From Wine to Beer: Changing Patterns of Alcoholic Consumption, and Living Standards, in Later Medieval Flanders, 1300 - 1550:

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From Wine to Beer: Changing Patterns of Alcoholic Consumption, and Living Standards, in Later Medieval Flanders, 1300 - 1550: Abstract

It is a commonplace observation that northern Europe is the land of beer and butter, while southern Europe is the land of wine and olive oil. This study seeks to examine the later medieval transition from wine to beer consumption in late-medieval Flanders. The first part of the study examines the meagre evidence for such a shift in the 14th and 15th centuries, drawing upon studies published by Margery James, Michael Postan, Hans Van Werveke, Jan Craeybeckx, Herman Van der Wee, and Richard Unger. Michael Postan was one of the first (of many) to suggest that the crucial factor was technological: the introduction of hops (in place of *gruit*) in brewing, from about the 1320s in the North German and Dutch towns. The importance of hops was two-fold. First, hop-brewing vastly improved the stability and durability of beer, so necessary for longer-term storage and long distance trade. Second, hops greatly facilitated the sterilization process (in that boiling killed only some of the harmful bacteria). The consumption of both beer and wine was, in pre-modern Europe, a vital necessity rather than a 'sinful' luxury, because water and milk were so often unsafe to drink, especially in towns. Beer was also important for its nutritional values (more so than wine).

The basic problem with the 'hop' thesis is that the Flemish evidence for the relative shift from wine to beer consumption comes too late. My primary sources are the annual revenues from sales of excise tax-farms on wine and beer consumption recorded in the treasurers' accounts of two towns: Bruges and Aalst. These excises taxes (and those on other foodstuffs and textiles) were largely used to finance payments on public debts (*renten*), primarily incurred to finance warfare. By far the most important were the wine and beer excises: as taxes on necessities that were also addictive. The Bruges accounts are especially valuable in two respects: they begin just after 1300, with few annual breaks into modern times (though our data ends in 1500); and for much of this period, they provide data on both domestic and foreign beers. Hamburg beer (possibly 'hop-beers') are first recorded in 1333; 'Hop and Delft' (Dutch) beers do not appear until 1380. The Aalst records begin much later, from 1395, but are then virtually continuous. From the outset, these accounts demonstrate the primacy of beer over wine in this small industrial town, while the much larger, far wealthier, far more cosmopolitan Bruges longer retained a preference for wine. But, in both sets of urban accounts, the major, decisive shift in consumption comes only from the 1430s (especially in Bruges).

To gain a better understanding of that transition, my next task is to estimate the economic burden of these highly regressive excise taxes in relation to my other research on monetary changes, prices, and wages in late-medieval Flanders. The advantage of the Aalst accounts is in providing annual wages for building craftsmen almost continuously from 1395 to 1550, while the Bruges accounts cease recording specific wages in 1480. I have calculated that tax burden by using two complementary methods to present the 'real' values of those excise taxes (in quinquennial harmonic means): (1) the number of 'commodity baskets' (used to create the price index) whose total value equals the annual tax-farm sales revenues; and (2) (but only for Aalst), the number of years' money-wage income for master masons (210 days employment per year) whose values similarly equals the annual tax-farm sales revenues. Finally, since both measures are based on constant populations, I have investigated the available demographic evidence that might indicate rising *per capita* burdens with falling urban populations in the fifteenth century. The most useful evidence comes from the smaller towns and villages of neighbouring Brabant, just to the east of Aalst.

The most surprising conclusion is that – even without such more dire demographic considerations – these excise tax burdens rose the most strongly during the so-called Golden Age of the artisans, in the middle decades of the 15th century (from the 1430s)– offsetting other factors that should have led to rising real wages in this period. Those considerations are all linked with the fundamental fact of 15th-century warfare that produced both severe coinage debasements and higher excise taxes, both reducing real incomes. This period was also the one with the greatest transition from more expensive wine to cheaper beer. Was this late-medieval shift in alcohol consumption at least partly based on these real income effects?

JEL classifications: E31; F16; H25; H31; H63; H71; J11; J30; J81; L81; N23; N33; N43N93; R23

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Introduction: wine and beer consumption in medieval Europe

There are two common-place observations about regional distinctions in food and drink consumption in medieval and early modern Europe: that the north is the land of butter, while the south (Mediterranean) is the land of olive oil; and that the north is the land of beer, while the south is the land of wine. The former paradigm – which also applied to the production of medieval woollen textiles – is undoubtedly more true than the latter, both in the past and the present.[1] Even today, per capita beer consumption has increased in southern Europe (certainly in Italy), while wine still commands a strong hold on northern Europe's alcoholic consumption, though, of course, in competition with beers and 'spirits', and with many other beverages unknown in the medieval world.

In medieval northern Europe, wine consumption had enjoyed, or once enjoyed, a very considerable importance, not only from northern provenances (especially France, the Rhine and Moselle regions) but even more from southern imports. One need think only of the role that Gascon wine imports played in the English economy and its society in the first half of the fourteenth century, as explored by Margery James.[2] For the Low Countries itself, we are indebted to Prof. Jan Craeybeckx's important monograph on the importation

[1] John Munro, 'Medieval Woollens: Textiles, Textile Technology, and Industrial Organisation, c. 800 - 1500', in David Jenkins, ed., *The Cambridge History of Western Textiles*, 2 vols. (Cambridge and New York: Cambridge University Press, 2003), Vol. I, chapter 4, pp. 181-227.

[2] Margery K. James, 'The Fluctuations of the Anglo-Gascon Wine Trade during the Fourteenth Century', *Economic History Review*, 2nd ser., 4:2 (1951), 170-96; reprinted in Margery K. James, *Studies in the Medieval Wine Trade*, ed. by Elspeth Veale, with an introduction by E. M. Carus-Wilson (Oxford: Clarendon Press, 1971), pp. 1-38; Michael M. Postan, 'The Trade of Medieval Europe: the North', in Michael Postan et al., eds, *The Cambridge Economic History of Europe*: Vol. II: *Trade and Industry in the Middle Ages*, 1st edn. (Cambridge: Cambridge University Press, 1952), pp. 199-200; 2nd edn. (Cambridge, 1987), pp. 248-49 (changed from the first edition, which has been reprinted in M.M. Postan, *Medieval Trade and Finance* (Cambridge, 1973), pp. 92-231, esp. pp. 168-69.

of French wines into this wealthy and densely populated region, from the thirteenth to sixteenth centuries.[3] For much of this period, French and other southern wines reached the Low Countries chiefly via Bruges, but subsequently, principally via Antwerp, which, from the 1460s, was displacing Bruges as the leading port and commercial centre of the Low Countries. The importance of the wine trade in the rise of the Antwerp market and the Brabant Fairs (with Bergen-op-Zoom), commencing as a regional foodstuffs fair in the later fourteenth, early fifteenth centuries, was given considerable prominence in Herman Van der Wee's magisterial monograph on *The Growth of the Antwerp Market and the European Economy (fourteenth-sixteenth centuries)*.[4]

Evidence for a relative decline in late-medieval wine consumption: and a shift to 'hop- beer'?

Nevertheless, these and other authors have commented on the relative decline of wine consumption in later medieval northern Europe. In her important 1951 article on Gascon wine exports and imports of alien wines into fourteenth-century England, Margery James documented a very sharp decline in that wine trade, especially from the commencement of the Hundred Years War (1336-1453). She attributed that decline largely to the consequences of those Anglo-French wars, in which Gascony-Guienne figured so strongly. Such warfare frequently disrupted production, commercial distribution, and especially maritime trade, so that contracting supplies sharply raising import prices, as measured in pounds sterling. Both factors would clearly explain the drastic 90 percent decline in the exports of Gascon wine: from 93,556 tons in 1329-30 to 9,041

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[3] Jan Craeybeckx, *Un grand commerce d'importation: Les vins de France aux ancien Pays-Bas (XIIIe - XVIe siècle)*, Ecole pratique des hautes études, VIe section: Centre de recherche historiques: Ports, routes, trafics, no. 9 (Paris: S.E.V.P.E.N, 1958).

[4] Herman Van der Wee, *Growth of the Antwerp Market and the European Economy, Fourteenth to Sixteenth Centuries* (The Hague, 1963), 3 vols., Vol. I: *Statistics*, Appendix 24, pp. 294-297; Vol. II: *Interpretation*, pp. 23-40; 309-16; Van der Wee, 'Structural Changes in European Long-Distance Trade, and Particularly in the Re-export Trade from South to North, 1350 - 1750', in James D. Tracy, ed., *The Rise of Merchant Empires: Long-Distance Trade in the Early Modern World, 1350 - 1750* (Cambridge and New York: Cambridge University Press, 1990), pp. 14 - 33. See also Jan Van Houtte, *Bruges: essai d'histoire urbaine* (Brussels: Renaissance du Livre, 1967); Jan A. Van Houtte, 'La genèse du grand marché international d'Anvers à la fin du moyen âge', *Revue belge de philologie et d'histoire*, 19 (1940), 87-126; Jan A. Van Houtte, 'Bruges et Anvers: marchés 'nationaux'ou 'internationaux' du XIVe au XVIe siecle?' *Revue du Nord*, 24 (1952), 89-108.

tons in 1380-81. Aggregate alien wine imports into England suffered an almost commensurate decline of 86 percent: from 7,356 tons in 1328-29 to 1,044 tons in 1380-81, though recovering to 3,352 tons in 1394-95.[5]

In the following year, in the 1952 edition of the *Cambridge Economic History*, Michael Postan cited James' wine trade data in support of his 'Depression' thesis. While largely accepting her war-based explanations for that decline, he also offered the hypothesis that it may be partly explained by a rise in beer consumption. In particular, he noted, as have most other authorities, the importance of the introduction of hops, from the early to mid-fourteenth century, for the subsequent rapid growth of beer production in 'most of the North German towns, above all in Hamburg, and also in towns of the northern Netherlands'. Nevertheless, he stated that historians do not 'know enough about medieval consumption .... to be able to judge to what extent wine and beer were true substitutes, and how far beer was merely ousting ales and other drinks of a humbler kind'.[6] Had there been such a substitution effect, however, one would expect to find not the evident rise in wine prices but a decrease (in real terms).

Furthermore, Margery James's subsequent doctoral dissertation, in documenting both Gascon wine export and English wine imports during the fifteenth century, also does not lend much support to that substitution thesis. According to her data, published posthumously in 1971, alien wine imports into England

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[5] James, 'Anglo-Gascon Wine Trade', pp. 170-96, especially Appendices I - IV, pp. 192-96. The graph in Appendix IV (p. 196), reveals the steep rise in prices from the 1340s, but the prices are evidently current, nominal prices and not 'real' prices; and thus they do not take account of the severe post-Plague inflations which England endured until the late 1370s, when deflation replaced inflation. Indeed her graph indicates a similar decline in wine prices from the 1370s. On English prices, see John Munro, 'Wage-Stickiness, Monetary Changes, and Real Incomes in Late-Medieval England and the Low Countries, 1300 - 1500: Did Money Matter?' *Research in Economic History*, 21 (2003), 185 - 297; John Munro, 'Before and After the Black Death: Money, Prices, and Wages in Fourteenth-Century England', in Troels Dahlerup and Per Ingesman, eds., *New Approaches to the History of Late Medieval and Early Modern Europe: Selected Proceedings of Two International Conferences at The Royal Danish Academy of Sciences and Letters in Copenhagen in 1997 and 1999*, Historisk-filosofiske Meddelelser, no. 104 (Copenhagen: The Royal Danish Academy of Sciences and Letters, 2009), pp. 335-364.

[6] Michael M. Postan, 'The Trade of Medieval Europe: the North', in Michael Postan et al., eds, *The Cambridge Economic History of Europe*: Vol. II: *Trade and Industry in the Middle Ages*, 1st edn. (Cambridge: Cambridge University Press, 1952), pp. 199-200, reprinted in M.M. Postan, *Medieval Trade and Finance* (Cambridge: Cambridge University Press, 1973), pp. 92-231, esp. pp. 168-69. For the 2nd, revised edn of 1987, see n. 7 below).

made a substantial recovery during the first half of the fifteenth century, despite ongoing warfare, reaching a peak of 14,757 tons in 1440-49: i.e., 4.4 times higher than the English wine imports of the early 1390s. With the loss of Gascony-Guienne, and the end of the Hundred Years' War in 1453, alien wine imports into England fell to a new low of 2,427 tons, by 1456-57. Nevertheless, English merchants subsequently resumed a substantial presence in Bordeaux, so that such wine imports recovered strongly, reaching 8,327 tons in 1480-81 and 10,389 tons in 1499-1500, though an amount still below the peak of the 1440s.[7]

Nevertheless, Richard Unger has recently lent some additional support to Postan's substitution thesis, in his very important monograph on the brewing industry in Holland (900-1900). He noted, though without documentation, that the Flemish bourgeois, who had customarily drunk wine in the mid-thirteenth century, 'had joined skilled artisans in preferring good quality beer', by the mid fifteenth century.[8] For late-medieval Flanders, more concrete evidence, albeit somewhat problematic, may be found in publications by Hans Van Werveke and the aforementioned Jan Craeybeckx. Their calculations (together) indicate that annual per capita wine consumption in Ghent fell from about 38 litres per head in the 1360s to well less than half, 16.5 litres per head a century later, in the 1450s and 1460s. Craeybeckx observes that the mid-fourteenth-century consumption, from this estimate, was about six times greater than mid-twentieth century per capita annual consumption (6 litres) in Belgium. He attributes this sharp decline to Ghent's late-medieval economic malaise; [9] and certainly its woollen textile industry did experience a severe slump in the late fourteenth and

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[7] James, *Medieval Wine Trade*, Appendix 6, pp. 57-59 (from chapter 2, 'The Anglo-Gascon Wine Trade during the Fifteenth Century', part of her unpublished doctoral dissertation). In the 1987 2nd revised edition of *The Cambridge Economic History of Europe*, in his only partially revised chapter on 'The Trade pf Medieval Europe: the North' (pp. 168-305), Michael Postan did take note of this recovery, evidently using James' data in his Table III, Exports and Imports of Dutiable Commodities (p. 242), but he did not relate these data to those in Table IV, Exports of Wine from Bordeaux in the Fourteenth Century (p. 249); and his quotation on beer cited earlier (n.

[8] Richard W. Unger, *A History of Brewing in Holland, 900 - 1900: Economy, Technology and the State* (Leiden and Boston: Brill, 2001), p. 33.

[9] Hans Van Werveke, 'Le commerce des vins français au moyen âge', *Revue belge de philologie et d'histoire*, 12:2 (1933), 1096-1101; Craeybeckx, *Les vins de France*, pp. 5-8. See also Henri Pirenne, 'Un grand commerce d'exportation au moyen âge: les vins de France', *Annmales d'histoire économique et sociale*,

especially the fifteenth centuries.[10]

For neighbouring Bruges, Craeybeckx estimates that this smaller but wealthier city had enjoyed a much higher annual per capita consumption of wine: about 100 litres per head in the 1340s. But that annual per capita consumption may have fallen about 25 percent to, perhaps 75 litres, by the 1420s.[11] Some evidence for Bruges' high level of per capita wealth can be found in a recent study comparing the real wages of building craftsmen in later-medieval England and Flanders. According to these calculations, real wages for such master craftsmen in Bruges were about double those for southern England in the mid-fourteenth century, and that, while building craftsmen in southern England experienced a swifter rise in real wages, at least from

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5: no. 21 (May 1933), 225-43. It contains no data on the Low Countries.

