 1481–1485 | 11.00 | 8.00 | 5.944 | 12.00 | 6.668 | 8.00 | 4.446 | 12.00 | 6.668 |
| 1486–1490 | 12.00 | 8.00 | 5.706 | 12.00 | 5.966 | 8.00 | 3.977 | 12.00 | 5.966 |
| 1491–1495 | 12.40 | 9.40 | 7.780 | 12.00 | 7.796 | 8.20 | 5.291 | 12.00 | 7.796 |
| 1496–1500 | 13.00 | 11.00 | 9.787 | 11.60 | 8.673 | 8.00 | 5.879 | 11.20 | 8.363 |

***Table 14.*** Continued.

| Years (5) | Pavers Masters OLV Hospital summer wage in d groot Brabant | Pavers Annual Wage in Commodity Baskets seasonally adjusted harmonic mean | Laborers OLV Hospital summer wage in d groot Brabant | Laborers Annual Wage in Commodity Baskets seasonally adjusted harmonic mean |
|---|---|---|---|---|
| 1421–1425 | 7.00 | 6.717 | 3.00 | 2.879 |
| 1426–1430 | 7.40 | 6.369 | 3.70 | 3.161 |
| 1431–1435 | 8.00 | 6.738 | 4.40 | 3.649 |
| 1436–1440 | | | 5.30 | 3.657 |
| 1441–1445 | | | 6.80 | 5.444 |
| 1446–1450 | 12.00 | 10.430 | 7.30 | 6.348 |
| 1451–1455 | 12.00 | 10.539 | 6.40 | 5.577 |
| 1456–1460 | 10.60 | 7.940 | 5.40 | 4.061 |
| 1461–1465 | 10.00 | 9.504 | 5.60 | 5.247 |
| 1466–1470 | 10.40 | 9.223 | 5.40 | 4.724 |
| 1471–1475 | 12.00 | 10.506 | 6.00 | 5.253 |
| 1476–1480 | 12.00 | 8.605 | 6.00 | 4.303 |
| 1481–1485 | 12.00 | 6.668 | 6.00 | 3.334 |
| 1486–1490 | 12.00 | 5.966 | 6.00 | 2.983 |
| 1491–1495 | 12.00 | 7.796 | 6.00 | 3.898 |
| 1496–1500 | 12.00 | 9.004 | 6.00 | 4.502 |

Seasonal = 157.5 days for the summer wage and 52.5 days for the winter wage.
d = pence (d): 12d to the shilling and 240d to the pound groot.
*Sources*: Verlinden and Scholliers (1959–1965, Vol. II, part ii, pp. 1244–1299).

***Table 15.*** Daily Summer Wages for Craftsmen in the Small Towns and Villages of Eastern Flanders, 1406–1470: For carpenters and thatchers in Afsne, St. Denijs (Maalte), Destelbergen, Zaffelare, and Zevergem: in d groot Flemish and annual wage income in units of the Flemish "basket of consumables" in quinquennial means (arithmetic and harmonic).*

| Years (5) | Value of Flemish Basket of Consumables in d groot Flemish | Afsne Carpenters wage in in d groot (daily) | Afsne Carpenters wage in units of the Flemish commodity basket (210 days) harmonic mean | Afsne Thatchers wage in d groot (daily) | Afsne Thatchers wage in units of the Flemish commodity basket (210 days) harmonic mean | St. Denijs Thatchers wage in d groot (daily) | St. Denijs Thatchers wage in units of the Flemish commodity basket (210 days) harmonic mean | Destelbergen Thatchers wage in d groot (daily) | Destelbergen Thatchers wage in units of the Flemish commodity basket (210 days) harmonic mean |
|---|---|---|---|---|---|---|---|---|---|
| 1406–1410 | 151.011 | 10.00 | 14.055 | 8.00 | 11.244 | 8.00 | 11.244 | 8.00 | 11.244 |
| 1411–1415 | 120.370 | 10.00 | 17.446 | 8.60 | 15.030 | 8.60 | 15.030 | 8.60 | 15.030 |
| 1416–1420 | 135.616 | 10.00 | 15.485 | 8.60 | 13.339 | 9.00 | 13.936 | 9.00 | 13.936 |
| 1421–1425 | 141.680 | 10.00 | 14.822 | 8.60 | 12.695 | 9.20 | 13.629 | 9.20 | 13.629 |
| 1426–1430 | 148.741 | 10.00 | 14.118 | 10.00 | 14.118 | 10.00 | 14.118 | 10.00 | 14.118 |
| 1431–1435 | 155.989 | 10.00 | 13.463 | 10.00 | 13.463 | 10.00 | 13.463 | 10.00 | 13.463 |
| 1436–1440 | 177.022 | 10.00 | 11.863 | 10.00 | 11.863 | 10.00 | 11.863 | 10.00 | 11.863 |
| 1441–1445 | 143.350 | 10.00 | 14.649 | 10.00 | 14.649 | 10.00 | 14.649 | 10.00 | 14.649 |
| 1446–1450 | 138.904 | 10.00 | 15.118 | 10.00 | 15.118 | 10.00 | 15.118 | 10.00 | 15.118 |
| 1451–1455 | 127.434 | 9.60 | 15.727 | 9.40 | 15.230 | 9.60 | 15.727 | 9.20 | 14.980 |
| 1456–1460 | 148.845 | 7.80 | 11.011 | 6.00 | 8.465 | 7.80 | 11.011 | 8.00 | 11.287 |
| 1461–1465 | 112.030 | 7.40 | 13.861 | 6.40 | 11.884 | 7.40 | 13.861 | 8.00 | 14.996 |
| 1466–1470 | 121.900 | 7.00 | 12.059 | 7.00 | 12.059 | 7.00 | 12.059 | 7.80 | 13.415 |

***Table 15.*** Continued.

| Years (5) | Zaffelare Thatchers wage in d groot (daily) | Zaffelare Thatchers wage in units of the Flemish commodity basket (210 days) harmonic mean | Zevergem Thatchers wage in d groot (daily) | Zevergem Thatchers wage in units of the Flemish commodity basket (210 days) harmonic mean | Small Towns: estimated means of annual wage in Flemish commodity baskets |
|---|---|---|---|---|---|
| 1406–1410 | 6.00 | 8.433 | 7.50 | 10.758 | 11.163 |
| 1411–1415 | 6.00 | 10.468 | 9.00 | 15.702 | 14.784 |
| 1416–1420 | 5.80 | 8.998 | 7.50 | 11.485 | 12.863 |
| 1421–1425 | 6.00 | 8.893 | 6.00 | 8.893 | 12.094 |
| 1426–1430 | 6.20 | 8.738 | 6.40 | 9.025 | 12.373 |
| 1431–1435 | 7.00 | 9.424 | 8.80 | 11.679 | 12.492 |
| 1436–1440 | 6.90 | 8.200 | 8.00 | 9.490 | 10.857 |
| 1441–1445 | 6.00 | 8.790 | 8.00 | 11.720 | 13.185 |
| 1446–1450 | 5.60 | 8.468 | 8.00 | 12.095 | 13.506 |
| 1451–1455 | 5.20 | 8.511 | 8.00 | 13.183 | 13.893 |
| 1456–1460 | 6.10 | 8.596 | 7.00 | 9.778 | 10.025 |
| 1461–1465 | 6.10 | 11.444 | 6.20 | 11.619 | 12.944 |
| 1466–1470 | 6.00 | 10.336 | 7.80 | 13.401 | 12.222 |

* The quinquennial means for the values of the Flemish "basket of commodities" and of the money wages are arithmetic; those for the quantities, or number of baskets that could have been purchased with the annual money wage (210 days), are in harmonic means.

*Sources*: Verlinden and Scholliers (1959–1965: Vol. II.i, pp. 520–524 for Afsne; pp. 524–528 for Destelbergen; pp. 556–558 for St. Denijs/Maalte; pp. 568–572 for Zaffelare; pp. 574–577 for Zevergem.

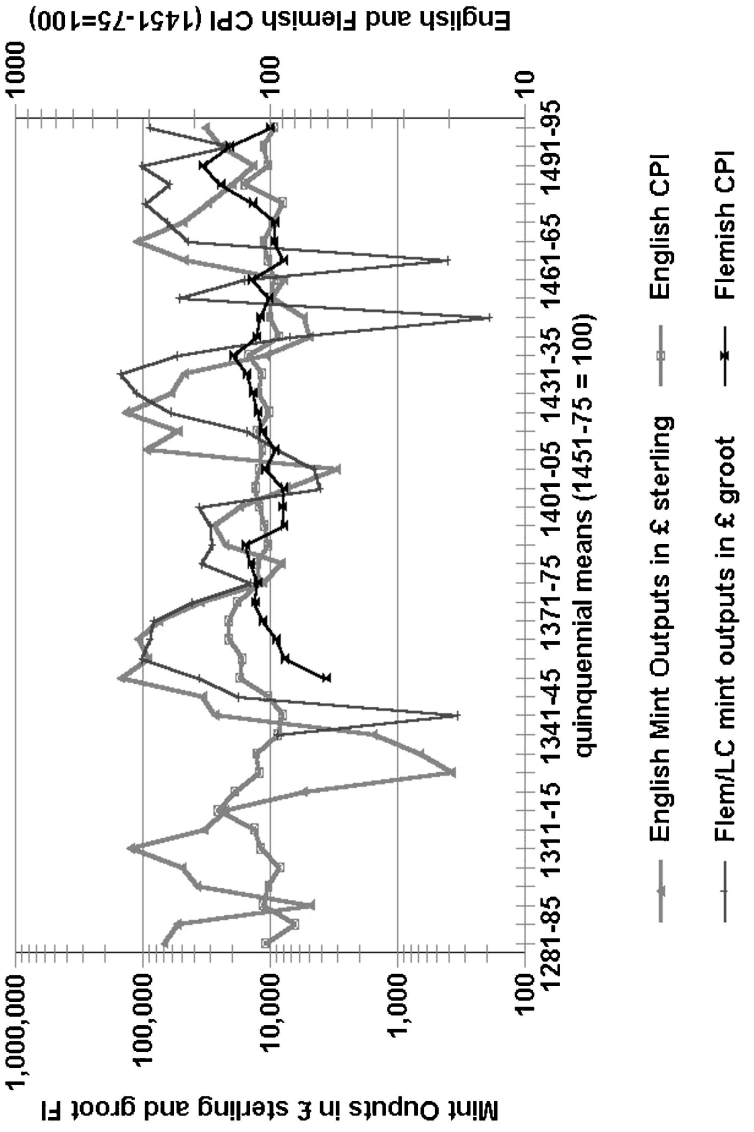


*Fig. 1.* Mint Outputs & Prices (Logs), 1281–1500: England, Flanders, Low Countries.

