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Coinage and Monetary Policies in Burgundian Flanders during the late-medieval 'Bullion Famines',. 1384 - 1482

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Abstract:

This paper seeks to answer two questions: were the coinage debasements in Burgundian Flanders (1384-1482) undertaken principally as monetary or fiscal policies; and were they beneficial or harmful? In a recent monograph, Sargent and Velde (*Big Problem of Small Change*: 2002) contend that monetary objectives governed almost all medieval, early-modern debasements, especially to remedy the chronic shortages of petty coins. Despite overwhelming evidence that Burgundian Flanders, along with most of north-west Europe in the later 14th and 15th centuries, experienced severe monetary scarcities and liquidity crises, especially in the periods ca. 1390 - ca. 1415 and ca. 1440 - ca. 1470, both periods of severe deflations, eras commonly known as 'bullion famines', there is no compelling evidence that the Burgundian rulers debased their coinages on the basis of any such monetary policies. My thesis is that the Burgundian rulers of Flanders, in competition with neighboring princes, undertook their debasements primarily as aggressive fiscal policies, specifically to finance warfare. Their goal was to increase their seigniorage revenues, the tax imposed on bullion brought to their mints, by two means: by increasing the tax rate itself, and by enticing an increased influx of bullion into their mints, both by the debasement techniques themselves and by auxiliary bullionist policies. Those policies were successful so long as three conditions were met: (1) that merchants supplying bullion received more coins of the same face value and thus with a greater aggregate money-of-account value than before (or than from other mints); (2) that the public accepted such debased coins at the same face value, by tale; and (3) that the merchants spent their increased supply of coins quickly, before any ensuing inflation eroded those gains. This study further demonstrates that the inflationary consequences of debasements were always less than those predicted by mathematical formulae – possibly because those debasements failed to counteract the prevailing forces of monetary contraction and deflation. Because so many princes pursued similar fiscal policies, many others engaged in debasement for purely defensive reasons: to protect their mints from foreign competition and to protect their domestic money supplies from influxes of debased and also counterfeit imitations: i.e., to counteract Gresham's Law. If many debasements were retaliatory measures against a neighbour's bullionist policies, those policies in general, and not just debasements, were also products of late-medieval warfare, which was also the primary culprit responsible for periodic monetary contractions: by impeding coinage circulations and bullion flows, and by provoking increased hoarding. The answer to the final question is that debasements were usually far more harmful than beneficial.

Note that this is an extensively revised and shortened version of an earlier working paper (no. 355), correcting some errors in that paper (concerning Spanish coinage): with the same tables, but with a new set of graphs,

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Introduction: coinage debasements in late-medieval Europe

Monetary policies dedicated to coinage debasements produced one of the most prominent, widespread, and arguably most harmful features of the later-medieval and early modern European economies. Though certainly many rulers in the ancient and early medieval worlds had also practised coinage debasements, King Philip IV of France (r. 1285-1313) was the first to undertake them this era, in 1295.[1] The subsequent Burgundian rulers of the French royal fief of Flanders (1384-1482) were among the most active and avid practitioners of this 'dark art.' Debasement was a policy that the eminent French philosopher, Nicolas Oresme, Bishop of Lisieux, chaplain, and counsellor of King Charles V (r. 1364-1380), had thoroughly condemned – unless undertaken with pubic approval – on the very eve of the Burgundian era, in his famous *Treatise on Coins (De origine, natura, jure et mutationibus monetarum*).[2] The first duke of Burgundy, Philip the Bold (r. 1384-1404), son of King John II of France, and younger brother of King Charles VI (r. 1380-1422), was certainly well aware of Oresme's strong views on debasements.

Nevertheless, the rationale, nature, forms, and consequences, economic and social, of medieval and early modern coinage debasements remain very contentious issues, in an ongoing vexatious debate. The central issues to be resolved are two-fold. First, were coinage debasement pursued principally as monetary policies or as fiscal policies? Second, whatever their rationale, were the consequences beneficial or harmful to the economies and societies of this era?

Recently, two very eminent economists, Thomas Sargent and François Velde, in a much praised monograph on *The Big Problem of Small Change* (2002), have set forth a compelling view, substantially

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[1] Borrelli de Serres, *Variations monétaires sous Philippe le Bel;* Girard, 'Guerre des monnaies', pp. 83-101; Graus, 'Crise monétaire', pp. 445-54; Grunzweig, 'Mutations monétaires', pp. 117-72; Cipolla, 'Currency Depreciation', pp. 413-33; Cazelles, 'Mutations monétaires', pp. 83-105, and 251-78.

[2] Johnson, *Nicholas Oresme.* The tract is also known as *De Moneta.* No original manuscript exists, and its exact date of composition remains unknown. See also, On Oresme, see also Spufford, *Money and Its Use*, pp. 295-304; and Bridrey, *Théorie de la monnaie*; and below, p. 14.

different from Oresme's hostile verdict.[3] They contend that most medieval and early modern coinage debasements were rational and public-spirited monetary policies undertaken to remedy periodic coin shortages, but especially the chronic, pervasive shortage of 'small change', or petty coins. Generally fractions of a penny, containing far more copper than silver (except in England), these were the coins that the poor, most of the peasantry and labouring classes, and indeed the substantial majority of the population required to purchase food, drink, and other basic necessities. Many other historians had set forth somewhat similar views contending that such debasements were a necessary remedy for the periodic deflationary 'bullion famines' that had afflicted so much of western Europe, especially north-western Europe, during the later fourteenth and through much of the fifteenth centuries.[4]

Medieval coinages, moneys of account, and debasements

Whatever the rationale for late-medieval coinage debasements, any answers to questions about their possible roles as monetary or fiscal policies must begin with an examination of the technology of minting and coinage alterations, which in turn requires a firm understanding of the relationship between coined money and moneys-of-account. The money-of-account system of Burgundian Flanders, the *pond groot* Flemish, and the prevailing systems used in medieval and early modern western Europe, were all based on one devised by Charlemagne's government, ca. 790-802: in which one pound weight of fine silver was then valued at one *libra* or pound of money of account, consisting of 20 shillings, each of which contained 12 pence (d), so that one pound = 240d.[5] One pence (d) in money-of-account was always equal or tied to the currently circulating

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[3] Sargent and Velde, *Big Problem of Small Change*.

[4] For this debate, see Munro, *Bullion Flows;* Munro, 'Wage-Stickiness', pp. 185 - 297; Miskimin, *Early Renaissance Europe,* pp. 25-32, 132-50*;* Miskimin, 'Money and Money Movements', pp. 79-96; Day, *The Medieval Market Economy;* Spufford, *Money and Its Use*, pp. 339-62; and sources cited in n.1.