[10] Hans Van Werveke, *Gand: Esquisse d'histoire sociale* (Brussels: Renaissance du Livre, 1946), pp. 48-69; John Munro, 'Industrial Protectionism in Medieval Flanders: Urban or National?' in Harry Miskimin, David Herlihy, and A. L. Udovitch, eds., *The Medieval City* (New Haven and London: Yale University Press, 1977), pp. 229-68; reprinted in John Munro, *Textiles, Towns, and Trade: Essays in the Economic History of Late-Medieval England and the Low Countries*, Variorum Collected Studies series CS 442 (Aldershot, Hampshire; and Brookfield, Vermont: Ashgate Publishing Ltd., 1994); John Munro, 'Anglo-Flemish Competition in the International Cloth Trade, 1340 - 1520', *Centre européen d'études bourguigonnes*, 35 (1995), 37-60 [*Rencontres d'Oxford (septembre 1994): L'Angleterre et les pays bas bourguignonnes: relations et comparaisons, XVe - XVIe siècle*, ed. Jean- Marie Cauchies]; John Munro, 'The Symbiosis of Towns and Textiles: Urban Institutions and the Changing Fortunes of Cloth Manufacturing in the Low Countries and England, 1270 - 1570', *The Journal of Early Modern History: Contacts, Comparisons, Contrasts*, 3:1 (February 1999), 1-74; John Munro, 'Gold, Guilds, and Government: The Impact of Monetary and Labour Policies on the Flemish Cloth Industry, 1390-1435', *Jaarboek voor middeleeuwse geschiedenis*, 5 (2002), 153 - 205; John Munro, 'Medieval Woollens: The Western European Woollen Industries and their Struggles for International Markets, c.1000 - 1500', in David Jenkins, ed., *The Cambridge History of Western Textiles*, 2 vols. (Cambridge and New York: Cambridge University Press, 2003), Vol. I, chapter 5, pp. 228-324, 378-86 (bibliography); Peter Stabel, 'Décadence ou survie? Économies urbaines et industries textiles dans les petite villes drapières de la Flandre orientale (14e-16e s.),' in Marc Boone and Walter Prevenier, eds., *La draperie ancienne des Pays Bas: débouchés et stratégies de survie (14e - 16e siècles)/ Drapery Production in the Late Medieval Low Countries: Markets and Strategies for Survival (14th-16th Centuries)*, Studies in Urban Social, Economic and Political History of the Medieval and Modern Low Countries (Leuven/Appeldorn, 1993), pp. 63-84; Peter Stabel, 'Les draperies urbaines en Flandres aux XIIIe - XVIe siècles', in Giovanni Luigi Fontana and Gèrard Gayot, eds., *Wool: Products and Markets (13th - 20th Century)/ La laine: produits et marchés (XIIIe - XXe siècle)/ La lana: prodotti e mercati (XIII - XX secolo)/la lana: productos y mercadoes (siglos XIII - XX)* (Padua: Libraria Editrice Università di Padova, 2004), pp. 355-80; Stabel, Peter, *Dwarfs among Giants: The Flemish Urban Network in the Late Middle Age*s, Studies in Urban Social, Economic and Political History of the Medieval and Modern Low Countries no. 8 (Leuven-Apeldoorn, 1997).

[11] Craeybeckx, *Les vins de France*, pp. 10-11.

the 1380s, their counterparts in Bruges still enjoyed a 25 percent advantage in real wages in the 1480s – when the individual wage data cease to be recorded in the Bruges financial accounts.[12] Finally, for Antwerp, he also cites evidence for a decline in per capita wine consumption, in the later sixteenth century; but longer-term estimate of wine consumption trends are impossible to make because urban excise-tax records are unavailable before 1560.[13]

Craeybeckx concludes his very brief quantitative survey by asking this vital question: Are we therefore entitled to conclude that wine consumption had 'strongly diminished' in later-medieval Flanders? He readily admits that 'it would be dangerous to affirm' such a conclusion. He notes in particular two obvious pitfalls in using such excise tax data to measure per capita wine consumption: (1) converting excise tax revenues into actual litres of wine consumed: especially when the taxes were farmed, rather than levied and collected directly; and when tax rates were frequently not recorded; and (2) estimating the urban populations, and their changes, over the late-medieval era. Nevertheless he does leave the impression that the late-medieval and early modern Low Countries did experience a relative decline in wine consumption and also a shift to increased per capita beer consumption, speculating, as did so many others, that such an increase 'was due to the improvement of beer, thanks to the addition of hops'.[14]

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[12] John Munro, 'Builders' Wages in Southern England and the Southern Low Countries, 1346 -1500: A Comparative Study of Trends in and Levels of Real Incomes', in Simonetta Cavaciocchi, ed., *L'Edilizia prima della rivoluzione industriale, secc. XIII-XVIII*, Atti delle "Settimana di Studi" e altri convegni, no. 36, Istituto Internazionale di Storia Economica "Francesco Datini" (Florence: Le Monnier, 2005), pp. 1013-76; See also Jean-Pierre Sosson, *Les travaux de la ville de Bruges, XIVe - XVe siècles: les matériaux, les hommes*, Collection Histoire Pro Civitate no. 48 (Brussels, 1977).

[13] Craeybeckx, *Les vins de France*, pp. 10-17. See also Van der Wee, *Growth of the Antwerp Market*, vol. I, Appendix 43:5, Annual gross incomes from the Antwerp beer excises, 1560-1601, p. 521. He does not provide, however, the data for the wine excise taxes; nor does Craeybeckx, except in summary observations about their relative decline.

[14] Craeybeckx, *Les vins de France*, pp. 5-10 (quotations on p. 10). He accepts an estimate of 50,000 for Ghent's population and of 35,000 for Bruges' population, both in the 1340s. He further assumes that Bruges' population was at least the same in the1420s, but admits ignorance about Ghent's population in the fifteenth century, while admitting that any major demographic decline would require an increased estimate of per capita wine consumption in Ghent. See Walter Prevenier, 'La démographie des villes du comté de Flandre aux XIVe et XVe siècles: État de question: essai d'interpretation', *Revue du Nord*, 65: no. 257 (Apr -

Subsequently, Herman Van der Wee also observed that the Low Countries experienced a decline in per capita wine consumption, over the course of the fifteenth and sixteenth centuries. For the fifteenth century, he attributed part of this decline in wine consumption to the 'industrial depression, which was catastrophic in both Flanders and Brabant'.[15] Presumably his argument – not really explained in the text cited – is that real incomes fell with this 'industrial depression', which chiefly involved the irredeemable decline of the traditional urban woollen cloth industries, so that many consumers, with severe budget constraints, were forced to engage in production substitution: i.e., to replace presumably expensive wines with cheaper beers.[16]

There may be some merit in the Van der Wee hypothesis. Certainly the drastic and irredeemable decline of the traditional, urban based luxury woollen textile industries, which had been the industrial mainstay of the southern Low Countries, is indisputable – especially from the 1430s.[17] But from the 1430s, another branch of the textile industry, the so-called *nouvelles draperies*, chiefly based in the smaller towns and some villages, were taking advantage of the plight of the traditional industries to undergo a remarkable expansion. They in turn were superseded by an even more remarkable revival and expansion of yet another branch the textile industries: the semi-worsted *sayetteries*, which became one of the most important industries of the southern Low Countries, before the 1568 Revolt (and Eighty Years War).[18]

June 1983), 255-75.

[15] Van der Wee, *Antwerp Market*, vol. I, Appendix 34, p. 294, citing in particular data for Ghent, provided in Craeybeckx, *Les vins de France*, pp. 8-10.

[16] See n. 10 above: in particular, Munro, 'Anglo-Flemish Competition in the International Cloth Trade', pp. 37-60; Munro, 'Symbiosis of Towns and Textiles', pp. 1-74; Munro, 'Gold, Guilds, and Government', pp. 153 - 205; Munro, 'Western European Woollen Industries', pp. 228-324.

[17] See note 10 above.

[18] John Munro, 'Spanish *Merino* Wools and the *Nouvelles Draperies*: an Industrial Transformation in the Late-Medieval Low Countries', *Economic History Review*, 2nd ser., 58:3 (August 2005), 431-84; John Munro, 'The Origins of the English 'New Draperies': The Resurrection of an Old Flemish Industry, 1270 - 1570', in Negley B. Harte, ed., *The New Draperies in the Low Countries and England, 1300 - 1800*, Pasold Studies in Textile History no. 10 (Oxford and New York: Oxford University Press, 1997), pp. 35-127;

Whether or not the entire economy of the southern Low Countries experienced a genuine, long-term depression in the fifteenth century – apart from the war-torn 1420s and 1430s and the anti-Habsburg revolts of the 1480s (in Flanders) – is a matter of ongoing dispute. But clearly, in the sixteenth century, this region did not experience depression but considerable expansion and genuine growth – despite some periodic trials and tribulations – up to the outbreak of the Revolt of the Netherlands, in 1568.[19] Furthermore, despite evidence for economic contraction in the fifteenth century, many will contend that this era was, for the southern Low Countries as much as for England, the ' Golden Age of Labour' – though this a highly contentious subject that requires further consideration in this study.[20]

In any event, an examination of the behaviour of prices for Rhine wines in southern Brabant (Lier

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Herman Van der Wee (in collaboration with John Munro), 'The Western European Woollen Industries, 1500 - 1750', in David Jenkins, ed., *The Cambridge History of Western Textiles*, 2 vols. (Cambridge and New York: Cambridge University Press, 2003), Vol. I, chapter eight, pp. 397- 472.

[19] See inter alia, John Munro, 'Economic Depression and the Arts in the Fifteenth-Century Low Countries', *Renaissance and Reformation*, 19 (1983), 235-50; reprinted in John Munro, *Textiles, Towns, and Trade: Essays in the Economic History of Late-Medieval England and the Low Countries*, Variorum Collected Studies series CS 442 (Aldershot, Hampshire; and Brookfield, Vermont: Ashgate Publishing Ltd., 1994); Raymond Van Uytven, 'La Flandre et le Brabant: 'Terres de promission' sous les ducs de Bourgogne?' *Revue du Nord*, 43 (1961), 281-318; Van der Wee, *Antwerp Market*, vol. II, pp. 3-112, 285-332; Herman Van der Wee, 'Typologie des crises et changements de structures aux Pays-Bas, XVe-XVIe siècles', *Annales: E.S.C.*, 18 (1963), republished in English translation as 'Typology of Crises and Structual Changes in the Netherlands, 15th to 16th Century', in Herman Van der Wee, *The Low Countries in the Early Modern World*, translated by Lisabeth Fackelman (London: Variorium, 1993). pp. 245-63 209-25; Herman Van der Wee, 'Structural Changes and Specialization in the Industry of the Southern Netherlands, 1100-1600', *Economic History Review*, 2nd ser. 28 (1975), 203-21 (also republished in Herman Van der Wee, *The Low Countries in the Early Modern World*, pp. 201-22): Herman Van der Wee, Herman, 'Prijzen en lonen als ontwikkelingsvariabelen: Een vergelijkend onderzoek tussen Engeland en de Zuidelijke Nederlanden, 1400-1700', in *Album aangeboden aan Charles Verlinden ter gelegenheid van zijn dertig jaar professoraat* (Wetteren: Universum, 1975), pp. 413-47; reissued in English translation (without the tables) 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* , trans. by Lizabeth Fackelman (Cambridge and New York, 1993), pp. 223-41.

[20] See n. 11 above, and n. below. See also my unpublished working-paper:' Real Wages and the 'Malthusian Problem' in Antwerp and South-Eastern England, 1400 - 1700: A regional comparison of levels and trends in real wages for building craftsmen' (given as a conference paper in Antwerp in April 2006): http://logec.repec.org/RAS/pmu10.htm (Research Papers in Economics).

region), with continuous annual data from 1423 to the 1560s, whether measured in terms of the overall Consumer Price Index (basket of consumables) or in comparison with barley prices (a chief ingredient of beers), does not indicate any distinct trends, certainly none indicating any relative increase in the value of these wines.[21] Unger, furthermore, contends that the prices for Hamburg beer in fifteenth-century Flanders were comparable to those for good wines (especially from 1494, when the tax on such beer was raised).[22]

Evidence for increased per capita beer consumption in the later medieval Low Countries

At the same time, irrespective of changes in relative incomes and relative prices, Van der Wee also contends, as do the other historians cited, that 'the increase in beer consumption also played an important role', citing, as to be expected, the well known successful growth of the Dutch brewing industries in the fourteenth and fifteenth centuries, and also the subsequent 'triumph' of the brewing industries in Leuven and Hoegarden in the sixteenth century[23]. Also to be cited is Erik Aerts' important study of Lier's brewing industry in this era.[24]

Evidence for the importance of beer consumption in a wide variety of towns in the Low Countries and North Germany during the fifteenth and sixteenth centuries can be found in Unger's *Brewing in Holland.* Here are some examples of annual per capita beer consumption that he provides for the Low Countries and Germany: in Leuven, 275 litres (1500); Hamburg, 250 litres (1450), 320 litres (1500), and 400 litres (1550); Lübeck, 400 litres (400); Antwerp, 369 litres (1531); Bruges, 263 litres (1550); Ghent, 202 litres (1580);

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[21] Van der Wee, *Antwerp Market*, vol. I, Appendix 24: Rhine wine prices at Lier, pp. 296-99; and Table no. in the appendix. Over the period 1420 to 1560, the mean annual value of Rhine wines was 1.51% of the annual values of a basket of consumables (Table x) and 13.57% of the value of 100 litres of barley. The variations from these two means were relatively small.

[22] Unger, *Brewing in Holland*, p. 33.

[23] Van der Wee, *Antwerp Market*, vol. I, pp. 294-95.

[24] Erik Aerts, *Het bier van Lier: de economische ontwikkeling van der bierindustrie in een middelgrote Brabantse stad (einde 14de - begin 19d eeuw*) (Brussels: Paleis der Academiën, 1996); and also Erik Aerts, 'De Zuidnederlandse brouwindustrie tijdens het Ancien Régime', *Handelingen XXXIII der Koninklijke Zuidnederlandse Maatschappij voor Taal- en Lettekunde en Geschiedenis*, (1979), 5-34.

Haarlem, 300 litres (1590); Leiden, 269 litres (1543; Lier, 310 litres (1550). He also notes that sixteenth-century English sailors consumed, on average, 4.6 litres of beer a day, and Hanseatic sailors, about 5 litres daily. [25] Van der Wee, citing similar but far fewer data, notes how much lower was Belgium's annual per capita beer consumption in the mid twentieth century (1958): 115 litres.[26]

Furthermore, we must note that beer constitutes a relatively high proportion of annual household budget expenditures in well known Consumer Price Indexes for later medieval and early modern north-western Europe. The best known is the Phelps Brown and Hopkins 'basket of consumables' index, for the base period of 1451-75 (i.e., for the index base of 100): in which beer is given a share of 22.5 percent.[27] Phelps Brown and Hopkins based their weight for their beer component on the Savernak household budget

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[25] Unger, *Brewing in Holland, 900 - 1900,* Table III-4, pp. 90-1, noting also that the daily beer ration for English and Hanseatic German sailors was then about 5 litres. For Leuven, see also Raymond Van Uytven, *Stadsfinanciën en stadsekonomie te Leuven van de XIIde tot het einde der XVIde eeuw* (Brussels, 1961), pp. 313-36, especially p. 335; Raymond Van Uytven, *Geschiedenis van de dorst: twintig eeuwen drinken in de Lage Landen* (Leuven: Davidsfond, 2007); Raymond Van Uytven, ed., *Van rank tot drank* (Brussels: Algemeen Spaar en Lijfrent Kas-Galerie, 2003); Raymond Van Uytven, 'Beer Consumption and the Socio-Economic Situation in the Franc of Bruges in the Sixteenth Century': English translation of 'Het bierverbruik en de sociaal-economische toestand in het Brugse Vrije in de zestiende eeuw', *Handelingen van het Genootschap voor Geschiedenis, gesticht onder de benaming 'Sociéte d'emulation' te Brugge*, 131 (1994), 5-34; republished in Raymond Van Uytven, *Production and Consumption in the Low Countries, 13th - 16th Centuries*, Variorum Collected Studies Series CS 714 (Aldershot: Ashgate-Variorum, 2001), XII, 1-24. For 's-Hertogenbosch in Brabant (now Noord Brabant, in the Netherlands), see Bruno Blondé and M. Limberger, 'Van Bourgondische welvaart tot Antwerpse schaduuw? Het bierverbruik te 's-Hertogenbosch in de vijftiende en de zestiende eeuw', *Bijdragen tot det geschiedenis bijonderlijk van het aloude Hertogdom Brabant*, 81:1-3 (1998), 71-89; Jord Hanus, *Affluence and Inequality in the Low Countries: The City of 's-Hertogenbosch in the Long Sixteenth Century, 1500 - 1650* (Antwerp: Universiteit Antwerpen, 2010), Table 25, p. 278.

[26] Van der Wee, *Antwerp Market*, vol. I, p. 294; and Herman Van der Wee, Herman, 'Voeding en Dieet in het Ancien Régime', *Spiegel Historiael*, 1 (1966), 94-101, republished in translation: as 'Nutrition and Diet in the Ancien Régime', in Herman Van der Wee, *The Low Countries in the Early Modern World* , trans. by Lizabeth Fackelman (Cambridge and New York, 1993), pp. 282-84, and Figure 151 (the data for Lier is from 1474).