*Sources:* See Tables 3, 4, 5 and 8.

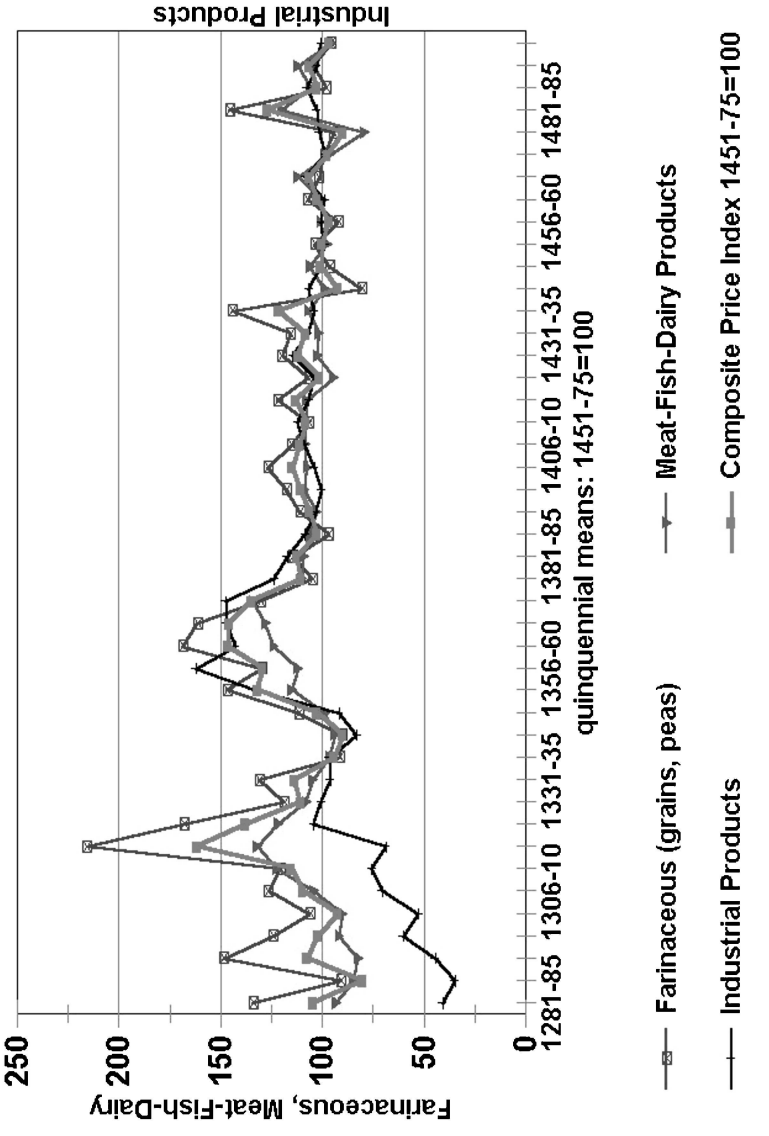


*Fig. 2.* English Prices, 1281–1500. Phelps Brown & Hopkins Composite Index.

*Source*: See Table 5.

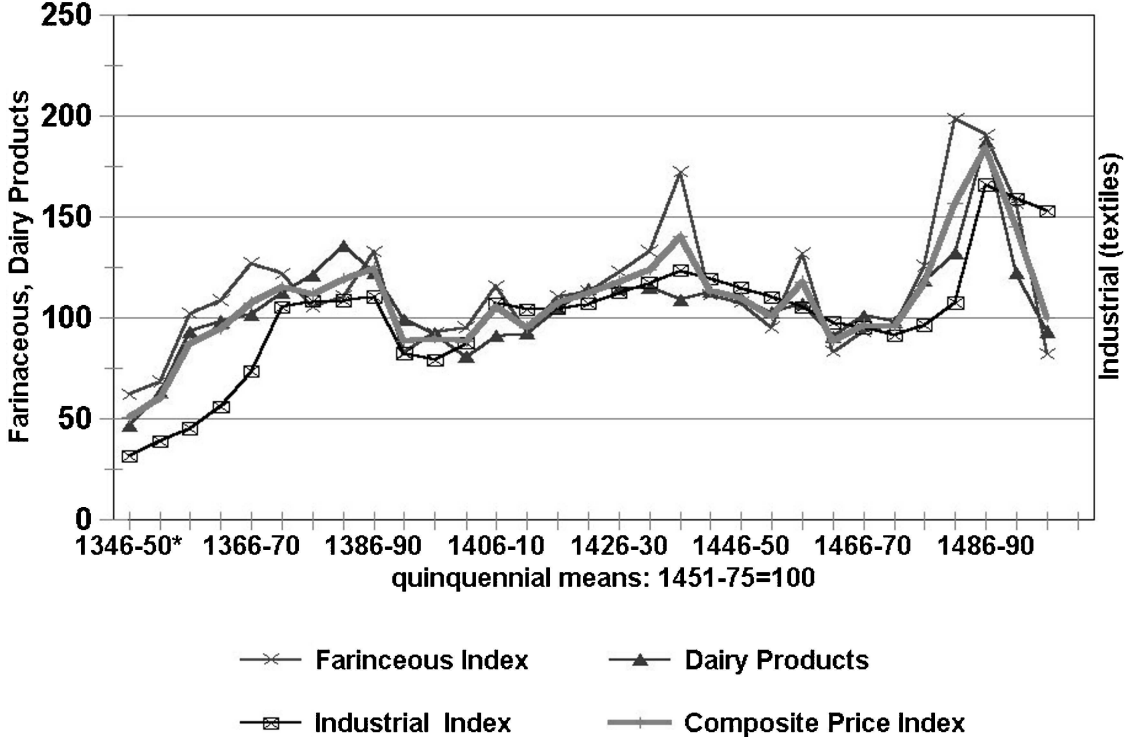


*Fig. 3.* Flemish Prices, 1351–1500. Composite Price Index: 1415–1475 = 100.

*Source*: See Table 8.

*Note*: * 1349–1350 only.

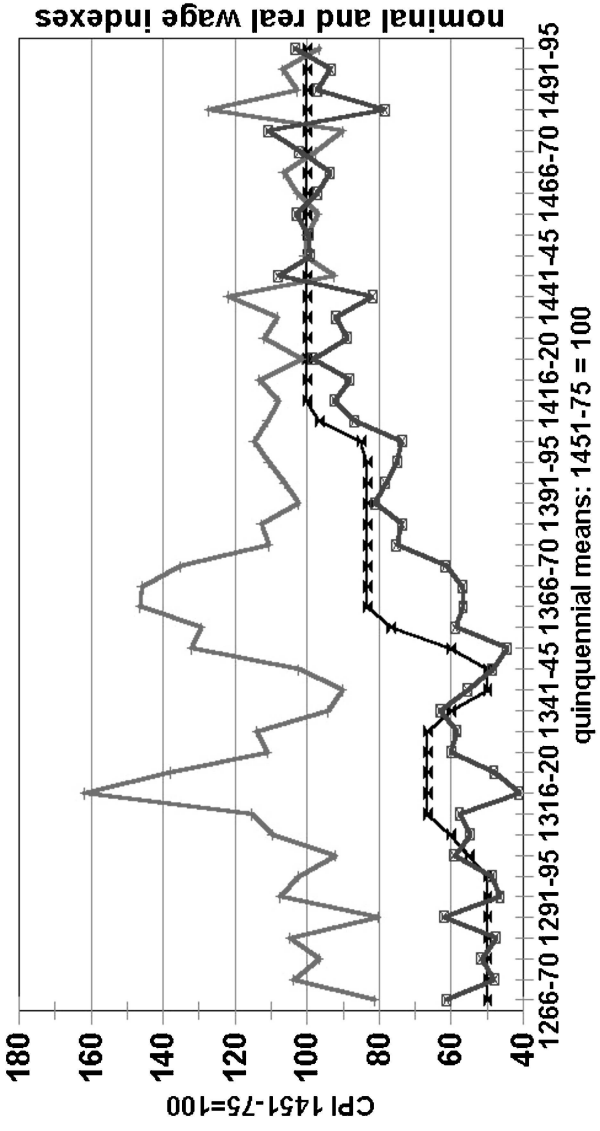


*Fig. 4.* English Masons' Wages, 1266–1500. CPI, Nominal and Real Wage Indexes.