[5] Until 1172, when Genoa struck for the first *grossi*, the largest coin denomination struck in western Europe was, in fact, the silver penny. The weight of the Carolinian pound was 489.6 grams: according to Fournial, *Histoire monétaire*, pp. 24-27, whose arguments justifying this weight are quite complex. But this weight has been challenged by other numismatists (by even more complex arguments), who variously offer alternative weights: 408.0 g., 411.36, 459.36, and 483.33. The last is based on the supposition that the Roman pound in fact weighed 322.2 , and that the Carolingian pound was 1.5 times heavier. For the other weights,

silver penny, whatever its current fineness and weight.

In the simplest terms, a *physical* debasement means the reduction of the quantity of precious metal – silver or gold – contained in the currently circulating coins, of a given face value, and thus also in the related unit of money-of-account: e.g., the penny, the shilling, and the pound. Such physical reductions in the precious metal of the coin itself took place by either a reduction in the weight of the coin itself; or by a diminution in its precious metal fineness: i.e., by adding proportionately more base metal — usually copper; or, most commonly, by both methods combined.[6] The consequence was to increase the number of coins with a given face value – e.g., the penny, or the shilling – minted from a pound or *marc* weight (244.753 g) of commercially fine silver.[7] That meant as well a corresponding increase in the nominal money-of-account value of that pound or *marc* of silver, known as the *traite*, as may be seen in Tables 1A and 1B, below.

Another form of coinage debasement, which normally applied only to gold coins and to more full-bodied, high-valued silver coins, was to increase their official exchange rates, or nominal money-of-account values. It must be clearly understood that gold values, and thus exchange rates, were always expressed in

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see Blockmans, 'Le poids des deniers carolingiens', pp. 179-81. None of these critics, however, explains the origin or evolution of the Parisian pound of 489.506 grams; nor explain why its weight, readily verifiable from the surviving official metallic weights, was virtually identical to that ascribed to the Carolingian pound by Fournial.

[6] In France and the Low Countries, the fineness of silver coins was reckoned, in terms of commercially fine silver, known as *argent le roy*, which was 23/24 or 95.833% pure, with 4.167% copper alloy. *Argent-le-roy* was reckoned in terms of 12 deniers, each of which contained 24 grains; and thus 288 grains in total. The fineness of gold coins was reckoned everywhere in terms of carats: so that fine gold coins had 24 carats (which, however, were probably 23.875 carats = 99.479% pure gold, with 0.53% copper: the actual fineness of Florentine florins, Venetian ducats, and English nobles). Gold coins were commonly alloyed with both silver and copper. Thus the Burgundian gold florin, from 1466, contained 19 carats of gold, 4 carats of silver, and only 1 carat of copper.

[7] The mint-weight used in France and the Low Countries was the *marc de Troyes* = one half of the French pound or *livre de Paris* = 244.7529 grams (see n. 5 above). The *marc* contained 8 *onces*, each of which contained 24 *deniers*, each of which in turn contained 24 grains, for a total of 4608 grains to the *marc*. The medieval English mint weight was the Tower Pound, with 12 ounces: each containing 20 *dwt* (penny-weight), each of which contains 32 grains, for a total of 7680 grains = 5400 Troy grains = 11.25 Troy ounces = 349.9144 grams. In 1525, it was superseded by the Troy pound, also of 12 ounces, with 20 dwt to the ounce and 24 grains to the dwt, for a total of 5760 grains = 373.242 grams. See Munro, 'Medieval Monetary Metrology', pp. 173-99; and Munro, 'Age of Erasmus', pp. 311-48.

terms of the principality's silver-based money-of -account. Such increases in official coinage values were necessary to maintain the former value relationships of these high-valued coins, if they were not similarly debased in fineness and/or weight, with the debased silver penny and other fractional coins.

That can be best understood by relating the market values of gold and silver coins, when, in this era, the normal ratio of values was about 11:1 or 12:1. A debasement of just one of the two coinages – say, the silver coinage – would have altered the bimetallic mint ratio to favour silver and thus to 'disfavour' gold, simply because that debasement would have increased the relative money-of-account value of the new silver coins. To some extent a small change in the bimetallic ratio may have been undertaken indeed to favour one of the two metals, and thus to encourage a greater influx of that metal into the prince's mint. But too drastic an alteration of the mint-ratio in favour of one metal (e.g., silver) would have led to the outflow of the other metal (gold). To prevent that exodus, the prince had to raise the official exchange rate or money-of-account value of the gold coins, or to debase the gold coins as well, by the physical means just discussed.[8]

The reasons why monetary transactions were almost invariably conducted in coin, even debased coin, rather than in bullion (or ingots), is fundamental to comprehending the nature and rational for debasements in medieval and early modern Europe. First, it was almost everywhere illegal to trade, or to make transactions, in bullion. For the law in most medieval principalities stipulated that all precious metals deemed to be bullion (*billon*) – excluding metals for licenced goldsmiths – had to be surrendered to the prince's mint for coinage.[9] But second, even if it had been legal to make transactions in bullion, doing so would not have been economically feasible, in terms of the required transaction costs: i.e., the cost of weighing the bullion,

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[8] The same set of changes were also required for full-bodied, high-value silver coins, if they were left unchanged during a debasement of lower-value coins. See Table 1B.

[9] The modern English term *billon* is commonly defined as a base or petty coin, one in which silver constitutes less than half of the metallic content, and thus copper (base metal) accounts for over half. The medieval term – *billon, billoen, billio* – meant instead bullion: any precious metal, including demonetized coinage, domestic and foreign, that was legally required to be surrendered to the prince's mint for coinage. It excluded precious metals in jewellery, plate, *objets d'art*, dress, and raw materials legitimately acquired by jewellers and goldsmiths, etc., for their crafts. See Munro, 'Billon', pp. 293-305.

and assaying it for fineness, and determining its market or exchange value. Gold and silver coins were generally worth more than their intrinsic bullion costs simply because they were a fully recognized legal tender – with the ruler's stamp of authorization or approval.

Official, legal tender coins were thus a *cost-saving* medium of exchange. That savings on transaction costs constituted an *agio* or premium that legal tender coins thereby commanded over their intrinsic bullion values. Merchants paid for that premium in their mintage fees, which were deducted from the total value of the coins produced from their bullion.[10] So long as this *agio* that coins thereby commanded over bullion was at least equal to the sum of the mintage fees, merchants would have continued to deliver bullion to the mints. Conversely, whenever domestic coins lost that *agio,* merchants would no longer have delivered bullion to the prince's mint, and would most likely have either hoarded or exported that bullion to some foreign mint.[11] Usually those precious metals so exported were sold to some foreign prince's mint as bullion and converted into his debased coins, provided that the aggregate value of those coins, so converted from the bullion, commanded a higher purchasing power there, than in the country from which the original coins (or bullion) had been exported.

The objectives of any coinage debasement – whether undertaken by fineness, weight, or value, or some combination thereof – were two-fold. The first was to increase the number of coins, of any given coin denomination, struck from a pound weight or *marc* of fine metal delivered to the mint, and thus to increase the aggregate money-of-account value of the total coinage struck from bullion so delivered (the *traite* value). Such increases in both the number and the money-of-account values of coins so struck can also be seen in Tables 1A and 1B. The second objective was to induce a much greater influx of precious metals into the prince's mint, from both domestic and foreign bullion, including demonetized coins (collectively known

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[10] For the economics of these mintage fees – brassage and seigniorage – see below, pp. 23-25.

