Department of Economics
and
Institute for Policy Analysis
University of Toronto
150 St. George Street
Toronto, Ontario M5S 3G7
Canada

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Prices, Wages, and Prospects for 'Profit Inflation' in England, Brabant, and Spain, 1501 - 1670: A Comparative Analysis

by

John Munro

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Department of Economics
University of Toronto

Author's e-mail: munro5@chass.utoronto.ca
http://www.economics.utoronto.ca/munro5

On-line version: http://www.chass.utoronto.ca/ecipa/wpa.html

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Abstract

This paper re-examines Earl Hamilton's famous 1929 thesis on 'Profit Inflation' and the 'birth of modern industrial capitalism': namely, that the inflationary forces of the Price Revolution era produced a widening gap between prices and wages, thus providing industrial entrepreneurs with windfall profits, which they reinvested in larger-scale, more capital intensive forms of industry. Hamilton's analyses of price and wage data for 16th- and 17th-century Spain, France, and England led him to conclude that: Spain had enjoyed virtually no 'profit inflation', since wages had generally kept pace with prices; and that early-modern England had experienced the greatest degree of such 'profit inflation'. Such a contrast in their national economic experiences helps to explain, in Hamilton's view, why Spain subsequently 'declined', while England became the homeland of the modern Industrial Revolution. Hamilton subsequently (1942, 1952) applied his theories to Britain during the 18th-century Industrial Revolution era itself; but this paper is confine to the debate about industrial experiences in the Price Revolution era of ca. 1520 - c. 1650. A major reason for the significance and fame of the Hamilton thesis was its enthusiastic endorsement by John Maynard Keynes, in his *Treatise of Money*, published the following year, in 1930.

Subsequently, the Hamilton 'profit inflation' thesis was subjected to severe attacks: by John Nef (1936-37) and David Felix (1956). But they had to rely on the same dubious and indeed often untrustworthy price and wage data for England and France (and of course on Hamilton's data for Spain, which was of much higher quality). Both rightly noted that the proper comparison had to be made between industrial wages and industrial prices, not the price level in general; and since industrial prices generally rose less than did the overall price level (heavily weighted with foodstuffs), they found much less evidence for 'profit inflation' than had Hamilton. Nef developed a counter thesis to argue that sharply rising raw material costs, especially for wood and charcoal, forced industrialists to engage in technological changes that not only reduced such costs but resulted in much larger-scale, more capital-intensive forms of industry.

This study is based on newer sets of price and wage indices that appeared after their publications: those by Phelps Brown and Hopkins for England (which I have modified, after using their data sheets in the LSE Archives); and Herman Van der Wee for Brabant (Antwerp-Lier region). In the continued absence of reliable data, France is ignored in this study. My calculations and analyses of both industrial prices and industrial wages suggest that, for England, there is more evidence for potential 'profit inflation', in some industries, than Nef or Felix had been willing to concede. But the major discovery was that the Antwerp region continuously experienced, over the 16th and 17th centuries, the contrary phenomenon: what Keynes had called 'Profit Deflation' (for him, a truly negative force), in that industrial wages rose faster than industrial prices. And yet indisputably the southern Low Countries had a much more industrialized and more rapidly growing economy than did England, at least until the Revolt of the Netherlands (1568-1609). The concept of 'profit inflation' is not, therefore, a useful analytical tool, if based just on wage costs.

This study concludes with a brief examination of the effects on inflation on two other factor costs: land, in terms of real rents, and capital, in terms of real interest rates and costs. In all likelihood both such costs did lag behind industrial prices in early-modern England and the Low Countries (and contrary to Eric Kerridge's 1953 assertions on English rents), though real interest rates lagged more than did real rents.

JEL Classifications: B2, E2, E3, J3, N1, N3, O1, O5

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Introduction: Hamilton, Profit Inflation, and the Historiography of the Price Revolution

In the twentieth-century historiography of the early-modern Price Revolution, and especially of its Spanish connections, no economic historian is more renowned – and indeed more controversial – than the late Earl Hamilton. His fame rests on two theses. The first is his monetary explanation of that Price Revolution: that the long, sustained era of inflation, from the early sixteenth to the mid seventeenth century, was fundamentally produced by the influx of treasure (gold and silver) from the Spanish Americas, especially silver from the mines of Potosí (in modern-day Bolivia). The second concerns the principal consequences of that Price Revolution: so-called 'profit inflation', which he saw as the fundamental instrument in the birth of modern industrial capitalism.[1] His theories have, of course, been subject to repeated attacks, and also to some unfair ridicule during the past seventy years.[2]

Only a few brief comments need be offered here on his first and most famous thesis. Hamilton, of course, was hardly the first to contend that the origins of the European Price Revolution were to be found

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[1] The fundamental publications by Earl J. Hamilton are: 'American Treasure and Andalusian Prices, 1503-1660: A Study in the Spanish Price Revolution,' *Journal of Economic and Business History*, 1 (February 1928), 1-35, reprinted in P.H. Ramsey, ed., *The Price Revolution in Sixteenth-Century England* (London, 1971), pp. 147-81; 'American Treasure and the Rise of Capitalism, 1500-1700,' *Economica*, 27 (Nov. 1929), 338-57; 'Imports of American Gold and Silver into Spain, 1503-1660,' *Quarterly Journal of Economics*, 43 (1929), 436-72; *American Treasure and the Price Revolution in Spain, 1501-1650* (Cambridge, Mass., 1934; reissued 1965); *Money, Prices, and Wages in Valencia, Aragon, and Navarre, 1351 - 1500* (Cambridge, Mass., 1936); 'The Decline of Spain,' *Economic History Review*, 1st ser., 8:2 (1937-38), reprinted in E.M. Carus-Wilson, ed., *Essays in Economic History*, 3 vols (1954-62), vol. I, pp. 215-26; 'Profit Inflation and the Industrial Revolution, 1751-1800', *Quarterly Journal of Economics*, 56:2 (February 1942), 256-73; reprinted in F.C. Lane and J.C. Riemersma, eds., *Enterprise and Secular Change: Readings in Economic History* (London, 1953), pp. 322-49; and 'Prices as a Factor in Business Growth: Prices and Progress', *Journal of Economic History*, 12:4 (Autumn 1952), 325-49. This was his Presidential Address to the 12th Annual Meeting of the Economic History Association.

[2] See below, pp. 11-17, 29; and nn. 23-34, and n. 52.

in the influx of Spanish American silver. Adam Smith had said as much in his *Wealth of Nations*.[3] Even during the midst of the Price Revolution era itself, in 1568, the famous French philosopher Jean Bodin won a signal victory over his debate opponent, Jean Cherruyt de Malestroit, in 'demonstrating' that the current inflation of prices in France was due far more to that influx than to coinage debasements.[4] Less well known is an even earlier Spanish publication, a treatise of 1556, by the cleric Azpilcueta Navarra, of the Salamanca School, that made virtually the same contention.[5] Yet, as recent critics have correctly noted, the influx of Spanish silver cannot have provided the *initial* causes of that long sustained inflation, because, as the graphs demonstrate, it had commenced in Spain itself, the Low Countries, England, and elsewhere from about 1516-20, and thus long before any significant importations of such silver, i.e., from the later 1550s.

Many of the critics are just as incorrect, however, in ascribing the fundamental causes to demographic factors alone – that is, quite simply, bad economic theory. To be sure, population growth did play some important roles, especially in influencing relative price changes (i.e., in particular, in explaining why grain, timber, and wood-fuel prices rose more than other prices during this era). In terms of the modernized income-version of the so-called Quantity Theory, the consequences of demographic changes,

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[3] Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations* [1776], ed. with introduction by Edwin Cannan and Max Lerner, Modern Library Edition (New York, 1937), p. 34: 'the discovery of the mines of America diminished the value of gold and silver in Europe'.

[4] George A. Moore, ed., *The Response of Jean Bodin to the Paradoxes of Malestroit and The Paradoxes, translated from the French Second Edition, Paris 1578* (Washington, 1946). See also Jean-Yves Le Branchu, ed., *Écrits notables dur la monnaie, XVIe siècle: De Copernic à Davanzati reproduits, traduits, d'après les éditions originales et les manuscrits, avec une introduction, des notices et des notes*, Collection des principaux économistes, nouvelle édition, 2 vols. (Paris, 1934): *Les paradoxes du Seigneur de Malestroict, conseiller du Roy, et Maistre ordinaire de ses comptes, sur le faict des monnoyes, presentez à sa Majesté, au mois de mars MDLXVI* (Paris, 1566); *La response de maistre Jean Bodin advocat en la cour au paradoxe des monsieur de Malestroit touchant l'enchérissement de toutes choses et le moyen d'y remedier* (Paris, 1568).

[5] Marjorie Grice-Hutchinson, *The School of Salamanca: Readings in Spanish Monetary Theory, 1544 - 1605* (Oxford, 1952): Appendix III, p. 95: 'And even in Spain, in times when money was scarcer, saleable goods and labour were given for very much less than after the discovery of the Indies, which flooded the country with gold and silver'.

especially those inducing structural changes in the economy, are reflected in two of the variables in the Equations of Exchange: M.V = P. y (income velocity equation) and M = k.P.y (cash balances equation). For population growth, in conjunction with many other 'real' factors, clearly had an influence on the *real* variable *y* (net national income at constant prices), and thus on the economy's ability or capacity to expand in response to increasing *monetized* aggregate demand (i.e., in terms of the elasticities of supply in the various economic sectors). And, as both Jack Goldstone and Peter Lindert have contended, demographically-induced structural changes in urbanization, market structures, and payments systems may also have increased *V* – the income velocity of high-powered money; or conversely, in reducing the variable *k,* representing the demand to hold real cash balances.[6]

Nevertheless monetary forces do remain fundamental in any explanation of the Price Revolution. The initial monetary forces responsible for instigating the onset of the Price Revolution in the early sixteenth-century were, as I have argued elsewhere, a combination of: (1) the South German silver-copper mining boom (c. 1460-c.1535), which culminated in the early decades of that century, (2) structural changes in Mediterranean trade that diverted more and more of the new silver flows away from the Levant to north-west Europe; and (3) the introduction of fully negotiable credit instruments, in private and public finance, with a dramatic expansion in the effective stocks and flows of European money supplies. Subsequently, and certainly from the 1560s, the influx of Spanish American silver quite clearly served to add more fuel to the ongoing inflationary forces in the European economy. Though the interminable debate about the *causes* of the European 'Price Revolution' are not the focus of this study, some basic knowledge of both the monetary

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[6] Jack A. Goldstone, 'Urbanization and Inflation: Lessons from the English Price Revolution of the Sixteenth and Seventeenth Centuries,' *American Journal of Sociology*, 89 (1984): 1122-60; Jack A. Goldstone,'The Causes of Long Waves in Early Modern Economic History,' in Joel Mokyr, ed., *The Vital One: Essays in Honor of Jonathan R. T. Hughes*, *Research in Economic History*, Supplement no. 6, (Greenwich, Conn., 1991), pp. 51 - 92; Jack A. Goldstone, 'Monetary Versus Velocity Interpretations of the 'Price Revolution': A Comment,' *Journal of Economic History*, 51 (March 1991): 176 - 81; Peter Lindert, 'English Population, Wages, and Prices: 1541 - 1913,' *The Journal of Interdisciplinary History*, 15 (Spring 1985): 609 - 34. But see also critiques of these views in Michael D. Bordo,'Explorations in Monetary History: A Survey of the Literature,' *Explorations in Economic History*, 23 (1986), 339-415.

and real forces involved in producing that inflation is essential for comprehending its economic and social consequences.[7]

Hamilton, Keynes, and the Profit Inflation Debate

The more interesting questions concern the economic consequences of that inflation, especially in terms of what Hamilton called 'profit inflation', in the form of a widening gap between prices and industrial wages. But Hamilton failed to make clear whether he meant the general price level or some particular set of prices. Inflation and its opposite, deflation, are usually measured by the movement of some form of price index, as a weighted average of prices for a group of selected commodities. Some historians have fallaciously contended that, if monetary forces produce an inflation, they should act equally on all prices; but any examination of the several available price indices for the European economy, from medieval times, will reveal that the prices of its component commodities virtually never moved in tandem.[8]

The irregular behaviour of such individual prices is not just due to the fact that, as noted earlier, changes in demographic and various other real factors had an almost continuous if regionally varying impact in altering relative or individual prices. For concurrent monetary changes themselves frequently also influenced such changes. In particular, distributions of increased money stocks, regionally or nationally,

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[7] See John Munro, 'The Central European Mining Boom, Mint Outputs, and Prices in the Low Countries and England, 1450 - 1550,' in Eddy H.G. Van Cauwenberghe, ed., *Money, Coins, and Commerce: Essays in the Monetary History of Asia and Europe (From Antiquity to Modern Times)*, Studies in Social and Economic History, Vol. 2 (Leuven, 1991), pp. 119 - 83; John Munro, 'Precious Metals and the Origins of the Price Revolution Reconsidered: The *Conjuncture* of Monetary and Real Forces in the European Inflation of the Early to Mid-Sixteenth Century,' in Clara Eugenia Núñez, ed., *Monetary History in Global Perspective, 1500 - 1808*, Proceedings of the Twelfth International Economic History Congress at Madrid, August 1998 (Seville, 1998), pp. 35-50; and John Munro, 'The Monetary Origins of the 'Price Revolution' Before the Influx of Spanish-American Treasure: The South German Silver-Copper Trades, Merchant-Banking, and Venetian Commerce, 1470-1540', in Dennis Flynn, Arturo Giráldez, and Richard von Glahn ed., *Global Connections and Monetary History, 1470 - 1800* (Aldershot, 2002).

[8] For example, see J.D. Gould, 'The Price Revolution Reconsidered', *Economic History Review*, 2nd ser., 17 (1964-5), 253; reprinted in Ramsey, *Price-Revolution in Sixteenth-Century England,* pp. 95. In reviewing a book on monetary history in *The Journal of European Economic Histor*y, 3: 1 (Spring 1974), 253, Anna Jacobson Schwartz commented that: 'the author subscribes to a familiar fallacy, namely that a monetary explanation to be valid requires that all prices move in unison'.

may have benefited some economic sectors more than others, thus allowing some groups or socio-economic strata to gain relatively greater increases in money incomes. By their impact on price and income elasticities of demand and thus also on elasticities of supply of commodities so demanded, the consequent changes in their savings and expenditure patterns would have subsequently altered the prices of a wide variety of individual goods and services. The short-run supply of grains in early-modern Europe, for example, was far less elastic than was the supply of various textiles, so that increased monetized demand would have led (as indeed recorded) to greater price increases for grains than for woollen or linen cloth. Furthermore, if wages and other money incomes for the lower and middle classes did not rise proportionately with the general level of prices, many such persons, facing household budget constraints, would have been forced to spend proportionately more of their reduced real incomes on foodstuffs, fuels, and other necessities, and thus proportionately less on many industrial goods (or more luxurious foodstuffs), thereby reducing the relative demand for such goods, which in turn would have led to a fall in their *relative* prices (if not in their current or nominal money prices).