[27] E. H. Phelps Brown and Sheila V. Hopkins, 'Seven Centuries of the Prices of Consumables, Compared with Builders' Wage Rates', *Economica*, 23:92 (November 1956), 296-314: reprinted in E.M. Carus-Wilson, ed., *Essays in Economic History*, 3 vols. (London, 1954-62), vol. II, pp. 168-78, 179-96, and in E.H. Phelps Brown and Sheila V. Hopkins, *A Perspective of Wages and Prices* (London, 1981), pp. 13-39 (with indexes not in the original). In my revised version of their price index, the weight for beer (barley malt) is somewhat less: 21.48 percent.

for 1453-61, which allocated a 23 percent share for beer or barley malt.[28] For sixteenth-century London alone, Steve Rappoport has allocated 20 percent for beer consumption in his price index.[29]

Herman van der Wee's less known but equally important 'basket of consumables' price index for Brabant (Antwerp-Lier-Brussels region), using the Phelps Brown & Hopkins index as a model, has a somewhat lower allocation or weight for beer: 17.08 percent.[30] He in turn had based his estimate on an analysis of the Lier's Beguinage Infirmary accounts for 1586-1600, which indicate that, on average, beer accounted for 16 percent of annual consumption expenditures, while wine accounted for only 1 percent.[31] My own Flemish 'basket of consumables' price index for 1350 to 1500, with the same base of 1451-75 = 100, allocates an expenditure weight for beer and ale (based on barley-malt prices) in between the two: 20.43 percent.[32] Finally, Robert Allen in his own and very different consumer price index has assigned a virtually identical weight to drink, in the form of beer alone, for northern Europe: 20.6 percent, to represent an annual average per capita consumption of 182 litres of beer.[33] As is obvious, none of these northern indexes provides any expenditure allocations for wine. For his southern European price index, however, Allen understandably does so, for this standard paradigm on alcoholic consumption: with 68.25 litres of wine per capita, per year, with the same expenditure weight in his index.[34]

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[28] See K.L. Wood-Legh, *A Small Household of the Fifteenth Century* (Manchester, 1956).

[29] Steve Rappaport, *Worlds Within Worlds : The Structures of Life in Sixteenth-century London* (Cambridge-New York, 1989), p. 125 (Table 5.1).

[30] Van der Wee, 'Prijzen en lonen', pp. 413-47 (n. 18 above).

[31] Van der Wee, 'Nutrition and Diet', pp. 282-84, and Figure 151; Van der Wee, *Antwerp Market*, vol. I, Appendix 47, 'Budget of the Infirmary of the Béguinage of Lier for Foodstuffs (1526-1602), pp. 534-37. See also Van der Wee, 'Prijzen en lonen', pp. 413-47.

[32] See Munro, 'Wage-Stickiness', pp. 185 - 297.

[33] Robert Allen, 'The Great Divergence in European Wages and Prices from the Middle Ages to the First World War', *Explorations in Economic History*, 38:4 (October 2001), 411-47, Table 3, p. 421.

[34] *Ibid.*

Why beer accounted for such a high proportion of (northern) household expenditures in this era is simply its role as an indispensable beverage in this era, because both water and milk were generally unsafe to drink, water especially in heavily polluted towns. To be sure, the actual reason why – the bacterial transmission of disease – was not discovered until the path-breaking medical discoveries of the 1870s. In 1876, the German scientist Robert Koch demonstrated that the a bacterium (*Bacillus anthracis*) was the cause of the animal and human disease anthrax. Two years later, in 1878, the French scientist Louis Pasteur published a paper to demonstrate the harmful effects of various micro-organisms in milk and various other beverages; and that discovery led to the famous 'pasteurization' process of heating milk in order to kill the harmful bacteria that it contained. Subsequently, in 1882-83, Koch discovered the bacteria that cause tuberculosis and cholera. Such discoveries rapidly led to the observation that bacterial diseases were chiefly water-borne (today, as well); and that in turn led western Europe and North America to develop water-sewage disposal and water-purification facilities, whose success resulted in a dramatic decline in mortality rates.[35] While medieval and early-modern Europeans knew nothing about bacteria (let alone viruses), they knew enough from personal observation to avoid drinking water and milk. The obvious advantage of beer is that its brewing processes involve a combination boiling the mixture of malt mash with water, and fermentation sufficient to destroy the harmful bacteria – or enough to make it safer to drink that polluted town water.[36]

But, as Richard Unger has further noted, the brewing process that subsequently made beer so much

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[35] In 1905, Koch, the recognized founder of the science of bacteriology, was awarded the Nobel prize in medicine. See Louis P. Cain and Elcye J. Rotella, 'Epidemics, Demonstration Effects, and Investment in Sanitation Capital by U.S. Cities in the Early Twentieth Century', in Joshua L. Rosenbloom, ed., *Quantitative Economic History: the Good of Counting*, Routledge Explorations in Economic History, vol. 40 (London and New York: Routledge, 2008), pp. 34-53; Louis P. Cain and Elcye J. Rotella, 'Death and Spending: Urban Mortality and Municipal Expenditure on Sanitation', *Annales de démographie historique*, 101:1 (2001), 139-54; and also Michael Haines, 'The Urban Mortality Transition in the United States, 1800-1940', *Annales de démographie historique*, 101:1 (2001), 33-64.

[36] For a scientific analysis of brewing processes, see Unger, *Brewing in Holland*, pp. 16-23; pp. 108-39.

safer to drink was the addition of hops, which served two purposes. First, the hops provided an agent that 'precipitated some of the nitrogenous constituents out of wort', while filtering the wort as it was drained from the brewing kettle; second, the hops contained chemicals that sterilized the wort, i.e., killing what remained of the harmful bacteria.[37]

The same arguments about fermentation apply of course to wine as well – and while beer is about 90 percent water, wine, from grape juices is not; and perhaps wine may have been even safer, certainly before the addition of hops. So such arguments, while explaining the vital importance of alcoholic beverages in household budgets, cannot in themselves explain any transition from wine to beer consumption in northern Europe. We often forget, however, the nutritional value of beer in itself. According to Robert Allen's calculations, for his northern and southern European household budgets, his expenditure allocation for 182 litres of beer (per year) contained 77,532 calories, while that for wine, with 68.5 litres per year, contained many fewer calories: 58,035.[38] But whether that difference was ever perceived and ever played in role in this supposed 'transition' is impossible to resolve.

The extent of any such transition must not be exaggerated. Thus, despite any relative decline in north European wine consumption, the continued importance of wine into the later sixteenth century may be readily seen in the reports of the Italian merchant Luigi Guicciardini on the importation of various commodities into the Low Countries, via Antwerp principally, in the 1560s. Collectively, French, Rhenish, Italian, Spanish, and Portuguese wines accounted for 12.8 percent of the total value of such imports; and in terms of foodstuffs, 28.2 percent, surpassed only by the value of Baltic grains, but surpassing the value of imported

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[37] Unger, *Brewing in Holland*, p. 26, citing in particular Louis Pasteur, *Studies on Fermentation: the Diseases of Beer, Their Causes, and the Means of Preventing Them*, trans from the French edition by Frank Faulkner and D. Constable Robb (London, 1879). Wort: 'an infusion of malt that is fermented to make beer'; 'wort is the liquid extracted from the mashing process during the brewing of beer'. Wort contains the sugars that are fermented by the brewing yeast to make alcohol. (Answers.com and Wikipedia).

[38] Allen, 'Great Divergence', Table 3, p. 421.

Portuguese (i.e., Asian) spices.[39]

Evidence for increased foreign 'hop beer' imports into the Low Countries in the fourteenth century

Surprisingly, Guicciardini makes no references to beer imports; and consistent annual series on beer imports into the late-medieval and early-modern Low Countries are not readily available.[40] But, for Flanders, one valuable proxy can be provided in the annual excise tax farms levied on both beer and wine in Bruges, for an unusually long period: the fourteenth, fifteenth, and sixteenth centuries, with far fewer lacunae than are found in other civic financial accounts in the southern Low Countries. For Bruges, the surviving accounts provide such data for 1308-1313, 1317-19, and then consistently from 1332, with an understandable absence of data only for the Black Death years, 1348 and 1349.[41] While most of the Flemish and Brabantine civic financial registers provide only the aggregate totals for all beer sales that were taxed, the Bruges civic financial registers distinguish between domestic and foreign beers: or more precisely, between the annual tax farms for such beers.

For the first three decades of the fourteenth century, the Bruges civic accounts record excise taxes for the sale of only domestic 'Bruges beer'; but the account for 1333 records the revenue from the excise tax farm on Hamburg beer: £128.00, out of a total of £882.50 (14.50 percent) for that year's beer tax-farms. Richard Unger notes that Holland's imports of Hamburg beer were 'well under way by the 1320s', certainly to Dutch towns, with a major growth from 1343 (temporarily curbed by the Black Death, but recovering in 1351). By the 1360s, Amsterdam was receiving on average 32,000 barrels or 5.6 million litres a year (probably more than half of Hamburg's exports). Despite the very important presence of Hanseatic merchants

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[39] Wilfrid Brulez, 'Le commerce international des Pays-Bas au XVI siècle: essay d'appreciation quantitative', *Revue belge de philologie et d'histoire/Belgisch tijdschrift voor filologie en geschiedenis*, 46:4 (1968), 1207-08, from Luigi Guicciardini, *Descrittioni di tutti i Paesi Bassi* (Antwerp, 1567), pp. 124-26.

[40] For evidence on beer imports into late-medieval Holland, see Unger, *Brewing in Holland*, pp. 26-68.

[41] I have used the annual civic accounts for Bruges from two archival sources: Stadsarchief Brugge, Staksrekeningen, 1302-1410; Algemeen Rijksarchief Belgë, Rekenmamer, reg. nos. 32,461 (1407) to 32,601 (1550). The tables and graphs in this study do not contain excise data from Bruges after 1500.

in Bruges – the most important of their four *kontors* abroad – some or much of this 'Hamburg' beer may have been imported from Amsterdam; and indeed Unger notes that by the later fourteenth century this re-export trade in German beer to the southern Low Countries had become 'an integral feature of Dutch trade'. He also noted that the high volume of Hamburg beer sales was based on its reputation for high quality and durability (it lasted longer), which, he contends, allowed it 'to compete effectively with wine'.[42]

As noted earlier, the most significant innovation in the northern brewing industries and beer trades of the fourteenth century, and one in which not only Hamburg and other North German towns but also the towns of Holland came to excel, was in the addition of hops, to replace (or complement) *gruit* in the brewing process. As also stressed earlier, the fundamental importance of hops lay in its sterilization capacities; but commercially, it may have been even more important – in later-medieval Europe – it its chemical abilities to stabilize the beer and preserve its taste and quality while being stored for long periods and transported over long distances. Hops, widely grown in north western Europe, were initially imported into Holland; but, according to Unger, Dutch farmers began cultivating hops around Kampen, Gouda, and Breda, from the 1320s.[43] Around this very time, a number of Dutch towns began brewing 'hop beers': Dordrecht (by 1322), Haarlem (1324), Gouda, Amersfoort, Kampen, Utrecht (all in 1325), Delft and Leiden (1326), and Alkmaar (1333).[44]

The Bruges financial accounts subsequently do contain special tax entries for 'Hop and Delft Beers', but surprisingly not until as late as 1380. There can be no doubt that these were Dutch-made beers. We may also assume, but cannot prove, that the previously imported 'Hamburg' beers, were similarly hop-beers.[45]

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[42] Unger, *Brewing in Holland*, pp. 28-33; cf. p. 31: stating that 'Much of the Hamburg beer that landed at ports in the northern Low Countries was destined for the Flemish market'.

[43] Unger, *Brewing in Holland*, p. 38.

[44] *Ibid*., p. 37.

[45] The only exception is 1337: with the commencement of the Hundred Years' War, when Edward III invaded Flanders (a French royal fief) to assert his claim to the French crown. As noted earlier, the Bruges financial registers are missing for 1348 and 1349: years of the Black Death.

Annual entries for the tax-farm sales of the 'Hop and Delft' beers continue in an unbroken series, for exactly fifty years, until 1430; but thereafter these tax farm sales were amalgamated with those for the Hamburg beer. From 1382 until 1408, the sales values of the 'Hop and Delft' beers exceeded those for Hamburg beers – by as much 7.8 times, in 1387. But from 1411, the value of the 'Hop-Delft' excise farms were consistently of lower values than those for the Hamburg beers; and that decline in relative values possibly explains why the former tax farms were subsequently amalgamated with the latter, from 1430.[46]

The following Table 1 provides quinquennial mean values of the excise-tax farms sales revenue for Bruges (domestic), Hamburg, Hop & Delft beers, and total Foreign Beers, with the percentage share for each type of beer excise-tax farms from 1306-10 to 1496-1500; and the values are given in £ groot (ponden groot) Flemish.[47] With the curious exception of the 1340s, the 'foreign beers', i.e., Hamburg beers, accounted for a relatively small share – generally under 30 percent, until the arrival of the 'Hop & Delft' beers from 1380. For the next 45 years, until the mid 1420s, the combined 'foreign beers' constituted by far the larger share of total excise tax revenues on beer: from 60.8 percent to as much as 83.4 percent (in 1391-95). Undoubtedly, the predominance of the 'Hop & Delft' beers, from 1386 to about 1400, reflects the ability of Dutch beer merchants to take advantage of Hanseatic conflicts with Flanders: the severe damages inflicted on Hanse merchants during the Second Artevelde Revolt (1382-1385), and then the Hanseatic embargo on the Bruges staple from 1388 to 1392, to enforce reparations for those damages.[48] But given the absolute decline in tax

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[46] Over this 50 year period, from 1380 to 1430, the value of the 'Hop & Delft' tax farms exceeded those for the Hamburg beers by annual average ratio 2.1:1.

[47] Most of these tax-farm revenues are presented, however, in £ parisis; and the £ groot was not adopted until about 1320. Nevertheless from then until the French occupation of the southern Low Countries, in 1795, the £1 groot Flemish was always worth £12 parisis.

[48] David Nicholas, *Medieval Flanders* (London and New York 1992), pp. 318-22; Philippe Dollinger, *The German Hansa*, trans. and ed. D.S. Ault and S. H. Steinberg (London: MacMillan, 1970), pp. 62-78; Marian Malowist, 'L'expansion économique des Hollandais dans le bassin de la Baltique aux XIVe et XVe siècles', from his *Studia z dziejow rzemiosla w okresie kryzysu feudalizmu w Europie Zachodniej w XIV i XV wieku* (Warsaw, 1954); republished in his *Croissance et regression en Europe, XIVe - XVIIe siècles*, in the series *Cahiers des Annales*, No. 34 (Paris: 1972), pp. 91-138.

farm revenues on Hamburg beers during these years, the absolute predominance of 'foreign beer' tax revenues over those for domestic beers is very impressive. We need not conclude, however, that those difference in tax-farm sales reflect proportional differences in the volumes of beers consumed (i.e., foreign vs. domestic) since the taxes levied on foreign beers were higher than those on domestic beers – justified by consumer preferences for the latter.[49]

From the quinquennium 1426-30 to the quinquennium 1481-85 (inclusive), foreign beers accounted for a very much reduced share of excise tax revenues on beer consumption in Bruges: generally no more than a third (from a low of 28.8 percent in 1431-35 to a high of 43.3 percent in 1476-80). Since the separate accounts for Dutch beer cease from 1430, for reasons discussed earlier, we should assume that the 'foreign beers' were now principally German. Possibly further research may better reveal the reasons for these evident consumption shifts from foreign to domestic beers.[50]

Finally, we may speculate – but by no means prove – that the relative decline in German beer sales reflects the impact of warfare and civil strife in the Low Countries during much of this period, indeed almost to the end of the fifteenth century. That military strife began with England's hostile reaction to the Burgundian acquisition of Holland-Zeeland and Hainaut (to resolve a civil war in these provinces), and English military intervention in both Hainaut and Holland during the 1420s (1422-1428). Worse was the Anglo-Burgundian War of 1436-1439 (after Duke Philip the Good's *volte face*, in deserting his English ally for Charles VII of France), with an English invasion of Flanders, which then led to the revolt of Bruges, during which Flemish rebels attacked German merchants in Bruges (suspected of being pro-English); and that in turn led to a Hanseatic desertion of Bruges for Antwerp (1436-38). That was almost immediately followed by the Dutch-Wendish War, 1438-1441, involving L|übeck and its Wendish League of western Baltic towns.

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[49] See Craeybeckx, *Les vins de France*, pp. 5-10; Unger, *Brewing in Holland*, pp. 37-39. The Hanse beer merchants generally paid 50% more in taxes per vat or tun of beer than did domestic brewers.

[50] It seems unlikely that changes in the ratio of excise tax burdens on the two types of beers could explain such radical shifts in the sales of the excise tax farms.