[11] For reasons why coins would lose that *agio*, see below, pp. 12-13.

as *billon*).[12]

Burgundian coinage debasements as monetary policies: the debate about the late-medieval 'bullion famines', deflation, and their resolution

This analysis of the mechanics and economics of medieval coinage debasements certainly seems to provide good *prima facie* grounds for contending that they were indeed undertaken as monetary policies specifically to remedy period coinage scarcities, during the well known 'bullion famines' of late-medieval western Europe. Earlier in my academic career, I had cavalierly dismissed any notions of so-called 'bullion famines' or any general problems of monetary scarcities, contending that inadequate supplies of bullion delivered to a prince's mint constituted a situation very different from any general scarcity of coinage in any regional economy, and had to be explained by deficient mint policies.[13]

Since then, however, my subsequent research convinced me that much of western Europe, and most especially the Low Countries and England, had indeed experienced severe monetary scarcities, if not precisely full-fledged 'bullion famines', with attendant problems of severe deflation, especially in two periods: from ca. 1375 to ca. 1415; and from ca. 1440 to ca. 1470.[14] Furthermore, my research on Burgundian monetary history had also convinced me that there were indeed very good *prima facie* grounds for contending that the late-medieval Low Countries had experienced a chronic shortage of petty coins: for the Burgundian mint accounts show that rarely was more than one per cent of the bullion received minted into these petty coins, known as *monnaies noires*, because they were largely copper.[15]

The evidence for and reflection of such monetary scarcities can be found in the drastic declines in

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[12] See n. 9 above.

[13] For such views, which I no longer endorse, see Munro, *Wool, Cloth and Gold.*

[14] Munro, 'Mint Policies', pp. 71-116; Munro, 'Bullion Flows', pp. 97-158; Munro, 'Mint Outputs', pp. 31-122; Munro, 'Monnayage', pp. 263-94; Munro, 'Petty Coinage', pp. 387-423; Munro, *Bullion Flows*; Munro, 'Wage-Stickiness', pp. 185 - 297; Munro, 'Monetary Origins.' pp. 1-34; Munro, 'Black Death, ' pp. 335-364.

[15] Munro, 'Petty Coinage', pp. 387-423: in particular Table 3, p. 396.

mint outputs – often verging on a complete cessation of new coinages – and of deflations that were clearly products of those coinage scarcities in north-western Europe. Several of my publications since then have been devoted to this theme, in particular to demonstrate the seriously negative economic consequences of deflation: i.e., of a serious, continuous, sustained fall in the price level. I also contended that the late-medieval 'bullion-famine' era had come to an end in the 1470s, after low commodity prices (i.e., deflation) had provided the economic motivation or profit incentive – by increasing the purchasing power of silver – for the two technological innovations that resolved this monetary problem. Those innovations, in both civil engineering (water-pumps) and chemical engineering (the *Seigerhütten* process), made possible the South German silver-copper mining boom, which in turn quintupled Europe's supply of mined silver, from the 1460s to the 1540s (though much was exported).[16] From the 1540s, Europe began receiving even larger influxes of silver, from the new Spanish American colonies.[17]

Coinage debasements had certainly never played any effective role in combatting late-medieval monetary scarcities and deflation; nor had any reputed advances in late-medieval banking and finance.[18] Nor have I ever been able to find any evidence, in the vast documentation now available for Burgundian Flanders, that its rulers had ever undertaken coinage debasements as monetary policies specifically to pursue any such reflationary objectives, with one minor, indeed trivial exception.

On 31 August 1457, during the worst phase of the mid-century bullion 'famine', the Burgundian monetary authorities instructed the Bruges mint-master to strike a greater number of *monnaies noires* called *courtes* or double-mites (= 1/12th of a penny *groot*) from the alloyed marc: 240 per marc instead of the previously stipulated number (or *taille*), 216. The results were not impressive: in the quinquennium 1456-60, only 51.302 kg of fine silver were minted – compared to 112 times as much in 1426-30: 5,724.645 kg. On

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[16] Munro, 'Central European Mining Boom', pp. 119 - 83; Munro, 'Monetary Origins', pp. 1-34.

[17] Munro','Profit Inflation', pp. 13-71; Hamilton, *Price Revolution.*

[18] See Munro, 'Bullionism and the Bill of Exchange', pp. 169-239; Munro, 'Patterns of Trade', pp. 147-95; Munro, 'Financial Innovations', pp. 105-67; Munro, 'Wage-Stickiness', pp. 185 - 297.

the other hand, 11.4 per cent of the fine silver struck the Flemish mints in the later 1450s (none from Oct 1458 to June 1466) was coined into *mites* – and that percentage may be compared to a typical percentage, as previously noted, of about one per cent, during the rest of the Burgundian era.[19]

Late-medieval 'bullionism' and defensive motives for coinage debasements

Although late-medieval mint and monetary policies in north-western Europe were otherwise unrelated to current problems of monetary scarcities and deflation, they must be understood in the context of this era's bullionist philosophies. The term 'bullionism' – providing the medieval roots of early-modern Mercantilism – refers to all those government policies and measures designed to increase the influx of precious metals into the ruler's lands, and more specifically, into his mints, and also related policies designed to prevent the export of precious metals, except legal-tender coins.[20] Late-medieval bullionist policies may be attributed not just to the princes' mint-profit motives, but also to the strong, almost universal conviction that the wealth, prosperity, and power of a realm fundamentally depended upon its stock of precious metals. Those bullionist policies obviously also became an integral feature of medieval mint policies: especially those designed both to protect the realm against foreign debasements and to permit the prince to engage in defensive coinage debasements. Thus, if the monetary policies practised by so many late-medieval princes may be viewed as aggressive, their victims would have been not only their own subjects but also those in neighbouring principalities. As in any form of warfare, victims of these late-medieval *guerres monétaires* would have instinctively sought to defend themselves; and if the best defence is offence, then many princes

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[19] These *courtes* had a fineness of 12 grains silver = 4.17% *argent le roy*. See Deschamps de Pas, 'Histoire monétaire des comtes de Flandre', pp. 123-24; and Munro, 'Petty Coinage', pp. 387-423: in particular Table 3, p. 396. This exception is nowhere mentioned in Sargent and Velde, *Big Problem of Small Change*.

[20] See Munro, *Wool, Cloth and Gold*, pp. 11-41; Munro, 'Bullionism and the Bill of Exchange', pp. 169-239; Munro, 'Bullion Flows and Monetary Contraction', pp. 97-158. Medieval and early-modern England was an exception. From 1364 to 1663, Parliament banned the export of all English legal tender coins. Statute 38 Edwardi III stat 1 c. 2 (Jan. 1364), in *Statutes of the Realm*, vol. I, p. 383, and Rymer, *Foedera,* vol. III.ii, p. 728; Statute 15 Carolus II c. 7 (May 1663), in *Statutes of the Realm,* vol. V, p. 452, sec. 9. See also Munro, 'Bullionism and the Bill of Exchange', pp. 187-205, 216-39.

did so by engaging in retaliatory debasements and related bullionist measures.