*Source:* See Table 6.

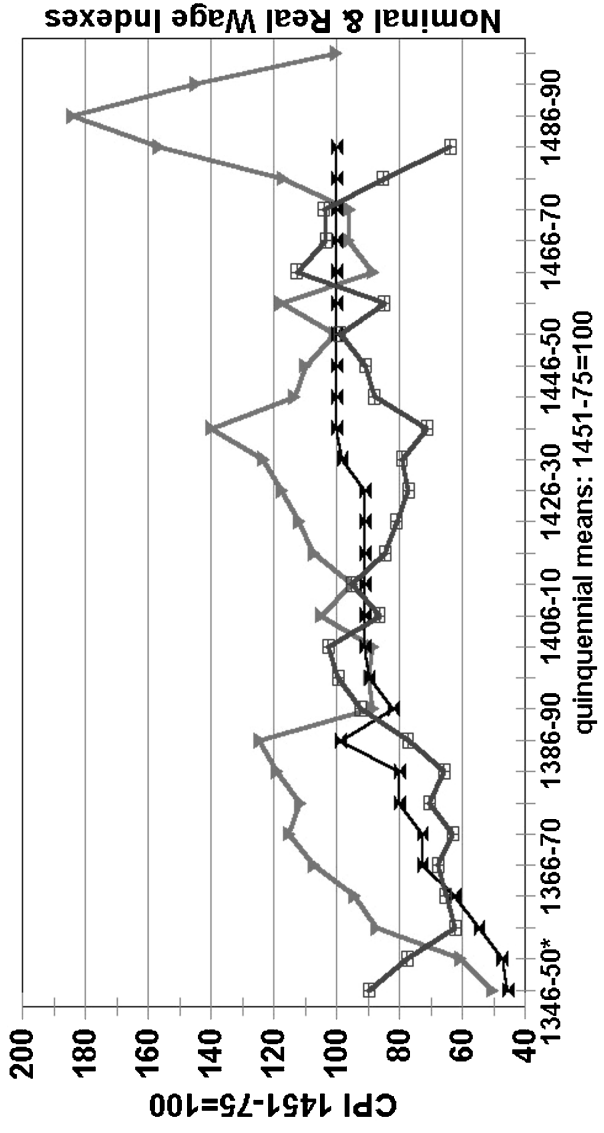


*Fig. 5.* Bruges Masons' Wages, 1351–1500. CPI, Nominal and Real Wage Indexes.

*Sources*: See Tables 8 and 10.

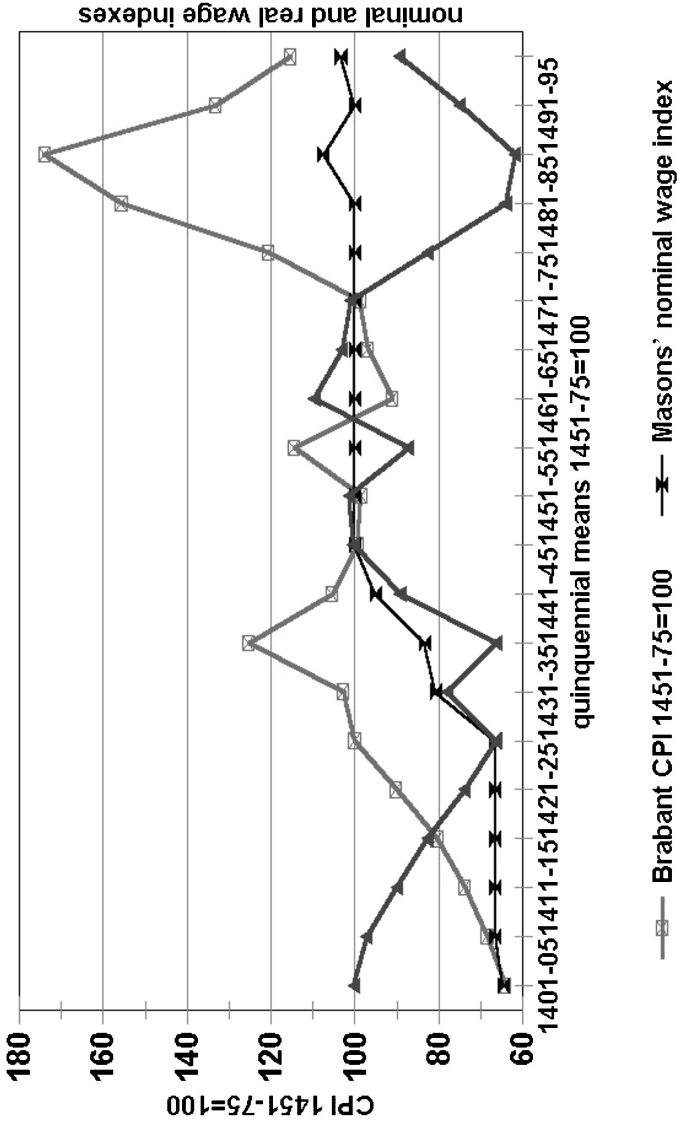


*Fig. 6.* Antwerp Masons' Wages, 1401–1500. CPI, Nominal and Real Wage Indexes.

*Sources*: See Tables 9 and 13.

# NOTES

1. Wages for master building craftsmen were 22d to 24d per day from 1730–1736; 24d from 1736–1773; and rising to 29d per day from 1773 to 1776. I have also revised the values of the sub-indexes and of the composite price index from tabulating the data from their working sheets, in: *Archives of the British Library of Political and Economic Science* [hereafter BLPES], the Phelps Brown Papers Collection.

2. See Rogers (1866, Vol. II, p. 317; and 1882, Vol. III, p. 628; Vol. IV, p. 520). In this transition period, wages were unstable: some masons and carpenters were paid 6d, 6.5d, 6.67d, 7.0d, and a few even 8d; but the mean appears to be 6.5d in this and the following years. With a base of 1451–1475 = 100, the Phelps Brown and Hopkins "basket of consumables" index stood at 96.90 in 1510, and about 110.0 in 1515–1517; but by 1536 this had risen to 164.25. The summer daily wage for master masons and carpenters rose to 7d in 1542, and thereafter by 1/2d increments to 10d in 1559, remaining at that rate until 1574.

3. Data from Stadsarchief Brugge, Stadsrekeningen 1331–1332 to 1475–1476; and Algemeen Rijksarchief, Rekenkamer, doc. nos. 32,461–32,566 (1406–1513). The policemen were paid this daily rate for the full 365 (or 366) days in the year, while the average master mason or carpenter worked at most about 210 days a year. For wages in Bruges, see also Sosson (1977, pp. 225–260, and graphs, pp. 300–309).

4. Wage data for Brabant taken from Verlinden and Scholliers (1959–1965, Vols. I–II); Van der Wee (1963, Vol. I, Appendices 27–30, pp. 333–389; Van der Wee, 1975, pp. 413–447).

5. See also Steffen (Stuttgart, 1901–1905).

6. See Van Zanden (1999, p. 192), commenting ". . . that there was no clear cut relationship between economic development and real wage growth" (p. 192); and that his research on real-wages "throws doubt on some of the conclusions of the optimists," referring in particular to De Vries (1994).

7. See Van der Wee (1975, pp. 413–447). His data show that Antwerp craftsmen did not suffer the same deterioration in real wages as did English craftsmen during the Price Revolution era (c.1520–c.1640), even with substantial demographic growth and inflation in both countries.

8. On the English "Assize of Bread and Ale," see Bland, Brown and Tawney (1914, pp. 155–157); Ross (1956–1957); and Jones (2000, pp. 136–138). The earliest assize dates from the twelfth century (reign of Henry I) and became the statute *Assisa Panis et Cervisie* evidently in 1266 (51 Henrici III): in Tomlins and Raithby, 1810–1822, Vol. I, pp. 199–200; and it was not abolished until 1819.

9. For the Savernak household, in Bridgport Dorset (1450s), for which foodstuffs accounted for 80% of total expenditures, see Phelps Brown and Hopkins (1956/1981, p. 14) and Wood-Legh (1956). See also Dyer (1983, 1988, 1989, Chapters 5–6) for evidence on consumption patterns in late-medieval England, especially on the rising consumption of meat and dairy products. For medieval and early-modern Flanders, Blockmans and Prevenier (1977, p. 22) endorse weights of 70–80% for foodstuffs, 5–15% for house rents, 5–10% for lighting and heating, and 5–10% for clothing. For the 70% for foodstuffs: 44% for bread grains, 15% for meat and fish, and 11% for vegetables. For Brabant, see Van der Wee (1975/1978 and 1966/1993, especially p. 284). The budget for the Lier Infirmary, from 1526 to 1602, was allocated on average: 44% for bread,

16% for beer, 1% for wine, 3% for fish, 20% for meat, and 10% for dairy products. The original Dutch-language version of the article (1975, pp. 417, 436) indicated the weights for dairy products as 4.7 kg for each of butter and cheese; but the table provides a weight of just 4.5 kg. for each. In the English translation (1978, Table II, p. 62) the weights are given instead as 4.8 kg for butter and 4.7 kg for cheese; and this version was also presented in the subsequent republication of his essays (1993, p. 225). Nevertheless these weights evidently have no bearing on the statistical values (i.e. in d *groot* Brabant) provided for this sub-index.