Labour, of course, is one of those commodities (or providers of service) whose price, in the form of wages, generally did not rise in tandem with the Consumer Price Index. The population growth that accompanied such periods of inflation, especially before the era of modern industrialization (i.e., before the 1860s), provided one major and obvious reason for that differential between prices and wages: a relatively more abundant supply of readily available labour and an adverse change in the land:labour ratio, presumably leading to a fall in the marginal productivity of agricultural labour – a subject requiring further analysis -- and thus (supposedly) in the real wage. Another reason for this price-wage gap is 'wage-stickiness', especially for institutional money wages involving either implicit or explicit contracts. To be sure, that phenomenon seems to have manifested a greater rigidity during deflationary eras. As Keynes rightly observed: 'Every trade union will put up some resistance to a cut in money-wages, however small...', but 'no trade union would dream of striking on every occasion of a rise in the cost of living', unless, of course,

the gap between money wages and rising wages became severe enough to produce a drastic reduction in living standards.[9]

Thus most economists and economic historians would surely agree with Hamilton that, in general, wage increases generally do lag behind rising consumer prices during inflationary eras – past and present. Hamilton himself first introduced this concept in a seminal article, published in 1929, on 'American Treasure and the Rise of Capitalism'.[10] The very next year, in his famed *Treatise on Money,* John Maynard Keynes bestowed his blessing on this concept of 'profit inflation' and on its role as a positive stimulus promoting industrial and general economic growth. If Hamilton had not explicitly used this term, Keynes certainly did.[11]

Any fair discussion of Hamilton's thesis should commence by examining the exact words he used in introducing this concept in his the aforementioned article. After comparing a set of graphs and tables on prices and wages in England, France, and Andalusia, for the sixteenth and seventeenth centuries, he then

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[9] John Maynard Keynes, *The General Theory of Employment, Interest and Money* (London, 1936), pp. 14-15. Preceded by this sentence: 'Thus it is fortunate that the workers, though unconsciously, are instinctively more reasonable economists than the classical school, inasmuch as they resist reductions of money-wages, which are seldom or never of an all-round character, even though the existing real equivalent of those wages exceeds the marginal disutility of the existing employment; whereas they do not resist reductions of real wages, which are associated with increases in aggregate employment and leave relative money-wages unchanged, unless the reduction proceeds so far as to threaten a reduction of the real wage below the marginal disutility of the existing volume of employment.'

[10] See n. 1 above.

[11] John Maynard Keynes, *A Treatise on Money*, two vols. (London, 1930), vol. II, pp. 152–63, esp. pp. 154-5: 'But it is the teaching of this Treatise that the wealth of nations is enriched, not during Income Inflations during Profit Inflations – at times, that is to say, when prices are running away from costs. We must, therefore, turn to the course of wages (as the only available indication of the movement of costs.)' He also stated, however, that Hamilton's presentation of wage data, if 'convincing' for Spain, 'must surely overstate the case' for England and France. Nevertheless, he states on pp. 158-59 that 'we may say that Profit Inflation in Spain lasted from 1520 to 1590, in England from 1550 to 1650, and in France from 1539 to 1700 (with a serious depression intervening from 1600 to 1625)'; and on p. 163: 'It is unthinkable that the difference between the amount of wealth in France and England in 1700 and the amount in 1500 could ever have been built up by Thrift alone. The intervening Profit Inflation which created the modern world was surely worth while if we take a long view.'

stated the following: [12]

> Let us assume that of every 100,000 pounds' worth of goods produced by a capitalist in England or France at the beginning of the sixteenth century 60,000 went to wages, 20,000 to rent, and 20,000 to profits..... [It is not] unreasonable to suppose that at the close of the sixteenth century the same product would have been sold for about 250,000 pounds; that wages would not have amounted to more than 75,000; and, making the unreasonable assumption that rents did not lag behind prices, not more than 50,000 pounds would have gone to rent. Profits amounted to 125,000 pounds, or 100 per cent on the turnover. The lag of wages behind prices has quadrupled profits. The windfalls thus received, along with gains from the East India trade, furnished the means to build up capital equipment, and the stupendous profits obtainable supplied an incentive for the feverish pursuit of capitalistic enterprise.

Prices and Wages in Spain, England, and Brabant: the current statistical evidence

A number of critical assumptions, some of them dangerous, underlie this rather astounding statement, which Keynes had found so appealing. The first assumption is, however, at least partially, if not wholly vindicated by subsequent evidence: namely, that the extent of inflation, as measured by variously constructed consumer price indices (CPI), was roughly comparable in the West European countries concerned during the era of the Price Revolution. From the beginning of the sixteenth century to the middle of the seventeenth, as shown in both Graph A and Table 5, the Composite Price Index (base 1501-10 =100) rose as follows: in Spain itself, to 457.1; in southern England, to 697.54; and in Brabant (southern Low Countries), to 845.55. It may thus seem, at first glance, somewhat odd that the Price Revolution in Spain was so much more muted than in the other two countries; but of course, the Price Revolution did not – we must repeat – begin with the influx of Spanish American treasure; and the forms or nature and the impact of the various monetary (and real) forces differed in all three countries. Nevertheless, the extent, albeit a regionally varying extent, of this widespread, continuous, and long-sustained inflation justifies the very term Price Revolution, especially when seen in historic perspective from the thirteenth to early twentieth centuries (i.e., in an era of commodity moneys, and thus before the institution of fiat paper money currencies).

Hamilton's graphs and tables for prices and wages in England and France were based on studies now

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[12] Hamilton, 'American Treasure', pp. 356-57.

regarded as too imperfect to be useful for current research: for England, those by Georg Wiebe, compiled from data published by James A. Thorold Rogers; and for France, those by le Vicomte d'Avenel.[13] In his 1929 article on 'American Treasure and the Rise of Capitalism', Hamilton's Spanish data were based on a set of Andalusian prices that he himself had published the previous year.[14] Subsequently, in his famed monograph, *American Treasure and the Price Revolution in Spain, 1501-1650* (1934), Hamilton expanded the presentation of his Spanish price data to include as well those from New Castile, Old Castile-Léon, and Valencia; and, from those, he produced composite price and money wage indices for Spain as a whole.[15]

About twenty years after that publication appeared a far superior set of wage and price indices for southern England, in two now famous articles by Henry Phelps Brown and Sheila Hopkins, in 1955 and

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[13] Georg Wiebe, *Zur Geschichte der Preisrevolution des XVI. und XVII. Jahrhunderts*, Staats- und sozialwissenschaftliche Beiträge, II:2 (Leipzig, 1895), largely based on price data in James E. Thorold Rogers, *A History of Agriculture and Prices in England*, *from the Year after the Oxford Parliament (1259) to the Commencement of the Continental War (1793), Compiled. Entirely From Original and Contemporaneous Records.,* 7 vols (Oxford, 1866-1902), especially vols. IV and V; Comte d'Avenel, *Histoire économique de la propriété, des salaires, des denrées, et de tous prix en général*, 7 vols. (Paris, 1894 - 1926).

[14] Earl Hamilton, 'American Treasure and Andalusian Prices', *Journal of Economic and Business History*, 1 (November 1928), 1-35, reprinted in P.H. Ramsey, ed., *The Price Revolution in Sixteenth-Century England* (London, 1971), pp. 147-81.

[15] In Hamilton, *American Treasure*, see Table 27 (p. 271): 'Composite Index Numbers of Money Wages, 1501-1650'; Table 29 (p. 278): 'Composite Index Numbers of Real Wages, 1501 - 1650 ('obtained by dividing the indices of money wages in Table 27 by the composite index numbers of commodity prices'); and Appendix VIII: 'Composite Index Numbers of Silver Prices, 1501-1650'. He did not provide any indication, however, of how the index was weighted (if at all). All provinces but Valencia used a money-of-account and coinage based on the *maravedís*, which contained an unvarying amount of fine silver, 0.094 gram, from 1501 to 1602. The coinage and money-of-account of Valencia was based on the *diner*, which, from 1501 to 1609, contained an unvarying amount of fine silver: 0.1389. Thereafter, Spain adopted a copper or *vellon* coinage, whose inflationary impact produced a premium or *agio* on the fine silver coinage, whose values Hamilton presented in Table 7 and Chart 4, for the years 1620- 1650, on pp. 95-97: ranging from 4.0 percent in 1620 to 104.2 percent in 1650, then falling to 25.0 percent and rising again to 44.9 percent in 1650. He did not, however, provide a table for *vellon* price indices for the period 1601-50; and such indices have to be computed by dividing his real wages indices by the money wage indices for this period (and that technique for the period 1501-1600 produces results virtually identical to those in his Composite Index Numbers of Silver Prices, in Appendix VIII. All of these tables used the base 1581=90 = 100, which I have converted to the base 1501-10 = 100. The graphs and tables in this study present prices in both silver and *vellon.*

1956, subsequently republished in a collection of the former's essays, *A Perspective on Wages and Prices* (London, 1981), which contains additional statistical appendices – the sub-indices for six groups of commodities – not provided in the original publication, or in subsequent reprints.[16] Although also based to a considerable extent on the price-data published by Thorold Rogers, Phelps Brown and Hopkins used his series with much greater care, and also utilized, for the period after the 1560s, an even better source: William Beveridge's published price data for early-modern England.[17] I myself have utilized the working papers in both the Phelps Brown Papers Collection and the Beveridge Price and Wage History Collection, now housed in the British Library of Political and Economic Science, to correct some compilation errors in their annual series and to interpolate missing data. For this current study, I have also utilized an index of prices for English industrial goods compiled by Robert Doughty, which contains a somewhat greater variety of products than contained in the Phelps Brown and Hopkins index (though his inclusion of salt is not necessarily helpful).[18]

Unfortunately nobody has yet advanced upon the work of Comte d'Avenel to present a better and

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[16] E.H. Phelps Brown and Sheila V. Hopkins, 'Seven Centuries of Building Wages,' *Economica*, 22 (August 1955), reprinted in E.M. Carus-Wilson, ed., *Essays in Economic History*, 3 vols. (London, 1954-62), Vol. II (1962), pp. 168-78.E.H. Phelps Brown and Sheila V. Hopkins, *A Perspective of Wages and Prices* (London, 1981), pp. 1- 12; E.H. Phelps Brown and S.V. Hopkins, 'Seven Centuries of the Prices of Consumables Compared with Builders' Wage-Rates,' *Economica*, 23 (Nov. 1956), reprinted in E.M. Carus-Wilson, ed., *Essays in Economic History*, Vol. II, pp. 179-96; in Peter Ramsey, ed., *The Price Revolution* (London, 1971), pp. 18-41; and in E.H. Phelps Brown and Sheila V. Hopkins, *A Perspective of Wages and Prices* (London, 1981), pp. 13-59. The justification for the commodity weights in their basket, especially for the base 1451-75=100 was taken from the account books of the Savernak household, in Dorset, published in K.L. Wood-Legh, *A Small Household of the Fifteenth Century* (Manchester, 1956).

[17] Sir William Beveridge, *Prices and Wages in England from the Twelfth to the Nineteenth Centuries*, vol. I: *Price Tables: Mercantile Era* (London, 1939; republished London, 1965). No other volume was ever published; and this volume regrettably contains no wage data.

[18] Robert Doughty, 'Industrial Prices and Inflation in Southern England, 1401-1640', *Explorations in Economic History*, 12 (1975), 177-92. It contains fifteen products: bricks, slates, plain tiles, lime, iron, lead, pewter, solder, woollen cloth, canvas, linen shirting, candles, charcoal, paper, and salt (with woollen cloth given double weight). For the period 1500 - 1750, the Phelps Brown and Hopkins index contains six products: charcoal, candles, oil, woollen cloth, canvas, and linen shirting. See Table A below.

more reliable set of price and wage indices for France; and for that reason, France has been omitted from this current study. An excellent, and in some respects, an even better replacement is now available for the southern Low Countries, from 1400 to 1700: more specifically, the Antwerp-Lier-Brussels region of the duchy of Brabant (but wages to 1670 only). Essentially modelled on the Phelps Brown and Hopkins set of price and wage indices, Professor Herman Van der Wee published these indices, originally in a Dutch-language essay, in 1975.[19] While containing fewer commodities than the Phelps Brown and Hopkins index, it presents not just the index numbers, but actual annual prices and wages, given in terms of Brabant's silver coinage based money-of-account, in *deniers groot.* [20] We may thus present the annual values of the Van der Wee 'Basket of Consumables' in these monetary terms and then compute how many of these baskets a master mason or carpenter, working about 210 days a year, could have purchased with the annual sum of his money wage income. For his base period of 1451-75, the same one used in the Phelps Brown and Hopkins 'basket of consumables' index, Van der Wee utilized very similar weights, but he chose the weights on the basis of the physical quantities in the Phelps Brown & Hopkins index, rather than on the percentage weights that the

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[19] Herman Van der Wee, 'Prijzen en lonen als ontwikkelingsvariabelen: Een vergelijkend onderzoek tussen Engeland en de Zuidelijke Nederlanden, 1400 - 1700,' in *Album offert à Charles Verlinden à l'occasion de ses trente ans de professoriat* (Ghent, 1975), pp. 413-35; reissued in English translation as: 'Prices and Wages as Development Variables: A Comparison between England and the Southern Netherlands, 1400-1700,' *Acta Historiae Neerlandicae*, 10 (1978), 58-78; republished in Herman Van der Wee, *The Low Countries in the Early Modern World*, Variorum (Aldershot, 1993), pp. 223-41. Only the original Dutch publication contains tables with the annual price and wage data. A more detailed series of wages and prices, though only to 1600, were published earlier in Herman Van der Wee, *The Growth of the Antwerp Market and the European Economy (fourteenth-sixteenth centuries)*, 2 vols. (The Hague, 1963), Vol. I: *Statistics*. For a further justification of the commodity weights in his 'basket', see 'Nutrition and Diet in the Ancien Régime', in Van der Wee, *The Low Countries*, pp. 279-87 (translated from *Spiegel Historiael*, 1 (1966), 94-101). See n. 16.