In pursuing debasements and related bullionist policies, the Burgundian dukes, along with most medieval princes, banned not only the export of precious metals but also the importation of foreign coins, especially silver coins. Such foreign coins, so demonetized (denied the status of legal tender), were declared or deemed to be bullion (*billon*) and thus had to be surrendered as such to the prince's mints.[21] What these rulers clearly perceived, correctly, was the operation of what is called Gresham's Law: in essence, that cheap money – i.e., debased or counterfeit and thus bad money – drives out dearer coins: i.e., better-quality, higher-silver or higher-gold content coins.[22]

Though without specific references to Gresham's Law, Peter Spufford has contended that periodic coinage debasements, instead of alleviating coin scarcities, acted only to exacerbate hoarding, with attendant negative consequences for the European medieval economy.[23] Gresham's Law assumes that the good coin that is driven out by the influx of foreign debased coins or by the circulation of domestic debased coins is either buried, converted into plate, or exported.[24] Indeed, with continuous competitive medieval debasements, much coin and bullion were exported to gain a higher value from foreign mints engaged in aggressive debasements. One can also readily appreciate that virtually all late-medieval bullionist policies must be blamed, along with warfare, and its consequences, for seriously impeding and diminishing the circulation of precious metals in the European economy. As I have contended elsewhere, late-medieval monetary contractions, or the periodic 'bullion famines' were more the consequence of reduced monetary flows than

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[21] See n. 9, above.

[22] See Munro, 'Gresham's Law', pp. 480-81; Munro, *Wool, Cloth and Gold*, pp. 11-41; and nn. 63, 70 below. This law is attributed to Sir Thomas Gresham (1519-1579), a merchant-banker and royal agent in Antwerp, and financial advisor to Queen Elizabeth I; he was also the founder of the Royal Exchange, in London (1565; on 23 January 1571, Elizabeth bestowed its royal title). But he did not formulate the law as such, and it was well known centuries before.

[23] Spufford, *Money and Its Use*, p. 347: 'Fear of debasements, and the instability of money, made men happier to keep their silver in the form of plate, in addition to the desire for ostentation.'

[24] See n. 22, above.

of reduced monetary stocks – including supposed outflows of bullion in trade with the East.[25]

Clearly, therefore, a very common motive for late-medieval debasements was purely defensive: to protect a prince's realm, and his own mints, obviously, from the economic as well as purely monetary damages inflicted by an influx of foreign debased coins. That was all the more serious a problem when those foreign influxes contained fraudulent or counterfeit imitation of that prince's own coins, and thus containing of course a smaller precious metal content. An allied problem was the circulation of coins, domestic and foreign, that had been fraudulently clipped or otherwise denuded of their precious metal contents.

The same consequences, however, could also have been honestly produced by simple wear and tear of the coins over time, since both silver and gold were very soft metals, even when alloyed with copper (as a necessary hardening agent). [26] When such clipping, wear and tear, or other diminutions in the precious-metal contents of so many coins in current circulation had led to the market's elimination of the *agio* or premium that coins commanded over bullion, then, as noted earlier, bullion ceased to flow to the prince's mints.[27] That would have forced the prince to engage in a debasement that reduced the silver contents of the penny and related coins to the level of the silver found in the currently circulating coinage. Such a debasement would have restored the *agio* of coinage over bullion, and thereby would also have renewed an influx of bullion into the prince's mints. [28]

Burgundian coinage debasements: aggressive motives for fiscal policies to finance warfare.

Almost all late-medieval mint ordinances – certainly those in France and the Low Countries – include virtual renditions of Gresham Law, and citations of these very adverse circumstances, in order to justify the

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[25] See Munro, *Bullion Flows*; Munro, 'Patterns of Trade', pp. 147-95; Munro, 'Wage-Stickiness', pp. 185 - 297.

[26] See Patterson, 'Silver Stocks', pp. 205-35; Mayhew, 'Numismatic Evidence', pp. 1-15; Feavearyear, *Pound Sterling*, pp. 1-45. He argues that most English debasements, before those of Henry VIII, were undertaken for such defensive reasons; but medieval England was a monetary anomaly.

[27] For the concept of coinage *agio*, or its premium in value over bullion, see above, pp. 8, 12.

[28] On this, see Feavearyear, *Pound Sterling,* pp. 1-45.

prince's coinage debasements.[29] Obviously it was always better to appear to be the victim than the victimizer. Only in England, however, and there, only in 1351 and 1411, can coinage debasements be judged to have been purely defensive; the next one (also fifty years later), Edward IV's debasement of 1464, was only partly defensive and certainly much more so aggressive.[30] Virtually all debasements in late-medieval France and the Low Countries – where the evidence can be weighed carefully – even when retaliatory in nature, were essentially aggressive in nature.

In brief, the fundamental aggressive motive to explain so many late-medieval coinage debasements was a lust for mint profits. That concept may be difficult to understand in today's world; but, in medieval and early-modern Europe, mints were indeed operated with a goal of producing profits. Even so, in today's world, the term *seigniorage* is still used for the same purpose: to indicate a source of government revenue from printing money.[31] In medieval and early-modern Europe, those profits came from the revenues that almost (if not all) governments of this era earned by virtue – so to speak – of their rigid monopoly on coinage in their own principalities.

If, however, the primary motive for most aggressive debasements was such profit-seeking, we may ask what lay behind that princely demand for seigniorage revenues? In my view, the rationale for such debasements, and from the prince's point of view, the real justification, was the need for readily available and elastic revenues to finance both warfare and defence. One must understand that medieval princes were rarely able to increase their feudal taxes in the short run; and that securing additional incomes from taxes, *aides*, loans, or grants from town assemblies, estates, or other legislative assemblies was difficult and usually

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[29] See Munro, *Wool, Cloth and Gold*, pp. 28, 33, 35 n. 24, 40, 44 n.6, 49, 58 n. 54, 60, 74 n. 33, 87 n. 58, 101 n. 20, 150 n. 76, 161 n. 19, 169.

[30] Feavearyear, *Pound Sterling*, pp. 15-45; Munro, *Wool, Cloth and Gold*, chapters 1-6.

[31] From *Investopedia,* via Answers.com: 'Seigniorage may be counted as revenue for a government when the money that is created is worth more than it costs to produce it. This revenue is often used by governments to finance a portion of their expenditures without having to collect taxes. If, for example, it costs the U.S. government $0.05 to produce a $1 bill, the seigniorage is $0.95, or the difference between the two amounts.'

involved unwelcome concessions.