10. A gap from 1430 to 1573, as ascertained from their working papers contained in the Archives, BLPES, the Phelps Brown Papers Collection, Box Ia.324; and J.IV.2a.

11. Van der Wee's reliance on just rye prices for the farinacous group (while using barley for the drink group) may be justified on the medieval Low Countries' preference for rye over wheat (see n. 8 above). The omission of prices for lamp oil and shirting in the industrial sub-index is hardly serious. A far wider range of industrial product prices is given in Doughty (1975); but it commences only in 1401.

12. R. Allen (2001) has constructed a somewhat different basket, which may be more useful for modern Europe, but not for medieval north-west Europe. It is also based on commodity values and wages expressed in terms of grams of pure silver, a method that permits international comparisons of commodity prices and wages, but one that can be misleading, since it is based on the unrealistic assumption that commodity price changes are proportional to changes in the silver contents of the coinages (with debasement) or in market values for silver. He also compared standard Laspeyres arithmetic indexes with geometric indexes, using the same data, and found no significant differences in trends. As he notes, "the geometric index is a weighted geometric average of the price relatives in which the weights equal budget shares;" but Phelps Brown and Hopkins (1956), in basing their index on budget shares, did not use the required technique to produce a true geometric index: i.e. by multiplying the price-relatives ($P_1/P_0$) and taking the nth root of the product, in which **n** represents the number of years in the series; or, more simply, by taking the sum of the natural logarithms of the individual price-relatives in a series and dividing that sum by the number of years. The obvious implication of an index based on fixed expenditure shares is that the quantity of grains consumed during a period of rising relative grain prices must, in theory, fall to a greater extent than the quantity of industrial goods, an historically unrealistic assumption.

13. For a more recent exposition, see Hatcher (1977, pp. 11–73).

14. For a general overview, see Hatcher (1977, 1986, 1994); Blanchard (1970), Campbell (1981); Miller and Hatcher (1978, pp. 27–63). For an estimate of 4.5 million in the 1290s, see Nightingale (1996, pp. 89–106); for the estimate of 7.2 million in 1292, see Hallam (1988, p. 536); for an estimate of 2.5–3.0 million in 1377, see Miller (1991, p. 6).

15. The following quotations also succinctly express his fundamental views: (1) "And price changes which are not 'general' but are mainly confined to grain, point to a factor which has already been shown to have operated in the opposite direction in the early centuries of the Middle Ages, i.e. population" (Postan, 1952, p. 213); (2) "A fall in population would also have, so to speak, a selective effect on prices, in that it would tend to lower the prices of agricultural products, which were previously being produced at high and ever rising cost . . . under steeply diminishing returns. . . but would have little effect on commodities not greatly subject to diminishing returns, i.e. most industrial products." (Postan, 1952, p. 214); (3) ". . . the movements of agricultural and

industrial prices did not synchronize" (Postan, 1951/1973, p. 9); (4) "Butter happened to be a semi-luxury entering into popular consumption. It is not necessary to know what [Alfred] Marshall said about the elasticity of the demand for bread in order to conclude that agricultural labourers were now better able to indulge in a little butter, however expensive . . . It is therefore highly significant that the price of butter and the price of grain diverged more widely than the prices of any other commodities [during] the fourteenth and fifteenth centuries. [And furthermore] the prices for animal products in current coinage actually rose [continuing from 1351] the rising trend of the previous two centuries for another 125 years." (Postan, 1952, pp. 209–210).

16. See Schwartz (1974, p. 253), for a review of Spooner (1972), in which she comments that: "the author subscribes to a familiar fallacy, namely that a monetary explanation to be valid requires that all prices move in unison." Her verdict would be equally valid if directed against the injudicious criticisms that Postan (1959, pp. 77–82) directed against Robinson (1959).

17. See below, pp. 211–213 On the abandonment of land in so much of medieval western Europe, the so-called "Wüstungen," see in particular Abel (1966/1980, pp. 49–79, and especially pp. 80–95) and Slicher van Bath (1963, pp. 160–94).

18. As noted above, for the pre-modern era, population growth, by increasing pressures on relatively fixed stocks of land and capital, would – in the absence of technological changes – likely have induced diminishing returns, producing rising marginal costs and thus rising grain prices. But such sharp rises in grain prices might well have forced many consumers, faced with budget constraints – as argued above in the context of monetary changes – to reduce their expenditures on other, less necessary commodities, thus driving down their relative prices. For a similar argument, see McCloskey (1972), in reviewing Ramsey's collection of essays on the Price Revolution (1971).

19. Keynes (1936, p. 300): "It is probable that the general level of prices will not rise very much as output increases, so long as there are available efficient unemployed resources of every type. But as soon as output has increased sufficiently to begin to reach the "bottle-necks," there is likely to be sharp rise in the prices of certain commodities . . . [But] the elasticity of supply partly depends upon the elapse of time." For further arguments on these issues, see Munro (1991, pp. 119–183); Munro (1999), in a review of Fischer (1996); and Munro (2003b).

20. See in particular Farmer (1983, pp. 117–155; 1988, pp. 760–778, 811–817, with Table F; and 1991, pp. 467–490, 516–524, with Tables H and I); Clark (2001).

21. The data in Table 3 are for "hired' and not workers *ad tascam*; and without food or other payments in kind. I have not, however, found comparable examples in other manorial accounts. Beveridge (1936, p. 30), commented that, at Taunton, wages "are affected by the greater importance there of customary services and the best method of presenting the [wage] series has not been determined." But that does not satisfactorily explain why building wages at Taunton were generally higher before the Black Death than elsewhere. Yet if Beveridge is correct, then wages on many late-medieval English manors would have been – to a greater or lesser degree – affected by the relative supplies of servile labor, before and after the Black Death.

22. Farmer (1996, pp. 214–220, and Table 11.4). On the selected Winchester manors, labor productivity on the arable fell from 34.3 acres per *famuli* ploughman in 1305 only marginally to 32.3 acres in 1382, but then more precipitously to 27.9 acres per ploughman in 1421, a 15.8% decline. In animal husbandry, the number of sheep under the care of

a single shepherd (again chiefly *famuli*) rose from 231 in 1341 to 342 in 1421, a 48.1% increase. For some corroborative evidence on Glastonbury and Ramsey manors, see also Raftis (1996, pp. 191–206).

23. In late-medieval Flanders, weaving a standard fine woolen broadcloth of 42 ells by 3.5 ells (29.4m by 2.45m = 72.0m$^2$), containing 84 lb. or 38.2 kg of wool (16.3 kg of warp and 21.8 kg of weft), typically required about 12–14 days, with two weavers and a boy. Another dozen days of labor were expended in wool-beating, wool-greasing, carding, combing, spinning, reeling, and warping the yarns for the same cloth, involving about 26–30 artisans and helpers; and at least another 6–9 days in the finishing processes of foot-fulling (three or four days per broadcloth), napping, shearing, and dyeing. According to a Parliamentary report of the 1790s, weaving a superfine broadcloth of 34 yards (i.e. before fulling), with 80 lb. of wool (36.2 kg), then required 364 man-hours (= 14.5 days, with two weavers and a boy), and a further 888 man-hours in wool preparation, spinning, reeling, and warping, and fulling (74 days). Fulling had been mechanized in England (water-wheels) from the thirteenth century, and remained the only significantly powered manufacturing process before the Industrial Revolution. See Endrei (1981, pp. 253–262; 1983, pp. 108–119); Van Uytven (1981, pp. 283–294); Munro (1988, pp. 693–715); Lipson (1921, Appendix I, pp. 258–259, citing *Parliamentary Papers*, Vol. 23, 1840, pp. 439–441, for the years 1781–1796).

24. Such a process would have been facilitated by the increased labor mobility that ensued from the later fourteenth century, with the breakdown of the manorial domain economies, the consequent leasing of domain lands to peasant tenants, and the decay of villeinage (serfdom). See Raftis (1964, pp. 129–204; 1996, pp. 291–206).

25. The Ordinance of Labourers, decreed on 14 June 1349, is restated and reissued, with some modifications, as the Statute of Labourers, 25 Edwardi III stat 2. c. 3 (1351). See also the so-called 1388 Statute of Cambridge (Statute 12 Ricardi II, c.3-c.5), which stipulated the annual stipends for agricultural servants and laborers, ranging from the Bailiff of Husbandry, at 13s 4d sterling per year, with clothing, to 6s 0d (i.e. 72d) for "Swineherds, Women Laborers, and Deyrie Women." Both in Tomlins and Raithby (1810–1822, Vol. I, pp. 307–308; Vol. II, pp. 56–57). For other legislation, see also, in Vol. I, pp. 311 (1351), 327 (1352), 350 (1357), 366 (1361), 373–375 (1362), 388 (1368); in Vol. II, pp. 11 (1378), 32 (1383), 63 (1390), 137 (1402), 157–158 (1406), 176 (1414), 196 (1416), 225 (1423), 227 (1425), 233–235 (1427), 244 (1429), 337 (1446), 585 (1495), 637 (1497). On such legislation, see in particular Given-Wilson (2000, pp. 85–89).

26. Some manorial records, however, periodically record mowers' and threshers' wages both by day and by output, thus permitting some such comparisons; and other records provide wages of sawyers and street-pavers by both quantity (piece-work) and by day. For one exercise in using such medieval data, see Clark (2001).

27. See Statute 11 Henry VII c. 22 (1495), which authorized the payment of a higher wage to those master masons and carpenters who supervised six or more men; the statute was reissued in 1514–1515 as 6 Henry VIII c. 3. Both in Tomlins and Raithby (1810–1822, Vol. II, pp. 585–587; Vol. III, pp. 124–126).