[20] From 1434-35, with the monetary unification of the Burgundian Low Countries, the Brabantine money-of-account, in *ponden groot*, became tied to the Flemish *pond groot* in a permanently fixed ratio of 1.5:1, so that 30s *groot* Brabant = 20s or 1 *pond groot* Brabant, until 1792. See Van der Wee, *Growth of the Antwerp Market,* Vol. I, Table XIII, pp. 123-35; John Munro, *Wool, Cloth and Gold: The Struggle for Bullion in Anglo-Burgundian Trade, ca. 1340-1478* (Brussels and Toronto, 1973), pp. 99-103; John Munro, 'Mint Outputs, Money, and Prices in Late-Medieval England and the Low Countries', in Eddy Van Cauwenberghe and Franz Irsigler, eds., *Münzprägung, Geldumlauf und Wechselkurse/ Minting, Monetary Circulation and Exchange Rates*, Trierer Historische Forschungen, vol. 7 (Trier, 1984), pp. 31-122.

latter had given to each commodity group. While those commodity percentage weights remained fixed and frozen throughout the span of the Phelps Brown and Hopkins index (1264-1954), they necessarily varied in the Van der Wee index, over time. Thus, during the sixteenth and early seventeenth centuries, when grain prices rose to a greater extent than did industrial prices, the share of the value of the total basket for the farinaceous/grain sub-index consequently rose, as indeed did the aggregate share for foodstuffs, while the percentage share for industrial goods correspondingly fell. In this respect, the Van der Wee composite index better reflects the changing pattern of consumer expenditures during the Price Revolution era than does the Phelps Brown and Hopkins index, as the following table A demonstrates.[21]

Table A: A Comparison of the Commodity Component Weights in the Phelps Brown & Hopkins and Van der Wee Composite Price Indices (base: 1451-75 = 100)

Commodity Group	Phelps Brown & Hopkins Basket, 1451-75: percentage weight (fixed)	Van der Wee Basket, 1451-75: percentage weight	Van der Wee Basket, 1501-05: percentage weight	Van der Wee Basket, 1596-1600: percentage weight
Farinaceous (grains, peas)	20.00	18.24	18.76	25.22
Meat and Fish	25.00	27.82	26.06	25.80
Dairy: Butter and Cheese	12.50	11.05	10.87	11.43
Drink: Barley malt	22.50	17.08	19.55	23.08
Fuel and Light	7.50	7.82	6.55	4.98

[21] See a more detailed analysis of the two baskets, with all their commodities, in Table 6 below. The Phelps Brown and Hopkins index contains fourteen commodities: wheat, rye, barley, and peas (farinaceous group); sheep, butter, cheese, red and white herrings (meat-dairy-fish group); charcoal, candles, and oil (fuel and light group); and woollen cloth, canvas, and linen shirting (textiles group). As the Phelps Brown working papers reveal, butter and cheese prices are missing from 1430 to 1561; but their Table 2, in 'Seven Centuries of the Prices of Consumables', p. 20, showing the structure of their four 'commodity baskets' erroneously suggests that butter and cheese are entirely absent for the basket labelled 1500-1725. The Van der Wee index contains ten commodities: rye (for grains), beef, cheese, butter, and herrings (for the meat-dairy-fish grouping); barley (for barley-malt, for the drink group); charcoal and tallow candles (fuel and light); and woollen and linen cloth (textiles).

Textiles: Woollen & Linens	12.50	18.00	18.20	9.49
Totals	100.00	100.00	100.00	100.00

The Attacks on the Hamilton Thesis: John Nef (1936-37) and David Felix (1956)

It is thus important to note that the first two articles attacking the Hamilton-Keynes thesis of Profit Inflation, and really the only two important ones, were published before these much more highly refined and reliable wage and price series became available; and indeed for England, the two major critics still had to rely on their interpretations of the price and wage data from Thorold Rogers, principally via Georg Wiebe. Since France has necessarily been omitted from this current study (see p. 9), their views on the relevance of the Hamilton thesis to the early-modern French economy, similarly based on the dubious d'Avenel data, will be largely if not entirely ignored.[22]

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[22] See, however, the index numbers for a 'composite unit of consumables' in Alsace, from 1401 to 1700 (1451-75=100), published in Henry Phelps Brown and Sheila Hopkins, 'Wage-Rates and Prices: Evidence for Population Pressure in the Sixteenth Century', in *Economica*, 24:97 (November 1957), republished in Phelps Brown and Hopkins, *A Perspective of Wages and Prices* (London, 1981), pp. 60-77, Table 2 (pp. 74-75), based L'Abbé A. Hanauer, *Études économiques sur l'Alsace ancienne et moderne*, 2 vols. (Paris, 1876-78), vol. II. Alsace, part of modern France, was then part of the duchy of Lorraine within within the German Habsburg Empire, until 1648 (Treaty of Westphalia). Hanauer's prices were quoted in terms of the 19th century French franc (with 4.5 grams silver), which the authors converted 'to an index of prices expressed in the denier of the unit of account, by use of Table III, of *Monnaies Stasbourgeoises*' (Vol. I, pp. 496-97). While there may have been no other option, such a technique would not likely produce accurate current money-of-account prices. In Table 3, p. 76, they also provide quarter-century mean index numbers for a similar 'composite basket of consumables', again based on d'Avenel's data (but taken from *Séances et travaux de l'Académie des Sciences Morales et Politiques: Compte Rendu* (Paris, 1892), pp. 349-419. See also Henry Phelps Brown and Sheila Hopkins, 'Builders' Wage-Rates, Prices and Population: Some Further Evidence', *Economica*, 26:101 (February 1959), also republished in their *Perspective on Wages and Prices*, pp. 78-98. It provides annual index numbers for a similar 'composite basket' and corresponding 'real-wage' indices for: Valencia, from 1413 to 1607; Augsburg, from 1499 to 1753; and Vienna, from 1520 to 1720 (and decennial means for Münster, from 1501-10 to 1551-60). The Valencia data were extracted from the Hamilton's two major monographs, cited in n. 1 above. None of these series, in either article, provide index numbers for industrial goods. A surprisingly useless source is: François Simiand, *Recherches anciennes et nouvelles sur le mouvement général des prix du XVIe au XIXe siècle*, École Pratique des Hautes Études, Section des Science historiques et philologiques, Conférences d'Histoire et Statistique économiques, 1930-1932 (Paris, 1932). Not even a single table is contained in its text of 677 pp. (crudely reproduced from a typescript); and the volume ends with a series of 16 hand-drawn graphs portraying the price-indices

The first major assault came from Professor John Nef, in a paper that he delivered in London in July 1936 on the topic: 'Prices and Industrial Capitalism in France and England, 1540 - 1640'.[23] He noted, first of all, that from the presentation of the Hamilton and Keynes tables, France appeared to have experienced a much greater degree of 'profit inflation' than did England during this century; but the historic record demonstrates instead that England then enjoyed much more industrial growth. One major reason was this was that insular England was spared the horrendous wars that afflicted France, especially from 1572 to 1598, and again during the Thirty Years War from 1618 to 1648 (wars far more drastic and destructive than the English Civil Wars of the 1640s). Not surprisingly, the intervening period of relative peace also marked a major spurt of French industrial growth; but this was also a period in real wages apparently rose in France, i.e., one in which 'profit-inflation' probably diminished.

For England, Nef does admit that 'there is certainly a remarkable coincidence between profit-inflation, which reflects the fall in real wages, and the growth of industrial capitalism ... in the first three of the four periods' under consideration; i.e., up to about 1620 (but not from then to the 1640s). His major challenge lay in the contention that 'more recent evidence' on wages, that supplied by the Beveridge Price History Commission, indicate that money rates rose much more than indicated in Wiebe's data. In particular, from 1571-82 to 1633-42, 'they rose more than 50 per cent', while Wiebe's data indicate a rise

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produced by d'Avenel, Hanauer, Thorold Rogers, Hamilton, Jevons, and others. This study has no new data.

[23] Published as: John U. Nef, 'Prices and Industrial Capitalism in France and England, 1540-1640,' *Economic History Review*, 1st ser. 7 (1937), reprinted in both: E.M. Carus-Wilson, ed., *Essays in Economic History*, Vol. I (London, 1954), pp. 108-34; and Frederic Lane and Jellie Riemersma, eds., *Enterprise and Secular Change* (London, 1953), pp. 292-321. This article was partly based on his prior research on industrial growth, previously published as: John U. Nef, 'The Progress of Technology and the Growth of Large-Scale Industry in Great Britain, 1540 - 1640', *Economic History Review*, 1st ser., 5:1 (1934), also republished in Carus Wilson, ed., *Essays in Economic Histor*y, Vol. I (London, 1954), pp. 88-107; and also John Nef, 'A Comparison of Industrial Growth in France and England, 1540-1640', *Journal of Political Economy*, 44 (1936), reprinted in John Nef, *Conquest of the Material World* (Chicago, 1964), pp. 144-212. See also John Nef, *The Rise of the British Coal Industry*, 2 vols. (London, 1923; reprinted 1966). In particular, Vol. I, Part ii, 'Coal and Industrialism', pp. 133-264; and especially Chapter 2, 'An Early Industrial Revolution', pp. 165-89; and John Nef, *Industry and Government in France and England, 1540-1640* (New York, 1940), which does not, however, deal with these theses.

in daily money wages of 'only' 39 percent.[24] That contention is not fully supported by the publication of Phelps Brown and Hopkins's data on building wages, which, for this period, lie between the Wiebe and Nef estimates: in that money wages rose from a quinquennial mean of 10.20d per day in 1571-75 to one of 14.90d in 1636-40, i.e., a rise of 46.1 percent. As the subsequent analysis will reveal, this somewhat more generous estimate of the rise in money wages for English building craftsmen does not really mitigate the very grim picture of sharply falling real wages that not only Hamilton but many subsequent historians have portrayed for this era.[25] Furthermore, Nef's complaint that estimates of real wages were based almost entirely on cereal products has been partly met by the much more diversified composition of the Phelps Brown and Hopkins basket. Admittedly, however, that basket still contains far more prices for raw materials (e.g., grains) than for finished products (bread, beer); and the latter, involving a much higher labour component, very likely rose to a much lesser degree than the former – especially, during this era, with significant technological changes in both brewing and baking.[26] Nef concluded this part of his argument by contending – as many others have

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[24] Nef, 'Prices and Industrial Capitalism', p. 116. This research project effectively came to an end with the outbreak of World War II, when, as indicated in n. 16 above, the one and only volume was published. While the early-modern wage data have never been published, Beveridge did publish some medieval wage data in two articles: William Beveridge, 'Wages in the Winchester Manors', *Economic History Revie*w, 1st ser., 7 (1936-37), 22-43; William Beveridge, 'Westminster Wages in the Manorial Era,' *Economic History Revie*w, 2nd ser., 8 (1955-56), 18 - 35. The voluminous wage data that I myself have gleaned from the Beveridge Price and Wage History Collection (LSE) do not contradict the evidence on wages published by Phelps Brown and Hopkins. See the next note.

[25] See Table 2 below. Phelps Brown and Hopkins did utilize some of the unpublished Beveridge wage data, as well as those from Thorold Rogers. Nef also contended that some wage-earners received part of their pay in food and drink from their employers; and that many possessed plots of land on which they could grow some food. For some similar arguments, see also Donald Woodward, 'Wage Rates and Living Standards in Pre-Industrial England', *Past and Present*, No. 91 (May 1981), pp. 28-46. The evidence on English wages that I have examined indicate that most artisans received money wages alone; and the wage data used in the indices in this study are those for money-wages alone.

[26] In 'Prices and Industrial Capitalism', p. 118, Nef notes that herring prices rose to a somewhat lesser degree than did building wages; and herrings do form part of the PB&H 'basket of consumables'. For the technological changes and Nef's thesis of 'an early industrial revolution' in Tudor-Stuart England, involving the adoption of new coal-burning furnaces in particular, see 'The Progress of Technology and the Growth of Large-Scale Industry', pp. 88-107. See also below, nn. 27-30 below.

since (including even Keynes) – that had 'the standard of living among the English working people really fallen by anything approaching half [50 percent – as indicated by Thorold Rogers's data], the advantages which employers derived from hiring labour cheaply might have been offset by the reduction in the amount [that] workmen could have spent on manufactured goods'.[27]

Nef's major and certainly his most powerful argument is that even if real wages fell, or more precisely the real cost of labour to the employer (see *infra*), other industrial costs were rising: in particular, the cost of timber (a major industrial input) and especially the cost of wood-charcoal fuels. As Tables 7 and 8 below indicate, incorporating considerable data not available to Nef, the prices for wood-charcoal and timber rose much more than did those for grains, and thus for any other group of commodities during the Price Revolution era, from c.1530 to 1640:[28] charcoal prices by 5.35 fold; timber prices, 5.24 fold; grains (wheat, rye, barley, oats); and the Phelps Brown & Hopkins 'basket of consumables', 3.98 fold. Industrial prices, on average, however, rose only 2.78 fold.

In contrast, when adequate coal prices do become available, with charcoal prices from the same location (Cambridge), from the 1580s, they experienced a rise of only 79.3 percent by the 1640s, compared to a rise of 98.3 percent in charcoal prices; and, with a subsequent fall in coal prices, they were only 45.8 percent higher than in the 1580s (while charcoal prices continued their inexorable climb). In Nef's view, this dramatic rise or relative increase in wood-fuel prices presented many industrialists with a dangerous price-cost squeeze that threatened them with poverty or extinction if they did not respond with cost-reducing technological innovations. In his thesis, the key innovations that did result in 'an early industrial revolution' in Tudor-Stuart England, one with much more capital intensive, larger-scale forms of industry, were principally those that created an entirely new furnace technology, based on the relatively cheaper coal fuels.

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[27] Nef, 'Prices and Industrial Capitalism', p. 135. See also below pp. and nn. 27-29.

[28] See also similar price data in John Hatcher, *The History of the British Coal Industry*, Vol. 1: *Before 1700* (Oxford, 1993), figure 3.1, p. 38; figure 3.2, p.43; and Appendix B, Tables 1- 8, pp. 572-89. See Nef's other publications in n. 22 above.

Since coal is a 'dirty' contaminating fuel – while charcoal is a pure-burning fuel – that new technology required vastly more complex and thus much larger reverberatory furnaces, which isolated the combustion of the fuels and its gases by reflecting the heat during the manufacturing processes: in making bread, beer, soap, glass, gunpowder, alum and dyestuff processing, metal-refining, etc.[29]

Impressively argued as it was, the Nef thesis has also come under considerable attack, principally on the grounds that the 'new' coal-burning manufacturing industries in the Tudor-Stuart era still formed only a very small component of the English industrial economy, particularly in comparison with the various textile industries (New and Old Draperies), that it provided virtually no exports, and that it did little to alter the overall structure of the English economy. But this debate also lies well beyond the scope of this study.[30]

The next (and last major attack) on the Hamilton thesis on 'profit inflation' came in 1956 in a very well argued article by David Felix in the prestigious *Quarterly Journal of Economics*.[31] By this time, undaunted by Nef's critique (and evidently still relishing Keynes's support), Hamilton had published, in this same journal (1942), another major article on the same theme, for a later era: 'Profit Inflation and the Industrial Revolution, 1751 - 1800'; and finally, in 1952, the *Journal of Economic History* had published his Presidential Address (for the Economic History Association) in the article: 'Prices as a Factor in Business

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[29] See n. 20 above.

[30] See in particular D.C. Coleman, *Industry in Tudor and Stuart England* (1975), pp. 35-49; Sybil Jack, *Trade and Industry in Tudor and Stuart England* (London, 1977), especially chapter 2, pp. 66-121. In defence of Nef, see Brinley Thomas, 'Was There an Energy Crisis in Great Britain in the 17th Century?' *Explorations in Economic History*, 23 (April 1986), 124 - 52. A related but still separate debate concerns Nef's view (and those as well of T.S. Ashton) on the changing fortunes of the English iron industry, which was unable to utilize coal – until the early eighteenth century when Abraham Darby developed the technique of purifying coal into coke as the fuel for smelting iron ore. In my view, Nef was correct and most of his critics were wrong on the issue of relative fuel costs.

[31] David Felix, 'Profit Inflation and Industrial Growth: the Historic Record and Contemporary Analogies', *Quarterly Journal of Economics*, 70:3 (August 1956), 441-63; republished in Roderick Floud, ed., *Essays in Quantitative Economic History* (Oxford, 1974), pp. 133-51. It necessarily repeats but also modifies Nef's attack on Hamilton, while largely supporting Nef's key arguments.