The mint and the coinage, however, were the prince's exclusive prerogative, though even that prerogative was sometimes challenged.[32] Often late-medieval mints did produce very large seigniorage revenues, as Hans Van Werveke has demonstrated, for example, for the reign of Flanders' Count Louis de Male (r. 1346-84).[33] Few would doubt that such fiscal motives had a strong priority in the coinage debasements of Philip IV and all of his royal successors in fourteenth- and fifteenth-century France. Certainly the aforementioned French philosopher and royal advisor Nicholas Oresme had no such doubts, in stating in his treatise *De Moneta*, ca. 1355, that:[34]

> I am of the opinion that the main and final cause why the prince pretends to the power of altering the coinage is the profit or gain that he can get from it; [for] it would otherwise be vain to make so many and so great changes.

The mechanics and economics of profit-seeking coinage debasements

Both the mechanics and economics of debasement as a fiscal policy to earn seigniorage revenues can be seen clearly in Table 5. It compares the coinage of the Flemish double *groot* coin, as struck from June 1418 to October 1428, with the new, debased coinage of November 1428. The official exchange value of this coin remained 2d *groot*, but its pure silver content had been reduced from 1.725 grams to 1.522 grams, for a loss of 0.203 g. or 11.768 per cent of its former (1418) fine silver contents. That diminution in silver contents had been achieved by reducing both the fineness and the weight of the double *groot*: the former,

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[32] In England, after Edward III's very minor, defensive debasement in 1351, the 1352 Parliament, by its Statute of Purveyors, decreed that the coinage 'shall never be worsened, neither in weight nor in fineness (*aloi*)', without its consent. The crown did observe that parliamentary statute for over a century – until Edward IV's debasement of 1464. *Statutes of the Realm*, vol. I, p. 322: Stat. 25 Edwardi III, stat. 5, c. 13. See Munro, *Wool, Cloth, and Gold*, pp. 35, 159-63 See below for Flanders, in 1418 and 1433, on pp. 28-29; and Spufford, 'Coinage, Taxation, and the Estates General', pp. 63-88; Spufford, *Monetary Problems and Policies,* pp. 1-46.

[33] Hans Van Werveke, 'Economische en sociale gevolgen', pp. 1 - 15;Van Werveke, ''Currency Manipulation', pp. 115-127.

[34] Johnson, *Nicholas Oresme*, p. 24: 'Videtur michi quod principalis et finalis causa propter quam princeps sibi vult assumere potestatem mutandi monetas, est emolumentum vel lucrum quod inde potest habere; aliter enim frustra faceret tot mutanciones et tantas.'

from 47.92 per cent purity (6 deniers *argent le roy*) to 42.59 per cent purity (5 deniers 8 grains); the latter, from a weight of 1.800 grams (68 cut to the *marc de Troyes*) to 1.588 gr (68.5 to the *marc).* The number of double *groot* coins cut from a *marc de Troyes* of commercially fine silver (*argent-le-roy*) rose from 136 double *groot* coins to 154.125 coins; and thus the change in *traite* or money-of-account value of that *marc* rose from 22s 8d (i.e., 136 *x* 2d) to 25s 8d 6 mites. The reduction in the coin's silver content, by 11.77 per cent, resulted in a 13.33 per cent increase in the value of the *traite per marc de Troyes* of commercially fine silver.[35] The results can be seen in Table 6.

The merchants' gains from late-medieval coinage debasements

For any debasement to succeed, and to induce a much larger influx of bullion into the prince's mints, the mint had to offer merchants who delivered bullion a real gain, or a better price than that offered by any competing mints, for their bullion (including previous and demonetized domestic coin issues). The merchants' actual gains depended on the fulfillment of three conditions. The first was that the merchants had to receive a greater number of coins, with the same face value, than they had previously received, and a higher value, in terms of goods and gold, than they would have received from any other mint. The second was that the public, including other merchants, had to accept the newly debased coins at the same nominal or face value, by *tale* (discussed below). The third condition was that these new coins had to retain their purchasing power, at least in terms of good and services within the domestic economy, within the 'short run' – in time for the merchants to spend their new coins.

In Table 5, compare the number and the money-of-account values of the double *groot* coins that

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[35] For definitions of the monetary terms, see nn. 5-6, above. Note that the number of double *groot* coins struck from that *marc* in November 1428, namely 154.125, is 13.33 per cent greater than the 136 double *groot* coins struck from the same marc from June 1418 to October 1428: i.e., a difference of 18.125 double *groot coins* = 36.25d or 3s 0d 6 mites. Note also that this difference in the total number of coins struck from the fine silver *marc* exactly equals the difference between the two *traite* values for the *marc*: 25s 8d 6 mites by the November 1428 mint indenture, compared to a sum of 22s 8d, for the previous coinage, of June 1418. This relationship between debasement and the increase in *traite* values is in accordance with the ΔT (traite) = $[1/(1 - x)] - 1$, relating changes involving reciprocals. Its importance is discussed below, on pp. 19-20.

merchants received for their bullion in June 1418 with those received after the debasement of November 1428. We thus find that merchants received, per *marc* of commercially fine silver, the following: in June 1418, 127 double *groot* coins worth 21s 2d *groot* (93.38 per cent of the bullion delivered); and in November 1428, 144 double *groot* coins, now worth 24s 0d *groot* (93.43 per cent of the bullion delivered). Their purely *nominal* gain of the extra 17 coins or (34d: or 2s 10d *groot)* was 13.38 per cent. Thus the mint ordinance fulfilled the first of our conditions.

The second condition is the most complex of the three: why would the public have accepted these newly debased coins at face value, when they contained less fine silver than before? This is a very important question because several economists have recently put forward two contrary propositions, to prove, in effect, that medieval debasements could not have worked – despite the evidence that debasements were so commonly practised, and for several centuries. The critics's first argument is that the general populace would not have accepted such newly debased coins at face value, but only at a proportionally lesser or discounted value: i.e., discounted from the amount of silver contained in the immediately preceding coin issue. Such discounting would have thus denied those merchants who converted bullion into debased coins any real gains. In effect, these critics are contending that Gresham's Law did not apply to medieval coinages, and it is therefore a modern fallacy.[36] In part that view can be rejected on the various grounds cited earlier to explain why domestic commerce was always transacted in legal tender coins rather than in bullion.[37]

Medieval hammered coinages: problems of detecting changes in weight and fineness

But an even more compelling argument to explain the general acceptance of even debased legal

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[36] See Rolnick and Weber, 'Gresham's Law', pp. 185-99; and Rolnick, Velde, and Weber, 'The Debasement Puzzle', pp. 789-808; and Sargent and Smith, 'Coinage Debasements and Gresham's Laws', pp. 197 - 226; and Velde, Weber, and Wright, ' Model of Commodity Money', pp. 291-333. A much more nuanced, highly modified view appears in Sargent and Velde, 'Big Problem of Small Change', pp. 137-61; and especially in the more recent Sargent and Velde, *Big Problem of Small Change* (2002). See an attack on their earlier views in Selgin, 'Salvaging Gresham's Law', pp. 637-49. For even earlier views, influencing Rolnick and Weber, see Miskimin, 'Enforcement of Gresham's Law', pp. 147-61; and Miskimin, 'Legal Tender', pp. 697-705. For my own views, see Munro, 'Gresham's Law', pp. 480-81.