28. In the list of references, see the English archives consulted for this study, especially the Archives, BLPES, Beveridge Price and Wage History Collection; The London Guildhall Manuscripts Library; and The Corporation of London Record Office.

29. See the previous note. Beveridge (1936, p. 34) notes that in the early thirteenth century Southwark wages had been about the same as those paid elsewhere on the Winchester estates.

30. At 4d or 5d per day, at Esher, in Surrey; Witney, in Oxfordshire; Wycombe, in Buckinghamshire; Overton and Ecchinswell (Itchingswell), in Hampshire; Taunton, in Somerset. For a list of the manors and their locations, see Titow (1972, pp. 28–39, with map).

31. See Hatcher (1994, pp. 13–19); Penn and Dyer (1990, pp. 356–376); Ritchie (1934, pp. 91–112; and n. 3).

32. In the appended list of References, see the archival sources for Belgium, chiefly town accounts; and also the published wage data in Verlinden-Scholliers (1959–1965), and Van der Wee (1963, Vol. I, Appendices 27–30, pp. 333–392; and Synoptic Tables of Wages, pp. 457–475).

33. Fullers, organized into guilds, also received piece-work wages, but since they were required to full a cloth in three to five days, according to the size and quality, a daily-wage rate can be extrapolated. Master weavers, who were actually industrial entrepreneurs, earned their incomes as profits, while dyers and shearers, also guild-protected, earned professional fees. See Munro (1988b, pp. 693–715; 1994a, pp. 377–388; 2002, pp. 153–206). For the fullers' strikes, see below, pp. 219–222.

34. See in particular Hatcher (1994); and below, pp. 211–212.

35. See nn. 20, 22 above. For the Statute of Artificers, Statute Elizabeth I c.4 see Tomlins and Raithby (1810–1822, Vol. IV: Part i, pp. 414–422) and Bland, Brown and Tawney (1914, pp. 325–336).

36. Discussed in much greater detail below, on pp. 210–212, 217–219 Hatcher himself admits (1994, p. 23) that "the vast majority of the greater landlords openly paid cash wages in excess of the unrealistic maxima specified by the law."

37. Riley (1860, Vol. I, pp. 99–100; Vol. II, pp. 541–543; 1868, pp. 253–255); Sharpe (1905, pp. 148, 301; 1907, p. 184). By 1349 the higher rate was already in force at Westminster Abbey (BLPES, Beveridge Price and Wage History Collection: Westminster Abbey).

38. Statute 11 Henry VII c. 22 (1495), in Tomlins and Raithby (1810–1822, Vol. II, pp. 585–587). The major exception was a maximum daily rate of 7d, summer and winter, for those senior or chief master masons and carpenters employing or supervising six or more men; or a rate of 5d daily, with food and drink. See n. 27 above.

39. See pp. 197–198 and nn. 28–29 above.

40. Van der Wee (1963, Vol. I, Appendix 48, pp. 540–544): interpolating 208 days for 1436). For this regression, $R^2 = 0.00002943$; adjusted $R^2 = -0.01017$; $F = 0.002885$.

41. Statute 11 Henry VII c. 22, repeated in 6 Henry VIII c. 3 (1514–1515), in Tomlins and Raithby (1810–1822, Vol. II, pp. 585–587; Vol. III, pp. 124–126). The framers of the 1495 statute, however, evidently believed that too many wage-earners were stealing leisure time during working hours by "late commyng unto their worke, erly departing therfro, long sitting at ther brekfast, dyner, and nonemete, and long type of sleping at after none."

42. See Campbell (1747/1969, pp. 331–341). In specifying hours of work for 380 crafts, this treatise indicated that the typical working day still remained a very long one: from 6:00 a.m. to 8:00 p.m. (or during all "daylight" hours). Subsequently, the 1833 Factory Act had stipulated a maximum working day of nine hours for children, aged nine to thirteen; and for those aged thirteen to eighteen, a maximum of 69 hours a week, with no more than 12 hours per day. The 1844 Factory Act limited the working day for women to 12 hours per day, and for children aged eight to thirteen, to 6.5 hours. Fielden's Act, imposing a limit of ten hours per day for both women and men (implicitly), was

passed at a time of great labor unrest, on the eve of the 1848 Chartists's Revolt. See Clapham (1964, pp. 572–578); Checkland (1964, pp. 244–249); Derry (1963, pp. 124–137, 151–154). In the U.S., New Hampshire's state legislature also enacted, in the same year 1847, a maximum ten-hour day; but the legislation applied only to women, and proved to be unenforceable. The effective state legislation dates only from 1887. See Goldin (1990, pp. 189–192, and Table 7.1); Atack and Passell (1994, pp. 542–544).

43. See Sosson (1977, p. 149, n. 41), citing guild statutes in Rijksarchief Brugge, Ambachten, no. 1, fo. 62: "dat hi sculdich es te werkene van nuchtens toten avonde alzo wel tsaterdaechs up vighelie avond als up anderen daghen . . ." Similarly the Bruges carpenters guild forbade them "te weerkene . . . by avonde of bi nachte met keersen [candles]." See other guild records that specify working hours in the textile trades (forbidding work by night), in Delepierre and Willems (1842); Espinas and Pirenne (1906–1924); Joossen (1935).

44. See n. 37 above: for the London ordinance of 1350, setting maximum summer and winter daily rates (at 6d and 5d respectively).

45. See Table 1. The subsequent Statutes of 1444 and 1495 did more clearly specify a winter maximum wage, lower than the stipulated summer wage. In London, and possibly also in Bruges, seasonality reappeared, after the 1440s in the form of a slightly higher summer wage. See sources in nn. 27, 37–38, 41, and 46 above.

46. In 1441: by reducing the uniform daily rate to 7.5d (or even to 7.0d for some) for the winter season (three months), while raising it to 8.5d for the rest of the year. (Corporation of London Record Office, London Bridgemaster's Accounts, Weekly Payments, First Series, Vol. IV. Unfortunately these accounts cease in 1445). See also Knoop and Jones (1967, pp. 105–106).

47. See below, p. 224. For accounts of wage payments in Bruges, see: Stadsarchief van Brugge, Stadsrekeningen 1424–1425 to 1467–1468. Before the 1440s, there are only occasional and sporadic indications of seasonal wages. On the other hand, some wage differences were clearly not seasonal in nature: thus some master masons and carpenters were paid 12d per day in December 1435, February 1436, December 1437, while some were paid 10d daily in June and September 1437, May and September 1438 (and thereafter to April 1444), in May and September 1446. Subsequent accounts, however, are explicit that winter wages were "paid before Easter" (in particular, the accounts of 1458–1459 and 1460–1461, specifying a winter wage of 10d rate for street-pavers). For seasonal wages Bruges from this period, or ca. 1450, see Sosson (1977, pp. 225–228, and 300–304, Figs 12–16). For Holland, see in particular De Vries (1978, pp. 79–97; and 1994, pp. 47–63). For England, see Thorold Rogers (1866, Vols I–II; and 1882, Vols III–IV); Phelps Brown and Hopkins (1955/1981, pp. 1–12).

48. See pp. 196–197 above; and the other archival sources listed in References. On this question, see in particular Beveridge (1936, pp. 36–37): "that in the Winchester manors there is no reason for suspecting any general practice of supplementation," not disclosed in the records, which record separately payments in cash (*stipendium*) and in kind (*corredia, allocationes*). He also notes that "*vadia* (originally cash payment in place of allowance) is used as a term interchangeable with *stipendium* (cash payment exclusive of allowance) and is invariably at or about the same level . . .."

49. Archives, BLPES, Beveridge Price and Wage Collection, Battle Abbey: Alciston Manor, 1336–1487 (Boxes H.10–11).

50. Archives, BLPES, Beveridge Price and Wage Collection, Westminster Abbey: 1393–1541 (Box P.10).

51. See the archival sources for Belgium in the list of References; and also Van der Wee (1963, Vol. I, Appendices 27–30, pp. 333–392; and Synoptic Tables of Wages, pp. 457–475); Verlinden and Scholliers (1959–1965).

52. See, for example, in Posthumus (1910, Vol. I, pp. 90–91, 161, 621–622, 653–666) documents nos. 74. 111–113 (March 1415); no. 132.VI.9 (1436/1437); no. 508: 10–13 (Nov. 1478); no. 525: 23–225 (Dec. 1478). Inter alia, these ordinances stipulated that: "ende die meester sal gehouden wesen sijn volle gelt te nemen van elc laken . . . dat die drapenieres hoir volres hoir volle loen geven sullen, ende alle Saterdages hoir gelt geven sullen, sonder horen volres enigerhande dinck te vercopen, te weten kairden, groff wolle laken, bier, broot, sout, gort, kairssen, seep, butter noch kase" (no. 508:13, p. 623); and, "die betalingen sel wesen mit ghelde ende mit gheerehande wair of andere goeden . . ." (no. 525:24, p. 653).

53. See the archival sources for Belgium in the list of References. On this issue, for early modern England, see also Woodward (1981, pp. 28–46; 1994, pp. 11–21; and 1995).