Growth: Prices and Progress'.[32] Felix necessarily deals with Hamilton's views on the Industrial Revolution era (and on France), which are beyond the purview of the study and hence will not be discussed here. In sum, Felix concludes that:

> industrial profit inflation is not much in evidence in the periods to which he refers ... [and] it is even possible that it was nonexistent, although this may be too bold a counterclaim in view of the gaps and obscurities in the evidence. But even if it did exist in a much reduced degree, it does not appear to have been a decisive force in determining rates of industrial growth'.

His more particular and principal objection, after surveying the evidence, was that 'there is no correlation either between the degree of price inflation and the degree of profit inflation, or between the rates of profit inflation and the apparent rates of industrial growth'.[33] We can take this argument as 'given' or settled and not deal with it further, with one exception.

The contention that 'during the seventeenth century English wages rose more rapidly than prices' is very misleading, in part because it is based on faulty data from and a misreading of Wiebe's index. The more serious fault is to ignore the fact that the Price Revolution era in England had come to and end in the mid-seventeenth century, to be followed by long-term, generally sustained *deflation* (except in the 1690s). Surely the Hamilton thesis must be evaluated in terms of the inflationary Price Revolution era alone. The (refined) Phelps Brown and Hopkins indices indicate the following for the period 1601-05 to 1646-50, with

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[32] See n. 1 above. In his published Presidential Address, Hamilton does respond to Nef's argument (if unconvincingly, by curtly and unfairly dismissing his evidence on timber prices); and he does admit (p. 338) that 'it would be manifestly absurd to contend that the great lag of wages behind prices in England, southern Germany, and perhaps France and other areas during the Price Revolution of the sixteenth and seventeenth centuries was solely responsible to the rise of modern capitalism.' Nevertheless he also states that 'it is difficult, however, to see how anything else could have been more important that the great lag of wages behind prices in certain economically advanced countries during the Price Revolution. Capitalism required *capital*, and it would not be easy to imagine a more powerful instrument for providing it than forced saving through a highly favorable price-wage ratio.' His article also deals with the modern Industrial Revolution era; but overall provides little that is new for the debate.

[33] Felix, 'Profit Inflation', pp. 441-43. He also deals with 'contemporary analogies' and notes that the renowned economist and economic historian W. Arthur Lewis had made 'a case for inflation in currently underdeveloped countries', citing his *Aspects of Industrialization*, National Bank of Egypt, Fiftieth Commemoration Lectures (Cairo, 1953), pp. 15-19.

a revised base of 1501-10=100: a rise in the Composite Price Index (CPI) from 438.12 to 697.54 (a 59.21 percent rise); a rise in Nominal Wage Index (NWI) from 200.00 (12d per day) to 283.33 (17d per day, a 41.67 percent rise); and thus a fall in Real Wage Index (RWI), from 45.65 to 40.69. *Thereafter*, post Price-Revolution, prices did fall (to an CPI of 584.76 in 1671-75), nominal wages continued to rise (to 18d or NWI of 300.00), and thus the RWI rose to 51.30, by 1671-75, when this study terminates.

Felix's most successful and certainly valid argument is that much of the inflation experienced in Spain, France, and England during the Price Revolution era was in terms of 'agricultural and wood product prices' and that when a comparison is made with industrial prices alone 'industrial profit inflation shrinks to quite modest proportions'. Felix also repeats the Nef argument that price increases for many finished goods evidently lagged behind the rise in the cost of their raw material components, especially timber and wool fuels; and he thus endorses Nef's that such changes in relative prices provided a key incentive for technological changes leading to more capital-intensive forms of industrial production.[34]

A Renewed Debate about Profit Inflation in the light of current evidence: general considerations

We thus come to the core critique or essential component in evaluating the Hamilton thesis on 'Profit Inflation'. Certainly the quotation cited earlier from Hamilton's seminal 1929 article (and essentially repeated in all his subsequent publications) implies that industrial prices moved in tandem with the overall shifts in the general price level (CPI). Unfortunately, in presenting his own data for Spain (and for the four components: Andalusia, Valencia, Castile, New Castile-Léon), he never provided any numerical indices for the any of the commodity groupings in this composite price index. He offered only some small-scale graphs, to be read with great difficulty, which suggest that agricultural prices and prices for variety of commodities

[34] Felix, 'Profit Inflation', p. 446, and Tables I and II, also based on Wiebe's data, in decennial means, but not consecutive, and for oddly defined periods (e.g., 1643-52). Felix also contends that profit inflation 'disappears in such expanding industries as iron, textiles, and paper', but that verdict cannot be vindicated without some knowledge of the actual money wages – and other production costs – in these industries. Felix is also, and naturally, sympathetic to Nef's erroneous contention that Weibe's money wage index should be elevated by 20 percent. See nn. 23-30 above.

(a few industrial products) more or less moved in tandem with the price level. I have, however, calculated and added the mean grain prices for his four regions, and presented the results in Table 1, below, which indicates that, from the 1560s, this index of grain prices often, if not always, moved above the composite price index; and such a movement would imply, therefore, that industrial prices from the 1560s did not generally rise as much as did the composite price index.[35]

The tables and graphs for prices in England and Brabant do provide the components of the composite price index in three groups: farinaceous (grains, peas, and barely malt, for 'drink); meat-fish-dairy products; and industrial goods. The weighting of the 'baskets' for these sub-components can be seen in Table 7 below. What these tables 2-5 and the graphs clearly show, for the entire Price Revolution era, is that the grain/farinaceous prices consistently, in these two regions, rose at a faster rate than other prices, though usually followed by a somewhat lesser rise in the other food prices. Conversely, and quite expectedly, for the reasons given above, the rise in industrial prices – and virtually all prices did rise in this era (including the price of labour) – lagged well behind the rise in the prices of foodstuffs (and certain industrial raw materials, as already noted, for England).

What therefore remains mystifying about Hamilton's presentation of his Profit Inflation thesis – all the more mystifying for a professional economist – is why such 'profit inflation' should be measured in terms of crude real wages, i.e., computed by dividing the Nominal (Money) Wage Index by the Composite Price Index. Thus, why and how would any industrialist in England (or France) gain from a fall in the real wages of his employees, if the principal reason for that fall was the rise in the costs of foodstuffs? As Nef had suggested, such a fall in real wages may well have led to a reduction in the demand of industrial employees for manufactured goods. If that conjecture may well be perfectly correct, one should observe, however, that in Tudor-Stuart England, only a minority of the adult population lived by money-wages alone, and that a far

[35] The task of collecting, in terms of Spanish *maravedís* (silver-based money-of-account), industrial prices for these four regions and then composing an national index, was too arduous a task to complete for the presentation of this paper.

higher proportion of the population was engaged in agricultural and related economic activities, which clearly benefited form a disproportionate rise in their prices and thus (or to some extent) their net incomes. Thus a fall in demand for industrial products from money-wage earners may have been much more than offset, during this era, by an increased in demand from landlords, tenant farmers, and even agricultural employees (most of whom would have grown or raised their own food), as well as from traders and merchants, petty capitalist producers, etc. Nevertheless, while such an increased aggregate demand – if it did occur – may have benefited industrial producers, these circumstances did not necessarily produce any 'profit inflation'.

Clearly the only correct method of measuring such 'profit inflation', and one that would permit better conclusions on the thesis, would be to compare the actual money wages, and other costs, with the consumer prices for each and every form of industrial production. A commendable ideal, to be sure, but a task that is just impossible to fulfill. What may be done is much more modest, and perhaps ultimately still too modest: namely, to compare the annual wages for building craftsmen (chiefly master masons and carpenters) with the annual prices for a small number of industrial goods, those contained in the Phelps Brown & Hopkins and the Van der Wee indices, and those in one other industrial-products index constructed by Robert Doughty. Unfortunately wage-data for most other industrial employees are lacking – certainly lacking for any long-term comparisons to be made; and, in any event, in textiles and many other industrial occupations wages were not paid by the day (from eight hours in winter months to fourteen in the summer) – as they were for building craftsmen – but by piece-work, making such comparisons all the more difficult.

How legitimate, therefore, is the use of wages for building craftsmen: both nominal and real? Any long-term survey of the movement of their real wages does not lend support for the standard view in economic theory that they reflect productivity changes. In the medieval era, such real wages reached their peak in the 1460s (when the cost of living was unusually low), a level not again attained in England until the early 1880s. It is difficult to believe that industrial productivity fell so much from the fifteenth century, even

with the population growth of the sixteenth century (from the 1520s), and did not regain that medieval peak even during periods of undisputed economic and industrial growth from the later seventeenth century (with some depopulation) and through the Industrial Revolution era.. Yet it must also be noted that the relationship between productivity and wages is oversimplified, for the true formula in economic theory for the real wage is: $W_L = MRP_L$; and thus the marginal revenue product could fall with a decline in the real price of the product that the unit of labour produces, even if its productivity did not fall (or even rose).

The one justification for using the money wages of building craftsmen (masons and carpenters) as a proxy for industrial wages is the opportunity-cost argument. Thus those who employed such craftsmen – and most worked for a wide variety of employers – had to pay a wage that would keep these artisans in that occupation and in their employ; and thus presumably they would have had to match wages that were being paid in comparable industrial occupations.

In the following comparisons, involving Spain, southern England, and Brabant, from 1501 to 1670 (or to 1650, for Spain), the real wages have been computed by two methods. The first is, of course, the standard method: by dividing the annual nominal or money wage index (NWI) by the Composite Price Index (CPI), or 'basket of consumables' index, for each year. The second was used only for Brabant, for which, as noted earlier, the annual prices for all commodities within the 'basket' are available. The average number of days that master building craftsmen worked each year has been estimated, on the basis of data supplied by Van der Wee, at 210 days; and that number was multiplied by the average annual money wage (the mean annual wage of master masons and carpenters) to obtain an estimate of the annual money wage income.[36]

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[36] Van der Wee, *Growth of the Antwerp Market*, vol. I: *Statistics*, section ii: Wages, pp. 333-34; 339-41, 457-61, Appendix 48, pp. 541-42. The wage rate chosen was the summer wage, which prevailed throughout most of the year; and it is not clear that all masters were subjected to the lower winter wage in this period (data on winter wages are in any event scarce). See John Munro, 'Urban Wage Structures in Late-Medieval England and the Low Countries: Work-Time and Seasonal Wages' in Ian Blanchard, ed., *Labour and Leisure in Historical Perspective, Thirteenth to Twentieth Centuries,* Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte Beiheft series 116 (Stuttgart 1994) 65-78; Jan De Vries, 'An Inquiry into the Behaviour of Wages in the Dutch Republic and the Southern Netherlands, 1580-1800', *Acta Historia Neerlandica*, 10 (1978) 79-97; reprinted in Maurice Aymard, ed., *Dutch Capitalism and World Capitalism*

That amount was divided by the annual value of the Van der Wee 'basket of consumables' to produce, therefore, an estimate of real wage incomes in terms of the number of baskets so purchased. All the data in the graphs are presented in both arithmetic and semi-logarithmic scales; and for most purposes of international comparisons, the latter is the better in revealing comparative rates of changes. In the tables, in which all the data are presented in quinquennial means, those for real wages have been computed in terms of the harmonic and not arithmetic mean, which is the better method for computing average quantities of goods purchased with a given sum of money.[37] Proof of the pudding may be seen in the fact that the computations of the harmonic means of the real wages for building craftsmen in Brabant produce identical results by both of these techniques (Table 3). This experiment therefore validates the Phelps Brown and Hopkins' computation of real-wages indices, in using the same formula, for each year in their series: RW = NWI/CPI. [38] But for the reasons just indicated, the most apt comparison is the changing relationship between nominal (money) wages and current industrial prices, which has been computed by dividing the NWI by the Industrial Price Index (IPI). Again, a second computation was made for Brabant: by dividing the annual value of all the industrial products in the Van der Wee 'basket of consumables' by the estimated annual wage income of master building craftsmen (as explained above).

Since Hamilton never did provide a composite index of industrial prices such a comparison is not possible for early-modern Spain (or for any of its four regions). Nevertheless, as Table 1 and graph B, and indeed as Hamilton himself noted, money wages did not lag to any significant extent behind the composite

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(Cambridge, 1982) 37-62.

[37] The *harmonic mean* is 'the reciprocal of the arithmetic mean of the reciprocals of the individual numbers in a given series.' See F.C. Mills, *Introduction to Statistics* (New York, 1956) , pp. 108-12, 401. The mathematical expression for this harmonic mean is: $HM = 1/ [\sum (1/r_1 + 1/r_2 + 1/r_3 + ... 1/r_n)] / N$ That can be rewritten in a two-part equation, for each quinquennium (five-year period): $HM = 1/x$, when $x = \sum (1/r_1 + 1/r_2 + 1/r_3 + 1/r_4 + 1/r_5) / 5$.

[38] The annual index numbers used for the CPI are those from my modified or corrected version of the Phelps Brown and Hopkins index; and in this study, for reasons indicated earlier, the quinquennial means are harmonic rather than arithmetic. See above, p. and n. 15.

price index during the 150 year period from 1501 to 1650; and, with the base 1501-10=100, the real wage index (harmonic means) fell below 90 in only four quinquennia: in 1546-50 (88.08), 1571-75 (89.32), 1596-1600 (86.84), and 1646-50 (89.79). Indeed, from 1606 to 1620, real wages actually experienced a significant rise (peaking at 115.66 in 1611-15). If wages did keep such a pace with a composite price index heavily weighted by foodstuffs – whose prices often did rise above the CPI (Table 1) – then it seems unlikely, for reasons elaborated above (p. 18), that they ever fell behind the presumed rise in industrial prices. For Hamilton, the absence of any such lag in wages, and thus the lack of any detectable 'profit inflation', was a prime explanation for Spain's failure to achieve any significant industrial growth in the early modern era and thus also an important if not the only reason for Spain's 'economic decline'.[39] But this debate also does not have any relevance for this current study.