[37] See above, pp. 8-9.

tender coins, at face value, can be found in the technology of medieval mints: for what is known as 'hammered' coinages In striking silver coins, from thin alloyed sheets of metal, with the required proportions of silver and copper, the mint-master's employees first cut out circular disks, known as blanks. The mint-master himself (or his trained deputy) then placed each of these blanks on the anvil-like lower coin dye. He then used a hammer to strike the upper coin-dye placed above the blank, thereby implanting the obverse and reverse stamps, with appropriate symbols or emblems of the prince, on each side of the coin. The employees then used shears to trim the disks, which had been flattened and extended by this hammering, into approximately round disks. As a consequence, coins so struck were never exactly the same in size, shape, and weight. Indeed coin weights were never specified by any measure other than the *taille*: i.e., the number cut from the alloyed *marc*, with a tolerance or *remède* of the number of coins (plus or minus), permitted to be struck from each *marc.*

Thus most individuals handling separate and individual coins were never able to tell whether not any differences between the weights of coins of a given denomination were purely the accidental results of these techniques or the result of fraud, including counterfeiting. Note, from a comparison of the two mint indentures, that the very minute changes in weight would have been very difficult to detect, even for those very few money specialists, usually just money-changers and bankers, who were equipped with accurate scales. They in turn might have required sets of perhaps fifty or one hundred coins to detect differences on these scales. Needless to say, most retail merchants, let alone individual customers, would not have been so equipped to undertake such tests.

Detecting changes in the coin's fineness was even more difficult, especially when the changes were as small as those indicated in Table 5, for the November 1428 Flemish debasement. Again, only money-changers and bankers would likely have been equipped with the required device for such testing, known as touchstones: instruments on which coins were rubbed to produce colour comparisons, as a gauge of the fineness, or the mixture of silver and copper alloy. Under the best of circumstances, they were very crude

measuring devices that were rarely accurate within five or even ten per cent. [38] The only certain way to have detected and measure changes in silver contents after a debasement was by melting the coins, in order to separate the silver from the copper. No merchant, of course, could have afforded to take such drastic measures, though mint officials sometimes did so. Even differences in the stamp on the obverse and reverse sides, if observed, would not have been an indication of the actual changes in value, since such changes took place with changes in princes and mint-masters, without debasements.

Indeed, contrary to some erroneous views in the economic history literature, most people – whether merchants, tradesmen, artisans, labourers, peasants, etc. – usually always accepted coins by *tale* – i.e., by number, at face-value, without ever weighing, assaying, or otherwise testing them. [39] Indeed, as contended earlier, coins, with the prince's official stamp, certifying its value, circulated with a premium value or *agio* over the comparable value of the bullion contents precisely because their ability to do so provided significant savings on transactions costs, vital for all trades. To be sure, in foreign trade transactions, some wealthy merchants – Italian or Hanseatic in particular – might have tested gold coins in large-value transactions, because the relative savings on transaction costs were lower and the costs of fraud were higher. But very few, if any, would have done so for low value silver coins circulating in domestic trade.

Even if some persons had done so, and discovered deficiencies in the silver content, how and when would they have discounted the value of, say, a penny coin? Consider the fact that, in 1300, the Flemish silver penny *groot*, then 11 *deniers* 12 grains *argent-le-roy* (95.667 per cent commercially fine), contained 3.794 grams pure silver; but in 1384, when the Burgundian era commenced, it was 6 *deniers argent-le-roy* (50.00 per cent fine = 47.917 per cent pure), with only 1.173 grams pure silver (Table 1A). Over those years,

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[38] Grierson, *Numismatics*, pp. 100-11, 150-5; Grierson, 'Medieval Numismatics', pp. 124-34; Grierson, 'Coin Wear and the Frequency Table', pp. i-xvi; Grierson, 'Weight and Coinage', pp. iii-xvii; Girard, 'Guerre des monnaies', pp. 83-101; Fournial, *Histoire monétaire*, pp. 9-38.

[39] See pp. 8-9 above. But subsequently, Sargent and Velde, *Big Problem of Small Change*, did conclude that commercial transactions using coin were generally conducted by tale, rather than by weight: pp. 16-19, 22, 75.

would its value have been discounted to just one-third of a penny *groot* (by relative silver values: actually 30.91 per cent)? Of course not: the 1384 *groot* still circulated at the same nominal value of 1d, just as it had done in 1300. [40] Nevertheless, if confidence in the coinage in general did wane, especially with increased supplies of counterfeit coins, merchants and tradesmen would have finally resorted to discounting the entire coinage: by raising their prices, and thus eliminating, as suggested earlier, the *agio* on coinage. Since the prince's mints would no longer have received much bullion, that situation might then have induced yet another round of debasements.

Did inflation eliminate the potential gains from debasements?

The second and seemingly compelling objection or counter-argument from the critics is that the consequent and quickly ensuing inflation would have eliminated any possible gains from the debasement. Let us first consider the statistical evidence on coinage debasements, mint outputs, and prices trends in Burgundian Flanders, presented in Tables 1 - 4, and Figures 1 - 5. That evidence provides convincing proof that these periodic coinage debasements did indeed increase the Flemish coined money supply, and also that such increases did lead to some periodic inflations. The silver content of the Flemish penny *groot* fell from 1.173 grams in 1384 to one of just 0.522 grams in 1482: a loss of 0.651 grams = 55.49 per cent of its 1384 contents. During this same era, the Flemish Consumer Price Index (base 1451-75 = 100) rose from 122.185 to 193.932: i.e. an increase of 71.747 = 58.72 per cent.[41] Those statistics seem comparable.

But these statistics are misleading in several ways. In the first place, a comparison of diminutions in metal contents with rises in prices, in this fashion, is statistically false, since we are dealing with reciprocals. The following is the formula needed to compare the consequence of a reduction of the coin's

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[40] If the debasement reduced the silver contents by exactly ten per cent, then by the formula given in note 34 for changes in the *traite* values -- ΔT (traite) = $[1/(1 - x)] - 1 -$ the requisite 'discount', by this approach, would have been 11.11%. How would such a discount have been achieved?

[41] For the construction of the Flemish Consumer Price Index, see Munro, 'Wage-Stickiness', Table 1, p. 231; and Munro, 'Builders' Wages', pp. 1018-28, and Table 1, pp. 1048-49. See also Tables 1 and 3, in the Appendix.

silver contents with the expected rise in the money-of-account value of a *marc* weight of commercially fine silver (244.753 g): i.e., its *traite* value.[42]

$$\Delta T \text{ (traite)} = [1/(1 - x)] - 1$$

in which ***x*** represents the percentage reduction of the fine silver content of the penny and the corresponding pence in money of account; and **ΔT** represents the consequent change in the money-of-account value of a *marc* of fine silver after the coinage debasement. By this formula, a 10-per cent reduction in the fine silver contents of the penny would have produced a 11.11 per cent rise in the nominal value of the new coined *marc* of silver, i.e., a potential increase of 11.11 per cent in the coined money supply.