A decade of relative peace was interrupted by more conflicts with the Hanseatic League, and their six-year embargo of Bruges, 1451-1457, when the Hanse moved first to Deventer and then to Utrecht. That had the unintended effect of encouraging more and more foreign merchants to move to Antwerp, while permitting the Dutch to expand their own trade, at the expense of the Hanse. Then, seven years later, the Anglo-Burgundian trade bans of 1464-1467, and the Anglo-Hanseatic war of 1467-72 (and the expulsion of recalcitrant Cologne from the League) together further injured Hanseatic commerce in the Low Countries. The final blow, in this era, came from the Flemish revolt against Archduke Maximilian of Habsburg, 1484-1492.[51] Yet, in the midst of that anti-Habsburg revolt, the foreign-beer excise-tax farms made a strong recovery, to account for 71.3 percent of total beer excise tax-farm revenues in 1486-90, though declining thereafter to about half (49.9 percent) of those revenues, in 1496-1500, when this statistical series ends.[52]

The Bruges excise tax-farms: the shift from wine to beer and related problems

Of greater or certainly more pertinent interest, in these financial registers, is the change in the relative shares of excise-tax farm revenues derived from the consumption of beer and wine. As Table 2 (quinquennial means), and the graph (annual data) readily reveal, there is indeed a pronounced shift from wine to beer over this two century period from 1308 to1500. At the beginning of the series, in 1308-10, wine accounted for 65.7 percent and beer accounted for the other 33.3 percent of total excise-tax farm revenues for alcoholic consumption. When the complete series commences, without any significant annual gaps, in 1331-35, the share for wine is even higher: 71.4 percent of these total revenues. But near the end of our series, in the early 1490s, the tax-farm shares for the two alcoholic beverages have been totally reversed: only 29.6 percent for wine and thus 70.4 percent for beer.

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[51] John H. Munro, *Wool, Cloth and Gold: The Struggle for Bullion in Anglo-Burgundian Trade, 1340-1478*, Centre d'Histoire Économique et Sociale (Brussels: Editions de l'Université de Bruxelles; and Toronto: University of Toronto Press, 1973), pp. 66-179; Van der Wee, *Antwerp Market*, vol. II, pp. 89-104; Nicholas, *Medieval Flanders*, pp. 326-32, 386-88, 392-99; Dollinger, *German Hansa*, pp. 298-302; T.S. Jansma, 'Philippe la Bon et la guerre hollando-wende, 1438-1441', *Revue du Nord*, 42 (1960), 5-18.

[52] See Table 2.

The most obvious explanation, and the one universally favoured by those had previously detected or suspected such a relative shift from wine to beer consumption, is the introduction of hop-beers, with the consequent improvement in the quality (taste) and transport and storage stability of such beers. As previously noted, many Dutch towns were producing and exporting hop-beers from the 1320s, but, as noted earlier, the separate entries for 'Hop and Delft beers' do not appear in the Bruges accounts until as late as 1380 – though we may assume that the other foreign category, for 'Hamburg' beer, had included some hop-beers.

The basic problem with this thesis, for the Bruges market, at least, is that the relative shares for wine and beer consumption taxes did not markedly change until well into the fifteenth century. Thus the excise tax farms for beer had accounted for 34.33 percent of the total revenues for alcoholic consumption in the first decade of the fourteenth century; and in the early 1380s, despite some intervening fluctuations, it remained relatively unchanged at 33.09 percent. Thereafter, the 'beer share' of total alcoholic consumption taxes rose very slowly, very incrementally, to reach a peak of 57.6 percent in the quinquennium 1406-10; but then that 'beer share fell' sharply to just 36.8 percent of total excise taxes on alcoholic beverages in 1416-10 (63.22 percent for wine). Only from the quinquennium 1431-35 did that share of excise taxes for beer consumption experience a permanent rise above 50 percent: rising from 52.2 percent of the total such tax farms in 1431-35 to a peak of 70.4 percent in 1491-95 (then following to 60.2 percent in 1496-1500, the final quinquennium in this study). As was also noted earlier, during this very same period, from the 1430s, foreign beers had also experience a retreat in their relative importance at Bruges, i.e., in relation to domestic beers.

The role of real-income changes for the shift from wine to beer: problems in the Flemish 'Golden Age'

It would be difficult to attribute this overall shift in alcoholic consumption, from a preponderance of wine to a final preponderance of beer, to changes in real incomes. For, *ceteris paribus*, we would assume the following: (1) that wine is the superior good, with the higher consumer preference, compared to beer; and thus (2) that rising real incomes should have resulted in a relative or per capita increase in wine consumption. For Bruges, we have real wage data only for building craftsmen, and only for the period from 1350 to 1485, so that we cannot measure such relationships for the entire two-century period. For the period just indicated, we

find – as would be anticipated – a negative correlation of -0.5819 (or $R^2 = 0.3386$; t-statistic of -3.6486): i.e., that the *overall* rise in real wages for master masons and master carpenters, from the mid fourteenth century (i.e., from the Black Death) to the 1480s, was accompanied by a relative decline in wine consumption.

If we compare changes in real wages for such master craftsmen by five-year periods, we find often conflicting results: sometimes relative wine consumption rises with rising real wages, and sometimes it rises with periodic declines in real wages; but more often the result predicted by the negative correlation coefficient holds: i.e., that wine consumption declines with rises in real wages. One may well argue, however, that we are not measuring the consumption preferences of the proper social group, and that such consumer preferences for wine were more likely to be found amongst the higher economic and social strata of Flemish society – merchants, landowners, *rentiers*, government officials, etc. – whose real incomes we cannot measure.

The term 'Golden Age' has long been applied to describe living standards in the fifteenth-century, especially for craftsmen and labourers in both England and the Low Countries. For the latter region, however, it probably was from being golden a period for the drapers and merchants involved in the now rapidly declining urban woollen industries.[53] Yet, even for urban building craftsmen and labourers in the southern Low Countries, there were only three periods in which real wages rose, according to the traditional formula, RWI = NWI/CPI:[54] from ca. 1390 to ca. 1415, from ca. 1440 to ca. 1475, and very briefly from ca. 1490 to ca. 1500. The basic reason for the rise in real wages during these three periods was not so much a rise in nominal silver wages as a fall in the consumer price index: i.e., as a consequence of deflationary forces. The three intervening periods were those in which real wages fell; and they fell chiefly because of the inflationary consequences of often radical Burgundian coinage debasements, primarily undertaken to finance warfare (i.e.,

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[53] See n. 10, above.

[54] i.e., in terms of index numbers, with a common base (here 1451-75 = 100): the Real Wage Index = the Nominal (Money) Wage Index divided by the Consumer Price Index. For an economist, the 'real wage' also means the Marginal Revenue Product of labour.

the wars cited earlier).[55]

Excise-tax farms, warfare, and problems of urban finances (*rentes*)

But even the rise in rise in the real wage index (by the formula just given) for urban craftsmen and labourers, during the three decades from the 1440s to the early 1470s, is deceptive, because these indices do not take into account many other factors determining real incomes, such as days of employment. But our most important concern is that the real-wage index takes no account of the burden of civic taxation. That concern now requires a closer examination of the excise tax farms on beer, wine, other foodstuffs (grain, fish, meat), textiles, and other key components of household consumption. The fact that these data are the revenues derived not from the actual collection of such consumption taxes from urban households but the revenues from merchants and financiers who purchased the 'tax farms', i.e., the right to collect these taxes from urban consumers, is not in itself the major problem. The governments of the Flemish towns sold these tax farms, annually, at competitive auctions. We may assume, on the one hand, that merchants hoped to make a profit and thus would not bid an amount in excess of the expected annual value of the tax collection; and we may assume, on the other hand, that a truly competitive market would eliminate any excessive profits or 'rents' from the tax-farm sales. At the same time, we may also therefore assume that these tax-farm revenues understate the actual tax burden imposed on the urban consumers.[56] Obviously, no urban consumers, implicitly paying the tax when purchasing wine, beer, or other consumption commodities subject to the excises, enjoyed any exemptions (though wines and beer sold to religious houses were often tax exempt).[57]

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[55] Munro, *Wool, Cloth, and Gold*, pp. 65-180; Munro, 'Gold, Guilds, and Government', pp. 153 - 205; Munro, 'Wage-Stickiness', pp. 185-297.

[56] It must be clearly understood that excise taxes on wine, beer, and other household goods were levied only on domestic urban consumers.

[57] Only urban consumers paid these excise taxes, which were never levied on rural households, which paid other taxes, especially property taxes – from which the poor were often exempt. See John Munro, 'The Usury Doctrine and Urban Public Finances in Late-Medieval Flanders (1220 - 1550): Rentes (Annuities), Excise Taxes, and Income Transfers from the Poor to the Rich', in Simonetta Cavaciocchi, ed., *La fiscalità nell'economia Europea, secc. XIII - XVIII/ Fiscal Systems in the European Economy from the 13th to the 18th Centuries*, Atti della 'Trentanovesima Settimana di Studi', 22 - 26 aprile 2007, Fondazione Istituto

The more important problem is the change in the tax rates (i.e., per vat of beer or wine purchased) in order to provide the town governments with sufficient revenues to meet their fiscal obligations: including those amounts (*beden*) that had to be paid to the dukes of Burgundy and their Habsburg successors (from 1482). As I have contended in other publications, this system of urban public finance had arisen in the thirteenth-century Flemish towns chiefly in order to finance the annual payments on the civic public debt (and periodically the redemption of some of these debts). Those urban debts were chiefly in the form of *rentes* or *renten*, in effect annuities, which the town governments sold to various merchants and financiers, as a more viable and fully licit alternative to interest-bearing loans and bonds, and thus to avoid the widespread and harshly enforced bans on usury.

Beginning with Pope Innocent IV (ca. 1250-51), ecclesiastical commentators and canon lawyers reluctantly agreed to accept *rentes* as non-usurious and thus licit financial contracts. The first and major condition, to determine that they were not loans (*mutuum*), was that those who purchased such *rentes* could never demand repayment of their capital from the seller of the *rentes* (e.g., the town governments), though the issuing seller was free to redeem the *rentes* at the nominal par value when it was advantageous to do so. Most medieval *rentier* capitalists were content to receive guaranteed annual streams of income for the capital so invested in either lifetime or perpetual *rentes*; but they could regain their capital, in part of in whole, by selling their *rentes* to some third- party investor to whom the income stream of annuity payments would be transferred. The second condition, and the one more relevant for this study, was that the annual payments on these *rentes* be akin to land rents: i.e., be derived from the fruitful products of the land, such as foodstuffs

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Internazionale di Storia Economica "F. Datini", Prato, Serie II: Atti delle "Settimane de Studi" et altri Convegni 39 (Florence: Firenze University Press, 2008), pp. 973-1026; and Tim Soens and Erik Thoen, 'The Impact of Central Government Taxation on the Flemish Countryside (end 13th - 18th Centuries): Some Reflections', in Simonetta Cavaciocchi, ed., *La fiscalità nell'economia europea, Seccoli XIII - XVIII/Fiscal Systems in the European Economy from the 13th to the 18th Centuries*, XXXIS Settimana du Studi (Florence: Le Monnier, 2008), pp. 957-71. As they have demonstrated, the levels of taxation – again, chiefly direct taxation – were far, far lower in the Flemish countryside, and far less regressive in this era, but only up to the seventeenth century.

and textiles, and thus in the form of excise taxes on their consumption.[58] As all economists agree, no form of taxation is more regressive and more harmful to the lower economic strata of society than the taxation of foodstuffs and similar basic household necessities; but such calculations were evidently never considered by either canon lawyers or governments.

Such *renten* or annuity payments were those that no late-medieval governments – of towns, counties, duchies, and kingdoms – could afford to avoid, let alone repudiate, even when their populations diminished, as most did, over the later Middle Ages. If populations did decline, warfare did not. Indeed the costs of warfare soared in absolute terms during the later Middle Ages, [59]as did, therefore, the sales of *renten* (and also the issue of illegal usurious loans); and that meant in turn, major increases in the levy of such excise taxes, especially, of course, those on beer and wine. The demand for such commodities was highly inelastic, thus enabling the tax burden or tax *incidence* to be fully shifted to the consumer for two obvious reasons: first, for reasons already elaborated, they were necessities, and not, as today 'sinful' luxuries; and second, because, as today, they were and are highly addictive.

We must now ask, therefore, to what extent the increases in the sales value of excise tax farms on beer and wine reflected not any changes in consumer preferences for alcohol, or changes in the level of public consumption of alcohol, but rather an increase in public debt and thus in the need to finance those increased debts with higher excise taxes.[60]

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[58] See John Munro, 'The Medieval Origins of the Financial Revolution: Usury, *Rentes*, and Negotiablity', *The International History Review*, 25:3 (September 2003), 505-62; Munro, ' Usury Doctrine and Urban Public Finances in Late-Medieval Flanders', pp. 973-1026.

[59] Philippe Contamine, *War in the Middle Ages* (London, 1984), chapter 7: 'War, Economy, and Taxation'; William Caferro, 'Mercenaries and Military Expenditure: The Costs of Undeclared Warfare in XIVth Century Siena', *Journal of European Economic History*, 23:2 (Fall 1994), 219-47; William P. Caferro, 'Warfare and Economy in Renaissance Italy, 1350 - 1450', *Journal of Interdisciplinary History*, 39:2 (Autumn 2008), 167-209.

[60] See Hans Van Werveke, *De Zwarte Dood in de zuidelijke Nederlanden, 1349-1351*, in *Mededelingen van de koninklijke Vlaamse Academie voor wetenschappen, letteren, en schone kunsten van België, Klasse der Letteren*, vol. XII, no. 3; Brussels, 1950), in which the author disputed the impact of the Black Death of Flanders, citing the fact that the excise tax farms for Ghent and Bruges did not decline after

Coinage debasements and inflation: problems in measuring the 'real value' of excise-tax farms

Since the counts of Flanders (to 1384), and their successor dukes of Burgundy (1384 - 1482), and then the Habsburg archduke of Austria (Maximilian, from 1482) also financed their warfare from the seigniorage revenues derived from coinage debasements, we must also ask to what extent the annual excise tax burdens rose in 'real' terms, by discounting the inflationary impact of the coinage debasement. One may appreciate the extent of this problem in noting the changes in the pure silver content of the Flemish penny or *groot:* falling from 2.067 grams in 1350 to 0.4663 grams, at the end of the Burgundian era in 1482; after some horrendous debasements under Maximilian, the silver content of the *groot* was restored to 0.4791 grams in 1499-1500.[61] The overall reduction in it silver contents, over this 150 year period, was 77.06 percent! Over the same 150-year period, the Flemish Consumer Price Index (with a base of1451-75 = 100) rose from a mean of 60.46 in 1351-55 to a mean of 184.51 in 1486-90 – a three-fold rise (though with many fluctuations in between), and then fell back to 100.36 in 1496-1500.[62]

Nevertheless, there is no simple relationship between such coinage changes and inflation other than a generalization that inflations were almost never proportional to the extent of debasements.[63] We may use index numbers, with the same base (1451-75=100), to 'deflate' the annual values of the excise tax farm sales, and thus to derive a better indication of their 'real' values. Another complementary technique employed in this study is to compare the nominal values (i.e., in current pounds *groot*) of the sum of the wine and beer excise tax farms with the nominal value of the 'basket of consumables' (in pence *groot* Flemish) that has been

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1348; but he did not take account of the previous warfare, which had increased the public debt and thus the level of the excise-tax farms. (Nor did he take full account of the coinage debasements of this era).

[61] See sources in my web page, 'My Research Data Online', connected to my Home Page: http://www.economics.utoronto.ca/munro5/ResearchData.html

[62] Munro, 'Wage-Stickiness', Table 8, pp. 249-50.

[63] In fact the relationship between debasements and potential price changes is an inverse one, expressed by the formula: [1/(1 + x)] - 1, where x = the percentage change in the silver content of the *groot* (*gros*). See John Munro, 'Deflation and the Petty Coinage Problem in the Late-Medieval Economy: The Case of Flanders, 1334 - 1484', *Explorations in Economic History*, 25:4 (October 1988), 387-423.

used to compute the Flemish price index in this study (base 1451-75 = 126.295 d. *groot*). We can then compute the number of such baskets of consumables whose value is equivalent to the total sales value of the excise tax farms; and then also compute the index number values of those baskets, using the same base (1451-75=100).