54. For both quotations, see Wilton and Prescott (1987, p. 214).

55. See Huberman (1986, 1991 and 1996).

56. See also Wilton and Prescott (1987, p. 215), in commenting on "the very deep recession of 1982," when the International Woodworkers "resisted wage cuts at sawmills in British Columbia. The union took the view that if the weakest firms succeeded in getting wage concessions in order to maintain employment, then all firms would demand the same concessions and all workers would suffer. Moreover, the union would have to fight battles already won in order to restore wage and benefit levels once market conditions improved;" and thus "wage cuts were resisted and many sawmills were closed."

57. See Munro (2002); Boone, Brand and Prevenier (1993); Boone and Brand (1993); Brand and Stabel (1995).

58. See in particular Postan (1950; 1951; 1972, pp. 31–35); and especially Postan and Titow (1959/1973, pp. 150–185, which presents evidence to indicate rising death rates from heriots, or "death-duties" levied on customary peasant holdings (usually in the form of livestock). For other evidence on rising demographic pressures, especially fragmentation of holdings, though not conclusive evidence for a Malthusian crisis, see Miller and Hatcher (1978, pp. 53–63); Campbell (1984), Smith (1984, 1991, pp. 25–77); Bailey (1998); Poos (1985; 1991, pp. 9–57, 89–130); and for peasant difficulties in paying increased royal taxes, see Maddicott (1975, pp. 1–75). For the "Great Famine" itself, see Lucas (1930); Kershaw (1973), and especially Jordan (1996, pp. 24–150).

59. Postan (1951, p. 14; and also Postan, 1950, pp. 186–214; 1972, pp. 27–39).

60. Poos (1985; 1991, pp. 89–130).

61. Herlihy (1967, pp. 55–77); Herlihy and Klapisch-Zuber (1985, pp. 232–279); Munro (1991, pp. 139–148); Harvey (1991, pp. 1–24).

62. Smith (1991, pp. 1–23); see also Harvey (1966, pp. 23–42), with a much stronger attack on Postan's thesis, denying any evidence of population decline before the Black Death; and also Hallam (1988, pp. 508–593), casting further doubts on general population decline before 1348.

63. Herlihy (1967, pp. 122–125).

64. That is: if the aggregate decline in West European net national income was greater than any change in the volume of money payments: if $\Delta y > \Delta (M.V) \Rightarrow P\downarrow$. See Robinson (1959; and Postan's "Note," pp. 77–82, which is not a valid response);

Spufford (1988, pp. 267–282) ; Nef (1952, 1987); Kovacevic (1960, pp. 248–258); Braunstein (1983, pp. 573–591); Westermann (1986, pp. 187–211); Munro (1991, 2003b). See also pp. 214–215 below.

65. See also Patterson (1972); Munro (1983, pp. 97–126).

66. Ames (1965), Prestwich (1977), Mate (1975), Robinson (1959), Spufford (1988, pp. 267–288).

67. The fall in the bimetallic ratio may have been due to both declining silver outputs from Bohemian mines and increasing supplies of West African (Sudanese) and Hungarian gold. See Lane (1977, pp. 52–59); Spufford (1986, graph 3 and Table II, pp. li–lxiii; and 1988, pp. 267–288, 340–342). Spufford's dates have been adjusted by those of Lane (1977). See also Mate (1978).

68. An absence of minting may indicate only that the nation's mints were offering a mint price for bullion uncompetitive with those of neighbouring foreign mints. With coinage debasement in a bimetallic system (in England, after 1344), a coinage debasement in, say, silver might succeed in recoining much of the current silver monetary stock, in inducing dishoarding, and in attracting foreign bullion, but at the expense of losing the now "disfavoured' gold to foreign mints. See the essays in Munro (1994). See Fig. 1; and Munro (1984, Table A-1, p. 86): regressing quinquennial mean current prices against corresponding mint output values (current moneys) in these two regions, see for 1350–1409: $R^2 = 0.4327$ ($t$ statistic: 2.762, significant at the 2.00% level); for 1350–1499: $R^2 = 0.2697$ ($t$-statistic: 1.455, significant only at the 15.71% level).

69. Mayhew (1987, Table I, p. 125): indicating that the coined money supply contracted from about £1,100,00 sterling in 1311–1324 to just £500,000 in the 1340s. See Mayhew (1995, 1974); and sources in nn. 67–68 above. For a more recent estimate, see: M. Allen (2000; 2001), indicating (Table 1 in M. Allen, 2001, p. 603) a larger estimated coined silver stock of £1,900,000 – £2,300,000 in 1319, falling to about £700,000 – £900,000 in 1351. See also Table 2, p. 607, providing, for 1470, an estimate of just £350,000 to £450,000 in silver, £400,000 to £500,000 in gold, and thus a total of no more than £750,000 to £950,000.

70. Phelps Brown and Hopkins (1955, p. 11); Thorold Rogers (1866, 1882); and the list of References for the Beveridge Price and Wage History collection (see nn. 48–50 above). Wages for masons and carpenters at the Oxford colleges did not fall, however; but remained at the daily rate of 4d set from at least 1300.

71. Money wages for master masons and carpenters were typically 3d per day from before 1264 to 1302; for many, 3.5d until 1310; and then 4d until 1338. See nn. 2, 20–21, 28–29, and n. 78 below.

72. For other analyses of medieval English wages before and after the Black Death, see in particular Farmer (1981, 1983, 1988, 1991), whose conclusion do not always match my own. For the more general economic and social consequences of the Black Death, see: Hatcher (1977, 1986, 1994); Platt (1996, pp. 1–47, 177–192); Bolton (1996, pp. 17–78); Putnam (1908); Poos (1991, pp. 218–221).

73. Statute 25 Edwardi III stat. 2 c. 3, in Tomlins and Raithby (1810–1822, Vol. I, pp. 311–312). See also n. 25 and pp. 196, 199–200 above. Wages for the winter season from Michaelmas to Easter were not specifically stipulated, except that they were to be "less according to the rate and discretion of the justices." For a discussion of this Statute, and the subsequent labor legislation, see Farmer (1991, pp. 483–490); Given-Wilson (2000, pp. 85–90); Putnam (1908).

74. Statute 23 Henrici VI c. 12, in Tomlins and Raithby (1810–1822, Vol. II, pp. 337–339). See above p. 210.

75. See above p. 200. As also noted there, these rates were just 1d per day higher than those of 1290.

76. Archives, BLPES, Beveridge Price History Collection, Box P9.

77. See Beveridge (1955–1956, pp. 26–28): commenting on "the failure of the Black Death to cause any immediate change of [wage] rates" in the Winchester manorial accounts of 1349–1350.

78. For this and the following, see: Archives, BLPES, Beveridge Price and Wage History Collection, Box H:10–11). At Battle Abbey, carpenters and masons had their pay raised from 4d to 5d daily in 1425; at Ecchinswell (Itchingswell) (Box A.33:159432), from 1433; but at Overton (Box A.33:159406), and Wycombe (BoxA.33:159407) first carpenters and then masons enjoyed the same increase from 4d to 5d as early as 1401–1405. At the urban Winchester College (Box F.8), wages for master carpenters had risen to 6d per day without food by 1398 (4d daily with food); but for master masons, the mean rate did not reach 6d daily (without food) until 1409. See also the raw-wage data published in Thorold Rogers (1866, Vol. II, pp. 272–334; and 1882, Vol. III, pp. 583–663).

79. As also noted above, on p. 194, the wages of occasional day laborers, chiefly agricultural, on Taunton manor, after doubling in the years following the Black Death (1349–1356), then fell to the pre-Plague level of 1d daily, remaining there until 1412–1413. See Table 7.

80. Ritchie (1934): data from presentments before Justices of the King's Bench at Brentwood in November 1389, following the 1388 Statute of Cambridge. As she also notes (p. 102), "eight hundred men who were receiving illegally high wages is not a large number for a country the size of Essex." She also noted daily wage payments of 4d with food, for tasks in the Winchester manorial accounts that are specifically listed as "without food'. See also Poos (1991, pp. 218–221); Penn and Dyer (1990).

81. Corporation of London Record Office, Bridgemaster's Accounts, Weekly Payment Series, Vols III–IV; Corporation of London Record Office, London Bridgemaster's Accounts, Weekly Payments, First Series, Vol. IV. Subsequently, from 1441, the craftsmen employed by the Tower Bridgemaster received a very minor seasonal adjustment in wages: a reduction in the daily rate for a now shorter winter season, to 7.5d but an increase to 8.5d for the rest of the year, thus slightly increasing the annual wage payments. Unfortunately these accounts cease in 1445. See also Knoop and Jones (1967, pp. 105–106).

82. For Flanders, see Munro (1981, 1983, 1984a, b); for Tuscany, see Herlihy (1967, pp. 122–125).

83. For this study, for both England and the Low Countries, the tables on real-wages present data in quinquennial means, which are calculated as both arithmetic and harmonic means. For both the annual data, within each quinquennium, are computed in the standard fashion as: RWI = NWI/CPI (nominal wage index divided by the consumer price index for each year). The arithmetic mean is calculated by computing the sum of the five annual data in each quinquennium, and not by dividing the quinquennial mean of the NWI by that for the CPI (which would produce an entirely false result). The harmonic means is the reciprocal of the arithmetic mean of the reciprocals of the individual values (index numbers of commodity baskets) in each quinquennium (or series); and it is the better measure of the average number of units that could be purchased with a given sum

of money. Its formula is: $H = 1/[3\ (1/r_1 + 1/r_2 + 1/r_3 + \ldots\ 1/r_n)]/N$. Note that the harmonic mean is always less than the arithmetic mean (and also less than the geometric mean). See Mills (1956, pp. 108–109 and 395–324, for index numbers using these means; and also n.12 above). See above, however, on pp. 189–190 some reasons why these indexes probably exaggerate the rise in real wages during periods of falling grain prices and their fall during periods of rising grain prices, particularly though with sticky wages.