A search for Profit Inflation in England during the Price Revolution era

For England, however, graph C and Table 2 reveal an entirely and strikingly different picture. Thus, despite Nef's criticisms of the older set of real wages indices (Thorold Rogers-Wiebe), the subsequent set of more highly refined indices produced by Phelps Brown and Hopkins (further refined, as noted earlier) still show a very stark fall in real wages. Again, with an adjusted base of 1501-10 = 100, the real wage index (NWI/CPI, in quinquennial harmonic means) had fallen to 52.92 as early as 1556-60 and to a nadir of 39.16 in 1631-35; and it was only 52.67 in 1666-70 (when this study ends). The most significant drop was in the

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[39] See Hamilton, 'The Decline of Spain', pp. 215-26 (n. 1 above); and Earl Hamilton, *War and Prices in Spain, 1651-1800* (Cambridge, Mass., 1947); for contrary views, see Michael Schwarzman, 'Background Factors in the Spanish Economic Decline,' *Explorations in Entrepreneurial History*, 3 (1950-51); J.H. Elliott, 'The Decline of Spain', *Past and Present*, No. 20 (Nov. 1961), pp. 52 - 75; revised edn. published in Trevor Aston, ed., *Crisis in Europe, 1560 - 1660: Essays from Past and Present* (London, 1965), pp. 167 - 93; and in Carlo Cipolla, ed., *The Economic Decline of Empires* (London, 1970), pp. 168-97; R. Trevor Davies, *The Golden Century of Spain, 1501-1621* (London, 1961), pp. 227-94; R. Trevor Davies, *Spain in Decline, 1621-1700* (London, 1965); Henry Kamen, 'The Decline of Castile: The Last Crisis', *Economic History Review*, 2nd ser. 17 (1964), 63-76; J.H. Elliott, *Imperial Spain, 1469-1716* (London, 1964), pp. 242-382; Jaime Vicens Vives, 'The Decline of Spain in the Seventeenth Century', in his *Economic History of Spain,* translated by Frances Lopez-Morillas (Princeton, 1969), Chapters 29-30; republished in Cipolla, *Economic Decline of Empires,* pp. 121-67.

early to mid sixteenth century; and since England and Wales were, by any measure, quite underpopulated in the 1520s, with less than 2.5 million inhabitants (vs. 4.5 to 6.5 million ca. 1300), and had no more than 3.2 million in 1561 – perhaps about half of the medieval peak, it seems unlikely that population growth was the sole culprit responsible for this stark decline in real wages.[40]

However, the more relevant index is that for the ratio of English money wages (per day) to the sub-index for a weighted basket of industrial product prices extracted from the Phelps Brown and Hopkins 'basket of consumables': NWI/IPI.[41] Those index numbers (again in terms of quinquennial harmonic means) fall to only 86.92 in 1556-60, declining slowly if irregularly thereafter, reaching a nadir of 68.55 in 1616-20, and climbed to reach a peak (for this period) of 89.12 in 1651-55, then declining to 80.84 in 1666-70. But, as noted earlier, England experienced deflation (in terms of the CPI) from the 1650s, while money wages continued to rise, albeit slowly (from 17d per day in 1646-50 to 18d per day by 1656-60). The somewhat more varied index of industrial prices compiled by Robert Doughty (see p. 19, with 15 industrial products) has also been used in this study, even though it terminates in 1640;[42] and its index numbers also are presented in Table 2. It reveals a somewhat greater potential for industrial 'profit inflation', since the index numbers for the ratio of NWI/IPI (with the same 1501-10 base) fell to 76.58 in 1556-60 and then, despite a slight jump in 1581-85 (to 82.08) they fell to a much more significant nadir of 61.81 in 1626-30, and then rose to 70.96 in the final quinquennium of 1636-40, even before deflation had begun to set in. If this table seems to offer somewhat more evidence of at least potential industrial 'profit inflation' in early modern England than either

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[40] E.A. Wrigley and R.S. Schofield, *The Population History of England, 1541 - 1871: A Reconstruction* (Cambridge, 1980), pp. 528 - 29, for the years 1541 - 1871. The figures they present are for England alone, less the country of Monmouthshire. To present the figures in the usual form, for England and Wales together, I have divided their annual data by 0.93383 (as indicated on p. 557, note to Table A5.3). For late-medieval England, see the debated discussed in Pamela Nightingale, 'The Growth of London in the Medieval English Economy,' in Richard Britnell and John Hatcher, eds., *Progress and Problems in Medieval England* (Cambridge, 1996), pp. 89-106.

[41] See above p. and n. 16; and below Table 6.

[42] See the previous note.

Nef or Felix had been willing to concede, the relevant evidence – with these comparisons involving industrial prices – is nevertheless far too weak to support Hamilton's overly and quite unrealistically optimistic case for establishing why England became the homeland of modern capitalistic industrialization. As noted earlier, however, we simply lack sufficient evidence, for all three regions, to conduct the optimum test: i.e., to compare the actual money wages and wholesale product prices in every major industry, along with changes in other costs.

A search for 'profit inflation' in Brabant (southern Low Countries) during the Price Revolution

An even more strikingly different picture, and different for generally opposite reasons, is to be found across the channel, in early-modern Brabant, or more precisely in the Antwerp-Lier-Brussels region. Rather surprisingly, the behaviour of real wages there is much more in accordance with the Spanish experience than with the English. For the real-wage index, whether measured by the ratio of money wages indices to those for the 'basket of consumables' (i.e., NWI/CPI), or by the ratio of money wages to the value of that basket (in d. *groot* Brabant), again with harmonic means for the five-year averages, shows very little decline for most of the Price Revolution era. The real-wage index (1501-10=100) falls below 90 only in five quinquennia before the war-torn years of the 1580s (falling from 106.53 in 1576-80 to 72.34 in 1586-90); and indeed in five quinquennia, that index rises above 100. That low-point of 1586-90 is surpassed only once, in 1646-50 (RWI of 69.55). And if the second quarter of the seventeenth century seems to be relatively bleak, when the real-wage index falls below 80, the first quarter of the seventeenth century was one of strongly rising real wages, when the mean real wage index was consistently above 110, until 1620. One explanation for that rise, and then the subsequent fall was that this period (1601-20) marked during the relatively peaceful interim between the Truce of 1609-21 and this region's involvement in the Thirty Years' War (1618-48).

Far more revealing are the index numbers for the quinquennial mean ratios between the nominal money wage index and the index of the composite of industrial prices (NWI/IPI). For there is no indication

whatsoever of any industrial 'profit inflation'; and that ratio rises to 140.53 in 1536-40, falling somewhat thereafter, but with one sharp upsurge in 1561-65, reaching 185.56, then falling to 117.68 (in 1571-75) – but still well above that crucial 100 mark indicator – and then rising to 167.95 in 1611-15. During the first half of the seventeenth century this ratio of money wages to industrial prices consistently remained well above that mark, and generally above 130, except in the decade 1641-50, when it fell to about 124. That decade also marked the end of the Price Revolution era in the Low Countries, as well; and thereafter, while prices fell, wages did not (stable at 72d. *groot* per day for both masons and carpenters from 1600). Thus as real wages rose again, reaching an index of 95.66 in 1666-70, so did the ratio of money wages to industrial prices, reaching an index of 157.24 in the same quinquennium. Another way to look at this ratio is to compute the value of annual money wages as a proportion of the composite of industrial prices in the Van der Wee basket. It rose from 15.68 percent in 1511-15 (i.e., before the actual onset of the Price Revolution in the Low Countries) to a peak of 30.56 percent in 1561-65, but thereafter it was virtually always above 20 percent, and frequently above 25 percent.

This is a situation that, for both Hamilton and Keynes, was the exact and negative opposite of Profit Inflation; for indeed Keynes called the readers' attention to 'the extra-ordinary correspondence between the periods of Profit Inflation and of Profit Deflation respectively with those of national rise and decline.'[43] Surely, at least for that latter case, this represents a gross historical inaccuracy for the early-modern Low Countries. For most historians would agree that during the sixteenth and seventeenth centuries this region (including Holland) was economically much more advanced than England, let alone Spain: with a far more extensive and richer industrial, commercial, and financial sectors, which together promoted a far more extensive degree of urbanization in the Low Countries.[44] Certainly for most of the sixteenth century, at least

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[43] Keynes, *Treatise on Money*, Vol. II, p. 161.

[44] See Van der Wee, *Growth of the Antwerp Market*, vol. II, pp. 41-280, 369-88; Herman Van der Wee, 'The Economy as a Factor in the Revolt of the Southern Low Countries', *Acta Historia Neerlandica*, 5 (1971), pp. 52-67, reprinted in his collection *The Low Countries in the Early Modern World* (1993), pp.

until the 1570s, Brabant itself probably experienced more substantial industrial growth, especially in textiles and various luxury oriented crafts , than did England (despite the success of its broadcloth industry). Antwerp's 'Golden Age' was, after all, the century from the 1460s to the 1560s, i.e., to outbreak of the Revolt of the Netherlands in 1566-68; and one of its most important industries was in finishing textiles, especially English woollens. Subsequently, however, Van der Wee does concede that 'the Eighty Years' War was clearly an important factor in the structural decline of the economy of Brabant [and the southern Netherlands more generally].'[45]

Nevertheless, we should not paint too bleak a picture of the economy of the southern Low Countries during the seventeenth century, even if it clearly fell behind the north (i.e., the Dutch Republic of the United Provinces); for it did achieve some significant recovery in the first third, even during the Thirty Years War, as can be seen, for example, in industrial statistics for the Flemish Hondschoote sayetterie, which, before the Revolt, had been northern Europe's leading producer of the light worsted-type say fabrics. Its sales , having reached a peak of 93,057 says in 1566-70 (mean), with the outbreak of the Revolt, then fell sharply to a mean of just 12,128 says in 1586-90; but it then recovered to 54,767 says in 1626-30, its seventeenth century peak. By that time its English rival, the so-called New Draperies, largely created (or re-created) by Flemish refugee artisans in East Anglia, from the 1570s, had successfully displaced the Flemish (and the Dutch, to the north),

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264-78; along with other important studies, especially 'Prices and Wages as Development Variables', pp. 223-44; 'The Low Countries in Transition: from the Middle Ages to Early-Modern Times', pp. 3-28; 'The Low Countries in Transition: from Commercial Capitalism to the Industrial Revolution', pp. 29-46; and 'Structural Changes and Specialization in Southern Netherlands Industry, 1100 - 1600', pp. 201-22 (republished from *Economic History Review*, 2nd ser., 2nd ser., 28 (1975), 203-21). And see also: Hermann Van der Wee, 'Industrial Dynamics and the Process of Urbanization and De-Urbanization in the Low Countries from the Late Middle Ages to the Eighteenth Century: A Synthesis,' in Herman Van der Wee, ed., *The Rise and Decline of Urban Industries in Italy and in the Low Countries: Late Middle Ages - Early Modern Time* (Leuven, 1988), pp. 307-81; Herman Van der Wee and Jan Modern, 'Antwerp as a World Market in the Sixteenth and Seventeenth Centuries,' in J. Van der Stock, ed., *Antwerp: Story of a Metropolis, 16th - 17th Centur*y, Antwerp 93, Hessenhuis 25 June - 10 October 1993 (Ghent, 1993), 19-31; Jan De Vries and Ad van der Woude, *The First Modern Economy: Success, Failure, and Perseverance of the Dutch Economy, 1500 - 1815* (Cambridge and New York, 1997).

[45] Van der Wee, 'Prices and Wages', p. 240.

as the north European leader in producing these cheap, light fabrics.[46] As Van der Wee has so rightly noted, the 'economic decay of Brabant' from the second quarter of the seventeenth century has to be explained by a complex set of other factors, including changes in international trade. Yet it is far from clear that demographic variables – population growth during the 1609-21 Truce, followed by decline – and changing real wages have that much explanatory power, especially since real wages rose the most strongly during that Truce, and then fell with the ensuring demographic and economic decline.[47]

In any event, the two more general and related conclusions must stand. First and foremost, throughout this period Brabant almost consistently experienced what Keynes called Profit Disinflation, at least in terms of the ratio of nominal wages to industrial prices, without any apparent negative consequences for industrial growth, certainly not during the two-thirds of the sixteenth century preceding the Revolt and during the first two decades of the seventeenth (i.e., during the 1609-21 Truce). Second, building craftsmen, and presumably many other industrial workers, in sixteenth-century Brabant, and also for much of the seventeenth century, were far more successful in maintaining or even in improving their real wages than were their English counterparts. Since inflation was often more severe in Brabant than in England, especially also with a more pronounced rise in the price of foodstuffs, the explanation must lie in the ability of the

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[46] See Emile Coornaert, *La draperie-sayetterie d'Hondschoote, XIVe-XVIIIe siècles* (Paris, 1930); Coornaert, 'Draperies rurales, draperies urbaines: l'evolution de l'industrie flamande au moyenâge et au XVI siècle,' *Belgische tijdschrift voor filologie en gescheidenis/Revue belge de philologie et d'histoire*, 28 (1950), 60-96; Jan Craeybeckx, 'L'industrie de la laine dans les anciens Pays-Bas méridionaux de la fin du XVIe au début du XVIIIe siècle,' in Marco Spallanzani, ed., *Produzione, commercio e consumo dei panni di lana* (Florence, 1976), pp. 21-43; John H. Munro, 'The Origins of the English 'New Draperies': The Resurrection of an Old Flemish Industry, 1270 - 1570,' in Negley Harte, ed., *The New Draperies in the Low Countries and England*, *1300 - 1800*, Pasold Studies in Textile History no. 10 (Oxford and New York, 1997), pp. 35-127.

[47] See Tables 3-4; and Van der Wee, 'Prices and Wages', p. 240. Perhaps Van der Wee means that the subsequent fall in real wages, from 1621-25 to 1646-50 inclusive, was a time-lagged effect of prior population increase; but this longer period of falling real wages also encompassed a period of prolonged demographic decline, for a which a time-lagged effect is more difficult to explain. Van der Wee also maintains (p. 240) that the earlier war-induced demographic decline had led to 'a rise in the real *per capita* wage income from 1587 onwards'; but that seems to be contradicted by Table 3: real wages fell from 100.88 in 1581-85 to 72.34 in 1586-90 recovering only to 97.43 in 1596-1600.

Brabantine building craftsmen to secure better compensation in terms of rising money wages. Quite possibly, as Van der Wee suggests, their success lay in superior corporate organization and more effective guild powers.[48] Clearly there was far less nominal 'wage stickiness' than in England during the sixteenth century , though certainly just as much in the seventeenth century (during both the inflationary and deflationary periods), as may be seen in Tables 2-4.

At the same time, it is so tempting to believe, as Van der Wee suggests, that the superior performance of the more highly advanced Brabantine economy, compared to England's still basically agrarian economy, would explain the striking disparities in real-wage trends between these two regions, at least until the later seventeenth century. But one set of statistics does not really support that assumption: for in 1401-05, the annual money income of a master carpenter and mason (mean wage) could have purchased 10.821 of the Van der Wee commodity baskets, an amount finally exceeded in the 1460s, but not again matched, until the mid-sixteenth century. At the beginning of the fifteenth century, it must be noted, Antwerp was in fact experiencing population growth;[49] but it was still an economic 'backwater', subservient to Flanders, and many decades away from commencing its role as an international entrepôt and financial centre. Thus in 1531-35, when Antwerp's economy had clearly become far more highly advanced, a builders' annual money wage income could purchase only 7.811 baskets (though 10.104 baskets in 1546-50); and only in 1561-65 – and in the only quinquennium of the sixteenth century – was that amount exceeded, with 12.279 baskets (falling to 6.662 baskets in 1586-90). Economic recovery in the Truce years of 1609-21 did mean a recovery in purchasing power to just over 10 such baskets a year, i.e., again about the level of the early fifteenth century.

Thus such studies in the behaviour of real wages, let alone a search for potential 'Profit Inflation',

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[48] Van der Wee, 'Prices and Wages', p. 240; and Van der Wee, *Growth of the Antwerp Market*, vol. II, pp. 381-88, 419-22.