In the case of Bruges, the real value of the total value of the alcohol-based excise tax farms (i.e., beer plus wine) fell from a quinquennial *harmonic mean* of 10,664.16 baskets in 1351-55 (index: 81.21) to a low of 6,105.89 such baskets in 1371-75 (index: 46.50). That estimated 'real value' then rose to a peak harmonic mean of 11,526.67 baskets in 1396-1400 (index: 87.78), thereafter falling to a new mean low of 4,636.00 baskets in 1436-40.[64]

Measures of and explanations for changes in the 'real' value of Bruges wine and beer tax farms

There are two possible explanations for these fluctuations in the 'real' values of these combined excise-tax farms. The first explanation is that the excise-tax rates did not change in correspondence with the inflation from the 1350s to ca. 1390, the subsequent deflation to ca. 1415-20, and then the renewed inflation that peaked in 1436-40 . The second is that this fall in the real value of the excise tax farms may reflect a decline in Bruges' urban population and thus in the number of consumers.

The subsequent tax history of the fifteenth century is even more interesting, and even more disconcerting if Bruges' population had continued to fall – as did the population of Ypres and other towns and villages in the southern Low Countries, especially from the seriously worsening economic conditions from

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[64] The harmonic mean is 'the reciprocal of the arithmetic mean of the reciprocals of the individual numbers in a given series'; and it is always somewhat less than the arithmetic mean. For the statistical explanation, see F.C. Mills, *Introduction to Statistics* (New York, 1956), pp. 108-12, 401; and Harold S. Sloan and Arnold J. Zurcher, *A Dictionary of Economics*, 3rd edn, (New York: Barnes and Noble, 1953), pp. 149-50. The mathematical equation is: $HM = 1/ [\sum (1/r_1 + 1/r_2 + 1/r_3 + ... 1/r_n)] / N$. The letter 'r' indicates the prices or wages in a series, so that 1/r means the reciprocal of that price or wage for each year in the series. For an explanation of why harmonic and not arithmetic means must be used in such historical studies, see Munro, 'Builders' Wages', pp. 1013-76.

1430s.[65] Thus, from that low of 4,636.00 consumer baskets (harmonic mean) in 1436-40 the aggregate value of the excise taxes on alcohol more than tripled to a mean of 14,428.09 consumer baskets in 1466-70 (index: 109.88). And that value soared during the very peak of the so-called Golden Age of the craftsmen, as measured by the rise in real wages: i.e., by the standard measure, the real wage index of Bruges master masons rose from a harmonic mean of 71.34 in 1436-40 to a peak of 112.73 in 1461-65 (falling slightly to 103.61 in 1466-70).

Thereafter, the aggregate value of the alcohol-based excise tax farms fell gradually: from 14,428.09 baskets in 1466-70 to 11,036.88 baskets in 1481-85 (index: 84.05), rising, then falling, and then recovering to reach a new peak of 14,764.82 baskets in 1496-1500 (index: 112.44), when real wages were probably rising – but, as noted, we lack adequate wage data for Bruges after 1485.[66] The general conclusion is that the fifteenth-century rises in real wages per se were more than offset by the rise in the burden of excise taxes on alcoholic beverages, 'necessary' beverages, as already explained.

A comparison with the excise-tax farms of Aalst (eastern Flanders): its shift from wine to beer

We can confirm that conclusion with even better, and much more complete data on builders' wages (into the mid sixteenth century) for the eastern Flemish textile town of Aalst, not far from the Brabant frontier (and not that far from Antwerp). Furthermore, my current data set allows me to calculate the total burden of all excise taxes on consumption – and the shares of those total excise tax-farm revenues in the form of the beer and wine excise tax farms.

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[65] For the rapid decline in the textile industries, see n. 10 above. For demographic statistics, see also n. 76 below. Ypres' population had fallen from 10,523 in 1431 to 7,626 in 1491: a decline of 27.53 percent (but thereafter recovering to 9,563 in 1506), according to estimates in Henri Pirenne, 'Les dénombrements de la population d'Ypres au XVe siècle (1412-1506)', *Vierteljahrschrift für Sozial und Wirtschaftsgeschichte* (1903), republished in Henri Pirenne, *Histoire économique de l'occident médiéval*, ed. Etienne Coornaert (Bruges: Declée de Brouwer, 1951), pp. 458-488, especially p. 467 (also presenting alternative figures of 10,736 inhabitants in 1412 and 9,390 in 1437). But see Prevenier, 'La démographie des villes du comté de Flandre', pp. 259-60, 270: which provides slightly different alternative estimates for Ypres' 1412 population: 10,782 and 10,489 inhabitants, and an estimate of perhaps 9,878 in 1469 (Table G: 2,195 hearths with an average family size of 4.5 persons).

[66] See p. and n. above; see also Sosson, *Les travaux de la ville de Bruges, XIVe - XVe siècles.*

The first observation about the Aalst excise-farm data, presented in Table 4, is simply that, from the very commencement of the records in 1395, the beer excises had already enjoyed a commanding presence over wine, as its share of total excise-tax farms on alcoholic beverages: 62.7 percent for beer and thus 37.3 percent for wine. That collectively the urban population already had a much greater preference for beer over wine, as early as the late fourteenth century, should not be surprising, since Aalst was a far smaller (ca. 3,600 inhabitants) town, a more purely industrial town, without any of the cosmopolitan mercantile and financial sector to be found in Bruges – an upper-class society with presumably a stronger preference for wine.

Nevertheless, in Aalst, there is evidently an even greater shift towards beer during the course of the fifteenth century, again especially from the 1430s (as in Bruges), so that the beer excise-tax farms generally account for around 80 percent – and often even more – of the total excise-tax farms for alcoholic beverages. Indeed, in the final three quinquennia in this table (from 1536 to 1550), the beer excise-tax farms account about 83 percent of the total value of all excise tax farms revenues (and thus only 17 percent for wine) – close to the ratio of beer to wine tax ratios in eighteenth century England.[67] For the entire 155-year period, from 1395-1400 to 1546-50, the respective shares for the two alcoholic beverages are: 78.3 percent for beer and 21.7 percent for wine.

At the beginning of this statistical series for Aalst, for the period 1395-1400, these two alcohol-based excise-tax farms together accounted for 60.2 percent of the total excise tax-farm revenues. Nevertheless, their combined value did not continue to retain that high share of the total excise taxes: falling to 47.25 percent of the total in 1416-20, and very rarely rising above 50 percent of the total thereafter, as Table X indicates, until the late 1480s. But in the first half of the sixteenth century, the combined total of the wine and beer excise-tax farms did rise substantially, reaching 68 percent of the total in the final quinquennium: 1546-50.

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[67] See Patrick O'Brien, 'The Political Economy of British Taxation', *Economic History Review*, 2nd ser., 41:1 (Feb. 1988), Table 5, p. 11. In late-eighteenth century England, beer (sum of beer, malt, and hops) accounted for 24.6% of the 'Major Taxes' (about 90% of the presumed total) collected, while wine accounted for only 4.63%. The sum of all taxes on alcohol and tobacco then accounted from 43.30% of all such English tax revenues (£6,917,000 out of £15,973,000).

As is now so well known, the Price Revolution had commenced near the beginning of the century, and was in full swing by the 1520s, and continued for another 130 years, until the 1650s.[68] As Table 5 and the graph C indicate, the crude real wage index for master masons (and carpenters) in Aalst, again using the common base of 1451-75 = 100, and expressed in quinquennial harmonic means (based on commodity baskets) fell steadily from a peak of 122.66 in 1496-1500 to a dismal low of 42.18 in 1541-45, though rising slightly to 48.24 in the final quinquennium of 1546-50. That is just one-third the level of real-wages in the base period of 1451-75.

Note, in the Aalst tax-farm data expressed in this table, the two salient features of these changes in the excise tax farm revenues during the first half of the sixteenth century: first, the increased relative shift from wine to beer; and, second, the increased share of the two alcoholic tax farms in the composition of the town's total excise tax-farm revenues. They lead one to ask if these changes are together a reflection of declining real incomes and living standards during this phase of the Price Revolution era. Certainly such a decline is readily apparent in the graph for real wages of building craftsmen in Aalst; but, as noted earlier, we have no further wage data for Bruges 1480, to permit similar comparisons.

If we assume that the major factor in declining real wages for building craftsmen was simply the fact – the indisputable fact – that their nominal wages (in silver coin) did not keep pace with the rising cost of living, then we must ask what choices they made, with ever more severe household budget constraints, in their consumer expenditures. Were urban households in Aalst spending relatively more on alcohol, as necessities, than on, say, textiles; and in doing so, spending more on presumably cheaper beer than on presumably more expensive wine? Or was the evident real decline in the excise-tax farms on textiles instead a reflection of this

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[68] John Munro,'The Monetary Origins of the "Price Revolution:" South German Silver Mining, Merchant-Banking, and Venetian Commerce, 1470-1540', in Dennis Flynn, Arturo Giráldez, and Richard von Glahn, eds., *Global Connections and Monetary History, 1470 - 1800* (Aldershot and Brookfield, Vt: Ashgate Publishing, 2003), pp. 1-34; John Munro, 'The Price Revolution', in Steven N. Durlauf and Lawrence E. Blume, eds., *The New Palgrave Dictionary of Economics*, 2nd edition, 6 vols. (London and New York: Palgrave Macmillan, 2008), vol. 6, pp. 631-34; John Munro, 'Money, Prices, Wages, and "Profit Inflation" in Spain, the Southern Netherlands, and England during the Price Revolution era: ca. 1520 - ca. 1650', *História e Economia: Revista Interdisciplinar*, 4:1 (2008), 13-71.

industry's current decline, which led the urban tax authorities to reduce the excise-tax burden on textiles? Obviously, there is no clear cut, decisive answer to these important questions, especially when we lack specific data on the changing rates of the excise taxes on all these items of household consumption. We might also cavil that this crude real-wage data – by which we mean daily wages only – do not permit us to estimate total real annual incomes (especially since we know little about employment); and we cannot estimate such real incomes for a highly diversified urban society, wide ranges in household incomes, based solely on real wages for building craftsmen. Nevertheless, we have no, or few other, real alternative sources of consistent annual wage and income data for late-medieval Flemish towns.[69]

Measuring the real excise-tax burdens in Aalst during the fifteenth-century 'Golden Age'

Since the focus of this study still remains the late-medieval era, and the fifteenth century in particular, we must now ask whether the Aalst price, wage, and tax data permit similar or even better insights into living standards for building craftsmen during their so-called Golden Age, especially in the mid fifteenth century, than do the Bruges data. Not surprisingly, the Aalst graph demonstrates a very close correspondence in the patterns and behaviour of real wages for master masons with those of their Bruges' counterparts, at least for the period in common with the two graphs: 1396 - 1485. Again, as in Bruges, real wages fell for most of the first third of the fifteenth century, and for the same reasons: the inflationary consequences of war-inspired

[69] One may object that building craftsmen's wage are not really representative of incomes for the middle strata of urban societies. See Bruno Blondé, *De sociale structuren en economische dynamiek van 's-Hertogenbosch 1500-1550* (Antwerp: Stichting Zuidelijk Historisch Contact, 1987); and also Bruno Blondé, ed., *Labour and Labour Markets Between Town and Countryside, Middle Ages-19th century* (Turnhout: Brepols, 2001). Nevertheless, most medieval historians must use wage data for building craftsmen simply because so few other daily wage data are available – in particular, because most wage-earners received piece-work and not time-based wages. Furthermore, the only employers who consistently recorded daily wages, on an annual basis, were town governments, hospitals, and ecclesiastical institutions, and chiefly only for building craftsmen. For other wage series, including wages for policemen and textile-fullers, see 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, no. 116 (Stuttgart: Franz Steiner Verlag, 1994), pp. 65-78; and Munro, 'Wage-Stickiness', pp. 1013-76.

coinage debasements in Flanders, when consumer price increases rapidly outpaced nominal wages.[70] In both graphs, the subsequent rise in the real-wage index, from the early 1440s to the mid-1470s, well illustrates what is commonly meant by the mid-century 'Golden Age' for artisans and labourers. In the graph for Aalst, the real wage is represented here not by the traditional index numbers (RWI = NWI/CPI), as given in the Bruges graph, but instead by the value of the commodity baskets on which the Flemish Consumer Price Index is based: i.e., the number of commodity baskets that a master mason could purchase with his annual money wage (for 210 days of employment), expressed in quinquennial harmonic means.[71] The two calculation methods produce, however, absolutely identical results.

The most striking feature of the Aalst real-wage graph is the behaviour of the variable labelled 'value of taxes in years wages': i.e., the number of days wages, converted into years (again: 210 days' employment), whose total value equals the aggregate value of the Aalst excise-tax farms revenues for each year.[72] That calculated number rises from a harmonic mean of 62.89 years wage income, in the initial quinquennium, 1396-1400, to an initial peak of 96.2 years' wage income in 1441-45, which was also – as noted earlier – when the crude real-wage index for masons (in both Bruges and Aalst) was experiencing its initial ascent into that supposed 'Golden Age' for such artisans. But as we know full well, this was also a period in which the Flemish urban textile industries entered the worst phase of their irredeemable crisis;[73] and it was also, for many other reasons as well, an era post-war economic depression and deflation – and deflation explains the

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[70] See above, n. Note, however, that building craftsmen in Aalst evidently experienced a lower degree of 'wage-stickiness' than did building craftsmen in Bruges. See Munro, 'Wage-Stickiness', pp. 185-297.

[71] For an explanation and justification for the choice of a mean employment year of 210 days, see Munro, 'Wage-Stickiness', pp. 185-297; Munro, 'Builders' Wages', pp. pp. 1013-76l; and especially Van der Wee, *Growth of the Antwerp Market*, Vol. I: *Statistics*, Appendix 48, pp. 540-44 (for Antwerp and Lier, in the period 1437-1600).

[72] More specific details of these calculations are provided in Table xxx.

[73] See n. 10 above.

rise in crude-real wage index. [74] Hence, may one contend that this steep rise in the excise tax burden, largely a consequence of the previous wars, eliminated most or even all of these supposed real-wage gains.

Subsequently, that excise-tax burden, in terms of the annual wages for Aalst's building craftsmen, was considerably exceeded in the two decades from ca. 1466 to ca. 1485. The estimated tax burden varied from 96.20 years' income in 1466-70 to a new peak of 116.28 years' income in 1471-75; and this ten year period was still within the supposed 'Golden Age' era of the Flemish craftsmen. While falling somewhat in the 1480s, but only because of a rise in nominal money wages, that estimated tax burden again rose to 102.11 years' income in 1496-1500 – again, when the crude real-wage index was high (122.66) – and it never fell below 96 years' wage-income, in the first two decades of the sixteenth century, and thus before the real onset of the Price Revolution, whose disastrous effect on real wages has already been noted.

Similarly, the excise tax burden may again be measured in equivalent value of Flemish commodity baskets, with results that are similar to those found for Bruges, while reinforcing the conclusions derived from measuring that burden in terms of annual wage-incomes for artisans.

Demographic problems: did per capita tax burdens rise with falling populations?

All these estimates are based on the assumption that Aalst's fifteenth-century population had remained stable at about 3,600 to 4,000 inhabitants.[75] But that seems unlikely, in light of the demographic declines

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[74] See John Hatcher, 'The Great Slump of the Mid-Fifteenth Century', in Richard Britnell and John Hatcher, eds., *Progress and Problems in Medieval England* (Cambridge and New York: Cambridge University Press, 1996), pp. 237-72; Pamela Nightingale, "England and the European Depression of the Mid-Fifteenth Century," *The Journal of European Economic History*, 26:3 (Winter 1997), 631-56; John Munro, 'Economic Depression and the Arts in the Fifteenth-Century Low Countries', *Renaissance and Reformation*, 19 (1983), 235-50; reprinted in John Munro, *Textiles, Towns, and Trade: Essays in the Economic History of Late-Medieval England and the Low Countries*, Variorum Collected Studies series CS 442 (Aldershot, Hampshire; and Brookfield, Vermont: Ashgate Publishing Ltd., 1994).