84. Archives, BLPES, Beveridge Price and Wage History Collection, boxes A.31 (Taunton), A.32 (Esher), A. 33 (Ecchinswell/Itchingswell, Overton, Wycombe), F.8 (Winchester College), G.14 (Hinderclay and Redgrave), H.10–11 (Battle Abbey).

85. See Feavearyear (1963, pp. 15–45); Munro (1979, 1981, 1983a, 1983b, 1984a, 1984b, 1988a, 1992); Fournial (1970); and Cazelles (1966).

86. See in particular: Miskimin (1975, pp. 25–32); Herlihy (1967, pp. 55–71, 180–212); Lopez (1962, pp. 29–52); Munro (1983a, pp. pp. 115–120); Boccaccio (1353/1921: introduction, esp. p. 7); Cassell (1983, pp. 277–290).

87. Herlihy (1967, pp. 128–130); Hamilton (1936, statistical appendices).

88. Unfortunately, the Flemish "basket of consumables" index contains only one industrial commodity, in this period (Table 1): cheap *strijptelaken* (rayed cloth) from Ghent (supplemented with cheap *voeringlaken* from 1401). Graphs of some prices for building materials during this period are contained in Sosson (1977, pp. 289–293): no. 1, for paving stones: very few data, but with a sharp decline in the later 1390s; no. 2, for bricks: decline in late 1380s, rise in early 1390s, then decline (to 1405); no. 3: for slates, decline in early 1390s, then rise, then decline, from 1400 to c. 1410; no. 4, for lime: sharp decline in early 1390s, then stable; no. 5, for solder: stable; and iron: severe fluctuations. For a similar graph, though only for solder and iron prices, see also Thoen (1988, Vol. I, Fig. 16, p. 255).

89. The sources of the mint data used in these tables, for England and the Low Countries, may be found in: Munro (1973, Appendix I, pp. 188–211; 1981, pp. 71–116; 1983, pp. 127–158; 1984, pp. 71, 86–111); Crump and Johnson (1913); Brooke and Stokes (1929); Challis (1992, pp. 83–178, 179–397; and Appendix 1, pp. 673–698).

90. The arguments are summarized in Nef (1941, 1952); Graus (1951); Miskimin (1964; 1975, pp. 25–72, 132–157); Lopez, Miskimin, and Udovitch (1970); Day (1978); Munro (1983a, pp. 97–112); Spufford (1988, pp. 267–288, 340–342).

91. Ashtor (1971; 1976, pp. 319–331). See also Day (1978); Munro (1983a); and nn. 93–94, 96.

92. The two sets of technological revolutions were, first, in mechanical engineering: adits and mechanical pumps to permit much deeper, well drained, mining shafts; and then in chemical engineering: the *Seiger-* or *Saigerhüttenprozess,* for smelting argentiferous-cupric ores with lead to separate the two metals. See Nef (1941; 1952, pp. 691–761); Braunstein (1983); Westermann (1972, 1986); Spufford (1988, pp. 363–377); Munro (1991, 2003a, b).

93. See Spufford (1988, p. 347): "many contemporary European observers believed that 'thesaurisation' [hoarding, the accumulation of plate] was the main cause of the bullion famines" during the later fourteenth and early fifteenth centuries; but he also comments (pp. 346–347) that: "In retrospect it appears that it was itself in part a response to the famine. Nevertheless it made that shortage worse . . . ."

94. See Thompson (1956, pp. xxxvi–xlix and p. 163), stating that "the reigns of the three Edwards [1272–1377] are, with the exception of the Civil Wars of Charles I, the most prolific in coin-finds since the Romano-British era. This is due primarily to a

period of continual unrest and bad economic conditions which encouraged an abnormal amount of hoarding." But elsewhere (p. xvi) he suggests that it is "not a safe assumption" to attribute all coins hoards to such reasons. Many of the fourteenth-century hoards are related to the continuing Scottish wars. Of the 394 coin hoards in the British Isles from c.600 to 1500, 85 can be dated to the reigns of Edward II, Edward III, and Richard II (1307–1399), with 14 in the period 1377–1399. See M. Allen (1999) for an updated list of fourteenth-century coin hoards: 36 for 1330–1351 (and another 40 in Scotland); 16 for 1351–1412; and only 12 for 1412–1464. Such coin hoard evidence seems therefore to provide better evidence for the deflation of c. 1327–1343, weaker evidence for the deflation of 1377–1410, and virtually none for the deflation era of c.1440–1470. Nevertheless, while the absolute number of extant hoards declines in the late fourteenth and early fifteenth centuries, population and coinage outputs declined to a much greater extent, thus reducing the likely incidence of hoards. The survival of specific hoards may be accidental; and money hoarded in one period was undoubtedly dishoarded and spent in some ensuing period (thus eliminating the evidence of the hoard). For the fifteenth-century Low Countries, see Spufford (1970, pp. 55–73; Appendix D, pp. 203–213).

95. See Miskimin (1975, pp. 92–104; 134–144); Huizinga (1926, pp. 140–152); Piponnier (1970, Chapters. 7–10); Geijer (1979, pp. 141–155); Stuard (1999, pp. 215–242); Lopez (1962, pp. 19–32). In or about 1500, a Venetian visitor wrote a memoir about England, in which he stated, with some considerable wonder, that "there is no small innkeeper, however poor and humble he may be, who does not serve with silver dishes and drinking cups; and no one, who has not in his house silver plate to the amount of at least £100 sterling, . . . is considered by the English to be a person of any consequence." Sneyd (1847, pp. 28–29).

96. See also Mate (1978), Mayhew (1995), and M. Allen (2001, Table 2, p. 607).

97. See Munro (1979, pp. 194–196; 1994, pp. 147–195 and 204–208; 2000, 2001); De Roover (1948, pp. 130, 236–246, 331–357, esp. pp. 339–342); Van der Wee (1963, vol. II, pp. 85–86, 333–340, 355–358; 1977, pp. 302, 312, 323–324, 361–362; 2000, pp. 87–112, 125–133); Nightingale (1990).

98. For deflation in late-fourteenth and early fifteenth-century Tuscany, see also Herlihy (1967, pp. 125–130).

99. See also Beveridge (1955, pp. 18–35); Bridbury (1973, pp. 582–586).

100. Bridbury's thesis evidently rests upon the assumption that England was so overpopulated before the Black Death that the entire agrarian economy suffered from massive disguised unemployment, with a negative marginal product for labor. Not only is that thesis untenable, but it is contradicted by the arguments and evidence posed in his subsequent article (Bridbury, 1977).

101. Many of the arguments that follow could just as well pertain to the so-called "Great Depression" era of severe deflation and rapidly rising real wages from 1873 to 1896. See in particular Feinstein (1990), MacKinnon (1994), and Saul (1985).

102. Van Werveke (1938); Munro (1973, pp. 43–74; and appendices, pp. 187–214; 1981, pp. 78–95; 1983, pp. 112–126). See also other monetary studies in Munro (1992).

103. According to the monetary formula for a *renforcement,* which involves reciprocal changes: $[1/(1 + x)] - 1$, where x = the *percentage* change in the silver content of the *groot* (*gros*). Thus $[1/(1.316) - 1] = 0.760 - 1 = -0.240$ or 24.0%. See Munro (1988, pp. 389–392, 417–418).

104. Stadsarchief Brugge, Stadsrekeningen 1388/1389 to 1399/1400: wage payments for building craftsmen in the "werken" accounts.

105. Gilliodts-van Severen (1871–1878, vol. III, no. 706, pp. 134–135, 140–142: for January 1390); Van Werveke (1931, pp. 1–15; 1938, pp. 336–347); De Roover (1948, pp. 227–229); Van der Wee (1963, Vol. II, pp. 14–18, 29–30).

106. In 1383, during the Artevelde revolt (1379–1385) and just before the initial, abortive *renforcement* of 1384, the daily wages of Bruges master craftsmen in the building trades had been reduced even more sharply, from 12d to 8d *groot*, but were raised to 9.33d in 1386 and then fully restored to 12d in 1387. In 1386, just after the suppression of the Artevelde revolt, the daily wages of Bruges policemen had been raised from 6d to 7.67d (7d 16 mites) *groot*, but were restored to 6d in 1387. Note again that the policemen's daily wages were paid for a 365-day year. Data extracted from the Bruges municipal accounts: Stadsarchief Brugge, Stadsrekeningen 1382/1383 to 1397/1398. Unfortunately the Ghent wage accounts are far too sparse to permit similar comparisons, and Ypres' *stadsrekeningen* now survive only from 1406 in the second copy deposited at the Lille Chambre des Comptes (now in the Algemeen Rijksarchief België). For Bruges policemen, see below pp. 222–223.

107. For some evidence on nominal-wage reductions during this same deflationary era (c.1380-c.1430), and on the difficulties in interpreting the published evidence, see pp. 226–227.

108. See in particular, Fris (1907, pp. 421–459); Nicholas (1987; 1988; 1992, pp. 273–323); Boone and Brand (1993, pp. 168–192); Boone, Brand, and Prevenier (1993, pp. 59–74); Brand and Stabel (1995, pp. 203–224); Munro (1994a, pp. 377–388; and 2002, pp. 153–206).