[49] Van der Wee, 'Wages and Prices', pp. 232, 238; see also n. 44 above.

tell us very little, if anything at all, about the sources of industrial and economic growth.[50] Indeed the penultimate conclusion about the Hamilton thesis, and more generally about any concepts of Profit Inflation as a factor promoting industrial growth in early-modern Europe, is that they make little sense, and for many reasons beyond those proposed by Nef and Felix.

Inflation and other factor costs: capital and land (interest and rents)

Indeed, such theses do not explain why capitalist industrialists in early-modern western Europe, if they actually did secure more and more profits from any widening gap between prices and wages, would be inspired to invest them in more capital-intensive, large scale enterprises. For if, as so many historians still assume, population growth was chiefly responsible for the fall in real wages during this Price Revolution era, why would rational industrial capitalists have replaced an ever cheapening factor of production, namely labour, with the presumably more expensive factor, capital? It certainly does not reasonably follow that population growth would have reduced the marginal productivity of labour in most industrial crafts, though it may have done so for labour in agriculture. Thus, why would most industrialists not seek to expand production by hiring more and more cheap labour, with evidently very elastic supplies? In this respect, the Nef thesis does make much more sense than the Hamilton thesis.

Perhaps, as J. D. Gould suggested so long ago, the real answer to this question may lie in the impact of inflation on real interest rates. For, *ceteris paribus*, nominal interest rates rarely adjust for inflation, which certainly, at the very least, cheapens the cost of *previously borrowed* capital, if such funds were borrowed by contracts stipulating fixed interest payments and repayment of principal in terms of the current money-of-

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[50] Van der Wee, 'Wages and Prices', p. 240, seems to be somewhat sympathetic to the concept of Profit Inflation in stating that 'falling real wage rates in the 16th century had long helped the export of traditional textiles'; and, on p. 241, that the 'very low 16th-century wage level opened wide prospects of extra profits for those entrepreneurs who succeeded in developing and launching new products'. But, as indicated earlier, we simply lack the specific price and wage data to substantiate these views.

account.[51] In any event, Van der Wee's data for the Low Countries indicate that even *nominal* rates of interest, for short term public loans, were falling during the sixteenth century: in Flanders, from 20.5 percent in 1511-15 to 11.0 percent in 1566-70; and on the Antwerp market, again from 20 percent in 1511 to 10 percent in 1550 (but 14 percent in 1555).[52]

Price or cost changes in the one remaining factor of production, land, might also offer another form of 'profit inflation' (as Hamilton himself had suggested). For most historians, however, any confidence in that hypothesis was virtually destroyed in 1953 by Eric Kerridge's classic article on 'The Movement of Rent' in Tudor Stuart England.[53] For his data showed that private agricultural rents had variously risen eight- to ten-fold from 1510-19 to 1650-59 (or from 4.38 to 7.03 fold from 1530-39), and thus in close correspondence with the overall rise in English agricultural prices (Table 2). But such rents were only for 'new takings', and from only two estates; indeed, rents on new takings on crown lands rose far less: 2.93 fold from 1510-19 to 1600-09 (when that series ends). To meet the obvious objection that so much land was in the form of copyhold tenures with fixed customary rents, he replied that 'the rise in rent took largely the form of increased entry fines' [i.e., an inheritance tax paid by the new tenant]. That reply ignores the obvious fact that such increases could take place only every seven, fourteen, or twenty-one years (or after an actual lifetime) at best.[54] An English industrial 'capitalist' who required land would presumably have leased it by

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[51] Gould, 'The Price Revolution Reconsidered', 249-66 (in Ramsey, *Price-Revolution in Sixteenth-Century England,* pp. 91-116). See also his useful comments about the 'profit inflation' debate (chiefly based on Nef and Felix).

[52] Van der Wee, *Growth of the Antwerp Market*, vol. I: *Statistics*, Appendix 45/2, pp. 525-27. No usable data after 1555 because the government was obtaining short-term funds from other sources; and the Spanish bankruptcy of 1557 disturbed relations with traditional lenders.

[53] Eric Kerridge, 'The Movement of Rent, 1540 - 1640', *Economic History Review*, 2nd ser., 6:1 (1953), reprinted in Carus-Wilson, *Essays in Economic History*, Vol. II, pp. 208-26.

[54] From just the Herbert and Seymour estates. Subsequently, in Eric Kerridge, *Agrarian Problems in the Sixteenth Century and After*, Historical Problems: Studies and Documents no. 6 (London,1969), pp. 17-31, 94-136, in opposing Tawney's views on landlords's arbitrary enclosures, he noted the regional variations in the ability of landlords' to engage in such tactics, suggesting that many rents did not rise.

a contract that, for a number of years – say, five, ten, or twenty (or even ninety-nine) -- would have established a fixed rent in current pounds sterling. If, during that same period, he benefited from rising prices for his product, he would thus have gained from cheaper *real* rents. Across the Channel, Van der Wee's data on polder rents in the Antwerp vicinity indicate a 9.89 fold rise from 1510 to 1630. Nevertheless, throughout this period, for periods generally from five to ten years, those rents remained fixed (evidently by contract or lease).[55] In sum, such evidence would suggest that if industrial entrepreneurs could periodically have gained from cheaper *real* rents during inflationary eras, such gains were probably less than those to be derived from a fall in *real* interest rates.

A concluding contrast: large-scale industrial capitalism in the deflationary fifteenth-century

Finally, in seeking connections between long-term inflations and industrial growth we may be missing those linked, however tangentially, to deflation. If so, we should launch our search a century earlier, especially during the nadir of the mid-fifteenth-century deflation, whose monetary roots I have explored at length elsewhere.[56] For general deflation, expressed in terms of a silver-based money-of-account (pounds sterling, livres tournois, *ponden groot*), simply means an increase in the purchasing power of silver, once for once, gram for gram. As I have also argued, in several of these studies, that phenomenon provided a strong profit incentive to engage in technological innovations that, by the 1460s and 1470s, produced a veritable revolution in both mining and smelting. The first, in mechanical engineering, was the application

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[55] Van der Wee, *Growth of the Antwerp Market*, Vol. I, Appendix 40/1, pp. 477-82. For other evidence on falling interest rates, see Sidney Homer and Richard Sylla, *A History of Interest Rates*, 3rd rev. edn (New Brunswick, 1991), especially Table 11 (pp. 137-38), and Chart 2 (p. 140); and Ian Blanchard, 'International Capital Markets and Their Users, 1450 - 1750', in Maarten Prak, ed., *Early Modern Capitalism: Economic and Social Change in Europe, 1400 - 1800*, Routledge Explorations in Economic History no. 21 (London and New York, 2001), pp. 107-24, esp. figure 6.1, 'Northern European Base Interest Rates, 1265-1635' (p. 108), and fig. 6.4 (p. 116).

[56] See above nn. 7 and 20, especially Munro, 'Mint Outputs, Money, and Prices in Late-Medieval England and the Low Countries', pp. 31-122; and various other studies in *Bullion Flows and Monetary Policies in England and the Low Countries, 1350 - 1500*, Variorum Collected Studies series CS355 (Aldershot, 1992).

of hydraulic machinery to create vacuum-powered drainage machinery, to cope with the inevitable problem of flooding with much deeper mine shafts, and thus to reach and safely exploit vast deposits of hitherto untouched silver-copper ores. The second, in chemical engineering, was the *Seigerhütten* process: a new method of lead-based smelting, to separate these two metals, in the now abundantly supplied silver-copper ores.[57] That process also used hydraulic machinery, in this case, to power the smelter's bellows, as did many other more larger-scale forms of industry in late-medieval and especially fifteenth century Europe, and thus long before the Price Revolution.[58]

Finally, we should also note, in seeking other examples of larger-scale forms of industrial capitalism that have nothing to do with Profit Inflation, the ship-building industries that emerged from the final development of the *carracks* or full-rigged Atlantic ship (combining square and lateen sails) by about the mid fifteenth century.[59]

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[57] See, also in n. 7, in particular, Munro, 'The Central European Silver Mining Boom', pp. 119-83; and also John Nef, 'Silver Production in Central Europe, 1450-1618', *Journal of Political Economy*, 49 (1941), 575-91; John Nef, 'Mining and Metallurgy', in M.M. Postan and E. E. Miller, eds., *Cambridge Economic History*, Vol. II: *Trade and Industry in the Middle Ages*, revised edn. (Cambridge, 1987), pp. 691-761, especially pp. 721-46.

[58] See John Munro, 'Industrial Energy from Water-Mills in the European Economy, Fifth to Eighteenth Centuries: the Limitations of Power', in Simonetta Cavaciocchi, ed., *Economica ed Energia, Seccoli XIII - XVIII*, Atti delle 'Settimane di Studi' e altrie Convegni, Istituto Internazionale di Storia Economica, 'Francesco Datini da Prato', vol. 34 (Florence, Le Monnier: 2003); and also Terry S. Reynolds, *Stronger than a Hundred Men: A History of the Vertical Water Wheel* (Baltimore and London, 1983).

[59] See in particular Richard Unger, *The Ship in the Medieval Economy, 600-1600* (London and Montreal, 1980); and Richard Unger, *Dutch Shipbuilding before 1800 : Ships and Guilds* (Assen, 1978).

Table 1.

SPAIN : Prices and Wages, in quinquennial means, 1501-05 to 1646-50

Base: 1501-10 = 100

Years	Composite Price Index Based on CPI: A (Silver)	Composite Price Index Based on CPI: B (Vellon after 1600)	Spanish Grain Price Index	Money-Wage Index	Real Wage Index harmonic means
1501-05	92.43	92.43	92.71	95.34	103.131
1506-10	107.57	107.57	107.29	104.66	96.882
1511-15	98.98	98.98	84.55	110.35	111.488
1516-20	104.28	104.28	80.43	115.29	110.544
1521-25	122.14	122.14	102.22	120.69	98.822
1526-30	131.57	131.57	139.50	120.85	91.778
1531-35	132.44	132.45	117.12	124.03	93.583
1536-40	138.73	138.74	119.88	130.86	94.325
1541-45	147.90	147.90	132.52	136.01	91.928
1546-50	165.89	165.89	163.72	146.08	88.083
1551-55	176.02	176.02	140.61	166.71	94.505
1556-60	194.01	194.01	200.78	188.23	96.930
1561-65	223.43	223.43	197.18	204.35	91.442
1566-70	227.73	227.73	206.47	216.32	94.899
1571-75	246.77	246.76	213.74	220.43	89.327
1576-80	247.82	247.82	262.76	231.26	93.366
1581-85	269.07	269.07	305.17	249.77	92.823
1586-90	274.97	274.98	282.63	267.03	97.070
1591-95	284.42	284.43	326.09	275.05	96.706
1596-00	320.98	320.98	366.41	278.60	86.837
1601-05	349.92	352.43	347.68	350.15	99.195
1606-10	330.12	335.31	400.39	372.46	111.049
1611-15	316.82	322.68	318.28	373.24	115.661
1616-20	328.56	335.64	384.67	374.11	111.446

SPAIN : Prices and Wages, in quinquennial means, 1501-05 to 1646-50

Base: 1501-10 = 100

Years	Composite Price Index Based on CPI: A (Silver)	Composite Price Index Based on CPI: B (Vellon after 1600)	Spanish Grain Price Index	Money-Wage Index	Real Wage Index harmonic means
1621-25	317.86	344.72	355.10	371.34	107.704
1626-30	328.05	410.81	435.91	384.65	93.553
1631-35	329.91	395.13	419.20	400.84	101.441
1636-40	323.47	409.67	419.46	406.46	99.216
1641-45	313.50	432.48	466.09	403.92	93.401
1646-50	343.36	457.09	573.78	410.25	89.791

Sources :

Earl J. Hamilton, 'American Treasure and the Rise of Capitalism, 1500-1700,' *Economica*, 27 (Nov. 1929), 338-57; Earl Hamilton, *American Treasure and the Price Revolution in Spain, 1501-1650* (Cambridge, Mass., 1934; reissued 1965), Chapter XII: 'Wages: Money and Real,' pp. 262-82; and Chapter XIII: 'Why Prices Rose,' pp. 283-308; Appendices (pp. 309-403), with statistical tables on prices and wages.

I have changed the base from the original, 1581-90 = 100, to the one used in these tables: 1501-10 = 100.

Table 2.

ENGLAND : Prices and Wage Indices, in quinquennial means, 1501-05 to 1671-75
Base: 1501 - 10 = 100

Years	Index A PBH Farinaceous Price Index	Index B PBH Fish, Meat Dairy Product	Index C PBH Ind Price Index	PBH Composite Price Index	Doughty Industrial Price Index	Daily Money Wage in d. for Master Mason, Carp	Bldg Craftsmen: Nominal Wage Index for Master Mason/Carpenter	Bldg Craftsmen: Real Wage Index harmonic mean
1501-05	109.40	92.52	101.18	101.43	100.395	6.00	100.00	98.586
1506-10	90.60	107.48	98.82	98.57	99.605	6.00	100.00	101.455
1511-15	98.27	107.32	105.38	103.08	101.581	6.00	100.00	97.017
1516-20	113.69	119.48	106.20	114.39	104.743	6.00	100.00	87.417
1521-25	128.43	165.34	110.14	138.72	114.032	6.00	100.00	72.089
1526-30	163.17	149.62	119.34	149.45	119.565	6.00	100.00	66.912
1531-35	154.12	155.49	119.53	147.83	111.462	6.00	100.00	67.645
1536-40	141.52	159.28	123.66	144.69	115.810	6.50	108.33	74.874
1541-45	145.54	213.07	129.00	167.69	126.482	6.90	115.00	68.599
1546-50	210.34	263.07	149.06	218.12	157.708	7.20	120.00	55.009
1551-55	255.79	311.55	178.87	261.63	189.723	8.40	140.00	53.397
1556-60	359.82	292.61	184.21	300.00	209.091	9.60	160.00	52.918
1561-65	264.01	319.95	211.88	274.79	230.237	10.00	166.67	60.651
1566-70	265.50	322.25	218.64	277.63	224.111	10.00	166.67	60.033
1571-75	273.83	322.29	218.83	281.24	234.783	10.20	170.00	60.549
1576-80	353.75	329.61	226.36	319.61	240.909	11.40	190.00	59.400
1581-85	337.61	342.42	241.84	320.58	243.676	12.00	200.00	62.387
1586-90	401.01	388.64	255.55	367.74	263.439	12.00	200.00	54.386
1591-95	436.29	421.78	254.83	395.14	270.553	12.00	200.00	50.615
1596-00	673.37	458.40	271.29	513.42	294.664	12.00	200.00	38.955
1601-05	494.99	458.33	275.98	438.12	282.806	12.00	200.00	45.649
1606-10	554.94	480.05	276.80	472.06	301.779	12.00	200.00	42.368
1611-15	597.13	517.80	286.07	506.11	314.625	12.00	200.00	39.517
1616-20	555.38	530.81	291.74	494.28	302.767	12.00	200.00	40.463
1621-25	593.65	515.15	283.63	503.14	306.126	12.00	200.00	39.750
1626-30	573.47	521.46	292.88	498.72	328.854	12.20	203.33	40.823
1631-35	747.56	536.65	288.15	577.86	340.514	13.60	226.67	39.155
1636-40	728.40	568.56	301.28	584.26	349.802	14.90	248.33	42.454
1641-45	597.92	565.03	327.60	532.37		16.10	268.33	50.403