[75] See Peter Stabel, *De kleine stad in Vlaanderen: Bevolkingsdynamiek en economische functies van de kleine en secundaire stedelijke centra in het Gentse kwartier (14de - 16de eeuw)*, Verhandelingen van de Koninklijke Academie voor Wetenschappen, Letteren en Schone Kunsten van België, Klasse der Letteren, Jaargang 57, no. 156 (Brussels: Paleis der Academiën, 1995), p. n. 18, stating that Aalst had about 3,600 inhabitants in 1338 and possibly 4,000 in 1500; but see also Peter Stabel, *Dwarfs among Giants: The Flemish Urban Network in the Late Middle Ages*, Studies in Urban, Social, Economic and Political History of the Medieval and Modern Low Countries, no. 8 (Leuven-Apeldoorn: Garant, 1997), p. 41, indicating that

experienced elsewhere in the southern Low Countries during this century, including the so-called Golden Age: in Ypres (perhaps as much as 27.5 percent), as already noted; [76] and in some small towns also in eastern Flanders – some losing as much as 50 percent, though a loss measured from the Black Death.[77] In the neighbouring duchy of Brabant, just to the east of Aalst, between 1437 and 1496, the smaller towns experienced an overall demographic decline of 25.24 percent; and the villages even more, by 26.35 percent. During this period (or up to the 1480s), they also experienced a commensurate increase in the proportion of non-taxed 'poor hearths': with 28.1 and 31.6 percent 'poor hearths', respectively.[78] Thus obviously any fall in Aalst's population, even if not approaching the Brabantine decline, would have meant a steeper increase in its *per capita* tax burdens than these tax data indicate, all the more so during the mid-century so-called 'Golden Age' of the artisans.[79]

Aalst's fifteenth-century population was '3,600 or more', which 'grew further in the middle of the 16th century'.

[76] See n. 53 above.

[77] From the mid-fourteenth to the mid or later fifteenth century, the population of Dendermonde had fallen by about one half: from about 9,000 to about 4,500. Hulst's population (about the same as that of Aalst) had fallen from 3,600 in 1417 to 3,000 in 1469, a decline of about 17 percent. But Kortrijk seems to have maintained a stable population of about 5,300 from 1440 to 1477; and Oudenaarde's population (with a thriving tapestry industry) actually grew from 5,700 in the 1440s to 6,200 in about 1500. For Oudenaarde, see Erik Thoen, *Landbouwekonomie en bevolking in Vlaanderen gedurende de late Middeleeuwen en het begin van de Moderne Tijden. Testregio: de kasselrijen van Oudenaarde en Aalst (einde 13de – eerste helft 16de eeuw)*, Belgisch Centrum voor Landelijke Geschiedenis no. 90, 2 vols. (Ghent, 1988), Part I: 'De demografische evolutie', pp. 15-233 Stabel, *Kleine stad*, pp. 17-24; Stabel, *Dwarfs among Giants*, pp. 38-43; Prevenier, 'La démographie des villes de Flandre', p. 264 (Table D): with unduly high population estimates, based on a high house-hold multiplier of 4.5 persons. See also the survey in Nicholas, *Medieval Flanders*, pp. 367-71: 'The fragmentary evidence suggest ... continued crisis'.

[78] Joseph Cuvlier, *Les dénombrements de foyers en Brabant, XIV - XVI siècle*, 2 vols. (Brussels, 1912-13), vol. I, pp. 432-3, 446-7, 462-77, 484-7; and also pp. cxxxv, clxxvii-viii, ccxxiii-xviii.

[79] However, as Table xx indicates, that tax burden appears to have been far less draconian, if measured on a per capita basis (for a population of 3,600): thus ranging from 3.668 days' wages in 1396-1400 to the onerous peak of 8.319 days' wages in 1546-50. If instead we measure the burden in terms of the estimated number of employed adult males (taken as one-quarter of that population), the burden correspondingly rises from 14.673 days' wages in 1396-1400 to 33.277 days' wages in 1546-1550: i.e, with a work-week of six days, about 5.5 weeks' wages.

The shift from wine to beer in late-medieval Flanders: some surprising conclusions

If this view is correct, then the severe costs that the combination of coinage debasements and excise taxes, both the product of warfare, inflicted on urban wage-earners, more than offset other economic forces promoting rising living standards in the fifteenth century. Are we therefore entitled to conclude that the relative shift from wine to beer, from foreign to domestic beers, and a relative increase in alcoholic consumption at the expense of other household goods was the consequence of a general fall in urban real incomes in fifteenth-century Flanders? To do so would thus substantiate the hypothesis, and only a tentative hypothesis that Herman Van der Wee had offered (discussed earlier) and one that most us had dismissed as not credible: that the fifteenth-century 'industrial depression' had played a major role in the shift from wine to beer consumption. The only safe conclusion is the one that Jan Craeybeckx had offered: that 'it would be dangerous to affirm' any definitive conclusions about a shift in consumption from wine to beer.[80]

Whether one believes that the fifteenth century was the Golden Age of the artisan, or the Golden Age of bacteria (Sylvia Thrupp),[81] one may still believe that it was golden for beer drinkers in the Low Countries – except of course for those who preferred *donker bier*.

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[80] See n. above.

[81] Sylvia Thrupp, 'The Problem of Replacement Rates in Late Medieval English Population', *Economic History Review*, 2nd ser., 18:1 (1965), 101-19.

Table 1:

Estimated per capita consumption of beer, per year and per day, in litres in various towns of the Low Countries and Germany

14th to early 17th centuries

Town	Year	Annual litres	Daily litres
BRABANT			
Antwerp	1418	210	0.575
	1526	369	1.011
	1531	369	1.011
	1567	295	0.808
	1567	296	0.810
	1568	346	0.948
	1612	259	0.710
	1618	420	1.150
	1697	274	0.750
Diest	1500	270	0.740
	1526	253	0.693
	1550	248	0.680
	1575	201	0.550
	1625	299	0.820
	1650	255	0.700
Lier	1550	310	0.849
Leuven	1372	277	0.759
	1434	210	0.575
	1472	271	0.742
	1500	275	0.753
	1524	273	0.750
	1574	273	0.748
	1601	285	0.780
	1650	350	0.960
Mechelen	1540	325	0.890
	1582	307	0.840
	1600	405	1.110
	1639	277	0.760
s-Hertogenbosch	1500	248	0.680
	1530	274	0.750
	1560	270	0.740
	1590	164	0.450

Town	Year	Annual litres	Daily litres
	1620	248	0.680
	1650	212	0.580
FLANDERS			
Bruges	1544	263	0.720
	1550	263	0.721
	1597	157	0.430
	1600	158	0.433
Ghent	1579	201	0.550
	1580	202	0.553
	1606	157	0.430
	1607	156	0.427
Ninove	1526	299	0.820
HOLLAND			
Alkmaar	1475	237	0.649
Haarlem	1475	250	0.685
	1514	158	0.433
	1590	300	0.822
Leiden	1514	228	0.625
	1543	269	0.737
	1571	267	0.732
	1621	301	0.825
GERMANY			
Hamburg	1450	250	0.685
	1475	310	0.849
	1500	320	0.877
	1525	285	0.781
	1550	400	1.096
Lübeck	1550	400	1.096
Nuremburg	1551	300	0.822
Mean:		272	0.744

Sources:

Richard W. Unger, *A History of Brewing in Holland, 900 - 1900: Economy, Technology and the State* (Brill: Leiden and Boston, 2001), Table III-4, pp. 90-91.

Jord Hanus, *Affluence and Inequality in the Low Countries: The City of 's-Hertogenbosch in the Long Sixteenth Century, 1500 - 1650* (Antwerp: Universiteit Antwerpen, 2010), Table 25, p. 278.

Table 2: Values of Imports into the Southern Netherlands c. 1560 in Million of Gulden (Carolus Florins of 40d gros Flemish)

Textile Product Imports	Value in Millions of Gulden	Per Cent of Total Import Values	Other Imports	Value in Millions of Gulden	Per Cent of Total Import Values
Raw Silk and Italian Silks	4.000	21.60%	Baltic grains	3.000	16.20%
English Woollens	3.240	17.50%	Portuguese Spices	2.000	10.80%
Spanish Wools*	1.250	6.80%	French wines	1.150	6.20%
English wools	0.500	2.70%	Rhenish wines	0.720	3.90%
French woad	0.400	2.20%	Italian/Spanish/Portuguese wines	0.500	2.70%
German fustians	0.240	1.30%	Portuguese salt	0.250	1.40%
Italian/Spanish alum	0.240	1.30%	French salt	0.250	1.40%
Spanish-American cochineal	0.225	1.20%	Spanish olive oils	0.200	1.10%
			Spanish salt	0.175	0.90%
			German copper	0.160	0.90%
Totals	10.095	54.60%	**Totals**	8.405	45.40%

Source: Based on Wilfrid Brulez, 'Le commerce international des Pays-Bas au XVI siècle: essay d'appreciation quantitative', *Revue belge de philologie et d'histoire/Belgisch tijdschrift voor filologie en geschiedenis*, 46:4 (1968), 1207-08, from Luigi Guicciardini, *Descrittioni di tutti i Paesi Bassi* (Antwerp, 1567), pp. 124-26.

* Spanish *merino* wools imported chiefly via Bruges.

Table 3:

Bruges: Beer and Wine Excise Tax Farm Sales (Assisen): in ponden (£) groot Flemish

Years: 5 year periods	Excise Tax Farm Sales Bruges Beer in £ groot Flemish	Excise Tax Farm Sales: Foreign Beer in £ groot Flemish	Excise Tax Farm Sales: Total Beer in £ groot Flemish	Beer as Percent of Total Alcohol Tax Farms	Excise Tax Farm Sales: Wine Excise in £ groot Flemish	Wine as Percent of Total Alcohol Tax Farms	Total Sales of Beer & Wine Tax Farms in £ groot Flemish
1308-10	1,443.92		1,443.92	34.33%	2,761.86	65.67%	4,205.78
1311-15	1,458.84		1,458.84	29.88%	3,424.20	70.12%	4,883.05
1316-20	298.10		298.10	24.65%	911.05	75.35%	1,209.15
1321-25							
1326-30							
1331-35	801.35	223.66	1,025.02	28.64%	2,554.17	71.36%	3,579.18
1336-40	544.57	56.77	601.33	30.66%	1,360.20	69.34%	1,961.54
1341-45	57.31	103.68	160.98	22.09%	567.89	77.91%	728.88
1346-50	454.28	119.53	573.80	44.29%	721.84	55.71%	1,295.65

Years: 5 year periods	Excise Tax Farm Sales Bruges Beer in £ groot Flemish	Excise Tax Farm Sales: Foreign Beer in £ groot Flemish	Excise Tax Farm Sales: Total Beer in £ groot Flemish	Beer as Percent of Total Alcohol Tax Farms	Excise Tax Farm Sales: Wine Excise in £ groot Flemish	Wine as Percent of Total Alcohol Tax Farms	Total Sales of Beer & Wine Tax Farms in £ groot Flemish
1351-55	1,341.72	122.45	1,464.17	42.82%	1,955.31	57.18%	3,419.47
1356-60	1,227.95	217.20	1,445.15	32.25%	3,035.55	67.75%	4,480.70
1361-65	1,126.25	330.71	1,456.96	32.40%	3,040.21	67.60%	4,497.17
1366-70	975.65	321.62	1,297.27	27.47%	3,425.19	72.53%	4,722.46
1371-75	850.85	356.76	1,207.61	32.60%	2,496.45	67.40%	3,704.06
1376-80	803.15	425.75	1,228.90	28.63%	3,064.11	71.37%	4,293.01
1381-85	620.94	1,126.75	1,747.69	33.09%	3,533.23	66.91%	5,280.92
1386-90	563.02	2,081.34	2,644.36	39.90%	3,982.60	60.10%	6,626.96
1391-95	355.74	1,784.59	2,140.33	41.09%	3,068.08	58.91%	5,208.41
1396-1400	553.84	1,955.67	2,509.51	45.89%	2,959.28	54.11%	5,468.78
1401-05	520.99	1,860.59	2,381.58	48.00%	2,579.92	52.00%	4,961.50
1406-10	445.27	1,733.85	2,179.12	57.57%	1,605.88	42.43%	3,784.99

Years: 5 year periods	Excise Tax Farm Sales Bruges Beer in £ groot Flemish	Excise Tax Farm Sales: Foreign Beer in £ groot Flemish	Excise Tax Farm Sales: Total Beer in £ groot Flemish	Beer as Percent of Total Alcohol Tax Farms	Excise Tax Farm Sales: Wine Excise in £ groot Flemish	Wine as Percent of Total Alcohol Tax Farms	Total Sales of Beer & Wine Tax Farms in £ groot Flemish
1411-15	394.31	1,364.41	1,758.72	48.53%	1,865.25	51.47%	3,623.97
1416-20	387.84	1,081.52	1,469.35	36.78%	2,525.38	63.22%	3,994.73
1421-25	633.01	979.53	1,612.53	43.06%	2,132.65	56.94%	3,745.18
1426-30	1,184.17	595.96	1,780.13	49.65%	1,805.25	50.35%	3,585.38
1431-35	1,741.75	703.10	2,444.84	52.19%	2,239.49	47.81%	4,684.33
1436-40	1,487.91	799.77	2,287.69	60.34%	1,503.45	39.66%	3,791.14
1441-45	2,314.37	1,644.35	3,958.72	60.39%	2,596.21	39.61%	6,554.93
1446-50	3,224.01	1,975.63	5,199.63	60.81%	3,350.70	39.19%	8,550.33
1451-55	2,621.49	1,989.17	4,610.66	61.88%	2,840.58	38.12%	7,451.24
1456-60	3,444.98	1,917.89	5,362.87	66.57%	2,692.56	33.43%	8,055.43
1461-65	2,474.92	1,389.06	3,863.98	63.70%	2,202.39	36.30%	6,066.37

Years: 5 year periods	Excise Tax Farm Sales Bruges Beer in £ groot Flemish	Excise Tax Farm Sales: Foreign Beer in £ groot Flemish	Excise Tax Farm Sales: Total Beer in £ groot Flemish	Beer as Percent of Total Alcohol Tax Farms	Excise Tax Farm Sales: Wine Excise in £ groot Flemish	Wine as Percent of Total Alcohol Tax Farms	Total Sales of Beer & Wine Tax Farms in £ groot Flemish
1466-70	2,993.23	1,790.74	4,783.98	65.06%	2,569.16	34.94%	7,353.14
1471-75	2,835.18	1,687.44	4,522.63	67.42%	2,185.66	32.58%	6,708.29
1476-80	3,185.80	2,430.85	5,616.65	67.64%	2,686.78	32.36%	8,303.43
1481-85	3,467.66	2,301.62	5,769.27	61.74%	3,575.46	38.26%	9,344.74
1486-90	2,271.08	5,628.46	7,899.54	66.22%	4,030.11	33.78%	11,929.65
1491-95	1,873.47	3,380.51	5,253.98	70.43%	2,206.35	29.57%	7,460.33
1496-1500	2,368.91	2,362.02	4,730.92	60.23%	3,123.99	39.77%	7,854.91
Totals	**53,347.79**	**46,842.94**	**100,190.74**	**51.81%**	**93,178.43**	**48.19%**	**193,369.17**

Table 4:

Bruges: Beer and Wine Excise Tax Farm Sales (Assisen): in ponden (£) groot Flemish

Years: 5 year periods	Excise Tax Farm Sales: Total Beer in £ groot Flemish	Beer as Percent of Total Alcohol Tax Farms	Excise Tax Farm Sales: Wine Excise in £ groot Flemish	Wine as Percent of Total Alcohol Tax Farms	Total Sales of Beer & Wine Tax Farms in £ groot Flemish	Value of Flemish Commodity Baskets in d groot Flemish	Value of Alcohol Tax Farms in Flemish commodity baskets harmonic means	Value of Alcohol Tax Farms in Flemish commodity baskets Index Nos. 1451-75=100
1351-55	1,464.17	42.82%	1,955.31	57.18%	3,419.47	76.593	10,664.1557	81.2115
1356-60	1,445.15	32.25%	3,035.55	67.75%	4,480.70	110.558	9,360.3033	71.2822
1361-65	1,456.96	32.40%	3,040.21	67.60%	4,497.17	119.255	8,708.8587	66.3212
1366-70	1,297.27	27.47%	3,425.19	72.53%	4,722.46	135.641	8,350.3320	63.5909
1371-75	1,207.61	32.60%	2,496.45	67.40%	3,704.06	145.519	6,105.8857	46.4986
1376-80	1,228.90	28.63%	3,064.11	71.37%	4,293.01	141.024	7,248.8813	55.2029
1381-85	1,747.69	33.09%	3,533.23	66.91%	5,280.92	150.534	7,973.7120	60.7228
1386-90	2,644.36	39.90%	3,982.60	60.10%	6,626.96	157.514	9,928.4141	75.6086
1391-95	2,140.33	41.09%	3,068.08	58.91%	5,208.41	111.784	11,187.8707	85.1998
1396-1400	2,509.51	45.89%	2,959.28	54.11%	5,468.78	113.407	11,526.6735	87.7799