109. Text of 4 September 1373 in Rijksarchief Van Oost-Vlaanderen, Oostenrijks Fonds, layette 1; provisions also repeated in layette 2 (2 May 1423). See also Espinas and Pirenne (1906–1924, vol. II, pp. 526–527): doc. no. 485, ordinances banning strikes; no. 491, pp. 533–535: letters of the *deken* of weavers guild submitting the dispute with fullers to arbitration; no. 492, pp. 535–537: Ghent fullers seek the count's pardon, who then awards a wage of 45d per *maerclaken*. In January 1386, after their real wage had deteriorated by 20% since just 1382 (as measured by this Flemish price index, in Table 8), the fullers' peaceful request for another increase now encountered a very hostile reaction from Count Louis' successor, Duke Philip the Bold. Fully supporting the drapers, he curtly told the fullers "to be content" with their current wage, and furthermore decreed that henceforth any foreign fullers would be free to establish fulleries within Ghent. Duke Philip also rebuffed the fullers' demands for a change in their guild constitution. Algemeen Rijksarchief, Trésor de Flandre, Series I, no. 2208; also published in Bartier and Van Nieuwenhuysen (1965, Vol. I, no. 88, pp. 123–124). See also Boone (1990, pp. 133–134).

110. Rates deduced from texts in Espinas and Pirenne (1906–1924, Vol. II, no. 492, pp. 535–537); Algemeen Rijksarchief, Trésor de Flandre, Series I, no. 2208; and especially Rijksarchief van Oost Vlaanderen te Gent, Oostenrijks Fonds, layette 2 (for 2 May 1423): "desquelz [desdiz foulons] ils n'avoient et ne leur en vouloit en baillier que trente deux gros . . . et est salaire trop petit . . ." See also Van Werveke (1931, pp. 4–14); Nicholas (1987, p. 130); and the following note. Fullers's wage data for other Flemish and Dutch drapery towns indicates that, on average, each journeyman received 35% of the wage, leaving 30% for the master (who, of course, received revenues from several similarly manned fulling vats).

111. De Sagher (1951–1966, Vol. III, pp. 445–446, 451–452, no. 553, and p. 468, no. 554:136). The two journeymen were to receive 14d groot each and the master 7d,

for a total of 35d per cloth in three days. The journeymen were also to receive another 1.25d groot (16d parisis) for scrubbing the cloths. The Wervik *dickedinnen* broadcloth was to be 38 ells by 9.5 quarter ells on the loom, about the same size as the Ghent *dickedinnen*.

112. Again thanks to intervention from Count Louis de Male. Algemeen Rijksarchief, Trésor de Flandre, Series I, no. 1103; partly published in Espinas and Pirenne (1906–1924, Vol. I, no. 206, pp. 668–669); and in Bartier-Van Nieuwenhuysen (1965, Vol. I, no. 253, pp. 385–386). The only previous wage datum is for a wage increase to 15d 4 mites (15.167d) in 1348; in 1349, that wage represented 31.35 g of silver and 0.238 unit of a basket of consumables (priced at 63.69d gros, in Table 12). The new wage set at 41d groot in 1374, represented 45.67 g silver and 0.304 basket (priced at 134.90d *groot*).

113. Algemeen Rijksarchief, Trésor de Flandre, Series I, no. 1103; partly published in Espinas and Pirenne (1906–24, Vol. I, no. 206, pp. 668–669; and in Bartier-Van Nieuwenhuysen (1965, Vol. I, no. 253, pp. 385–386): "les diz drapiers disans que ce estoit trop grand salaire et qu'ilz devoient estre contens de xxxii [32] gros, attendu que au temps de la dicte ordonnance [1373–1374, of Louis de Male] la monnoie estoit plus feble que elle n'est de present, car le franc d'or valoit pour lors xxxvii [37] gros ou environ et aujourduy il ne vault que xxxiii [33], et selonc ce que la dicte monnoie estoit plus forte le salaire des diz foulons devoit estre diminue . . ." (In fact the Flemish silver coinage of 1374 had been stronger than that of 1390). The Flemish gold noble had been revalued to 6s 0d or 72d *groot*, from 8s 6d or 102d.

114. The Flemish price index used here (1451–1475 = 100), fell from the peak of 124.72 in 1386–1390, reflecting the debasements of those years, to a trough of just 88.51 in 1391–1395 and was virtually at that same level (88.53) in 1401–1405. The *renforcement* reduced the *traite* – the coined value of a kilogram of pure silver – from £5.337 to £4.050 *groot* Flemish; expressed in terms of the increase in grams of silver in the coinage (0.315g) the change becomes : [(1.00 + 0.316)/1] – 1 = 0.7599 – 1 = –0.2401 or – 24%. See Tables B-1 and B-3 in Munro (1984a, pp. 96, 100).

115. Stadsarchief Brugge, Stadsrekeningen 1384–1385 to 1399/1400: from the construction *werken* accounts.

116. See in particular: Hatcher (1996, pp. 237–272); Nightingale (1997, pp. 631–656); Van der Wee (1963, Vol. II, pp. 61–73; 1975, pp. 203–221); Munro (1983, pp. 235–250; 1994; 1995, pp. 37–60; 1999, pp. 1–74. For a contrary view and then more nuanced views see Van Uytven (1961, 1966, 1992, 1995).

117. For an explanation see Sosson (1977, pp. 51–55, 225–227). Unfortunately, there are almost no continuous wage series for Ghent. For the few available for the fifteenth century, see Verlinden and Scholliers (1959–1965, Vol. II, part i, pp. 386–397, 409–428), generally in the same range as those at Bruges.

118. Algemeen Rijksarchief België, Rekenkamer, Stadsrekeningen Aalst, registers nos 31,412–431, 520.

119. The summer wage prevailed for nine months; the winter wage, for three months. In neighbouring Mechelen most master masons and some carpenters had their daily summer wage increased from 8d to 10d *groot* Brabant by 1420 (Stadsarchief Mechelen, Stadsrekeningen nos. 86–97). In 1434, with the monetary reform, it was increased again to 12d per day; but Antwerp master masons did not receive that same daily wage until 1443. Thus, Mechelen master masons maintained a higher level of real wages than did their Antwerp counterparts during this period: with a decline in the seasonally adjusted annual money wage for Mechelen masons, in terms of equivalent commodity baskets,

from a harmonic mean of 9.513 baskets in 1421–1425 to 8.280 baskets in 1436–1440 (See Tables 13–14).

120. Note that, for both the Antwerp and Mechelen masons, the number of commodity baskets that could have been purchased with their annual money wage income has been computed by assigning nine months (157.5 days) to the summer wage and thus three months (52.5 days) to the lower winter wage. See Tables 13–14 and their sources.

121. For other examples given by Beveridge (1936, 1955), for the Westminster and Winchester manors (especially Hinderclay) in the 1390s: a fall in the mean wage of threshers from 9.50d to 8.88d per three-rased quarters; and for reapers, from 17.13d to 14.96d per acre, from 1380–1389 to 1390–1399. From the tables presented in all these published sources, I had constructed a working-table with 40 wage groups for the years 1380–1400; and the data suggest that 32 of the 40 groups experienced at least some nominal-wage reductions: 20 in the 1380s and 22 in the 1390s, and thus 12 over both decades. But the unweighted decennial means of the 40 money-wage series fell 3.6% overall. For reasons indicated on p. 197 above, concerning the computation of decennial mean wage rates, this possibly dubious working-table is not being published here.

122. See above pp. 200–202 and Blanchard (1978) for the discussion of a possibly backward-bending supply curve of labor during this late-medieval era.

123. The elasticity of substitution $s_{KL}$ is the ratio of the proportional changes in the marginal products of land+capital ($y_K$) and labor ($y_L$). Conversely, if K increases relatively to L, and if the proportional increase in K/L exceeds the proportional fall in the ratio of the marginal products of land-capital and of labor – i.e. if $S_{KL} > 1$, then the share of the national income accruing to these increased factors K will also rise. For mathematical proof, with the CES Production Function, see Layard and Walters (1978, pp. 63–68, 270–276). See also Phelps Brown and Hart (1952/1981, pp. 106–130): "when big changes occur in money wage rates, the accompanying changes in the share of wages [of national income] are relatively small;" and "a main cause of the long-period change in the share of wages has been simply the change in the relative number of wage earners."

124. They cite in particular Hilton (1985, pp. 253–267); and more recently Dyer (2000, p. 24) has made an even bolder claim: that "by the end of the thirteenth century the lowest estimate for those mainly dependent on employment by others is 50 per cent." But another recent estimate provides quite a contrary view: that in the early fourteenth century, a typical English smallholder peasant, with 18 acres, could find wage-paying employment, outside his holding, for only about 27 days per year; or 80 days for three adult peasants on one holding. See Kitsikopoulos (2000, p. 243); and also Bailey (1998).

## ACKNOWLEDGMENTS

Research for this article was funded, in part, by grants from the Social Sciences and Humanities Research Council of Canada (3-195-156-06; 410-93-0866; 410-96-0306; 410-99-0274). I wish to thank the staff of the Archives of the British Library of Political and Economic Science and of the Algemeen Rijksarchief of Belgium for their invaluable assistance in doing the research for this article; and the members of the Economic History Workshops of the University of Toronto and of Rutgers University for their criticisms, advice, and suggestions for revising this paper, with particular thanks to Gillian Hamilton, Michael Baker, Xiadong

Zhu, Eugene White, and James Masschaele; and also thanks for similar advice from the anonymous referees. The usual disclaimer applies.

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