ENGLAND : Prices and Wage Indices, in quinquennial means, 1501-05 to 1671-75
Base: 1501 - 10 = 100

Years	Index A PBH Farinaceous Price Index	Index B PBH Fish, Meat Dairy Product	Index C PBH Ind Price Index	PBH Composite Price Index	Doughty Industrial Price Index	Daily Money Wage in d. for Master Mason, Carp	Bldg Craftsmen: Nominal Wage Index for Master Mason/Carpenter	Bldg Craftsmen: Real Wage Index harmonic mean
1646-50	885.22	675.63	331.89	697.54		17.00	283.33	40.694
1651-55	606.26	646.91	350.10	571.16		17.80	296.67	51.858
1656-60	710.97	633.33	336.62	608.13		18.00	300.00	49.332
1661-65	777.48	634.85	347.27	639.20		18.00	300.00	46.933
1666-70	622.01	613.76	371.13	569.56		18.00	300.00	52.672
1671-75	684.75	587.94	361.54	584.76		18.00	300.00	51.303

Table 2, continued

ENGLAND : Prices and Wage Indices, in quinquennial means, 1501-05 to 1671-75
Base: 1501 - 10 = 100

Years	Bldg Craftsmen: Real Wage Index harmonic mean	Ratio of Money Wages to PBH Ind Prices harmonic means	Ratio of Money Wages to Doughty Ind Prices harmonic means
1501-05	98.586	98.831	99.606
1506-10	101.455	101.197	100.397
1511-15	97.017	94.891	98.444
1516-20	87.417	94.158	95.472
1521-25	72.089	90.794	87.695
1526-30	66.912	83.795	83.636
1531-35	67.645	83.660	89.716
1536-40	74.874	87.606	93.544
1541-45	68.599	89.109	90.950
1546-50	55.009	80.569	76.251
1551-55	53.397	78.042	73.678
1556-60	52.918	86.920	76.580
1561-65	60.651	78.662	72.389
1566-70	60.033	76.229	74.368
1571-75	60.549	77.579	72.365
1576-80	59.400	83.840	78.777
1581-85	62.387	82.699	82.076
1586-90	54.386	78.262	75.919
1591-95	50.615	78.484	73.923
1596-00	38.955	73.721	67.874
1601-05	45.649	72.470	70.720
1606-10	42.368	72.255	66.274
1611-15	39.517	69.913	63.568
1616-20	40.463	68.553	66.057
1621-25	39.750	70.514	65.332
1626-30	40.823	69.448	61.806
1631-35	39.155	78.641	66.527
1636-40	42.454	82.380	70.956

ENGLAND : Prices and Wage Indices, in quinquennial means, 1501-05 to 1671-75
Base: 1501 - 10 = 100

Years	Bldg Craftsmen: Real Wage Index harmonic mean	Ratio of Money Wages to PBH Ind Prices harmonic means	Ratio of Money Wages to Doughty Ind Prices harmonic means
1641-45	50.403	81.892	
1646-50	40.694	85.364	
1651-55	51.858	84.732	
1656-60	49.332	89.120	
1661-65	46.933	86.388	
1666-70	52.672	80.835	
1671-75	51.303	82.978	

Sources:

E.H. Phelps Brown and Sheila V. Hopkins, 'Seven Centuries of Building Wages', *Economica*, 22 (August 1955), reprinted in E.H. Phelps Brown and Sheila V. Hopkins, *A Perspective of Wages and Prices* (London, 1981), pp. 1-12.

E.H. Phelps Brown and S.V. Hopkins, 'Seven Centuries of the Prices of Consumables Compared with Builders' Wage-Rates', *Economica*, 23(Nov. 1956), reprinted in E.H. Phelps Brown and Sheila V. Hopkins, *A Perspective of Wages and Prices* (London, 1981), pp. 13-59, containing additional statistical appendices not provided in the original publication, or in earlier reprints. I have corrected a number of the indices from the Phelps Brown Papers Collection, now housed in the Archives of the British Library of Political and Economic Science (LSE), in uncatalogued boxes; and I have also interpolated missing data in their annual series, for both prices and wages.

Robert Doughty, 'Industrial Prices and Inflation in Southern England, 1401-1640', *Explorations in Economic History*, 12 (1975), 177-92.

Table 3.

BRABANT : Prices and Wage Indices, in quinquennial means, 1501-05 to 1671-75
Base: 1501 - 10 = 100

Year	Index A Van der Wee Farinaceous Price Index	Index B Van der Wee Fish, Meat Dairy Product	Index C Van der Wee Industrial Price Index	Van der Wee Composite Price Index	Nominal Wage Index for Master Bldg Craftsmen	Real Wage Index harmonic	NWI:IPI Ratio of NWIndex to Ind Pr Ind harmonic
1501-05	111.581	102.835	97.056	104.432	100.000	95.756	103.033
1506-10	88.419	97.165	102.944	95.568	100.000	104.638	97.140
1511-15	120.767	109.153	114.720	114.800	109.796	95.348	95.210
1516-20	132.947	125.532	113.886	125.090	122.449	97.889	107.519
1521-25	177.077	141.014	125.420	149.792	124.082	82.772	99.010
1526-30	165.855	148.363	125.743	148.611	126.122	84.766	100.339
1531-35	169.808	155.388	96.384	144.845	122.857	84.815	127.428
1536-40	188.818	160.542	99.933	154.540	140.408	90.674	140.528
1541-45	207.268	178.372	120.930	173.435	155.918	90.117	128.749
1546-50	165.076	189.291	134.480	166.010	182.041	109.703	135.365
1551-55	265.136	220.082	147.359	216.870	193.469	89.216	131.346
1556-60	290.375	265.820	174.620	250.337	214.286	84.525	123.066
1561-65	317.752	260.132	187.095	261.342	349.388	133.320	185.555
1566-70	303.435	278.286	194.408	264.965	291.020	109.041	148.803
1571-75	456.110	332.194	241.565	352.492	284.898	80.603	117.677
1576-80	526.577	374.134	266.676	400.179	433.469	106.529	160.934
1581-85	644.309	530.171	315.714	513.984	531.429	100.876	166.375
1586-90	993.011	564.570	367.684	665.767	484.898	72.340	131.794
1591-95	734.245	583.850	340.664	573.013	499.592	87.508	146.576
1596-00	844.289	622.106	340.583	626.801	548.571	87.433	160.840
1601-05	616.454	526.410	342.573	509.738	587.755	115.305	171.571
1606-10	640.435	505.794	350.477	512.709	587.755	114.637	167.701
1611-15	692.392	501.403	349.966	529.557	587.755	110.990	167.946
1616-20	606.909	541.166	380.401	521.925	587.755	112.613	154.510
1621-25	910.443	657.268	398.306	679.085	587.755	86.551	147.564
1626-30	1023.083	773.313	407.958	765.574	587.755	76.773	144.072

Year	Index A Van der Wee Farinaceous Price Index	Index B Van der Wee Fish, Meat Dairy Product	Index C Van der Wee Industrial Price Index	Van der Wee Composite Price Index	Nominal Wage Index for Master Bldg Craftsmen	Real Wage Index harmonic	NWI:IPI Ratio of NWIndex to Ind Pr Ind harmonic
1631-35	960.523	797.652	423.175	756.322	587.755	77.712	138.892
1636-40	1053.894	819.471	451.566	805.549	587.755	72.963	130.159
1641-45	994.050	902.720	475.844	821.781	587.755	71.522	123.519
1646-50	1070.587	897.757	467.213	845.067	587.755	69.551	125.800
1651-55	914.337	833.426	421.831	752.821	587.755	78.074	139.334
1656-60	850.719	779.250	393.548	702.155	587.755	83.707	149.348
1661-65	968.910	740.403	405.243	733.080	587.755	80.176	145.038
1666-70	656.050	745.557	373.787	614.449	587.755	95.656	157.243
1671-75	822.065	763.654	407.958	689.868			

Sources: see Table 3.

Table 4.

BRABANT : Prices and Wages in d groot Brabant, in quinquennial means, 1501-05 to 1671-75
With the Composite Price and Money Wage Index: Base: 1501 - 10 = 100

Year	Grains: Van der Wee Farinaceous prices in d groot Brab	Meat: Van der Wee Fish, Meat prices in d groot Brab	Industrial: Van der Wee Industrial prices in d groot Brab	Van der Wee Composite prices in d groot Brab	Van der Wee Composite Price Index 1501-10 = 100	Master Builder's Daily Wage in d gr	Nominal Wage Index 1501-10 = 100
1501-05	111.8	107.7	72.2	291.70	104.432	12.250	100.000
1506-10	88.6	101.8	76.6	266.94	95.568	12.250	100.000
1511-15	121.0	114.4	85.3	320.66	114.800	13.450	109.796
1516-20	133.2	131.5	84.7	349.40	125.090	15.000	122.449
1521-25	177.4	147.7	93.3	418.40	149.792	15.200	124.082
1526-30	166.1	155.4	93.5	415.10	148.611	15.450	126.122
1531-35	170.1	162.8	71.7	404.58	144.845	15.050	122.857
1536-40	189.1	168.2	74.3	431.66	154.540	17.200	140.408
1541-45	207.6	186.9	90.0	484.44	173.435	19.100	155.918
1546-50	165.3	198.3	100.0	463.70	166.010	22.300	182.041
1551-55	265.6	230.6	109.6	605.76	216.870	23.700	193.469
1556-60	290.8	278.5	129.9	699.24	250.337	26.250	214.286
1561-65	318.3	272.5	139.2	729.98	261.342	42.800	349.388
1566-70	303.9	291.6	144.6	740.10	264.965	35.650	291.020
1571-75	456.8	348.0	179.7	984.58	352.492	34.900	284.898
1576-80	527.4	392.0	198.4	1117.78	400.179	53.100	433.469
1581-85	645.3	555.5	234.9	1435.66	513.984	65.100	531.429
1586-90	994.6	591.5	273.5	1859.62	665.767	59.400	484.898
1591-95	735.4	611.7	253.4	1600.54	573.013	61.200	499.592
1596-00	845.6	651.8	253.4	1750.78	626.801	67.200	548.571
1601-05	617.4	551.5	254.8	1423.80	509.738	72.000	587.755
1606-10	641.5	529.9	260.7	1432.10	512.709	72.000	587.755
1611-15	693.5	525.3	260.3	1479.16	529.557	72.000	587.755
1616-20	607.9	567.0	283.0	1457.84	521.925	72.000	587.755
1621-25	911.9	688.6	296.3	1896.82	679.085	72.000	587.755
1626-30	1024.7	810.2	303.5	2138.40	765.574	72.000	587.755

Year	Grains: Van der Wee Farinaceous prices in d groot Brab	Meat: Van der Wee Fish, Meat prices in d groot Brab	Industrial: Van der Wee Industrial prices in d groot Brab	Van der Wee Composite prices in d groot Brab	Van der Wee Composite Price Index 1501-10 = 100	Master Builder's Daily Wage in d gr	Nominal Wage Index 1501-10 = 100
1631-35	962.1	835.7	314.8	2112.56	756.322	72.000	587.755
1636-40	1055.6	858.6	335.9	2250.06	805.549	72.000	587.755
1641-45	995.6	945.8	354.0	2295.40	821.781	72.000	587.755
1646-50	1072.3	940.6	347.6	2360.44	845.067	72.000	587.755
1651-55	915.8	873.2	313.8	2102.78	752.821	72.000	587.755
1656-60	852.1	816.4	292.8	1961.26	702.155	72.000	587.755
1661-65	970.5	775.7	301.5	2047.64	733.080	72.000	587.755
1666-70	657.1	781.1	278.1	1716.28	614.449	72.000	587.755
1671-75	823.4	800.1	303.5	1926.94	689.868		

Table 4, continued:

BRABANT : Prices and Wages in d groot Brabant, in quinquennial means, 1501-05 to 1671-75
With the Composite Price and Money Wage Index: Base: 1501 - 10 = 100

Year	Master's Annual Wage Income (210 Days) in Commodity Baskets	Real Wage: in Commodity Baskets Harmonic Mean: 1501-10 = 100	Real Wage: RWI = NWI/CPI Harmonic Mean 1501-10 = 100	Ratio of Money Wages to Industrial Prices arithmetic	Ratio of Money Wages to Industrial Prices harmonic
1501-05	8.819	95.756	95.756	16.99%	16.97%
1506-10	9.637	104.638	104.638	16.03%	16.00%
1511-15	8.781	95.348	95.348	15.75%	15.68%
1516-20	9.015	97.889	97.889	17.71%	17.71%
1521-25	7.623	82.772	82.772	16.34%	16.30%
1526-30	7.807	84.766	84.766	16.54%	16.52%
1531-35	7.811	84.815	84.815	21.35%	20.98%
1536-40	8.351	90.674	90.674	23.29%	23.14%
1541-45	8.300	90.117	90.117	21.22%	21.20%
1546-50	10.104	109.703	109.703	22.34%	22.29%
1551-55	8.217	89.216	89.216	21.69%	21.63%
1556-60	7.785	84.525	84.525	20.39%	20.27%
1561-65	12.279	133.320	133.320	30.79%	30.56%
1566-70	10.043	109.041	109.041	24.71%	24.50%
1571-75	7.423	80.603	80.603	19.58%	19.38%
1576-80	9.811	106.529	106.529	26.70%	26.50%
1581-85	9.291	100.876	100.876	28.16%	27.40%
1586-90	6.662	72.340	72.340	21.96%	21.70%
1591-95	8.059	87.508	87.508	24.20%	24.14%
1596-00	8.052	87.433	87.433	26.53%	26.49%
1601-05	10.619	115.305	115.305	28.26%	28.25%
1606-10	10.558	114.637	114.637	27.62%	27.62%
1611-15	10.222	110.990	110.990	27.69%	27.66%
1616-20	10.372	112.613	112.613	25.46%	25.44%
1621-25	7.971	86.551	86.551	24.39%	24.30%

Year	Master's Annual Wage Income (210 Days) in Commodity Baskets	Real Wage: in Commodity Baskets Harmonic Mean: 1501-10 = 100	Real Wage: RWI = NWI/CPI Harmonic Mean 1501-10 = 100	Ratio of Money Wages to Industrial Prices arithmetic	Ratio of Money Wages to Industrial Prices harmonic
1626-30	7.071	76.773	76.773	23.75%	23.72%
1631-35	7.157	77.712	77.712	22.93%	22.87%
1636-40	6.720	72.963	72.963	21.48%	21.43%
1641-45	6.587	71.522	71.522	20.49%	20.34%
1646-50	6.406	69.551	69.551	20.84%	20.72%
1651-55	7.190	78.074	78.074	22.96%	22.94%
1656-60	7.709	83.707	83.707	24.62%	24.59%
1661-65	7.384	80.176	80.176	23.89%	23.88%
1666-70	8.810	95.656	95.656	25.91%	25.89%
1671-75					

Sources: Herman Van der Wee, *Growth of the Antwerp Market and the European Economy, 14th to 16th Centuries*, 3 Vols. (The Hague, 1963). Vol. I: *Statistics*; and Vol. III: *Graphs*.