Years: 5 year periods	Excise Tax Farm Sales: Total Beer in £ groot Flemish	Beer as Percent of Total Alcohol Tax Farms	Excise Tax Farm Sales: Wine Excise in £ groot Flemish	Wine as Percent of Total Alcohol Tax Farms	Total Sales of Beer & Wine Tax Farms in £ groot Flemish	Value of Flemish Commodity Baskets in d groot Flemish	Value of Alcohol Tax Farms in Flemish commodity baskets harmonic means	Value of Alcohol Tax Farms in Flemish commodity baskets Index Nos. 1451-75=100
1401-05	2,381.58	48.00%	2,579.92	52.00%	4,961.50	111.810	10,626.2518	80.9229
1406-10	2,179.12	57.57%	1,605.88	42.43%	3,784.99	132.939	6,843.0552	52.1124
1411-15	1,758.72	48.53%	1,865.25	51.47%	3,623.97	120.370	7,213.0653	54.9302
1416-20	1,469.35	36.78%	2,525.38	63.22%	3,994.73	135.616	7,026.1838	53.5070
1421-25	1,612.53	43.06%	2,132.65	56.94%	3,745.18	141.680	6,331.3817	48.2158
1426-30	1,780.13	49.65%	1,805.25	50.35%	3,585.38	148.741	5,769.5579	43.9373
1431-35	2,444.84	52.19%	2,239.49	47.81%	4,684.33	155.989	7,194.9120	54.7920
1436-40	2,287.69	60.34%	1,503.45	39.66%	3,791.14	177.022	4,635.9966	35.3049
1441-45	3,958.72	60.39%	2,596.21	39.61%	6,554.93	143.350	10,703.9838	81.5148
1446-50	5,199.63	60.81%	3,350.70	39.19%	8,550.33	138.904	14,584.4558	111.0661
1451-55	4,610.66	61.88%	2,840.58	38.12%	7,451.24	127.434	12,801.0197	97.4846

Years: 5 year periods	Excise Tax Farm Sales: Total Beer in £ groot Flemish	Beer as Percent of Total Alcohol Tax Farms	Excise Tax Farm Sales: Wine Excise in £ groot Flemish	Wine as Percent of Total Alcohol Tax Farms	Total Sales of Beer & Wine Tax Farms in £ groot Flemish	Value of Flemish Commodity Baskets in d groot Flemish	Value of Alcohol Tax Farms in Flemish commodity baskets harmonic means	Value of Alcohol Tax Farms in Flemish commodity baskets Index Nos. 1451-75=100
1456-60	5,362.87	66.57%	2,692.56	33.43%	8,055.43	148.845	12,628.9919	96.1745
1461-65	3,863.98	63.70%	2,202.39	36.30%	6,066.37	112.030	12,731.3021	96.9536
1466-70	4,783.98	65.06%	2,569.16	34.94%	7,353.14	121.900	14,428.0921	109.8753
1471-75	4,522.63	67.42%	2,185.66	32.58%	6,708.29	121.264	13,225.5380	100.7174
1476-80	5,616.65	67.64%	2,686.78	32.36%	8,303.43	148.034	13,242.7655	100.8486
1481-85	5,769.27	61.74%	3,575.46	38.26%	9,344.74	198.097	11,036.8775	84.0500
1486-90	7,899.54	66.22%	4,030.11	33.78%	11,929.65	233.028	12,280.0004	93.5168
1491-95	5,253.98	70.43%	2,206.35	29.57%	7,460.33	183.104	9,813.7491	74.7354
1496-1500	4,730.92	60.23%	3,123.99	39.77%	7,854.91	126.617	14,764.8242	112.4397
Totals	**100,190.74**	**51.81%**	**93,178.43**	**48.19%**	**193,369.17**			

Table 5:

Bruges: Beer and Wine Excise Taxes (Assisen): in ponden groot Flemish
in quinquennial means, 1306-10 to 1496-1500 : in comparison with real wages for building craftsmen

Years 5-yrs	Excise Tax Farms: Total Beer in £ groot	Beer as Percent Total	Excise Tax Farms: Wine Excise in £ groot	Wine as Percent of Total	Total Value of beer + wine tax farms in £ groot	Bruges Real Wage Index 1451-75=100 NWI/CPI harmonic	Ratio of RWI to Wine Share	Ratio of Wine Share to RWI
1346-50	573.80	44.29	721.84	55.71	1,295.65	89.884	1.6133	0.6198
1351-55	1,464.17	42.82	1,955.31	57.18	3,419.47	77.572	1.3566	0.7371
1356-60	1,445.15	32.25	3,035.55	67.75	4,480.70	62.309	0.9197	1.0873
1361-65	1,456.96	32.40	3,040.21	67.60	4,497.17	65.366	0.9669	1.0342
1366-70	1,297.27	27.47	3,425.19	72.53	4,722.46	67.716	0.9336	1.0711
1371-75	1,207.61	32.60	2,496.45	67.40	3,704.06	63.120	0.9365	1.0678
1376-80	1,228.90	28.63	3,064.11	71.37	4,293.01	70.520	0.9880	1.0121
1381-85	1,747.69	33.09	3,533.23	66.91	5,280.92	65.898	0.9849	1.0153
1386-90	2,644.36	39.90	3,982.60	60.10	6,626.96	77.375	1.2875	0.7767
1391-95	2,140.33	41.09	3,068.08	58.91	5,208.41	92.439	1.5693	0.6372
1396-1400	2,509.51	45.89	2,959.28	54.11	5,468.78	99.731	1.8430	0.5426

Years 5-yrs	Excise Tax Farms: Total Beer in £ groot	Beer as Percent Total	Excise Tax Farms: Wine Excise in £ groot	Wine as Percent of Total	Total Value of beer + wine tax farms in £ groot	Bruges Real Wage Index 1451-75=100 NWI/CPI harmonic	Ratio of RWI to Wine Share	Ratio of Wine Share to RWI
1401-05	2,381.58	48.00	2,579.92	52.00	4,961.50	102.687	1.9748	0.5064
1406-10	2,179.12	57.57	1,605.88	42.43	3,784.99	86.366	2.0356	0.4913
1411-15	1,758.72	48.53	1,865.25	51.47	3,623.97	95.384	1.8532	0.5396
1416-20	1,469.35	36.78	2,525.38	63.22	3,994.73	84.660	1.3392	0.7467
1421-25	1,612.53	43.06	2,132.65	56.94	3,745.18	81.037	1.4231	0.7027
1426-30	1,780.13	49.65	1,805.25	50.35	3,585.38	77.190	1.5331	0.6523
1431-35	2,444.84	52.19	2,239.49	47.81	4,684.33	79.378	1.6604	0.6023
1436-40	2,287.69	60.34	1,503.45	39.66	3,791.14	71.344	1.7990	0.5559
1441-45	3,958.72	60.39	2,596.21	39.61	6,554.93	88.102	2.2244	0.4496
1446-50	5,199.63	60.81	3,350.70	39.19	8,550.33	90.922	2.3202	0.4310
1451-55	4,610.66	61.88	2,840.58	38.12	7,451.24	99.106	2.5997	0.3847
1456-60	5,362.87	66.57	2,692.56	33.43	8,055.43	84.850	2.5385	0.3939
1461-65	3,863.98	63.70	2,202.39	36.30	6,066.37	112.733	3.1052	0.3220

Years 5-yrs	Excise Tax Farms: Total Beer in £ groot	Beer as Percent Total	Excise Tax Farms: Wine Excise in £ groot	Wine as Percent of Total	Total Value of beer + wine tax farms in £ groot	Bruges Real Wage Index 1451-75=100 NWI/CPI harmonic	Ratio of RWI to Wine Share	Ratio of Wine Share to RWI
1466-70	4,783.98	65.06	2,569.16	34.94	7,353.14	103.605	2.9653	0.3372
1471-75	4,522.63	67.42	2,185.66	32.58	6,708.29	104.148	3.1965	0.3128
1476-80	5,616.65	67.64	2,686.78	32.36	8,303.43	85.315	2.6366	0.3793
1481-85	5,769.27	61.74	3,575.46	38.26	9,344.74	63.754	1.6663	0.6001
1486-90	7,899.54	66.22	4,030.11	33.78	11,929.65			
1491-95	5,253.98	70.43	2,206.35	29.57	7,460.33			
1496-1500	4,730.92	60.23	3,123.99	39.77	7,854.91			

Table 6:

Aalst: Excise-Tax Farm Revenues
Receipts from the Annual Auctions of Excise-Tax Farms on Wine, Beer, and other products in £ groot Flemish
in quinquennial means: 1396-1400 to 1546-1550

Years	Wine	Wine	Beer	Beer	Total	Alcohol	Cloth	Grain	Total	Index:
5 - year means	Excise Farm in £ groot Flemish	Excise Farm as % of total alcohol farms	Excise Farm in £ groot	Excise Farm as % of total alcohol farms	Wine & Beer Excise Farms in £ groot	Farms as % of Total Tax Farms	Excise Farm in £ groot Flemish	Excise Farm in £ groot Flemish	Excise Tax Farm Sales £ groot Flemish	Mean of 1451-75= 100
1395-1400	88.950	37.31%	149.478	62.69%	238.428	60.18%	27.908	66.783	396.178	61.523
1401-05	91.994	33.74%	180.640	66.26%	272.633	55.90%	22.055	63.015	487.716	75.738
1406-10	66.026	25.43%	193.653	74.57%	259.679	54.17%	24.264	68.124	479.401	74.447
1411-15	86.202	30.38%	197.527	69.62%	283.729	50.03%	69.375	71.411	567.139	88.072
1416-20	81.850	32.38%	170.933	67.62%	252.783	47.25%	73.448	70.183	534.940	83.072
1421-25	81.894	31.69%	176.531	68.31%	258.425	48.25%	75.708	71.813	535.592	83.173
1426-30	64.308	21.46%	235.392	78.54%	299.700	53.93%	73.433	56.529	555.714	86.298
1431-35	73.786	27.06%	198.929	72.94%	272.715	50.47%	70.691	56.307	540.357	83.913
1436-40	50.125	19.67%	204.723	80.33%	254.848	50.26%	77.708	47.191	507.036	78.738
1441-45	58.540	19.22%	245.998	80.78%	304.538	46.38%	125.356	68.815	656.546	101.956

Years 5 - year means	Wine Excise Farm in £ groot Flemish	Wine Excise Farm as % of total alcohol farms	Beer Excise Farm in £ groot	Beer Excise Farm as % of total alcohol farms	Total Wine & Beer Excise Farms in £ groot	Alcohol Farms as % of Total Tax Farms	Cloth Excise Farm in £ groot Flemish	Grain Excise Farm in £ groot Flemish	Total Excise Tax Farm Sales £ groot Flemish	Index: Mean of 1451-75= 100
1446-50	67.009	21.82%	240.048	78.18%	307.057	49.12%	106.334	61.066	625.077	97.069
1451-55	59.765	22.37%	207.382	77.63%	267.147	54.39%	65.207	41.282	491.177	76.276
1456-60	52.028	19.36%	216.694	80.64%	268.722	46.33%	114.369	63.267	580.045	90.076
1461-65	54.152	17.60%	253.559	82.40%	307.711	45.11%	130.691	89.157	682.092	105.923
1466-70	57.823	17.06%	281.189	82.94%	339.012	48.20%	130.583	79.988	703.321	109.220
1471-75	65.805	19.00%	280.588	81.00%	346.393	45.39%	163.663	82.738	763.113	118.505
1476-80	73.907	21.91%	263.358	78.09%	337.264	44.96%	164.366	81.462	750.107	116.485
1481-85	75.014	25.33%	221.164	74.67%	296.178	43.45%	162.214	58.681	681.604	105.847
1486-90	59.833	20.25%	235.583	79.75%	295.417	46.01%	131.958	72.167	642.008	99.699
1491-95 *										
1496-1500	96.818	19.94%	388.734	80.06%	485.552	57.52%	84.413	77.630	844.156	131.090
1501-05	95.002	20.78%	362.160	79.22%	457.162	58.05%	54.527	81.218	787.469	122.287

Years	Wine	Wine	Beer	Beer	Total	Alcohol	Cloth	Grain	Total	Index:
5 - year means	Excise Farm in £ groot Flemish	Excise Farm as % of total alcohol farms	Excise Farm in £ groot	Excise Farm as % of total alcohol farms	Wine & Beer Excise Farms in £ groot	Farms as % of Total Tax Farms	Excise Farm in £ groot Flemish	Excise Farm in £ groot Flemish	Excise Tax Farm Sales £ groot Flemish	Mean of 1451-75= 100
1506-10	87.157	19.32%	363.924	80.68%	451.081	59.65%	42.867	82.103	756.231	117.436
1511-15	94.908	18.57%	416.219	81.43%	511.127	64.66%	29.290	82.715	790.518	122.761
1516-20	110.473	24.40%	342.340	75.60%	452.813	59.65%	27.223	84.332	759.086	117.880
1521-15	85.892	19.75%	349.042	80.25%	434.933	63.21%	26.342	55.785	688.131	106.861
1526-30	113.887	19.91%	458.117	80.09%	572.003	60.27%	28.503	88.187	949.104	147.388
1531-35	117.760	22.61%	403.110	77.39%	520.870	63.96%	24.660	62.943	814.355	126.463
1536-40	95.490	17.21%	459.357	82.79%	554.847	66.71%	21.048	60.590	831.677	129.152
1541-45	118.593	18.36%	527.417	81.64%	646.010	64.29%	19.240	115.193	1,004.910	156.054
1546-50	124.800	16.35%	638.335	83.65%	763.135	67.95%	15.360	123.310	1,123.110	174.410
Totals	**2,449.79**	**21.66%**	**8,862.12**	**78.34%**	**11,311.91**	**55.11%**	**2,182.81**	**2,183.98**	**20,527.91**	

* accounts missing for these years

Table 7: Aalst: Excise-Tax Farm Revenues and Total Civic Revenues

Receipts from the Annual Auctions of Excise-Tax Farms on Wine, Beer, and Other Consumer Products

in £ parisis and £ groot Flemish: £1.0 groot = £12.00 parisis

As percentages of total civic revenues (compared renten sales as percentages of total revenues in quinquennial means: 1396-1400 to 1546-1550

Years	Total of Wine and Beer excise tax farms in £ groot	Wine & Beer as % of total tax farm revenues	Total Tax Farm Revenues in £ groot Flemish	Total Civic Revenues in £ groot Flemish	Excise Tax Farms as percent of total Revenues
1396-1400	238.428	60.18%	396.178	537.629	73.69%
1401-05	272.633	55.90%	487.716	665.755	73.26%
1406-10	259.679	54.17%	479.401	787.844	60.85%
1411-15	283.729	50.03%	567.139	824.702	68.77%
1416-20	252.783	47.25%	534.940	697.884	76.65%
1421-25	258.425	48.25%	535.592	822.358	65.13%
1426-30	299.700	53.93%	555.714	786.661	70.64%
1431-35	272.715	50.47%	540.357	793.694	68.08%
1436-40	254.848	50.26%	507.036	738.117	68.69%
1441-45	304.538	46.38%	656.546	795.337	82.55%
1446-50	307.057	49.12%	625.077	737.683	84.74%
1451-55	267.147	54.39%	491.177	658.883	74.55%
1456-60	268.722	46.33%	580.045	712.918	81.36%
1461-65	307.711	45.11%	682.092	855.256	79.75%
1466-70	339.012	48.20%	703.321	839.933	83.74%
1471-75	346.393	45.39%	763.113	1,053.487	72.44%
1476-80	337.264	44.96%	750.107	1,081.942	69.33%
1481-85	296.178	43.45%	681.604	1,027.978	66.31%
1486-90	295.417	46.01%	642.008	1,279.970	50.16%

Years	Total of Wine and Beer excise tax farms in £ groot	Wine & Beer as % of total tax farm revenues	Total Tax Farm Revenues in £ groot Flemish	Total Civic Revenues in £ groot Flemish	Excise Tax Farms as percent of total Revenues
1491-95 *					
1496-1500	485.552	57.52%	844.156	1,005.923	83.92%
1501-05	457.162	58.05%	787.469	962.720	81.80%
1506-10	451.081	59.65%	756.231	903.551	83.70%
1511-15	511.127	64.66%	790.518	939.051	84.18%
1516-20	452.813	59.65%	759.086	925.650	82.01%
1521-15	434.933	63.21%	688.131	993.970	69.23%
1526-30	572.003	60.27%	949.104	1,122.196	84.58%
1531-35	520.870	63.96%	814.355	1,030.130	79.05%
1536-40	554.847	66.71%	831.677	1,084.982	76.65%
1541-45	646.010	64.29%	1,004.910	1,339.008	75.05%
1546-50	763.135	67.95%	1,123.110	1,538.393	73.01%
Totals	11,311.911	55.11%	20,527.909	27,543.601	74.53%

* Aalst town accounts registers are missing for these years.