By the crude, simplistic Quantity of Theory of Money, that should also have been the rate of inflation. For Flanders, over the century 1384 - 1482, the expected rate of inflation, resulting from a 55.47 per cent reduction in the penny's silver content, should have been 124.57 per cent – instead of the far more modest 58.72 per cent rise in prices that did occur, as just noted. [43] While this snapshot is useful for purely heuristic purposes, the real statistical tests would have to be measured in year to year changes in the domestic price index, following each coinage debasement.

The historical lesson is clearly demonstrated in Table 4. Coinage debasements, and consequent increases in money supplies, never produced correspondingly proportional inflations. There are five possible reasons why inflations were never directly and predictably related to coinage debasements. First, coinage debasements rarely succeeded in reminting the entire domestic coined money supply, even if the financial terms seemed compelling for merchants to surrender their own current coins to the mint. For many others would have chosen to retain them, knowing that their higher bullion contents would later fetch a higher

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[42] For definitions of fineness and weight, in terms of the *marc de Troyes*, see nn. 5-6, 12-13 above. The computation of the *traite* or money-of-account value of a *marc* of commercially fine silver simply involves the calculation of the number of coins, of a given denomination, struck from the *alloye*d *marc* (i.e., with the copper added) – a number known as the *taille per marc* – and then a multiplication of that number by the official value of the coin itself. Thus **T = (taille * face value)/percentage fineness.**

[43] See Table 1A, and n. 35 above.

market value. Second, even if a silver debasement was also designed to attract other sources of bullion, as well, especially from neighbouring lands, the expected cost or monetary loss would have been some outflow of the other metal, gold, for reasons noted earlier. Third, coins did not account for the entire money supply; and, therefore, we must also take account of credit changes. I have dealt with this subject at length, in other publications, in which I contended that credit instruments never fully remedied any shortages in the medieval supplies of coined money, and did not effectively combat deflation.[44]

Fourth, consider the logic of the modernized Quantity Theory of Money, whose basic formula is M.V = P.y. Any inflationary consequences – i.e., a rise in P (Consumer Price Index) – from an increase in the money supply (M) may have been offset by a decrease in the income velocity of money (V) and/or by increases in net national product (NNP) and income (i.e., *y*). The more useful version of the quantity theory is the Cambridge Cash Balances equation: M = k.P.y, in which *k* is the reciprocal of V, i.e., k = 1/V and V = 1/k. The symbol or variable *k* represents that percentage share of net national income that the public chooses to hold in cash balances: i.e., rather than profitably investing those funds. The reasons for holding cash balances are known collectively as *liquidity preference*: involving a mix of transaction, precautionary, and speculative motives. According to Keynesian economics, an increase in the money supply, without any changes in liquidity preference, would have led to a fall in interest rates, which in turn would have led to an increase in *k* (cash balances held). That is the equivalent to a reduction in V, i.e. the income velocity of money.

Fifth, perhaps the most important factor was simply the failure of coinage debasements to counter-act or fully offset the prevailing deflationary consequences of long-term, widespread monetary scarcities – i.e., the prevalent 'bullion famines.' Indeed, one obvious reason why they failed to do so is that coinage debasements were almost always periodic or episodic and thus relatively short-term, as well as being merely regional in their impacts. Furthermore, in Burgundian Flanders, three episodes of coinage debasement were

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[44] See p. 8 and n. 18 above.

followed by the exact monetary opposite: a coinage *renforcement* or a restoration (usually only partial) and strengthening of the coinage, adding more silver: in 1384, in 1389-90, and in 1433-35. By necessarily contracting the money supply – i.e., in reminting debased coins into necessarily fewer but stronger coins, these *renforcements* had severely deflationary consequences, readily apparent in Table 3.[45]

We may offer three more specific observations about the inflationary consequences of coinage debasements. First, when price changes did take place following debasements, they did not do so immediately, but relatively slowly, since some time would have been necessary for the increased quantity of coins to enter and become part of the coinage circulation. That observation applies also to the previously enunciated proposition: that wholesalers and retailers would have ultimately reacted to a debasement only by raising their prices. Their success in doing so, however, still depended upon the increased circulation of the new coins.

Second, the extent of any subsequent rise in prices was far from being uniform. The price changes for individual commodities depended on both their supply and demand elasticities; and the latter must also be seen in terms of both the price- and income-elasticities of demand.[46] Provided, therefore, that the merchants had spent those double *groot* coins quickly enough, after receiving their newly debased coins, and spent them on the right selection of goods and services, they would certainly have profited – i.e., realized a genuine net *real* gain.

Third, we may further observe that money-changers and merchants who gained from delivering bullion to the mints and quickly spending their increased number of coins benefited from what is now known in economics as asymmetric information: i.e., that they were privy to the knowledge of the mint changes that

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[45] See Tables 1A and 1B.

[46] See above, pp. 30-31; and Table 4. See also, in support of these views, Munro, 'Monetary Contraction and Industrial Change', pp. 95 - 162; Munro, 'Mint Outputs, Money, and Prices', pp. 31-122; Munro, 'Petty Coinage', pp. 387-423; Munro, 'Wage-Stickiness', pp. 185 - 297; Munro, 'Profit Inflation', pp. 13-71; Munro, 'Monetary Origins of the Price Revolution', pp. 1-34; Munro, 'Black Death', pp. 335-364.

remained unknown, for some time, to the general public.[47] But inevitably such information would have been finally disseminated to the general public. That information, combined with the increased number of coins in circulation, would have led to some inflation, and thus to some loss, though rarely a total loss, of the net gains from a debasement.

The mintage fees: brassage and seigniorage

As noted earlier, the mint retained from the bullion supplied a small proportion – usually under ten per cent (Table 1B) – for the stipulated mintage fees, which comprised two items: the brassage, for the mint-master; and the seigniorage, for the prince. The brassage fee can be readily understood: that it cost money to make money. Obviously, the mint-master had to be compensated for his production costs: the copper alloy added, the labour costs of production, the capital costs of his tools (hammers, dyes, furnaces, forges, melting pots, shears, etc.), and the administrative costs of operating the mint.[48] Those costs were normally modest, except for the petty coinage , the *monnaies noires*, with high copper contents. In accordance with the Flemish mint indenture of June 1418, the mint-master retained 7 of the 136 double *groot* coins struck. That amounted to 1s 2d *groot* or 5.15 per cent of the bullion delivered. But, in accordance with the next mint indenture, for the debasement of November 1428, the mint master received only a minuscule increase of just 1/8 double *groot* = a quarter-*groot*, or just 6 mites. In fact, his share of the total bullion received fell from 5.15 per cent to 4.62 per cent – an amount that likely was insufficient to cover his increased costs for labour and copper alloy. So much for the view that mint-masters had instigated debasements for their own profit.