Herman Van der Wee, 'Prices and Wages as Development Variables: A Comparison Between England and the Southern Netherlands, 1400-1700,' *Acta Historia Neerlandica*, 10 (1978), 58-78, republished in Herman Van der Wee, *The Low Countries in the Early Modern World*, translated by Lizabeth Fackelman, Variorum Publications (Aldershot, 1993), pp. 223-41. English translation of his 'Prijzen en lonen als ontwikkelingsvariabelen: Een vergelijkend onderzoek tussen Engeland en de Zuidelijke Nederlanden, 1400 - 1700,' in *Album offert à Charles Verlinden à l'occasion de ses trente ans de professoriat* (Ghent, 1975), pp. 413-35. Only the Dutch version in this original publication contains the specific annual data in tabular form.

I have changed the base from the original, 1451-75 = 100, to the one used in these tables: 1501-10 = 100.

Table 5

Comparison of Price and Nominal Wage Indices in Spain, Brabant, and England, 1501-05 to 1666-70
in quinquennial means, 1501-10 = 100

Years	SPAIN Composite Price Index Based on CPI: B (Vellon after 1600)	SPAIN Money-Wage Index	BRABANT Van der Wee Composite Price Index	BRABANT Van der Wee Industrial Price Index	BRABANT Nominal Wage Index for Master Bldg Craftsmen	BRABANT NWI:IPI: Ratio of NWIndex to Ind Pr Ind harmonic
1501-05	92.43	95.34	104.432	97.056	100.000	103.033
1506-10	107.57	104.66	95.568	102.944	100.000	97.140
1511-15	98.98	110.35	114.800	114.720	109.796	95.210
1516-20	104.28	115.29	125.090	113.886	122.449	107.519
1521-25	122.14	120.69	149.792	125.420	124.082	99.010
1526-30	131.57	120.85	148.611	125.743	126.122	100.339
1531-35	132.45	124.03	144.845	96.384	122.857	127.428
1536-40	138.74	130.86	154.540	99.933	140.408	140.528
1541-45	147.90	136.01	173.435	120.930	155.918	128.749
1546-50	165.89	146.08	166.010	134.480	182.041	135.365
1551-55	176.02	166.71	216.870	147.359	193.469	131.346
1556-60	194.01	188.23	250.337	174.620	214.286	123.066
1561-65	223.43	204.35	261.342	187.095	349.388	185.555
1566-70	227.73	216.32	264.965	194.408	291.020	148.803
1571-75	246.76	220.43	352.492	241.565	284.898	117.677
1576-80	247.82	231.26	400.179	266.676	433.469	160.934
1581-85	269.07	249.77	513.984	315.714	531.429	166.375
1586-90	274.98	267.03	665.767	367.684	484.898	131.794
1591-95	284.43	275.05	573.013	340.664	499.592	146.576
1596-00	320.98	278.60	626.801	340.583	548.571	160.840
1601-05	352.43	350.15	509.738	342.573	587.755	171.571
1606-10	335.31	372.46	512.709	350.477	587.755	167.701
1611-15	322.68	373.24	529.557	349.966	587.755	167.946
1616-20	335.64	374.11	521.925	380.401	587.755	154.510
1621-25	344.72	371.34	679.085	398.306	587.755	147.564

Comparison of Price and Nominal Wage Indices in Spain, Brabant, and England, 1501-05 to 1666-70
in quinquennial means, 1501-10 = 100

Years	SPAIN Composite Price Index Based on CPI: B (Vellon after 1600)	SPAIN Money-Wage Index	BRABANT Van der Wee Composite Price Index	BRABANT Van der Wee Industrial Price Index	BRABANT Nominal Wage Index for Master Bldg Craftsmen	BRABANT NWI:IPI: Ratio of NWIndex to Ind Pr Ind harmonic
1626-30	410.81	384.65	765.574	407.958	587.755	144.072
1631-35	395.13	400.84	756.322	423.175	587.755	138.892
1636-40	409.67	406.46	805.549	451.566	587.755	130.159
1641-45	432.48	403.92	821.781	475.844	587.755	123.519
1646-50	457.09	410.25	845.067	467.213	587.755	125.800
1651-55			752.821	421.831	587.755	139.334
1656-60			702.155	393.548	587.755	149.348
1661-65			733.080	405.243	587.755	145.038
1666-70			614.449	373.787	587.755	157.243

Table 5, continued.

Comparison of Price and Nominal Wage Indices in Spain, Brabant, and England, 1501-05 to 1666-70

Base: 1501-10 = 100

Years	ENGLAND PBH Composite Price Index	ENGLAND PBH Industrial Price Index	ENGLAND Bldg Craftsmen: Nominal Wage Index for Master Mason/Carpenter	ENGLAND Ratio of Money Wages to PBH Ind Prices harmonic means
	in quinquennial means, 1501-10 = 100			
1501-05	101.43	101.18	100.00	98.831
1506-10	98.57	98.82	100.00	101.197
1511-15	103.08	105.38	100.00	94.891
1516-20	114.39	106.20	100.00	94.158
1521-25	138.72	110.14	100.00	90.794
1526-30	149.45	119.34	100.00	83.795
1531-35	147.83	119.53	100.00	83.660
1536-40	144.69	123.66	108.33	87.606
1541-45	167.69	129.00	115.00	89.109
1546-50	218.12	149.06	120.00	80.569
1551-55	261.63	178.87	140.00	78.042
1556-60	300.00	184.21	160.00	86.920
1561-65	274.79	211.88	166.67	78.662
1566-70	277.63	218.64	166.67	76.229
1571-75	281.24	218.83	170.00	77.579
1576-80	319.61	226.36	190.00	83.840
1581-85	320.58	241.84	200.00	82.699
1586-90	367.74	255.55	200.00	78.262
1591-95	395.14	254.83	200.00	78.484
1596-00	513.42	271.29	200.00	73.721
1601-05	438.12	275.98	200.00	72.470
1606-10	472.06	276.80	200.00	72.255
1611-15	506.11	286.07	200.00	69.913

Comparison of Price and Nominal Wage Indices in Spain, Brabant, and England, 1501-05 to 1666-70

Base: 1501-10 = 100

Years	ENGLAND PBH Composite Price Index	ENGLAND PBH Industrial Price Index	ENGLAND Bldg Craftsmen: Nominal Wage Index for Master Mason/Carpenter	ENGLAND Ratio of Money Wages to PBH Ind Prices harmonic means
	in quinquennial means, 1501-10 = 100			
1616-20	494.28	291.74	200.00	68.553
1621-25	503.14	283.63	200.00	70.514
1626-30	498.72	292.88	203.33	69.448
1631-35	577.86	288.15	226.67	78.641
1636-40	584.26	301.28	248.33	82.380
1641-45	532.37	327.60	268.33	81.892
1646-50	697.54	331.89	283.33	85.364
1651-55	571.16	350.10	296.67	84.732
1656-60	608.13	336.62	300.00	89.120
1661-65	639.20	347.27	300.00	86.388
1666-70	569.56	371.13	300.00	80.835

Sources:

See sources for Tables 1 - 4.

Table 6.

**The 'Baskets of Consumables' for Southern England and Brabant:
The Phelps Brown & Hopkins and the Van der Wee Composite Price Indices**

		ENGLAND: Phelps Brown & Hopkins Composite Index			BRABANT: Van der Wee Composite Index				
FARINACEOUS	**Metric Units**	**Quantity**	**Price in 1500 in d. ster**	**Weight/ Percentage**	**Quantity**	**Mean Value in 1451-75 in d. gr. Brabant**	**Weight/ Percentage in 1451-75**	**Mean Value in 1501-05 in d. gr. Brabant**	**Weight/ Percentage in 1501-05**
wheat	litres	45.461							
rye	litres	36.369			126.000	42.404	18.24%	54.720	18.76%
barley	litres	18.184							
peas	litres	24.243							
Sub-total	litres	124.257	20.80	20.00%		42.404	18.24%	54.720	18.76%
MEAT-DAIRY-FISH									
sheep	number	1.500							
beef: salted	kg				23.500	54.704	23.53%	64.840	22.23%
white herrings	number	15.000							
red herrings	number	25.000			40.000	9.988	4.30%	11.180	3.83%
Sub-total: meat/fish				25.00%		64.692	27.82%	76.020	26.06%
butter	kg	4.536		6.25%	4.800	19.728	8.48%	23.520	8.06%
cheese	kg	4.536		6.25%	4.700	5.968	2.57%	8.200	2.81%
Sub-total: dairy				12.50%		25.696	11.05%	31.720	10.87%
Sub-total of group			39.00	37.50%		90.388	38.87%	107.740	36.94%

The 'Baskets of Consumables' for Southern England and Brabant:
The Phelps Brown & Hopkins and the Van der Wee Composite Price Indices

		ENGLAND: Phelps Brown & Hopkins Composite Index			**BRABANT: Van der Wee Composite Index**				
FARINACEOUS	**Metric Units**	**Quantity**	**Price in 1500 in d. ster**	**Weight/ Percentage**	**Quantity**	**Mean Value in 1451-75 in d. gr. Brabant**	**Weight/ Percentage in 1451-75**	**Mean Value in 1501-05 in d. gr. Brabant**	**Weight/ Percentage in 1501-05**
DRINK									
barley malt or barley	litres	163.659	23.40	22.50%	162.000	39.712	17.08%	57.040	19.55%
FUEL & LIGHT									
charcoal	litres	154.567			162.000	10.568	4.54%	10.160	3.48%
candles	kg	1.247			1.333	7.608	3.27%	8.940	3.06%
oil	litres	0.284							
Sub-total			7.80	7.50%		18.176	7.82%	19.100	6.55%
TEXTILES									
woollen cloth	metres	0.305			1.125	24.844	10.68%	29.700	10.18%
canvas	metres	0.610							
linen shirting	metres	0.457			1.800	17.000	7.31%	23.400	8.02%
Sub-total			13.00	12.50%		41.844	18.00%	53.100	18.20%
GRAND TOTAL			104.00	100.00%		232.524	100.00%	291.700	100.00%
Farinaceous/Drink			44.20	42.50%		82.116	35.32%	111.760	38.31%
Meat/Dairy/Fish			39.00	37.50%		90.388	38.87%	107.740	36.94%

The 'Baskets of Consumables' for Southern England and Brabant:
The Phelps Brown & Hopkins and the Van der Wee Composite Price Indices

		ENGLAND: Phelps Brown & Hopkins Composite Index			BRABANT: Van der Wee Composite Index			
FARINACEOUS	**Metric Units**	**Quantity**	**Price in 1500 in d. ster**	**Weight/ Percentage**	**Quantity**	**Mean Value in 1451-75 in d. gr. Brabant**	**Weight/ Percentage in 1451-75**	**Mean Value in 1501-05 in d. gr. Brabant**	**Weight/ Percentage in 1501-05**
Industrial Products			20.80	20.00%		60.020	25.81%	72.200	24.75%
Total			104.00	100.00%		232.524	100.00%	291.700	100.00%

Sources:

E.H. Phelps Brown and S.V. Hopkins, 'Seven Centuries of the Prices of Consumables Compared with Builders' Wage-Rates,' *Economica*, 23 (Nov. 1956), reprinted in E.H. Phelps Brown and Sheila V. Hopkins, *A Perspective of Wages and Prices* (London, 1981), pp. 13-59.

Herman Van der Wee, 'Prijzen en lonen als ontwikkelingsvariabelen: Een vergelijkend onderzoek tussen Engeland en de Zuidelijke Nederlanden, 1400 - 1700,' in *Album offert à Charles Verlinden à l'occasion de ses trente ans de professoriat* (Ghent, 1975), pp. 413-35; republished in English translation as: 'Prices and Wages as Development Variables: A Comparison between England and the Southern Netherlands, 1400-1700,' *Acta Historiae Neerlandicae*, 10 (1978), 58-78.

Table 7:

Price-Relatives of Charcoal, Timber, Industrial Products, Grains, and the Phelps-Brown & Hopkins 'Basket of Consumables,' in Decennial Averages, 1530-9 to 1640-9

Mean value of 1530-9 = base 100

Decade	Charcoal (Cambridge)	Timber (National)	Industrial Products	Grains: Wheat, Rye Oats, and Barley	Basket of Consumables Index
1530-9	100	100	100	100	100
1540-9	122	115	115	116	124
1550-9	203	174	169	216	186
1560-9	217	178	198	196	180
1570-9	230	206	203	230	203
1580-9	270	247	209	282	230
1590-9	287	289	216	366	305
1600-9	320	335	233	348	306
1610-9	359	397	249	407	341
1620-9	345	450	240	399	333
1630-9	378	475	255	491	397
1640-9	535	524	278	488	398

Sources:

(a) charcoal: J.E. Thorold Rogers, *History of Agriculture and Prices in England*, vol. IV (*1401-1582*), pp. 383-7; vol. V (*1583-1702*), pp. 398-402.

(b) timber, industrial products, grains: Peter Bowden, 'Agricultural Prices: Statistical Appendix,' in Joan Thirsk, ed., *Agrarian History of England and Wales*, vol. IV: *1500-1640* (Cambridge,1967), Table XIII, p. 862.

(c) 'Basket of Consumables': E.H. Phelps Brown and S.V. Hopkins, 'Seven Centuries of the Prices of Consumables Compared with Builders' Wage-Rates,' *Economica*, 23 (Nov. 1956), reprinted in E.H. Phelps Brown and Sheila V. Hopkins, *A Perspective of Wages and Prices* (London, 1981), pp. 13-59.

Table 8:

Prices and Price-Relatives of Wood-Charcoal and Coal at Cambridge, and the Phelps-Brown & Hopkins 'Basket of Consumables' Price Index, 1580-9 to 1690-9

Index Base: Average of 1580-9 = 100

Decade	Charcoal: Shillings per Load	Index	Coal: Shillings per Chaldron of 36 bushels	Index	Basket of Consumables Index
1580-9	19.52s.	100.0	13.22s.	100.0	100.0
1590-9	20.79	106.5	13.41	101.4	132.2
1600-9	23.18	118.8	15.19	114.9	133.0
1610-9	25.96	133.0	13.88	105.0	148.0
1620-9	24.97	127.9	15.82	119.7	144.5
1630-9	27.38	140.3	16.78	126.9	172.5
1640-9	38.70	198.3	23.71	179.3	172.9
1650-9	38.40	196.7	20.76	157.0	178.2
1660-9	38.64	198.0	19.65	148.6	181.1
1670-9	43.50	222.8	21.48	162.5	172.2
1680-9	n.a.	--	19.28	145.8	161.6
1690-9	n.a.	--	24.07	182.1	181.2

Sources: Calculated from James E. Thorold Rogers, *History of Agriculture and Prices in England*, Vol. IV, pp. 385-7; Vol. V, pp. 398-402; and E.H. Phelps Brown and S.V. Hopkins, 'Seven Centuries of the Prices of Consumables Compared with Builders' Wage-Rates,' *Economica*, 23 (Nov. 1956), reprinted in E.H. Phelps Brown and Sheila V. Hopkins, *A Perspective of Wages and Prices* (London, 1981), pp. 13-59.