Source:

Algemeen Rijksarchief België (Archives Générales du Royaume), Rekenkamer/Chambre de Comptes, reg. nos. 31,412 - 31,532.

For the sources for the consumer baskets, see sources for Table 12.

Table 8: Values of the Sales of Excise Tax Farms in Aalst: in pounds parisis and groot Flemish and in the equivalent value of the Flemish Basket of Consumables, for the Flemish price index in quinquennial means, 1396-1400 to 1546-50

Years: Quin-quenniums	Mean Value of of Total Excise Tax Farm Revenues in £ groot Flem	Value of Flemish Basket of Consumables in d groot Flem Mean: 126.295d	Flemish Price Index for the Basket Mean of 1451-75=100	Value of Total Excise Tax Farms in Flemish Baskets of Consumables	Index of Total Excise Tax Farms in Flemish Baskets of Consumables Mean of 1451-75=100
1396-1400	396.178	115.304	91.298	865.368	69.040
1401-05	487.716	111.810	88.531	1,057.126	84.339
1406-10	479.401	132.939	105.261	961.134	76.681
1411-15	567.139	120.370	95.309	1,122.510	89.555
1416-20	534.940	135.616	107.381	900.551	71.847
1421-25	535.592	141.680	112.182	925.372	73.828
1426-30	555.714	148.741	117.773	896.667	71.537
1431-35	540.357	155.989	123.512	838.614	66.906
1436-40	507.036	177.022	140.166	752.781	60.058
1441-45	656.546	143.350	113.504	1,283.387	102.390
1446-50	625.077	138.904	109.984	1,092.793	87.185
1451-55	491.177	127.434	100.902	934.272	74.538
1456-60	580.045	148.845	117.855	944.964	75.391
1461-65	682.092	112.030	88.705	1,477.210	117.854
1466-70	703.321	121.900	96.520	1,387.199	110.673
1471-75	763.113	121.264	96.017	1,523.476	121.545
1476-80	750.107	148.034	117.213	1,256.804	100.270
1481-85	681.604	198.097	156.853	897.013	71.565
1486-90	642.008	188.911	149.580	815.631	65.072
1491-95*		183.104	144.981		
1496-1500	844.156	126.617	100.255	1,593.471	127.129
1501-05	787.469	194.467	125.449	975.132	77.797
1506-10	756.231	177.960	114.801	1,028.189	82.030

Years: Quin-quenniums	Mean Value of of Total Excise Tax Farm Revenues in £ groot Flem	Value of Flemish Basket of Consumables in d groot Flem Mean: 126.295d	Flemish Price Index for the Basket Mean of 1451-75=100	Value of Total Excise Tax Farms in Flemish Baskets of Consumables	Index of Total Excise Tax Farms in Flemish Baskets of Consumables Mean of 1451-75=100
1511-15	790.518	213.773	137.904	908.914	72.514
1516-20	759.086	232.933	150.264	782.595	62.437
1521-25	688.131	278.933	179.938	599.318	47.814
1526-30	949.104	276.733	178.519	824.594	65.787
1531-35	814.355	269.720	173.995	730.432	58.275
1536-40	831.677	287.773	185.641	696.081	55.534
1541-45	1,004.910	322.960	208.340	748.274	59.698
1546-50	1,123.110	309.133	199.420	882.569	70.413

* Aalst town accounts registers are missing for these years.

Sources:

Algemeen Rijksarchief België (Archives Générales du Royaume), Rekenkamer/Chambre de Comptes, reg. nos. 31,412 - 31,532.

For the sources for the consumer baskets, see sources for Table 11.

Table 9: Revenues from the Sale of Excise Tax Farms at Aalst in £ groot Flemish and equivalent values of the number of days' wages for master masons, in quinquennial means, 1396-1400 to 1546-50

5- Year means	Total of Excise Tax Farm Revenues in £ groot Flemish	Value of Flemish Basket of Consumables in d groot Flemish	Flemish Price Index 126.295d Mean of 1451-75	Mean Daily Wage of Master Masons in d. groot Flemish	Value of Excise Farms in no. of days wages for master masons	Index: Value of Excise Tax Farms in no. days wages for masons	Income (210 days) for Master Masons In Baskets of Consumables: in harmonic means	Real Wage Index in Commodity Baskets Mean of 1451-75 = 100
1396-1400	396.178	115.304	91.298	7.200	13,205.926	65.715	12.749	100.762
1401-05	487.716	111.810	88.531	7.500	15,606.922	77.663	14.086	111.333
1406-10	479.401	132.939	105.261	7.500	15,340.844	76.339	11.848	93.638
1411-15	567.139	120.370	95.309	7.500	18,148.433	90.310	13.085	103.415
1416-20	534.940	135.616	107.381	7.700	16,673.442	82.970	11.880	93.891
1421-25	535.592	141.680	112.182	7.800	16,479.744	82.007	11.532	91.143
1426-30	555.714	148.741	117.773	7.900	16,882.447	84.010	11.159	88.198
1431-35	540.357	155.989	123.512	8.000	16,210.721	80.668	10.770	85.122
1436-40	507.036	177.022	140.166	7.900	15,403.618	76.651	9.404	74.323
1441-45	656.546	143.350	113.504	7.800	20,201.426	100.526	11.446	90.467
1446-50	625.077	138.904	109.984	7.700	19,482.926	96.951	11.540	91.204
1451-55	491.177	127.434	100.902	7.000	16,840.352	83.801	11.294	89.265
1456-60	580.045	148.845	117.855	7.900	17,621.620	87.689	11.123	87.914
1461-65	682.092	112.030	88.705	8.200	19,963.663	99.343	15.320	121.085
1466-70	703.321	121.900	96.520	7.800	21,640.641	107.688	13.432	106.163
1471-75	763.113	121.264	96.017	7.500	24,419.600	121.517	12.984	102.622
1476-80	750.107	148.034	117.213	8.000	22,503.206	111.980	11.349	89.696
1481-85	681.604	198.097	156.853	7.500	21,811.333	108.538	7.996	63.196
1486-90	642.008	188.911	149.580	10.000	15,408.200	76.674	9.012	71.225
1491-95*		183.104	144.981	10.000			11.469	90.646
1496-1500	844.156	126.617	100.255	9.400	21,552.912	107.252	15.519	122.657
1501-05	787.469	194.467	125.449	9.000	20,999.178	104.496	9.719	76.814

5- Year means	Total of Excise Tax Farm Revenues in £ groot Flemish	Value of Flemish Basket of Consumables in d groot Flemish	Flemish Price Index 126.295d Mean of 1451-75	Mean Daily Wage of Master Masons in d. groot Flemish	Value of Excise Farms in no. of days wages for master masons	Index: Value of Excise Tax Farms in no. days wages for masons	Income (210 days) for Master Masons In Baskets of Consumables: in harmonic means	Real Wage Index in Commodity Baskets Mean of 1451-75 = 100
1506-10	756.231	177.960	114.801	9.000	20,166.148	100.351	10.653	84.194
1511-15	790.518	213.773	137.904	8.900	21,317.346	106.079	8.748	69.144
1516-20	759.086	232.933	150.264	9.000	20,242.289	100.730	8.114	64.129
1521-25	688.131	278.933	179.938	9.000	18,350.156	91.314	6.776	53.553
1526-30	949.104	276.733	178.519	9.000	25,309.444	125.945	6.830	53.979
1531-35	814.355	269.720	173.995	8.200	23,834.780	118.607	6.390	50.507
1536-40	831.677	287.773	185.641	7.600	26,263.474	130.692	5.536	43.752
1541-45	1,004.910	322.960	208.340	8.200	29,412.012	146.360	5.337	42.181
1546-50	1,123.110	309.133	199.420	9.000	29,949.598	149.035	6.104	48.240

* Aalst town accounts registers are missing for these years.

Sources:

Algemeen Rijksarchief België (Archives Générales du Royaume), Rekenkamer/Chambre de Comptes, reg. nos. 31,412 - 31,532.

For the sources for the consumer baskets, see sources for Table 11.

Table 10 **Revenues from the Sale of Excise Tax Farms in £ groot Flemish and equivalent values of the number of days wages for master masons, in quinquennial means, 1396-1400 to 1546-50**

Years in 5 - year means	Total of Excise Tax Farm Revenues in £ groot Flemish	Flemish Price Index 126.295d Mean of 1451-75=100	Mean Daily Wage of Master Masons in d. groot Flemish	Value of Excise Farms in no. of days wages for master masons	Per Capita Tax Burden for Presumed Population of 3600 in days' wages	Tax Burden for Employed Adult Males [900] per person in days' wages
1396-1400	396.178	91.298	7.200	13,205.926	3.668	14.673
1401-05	487.716	88.531	7.500	15,606.922	4.335	17.341
1406-10	479.401	105.261	7.500	15,340.844	4.261	17.045
1411-15	567.139	95.309	7.500	18,148.433	5.041	20.165
1416-20	534.940	107.381	7.700	16,673.442	4.632	18.526
1421-25	535.592	112.182	7.800	16,479.744	4.578	18.311
1426-30	555.714	117.773	7.900	16,882.447	4.690	18.758
1431-35	540.357	123.512	8.000	16,210.721	4.503	18.012
1436-40	507.036	140.166	7.900	15,403.618	4.279	17.115
1441-45	656.546	113.504	7.800	20,201.426	5.612	22.446
1446-50	625.077	109.984	7.700	19,482.926	5.412	21.648
1451-55	491.177	100.902	7.000	16,840.352	4.678	18.712
1456-60	580.045	117.855	7.900	17,621.620	4.895	19.580
1461-65	682.092	88.705	8.200	19,963.663	5.545	22.182
1466-70	703.321	96.520	7.800	21,640.641	6.011	24.045
1471-75	763.113	96.017	7.500	24,419.600	6.783	27.133
1476-80	750.107	117.213	8.000	22,503.206	6.251	25.004
1481-85	681.604	156.853	7.500	21,811.333	6.059	24.235
1486-90	642.008	149.580	10.000	15,408.200	4.280	17.120
1491-95	n.a.	144.981	10.000			
1496-1500	844.156	100.255	9.400	21,552.912	5.987	23.948
1501-05	787.469	125.449	9.000	20,999.178	5.833	23.332
1506-10	756.231	114.801	9.000	20,166.148	5.602	22.407

Years in 5 - year means	Total of Excise Tax Farm Revenues in £ groot Flemish	Flemish Price Index 126.295d Mean of 1451-75=100	Mean Daily Wage of Master Masons in d. groot Flemish	Value of Excise Farms in no. of days wages for master masons	Per Capita Tax Burden for Presumed Population of 3600 in days' wages	Tax Burden for Employed Adult Males [900] per person in days' wages
1511-15	790.518	137.904	8.900	21,317.346	5.921	23.686
1516-20	759.086	150.264	9.000	20,242.289	5.623	22.491
1521-25	688.131	179.938	9.000	18,350.156	5.097	20.389
1526-30	949.104	178.519	9.000	25,309.444	7.030	28.122
1531-35	814.355	173.995	8.200	23,834.780	6.621	26.483
1536-40	831.677	185.641	7.600	26,263.474	7.295	29.182
1541-45	1,004.910	208.340	8.200	29,412.012	8.170	32.680
1546-50	1,123.110	199.420	9.000	29,949.598	8.319	33.277

* Aalst town accounts registers are missing for these years.

Sources:

Algemeen Rijksarchief België (Archives Générales du Royaume), Rekenkamer/Chambre de Comptes, reg. nos. 31,412 - 31,532.
For the sources for the consumer baskets, see sources for Table 11.

Table 11 **Population Decline and Poverty in the Duchy of Brabant, 1437 - 1496**
The number of family hearths (households) and percentage of hearths without taxable income: ('poor hearths') in 1437, 1480, and 1496

Area of Census in the duchy of Brabant	1437 no. of hearths	1437 per cent poor hearths	1480 no. of hearths	1480 per cent poor hearths	1496 no. of hearths	1496 per cent poor hearths	Percentage Change from 1437 to 1496
Brussels	6,376	10.5	7,414	7.9	5,750	17.1	-9.82%
Antwerp	3,440	13.5	5,450	10.5	6,586	12.5	91.45%
Leuven	3,579	7.6	3,933	18.3	3,069	n.a.	-14.25%
s'Hertogen-bosch	2,883	10.4	2,930	7.9	3,456	n.a.	19.88%
Sub-total Large Towns	16,278	10.5	19,727	14.8	18,861	n.a.	15.87%
Small Towns	14,159	9.2	12,216	28.1	10,600	n.a.	-25.14%
Villages	62,301	29.7	54,540	31.6	45,882	n.a.	-26.35%
Total Duchy	92,738	23.4	86,483	27.3	75,343	n.a.	-18.76%

Source:

Joseph Cuvlier, *Les dénombrements de foyers en Brabant, XIV - XVI siècle*, 2 vols. (Brussels, 1912-13), vol. I, pp. 432-3, 446-7, 462-77, 484-7; and also pp. cxxxv, clxxvii-viii, ccxxiii-xviii.

Table 12. **Basket of Consumables: Commodity Price Indexes for Brabant and Flanders**

mean of 1451-75 = 100

Commodity	**BRABANT**				
	Amount	**Unit**	**Value in d gr. Brabant**	**Value in d gr. Flemish**	**Percent**
Farinaceous					
Wheat Rye Barley Peas	126	litres	42.404	28.269	18.24%
Sub-total	126.000	litres	42.404	28.269	18.24%
Drink					
barley (or malt)	162.000	litres	39.712	26.475	17.08%
Total Farinaceous	288.000	litres	82.116	54.744	35.32%
Meat					
Pigs Sheep Beef	23.500	kg	54.704	36.469	23.53%
Sub-total			54.704	36.469	23.53%
Fish: Herrings	40.000	no.	9.988	6.659	4.30%
Sub-total			119.396	79.597	51.35%

Commodity	**BRABANT**				
	Amount	**Unit**	**Value in d gr. Brabant**	**Value in d gr. Flemish**	**Percent**
Dairy					
Butter	4.800	kg	19.728	13.152	8.48%
Cheese	4.700	kg	5.968	3.979	2.57%
Sub-total			25.696	17.131	11.05%
Food and Drink			172.504	115.003	74.19%
Industrial: Fuel					
Charcoal	162.000	litres	10.568	7.045	4.54%
Candles	1.333	kg	7.608	5.072	3.27%
Lamp Oil					
Sub-total			18.176	12.117	7.82%
Industrial: Textiles					
Canvas/Linen	1.800	metre	17.000	11.333	7.31%
Shirting					
Coarse Woollens	1.125	metre	24.844	16.563	10.68%
Sub-total			41.844	27.896	18.00%
TOTAL			**232.524**	**155.016**	**100.00%**

Table 12. Basket of Consumables Commodity Price Indexes for Brabant and Flanders

mean of values for 1451-75 = 100

Commodity	**FLANDERS**			
	Amount	**Unit**	**Value in in d groot Flemish**	**Percent of total**
Farinaceous				
Wheat	45.461	litres	13.279	10.51%
Rye	36.369	litres	7.062	5.59%
Barley	18.184	litres	2.867	2.27%
Peas	24.243	litres	7.341	5.81%
Sub-total	124.257	litres	30.549	24.19%
Drink				
barley (or malt)	163.659	litres	25.805	20.43%
Total Farinaceous	287.917	litres	56.354	44.62%
Meat				
Pigs				
Sheep				
Beef		kg		
Sub-total				
Fish: Herrings		no.		
Sub-total				

Table 12. Basket of Consumables Commodity Price Indexes for Brabant and Flanders

mean of values for 1451-75 = 100

Commodity	**FLANDERS**			
	Amount	**Unit**	**Value in in d groot Flemish**	**Percent of total**
Dairy				
Butter	13.610	kg	36.087	28.57%
Cheese	13.610	kg	8.578	6.79%
Sub-total	27.220		44.665	35.37%
Food and Drink			101.019	
Industrial: Fuel				
Charcoal		litres		
Candles		kg		
Lamp Oil				
Sub-total				
Industrial: Textiles				
Canvas/Linen		metre		
Shirting				
Coarse Woollens	1.225	metre	25.276	20.01%
Sub-total			25.276	20.01%
TOTAL			**126.295**	100.00%

Table 12. Basket of Consumables Commodity Price Indexes for Brabant and Flanders

mean of values for 1451-75 = 100

Commodity **FLANDERS**

Amount	Unit	Value in in d groot Flemish	Percent of total

bu = bushels; lb. = pound avoirdupois (453.592 g); pt = pint; yd = yard; l. = litre; m. = metre

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