The other mintage fee was seigniorage: the tax that the prince imposed on minting coins, i.e., as a fixed percentage of the bullion delivered to his mint, by virtue, as noted earlier, of his official monopoly on coinage within his realm. Counterfeiting was, of course, a very serious violation of the prince's monopoly

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[47] See Gandal and Sussman, 'Asymmetric Information', pp. 440-457. Note that in 2001, George Akerlof, Michael Spence, and Joseph Stiglitz won the Nobel Prize in Economics for their analyses of markets with asymmetric information.

[48] Since the mint was the property of the prince, the prince was responsible for the capital and maintenance costs of the mint buildings, but not of the mint-master's equipment.

on coinage, and indeed of his sovereignty; and it was usually treated, therefore, as a capital crime.[49]

Clearly, at least in proportional terms, the agent who realized the greatest gain was the prince; i.e., here, Duke Philip the Good. In his 1428 Flemish debasement, his seigniorage tax was increased from 2 double *groot* coins (4d) to 3 such coins (6d), a 50-per cent increase, increasing his share of the bullion delivered to the mint from 1.47 per cent to 1.95 per cent.

Indeed, the single best test for whether or not a coinage debasement was aggressive and motivated by profit-seeking is whether or not the prince increased his seigniorage rates in implementing that debasement.[50] If the debasement had been purely defensive in nature, and in particular designed to remedy deficiencies in the coinage supply, why would the prince have raised his seigniorage rate? Consider, also, and in particular, the fact that the higher the seigniorage rate, the lower would have been the mint price for merchants, thus reducing their incentive to bring bullion to that particular prince's mint, in competition with other mints. Calculating the most effective increase in rates was a skilled art.

The prince's increased mint profits were based on two factors: the increase in the seigniorage rate itself, and the success of the debasement in increasing the Flemish mint output, subject to the constraints on total mintage fees just noted. As Table 6 demonstrates, Duke Philip's 1428 debasement was very successful indeed : from 1428 to 1429, it increased the quantity of silver bullion struck by 1475.68 per cent (from 1,078.65 kg to 16,996.01 kg); the current value coinage output, in pounds *groot* Flemish, by 1666.02 per cent (from £5,267.28 to £93,021.38 *groot*); and the seigniorage revenues, by 1554.47 per cent (from £123 to £2,035 *groot* Flemish). As this table also indicates, coinage debasements were subject to rapidly diminishing returns, a condition that often forced prince, as just noted, to engage in subsequent debasements. In this case, however, Duke Philip the Good instead chose – if in response to pressure from the Flemish towns – to

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[49] See Munro, 'Profits of Counterfeiting', pp. 127-48; Munro, 'Medieval Monetary Metrology', pp. 173-99.

[50] See Table 1 B: with data on all the silver coinage changes from 1384 to 1482. Note the increase in the seigniorage rates with all the major debasements, and their reductions with a return to stronger and stable coinages.

reform the Flemish coinage and impose a monetary unification on his recently acquired Burgundian Low Countries, in 1433-5.[51]

Debasements and warfare in the Burgundian Low Countries

Of course, it would now be an enormous and ultimately also a tedious task to demonstrate that each and every one of the numerous Flemish coinage debasements had been undertaken primarily for such fiscal motives: specifically to finance warfare and defence. Only the major wars need to be cited here. [52] First, under Duke Philip the Bold (r. 1384-1404): the Second Artevelde or Ghent rebellion (aided by English intervention), from 1382-85; and the Guelders war of 1388. Under Duke John the Fearless (r. 1404-1419): the Burgundian-Armagnac civil wars, 1411-19, culminating in Duke John's murder at Montereau. His son and successor Philip the Good (r. 1419-67) immediately defied the French Dauphin Charles (later Charles VII), by contracting a military alliance with England, whose king, Henry V, had achieved such a major victory over the French at Agincourt (1415). During his wars with Charles, Philip also became involved in the civil war in Holland-Zeeland (Hoeks vs. Kabiljauws), which also embroiled him in conflict with England, in 1424- 28, ending with Burgundian acquisition of these Imperial counties. Duke Philip subsequently complained to his subjects how costly were these wars:[53]

> You also well know how, during a lull in the war in France, I had to wage a burdensome and murderous war against the English [Humphrey, Duke of Gloucester] in my lands of Holland, Zeeland and Friesland in order to protect Flanders ... This war...had cost me, besides all the heavy expenses that I incurred throughout this period in the French war, over a million gold *saluts*, which at first I was extremely ill-prepared to find.

The troubled Anglo-Burgundian military alliance finally ended, in 1435, with Duke Philip's *volte-face*, in making peace with Charles VII, by the Treaty of Arras, which then led to the Anglo-Burgundian war

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[51] See p, 27 and nn. 57-58, below.

[52] See Vaughan, *Philip the Bold*; Vaughan, *John the Fearless;* Vaughan, *Philip the Good*; Vaughan, *Charles the Bold*; Calmette, *Les grands ducs de Bourgogne*; Nicholas, *Medieval Flanders*, pp. 317-99.

[53] In a speech before the deans of Ghent's craft guilds, in January 1447. Cited (and translated) by Vaughan, *Philip the Good*, pp. 307-08, quoting from the Flemish texts in Fris, *Dagboek van Gent,* vol. I, pp. 57-68.

of 1436-1439, complicated by the Dutch-Wendish wars of 1438-1441.[54] Then, relative peace — and an absence from coinage debasements – ensued over the next two decades, until Philip's son Charles the Rash (r. 1467-1477) renewed the Burgundian conflicts with Louis XI's France. That conflict began with the rebel League of the Common Weal, 1465-66 (i.e., before Charles became duke). That in turn led to Charles' suppression of the French-sponsored revolt of Liège, in 1468; his abortive invasion of Normandy, in 1471; and then his wars with Imperial Alsace, Lorraine, and the Swiss, all allies of Louis XI, culminating in the Burgundian defeat and Charles' death, at the hands of the Swiss, at Nancy (Lorraine), in 1477. In that year, his daughter Marie married the Habsburg Archduke Maximilian (d. 1519). Her accidental death in March 1482 led to a disputed regency (their son Philip vs Maximilian) and protracted civil wars in Flanders, and to even more horrendous coinage debasements, ending only in the 1490s, which events are all beyond the scope of this study.[55]

Some brief conclusions: debasements were generally more harmful than beneficial

We may conclude that late-medieval coinage debasements, at least those examined in Burgundian Flanders, were generally more harmful than beneficial. They failed to provide any long-term remedy for the combined problems of chronic monetary scarcity and deflation. Indeed, as noted earlier, the Burgundian rulers generally ended their rounds of debasements with severely deflationary *renforcements*. Second, as observed earlier, the combination of coinage debasements and related bullionist measures generally served only to aggravate monetary scarcities by impeding both bullion flows and coinage circulations, and also by encouraging hoarding. Third, to the extent that debasements did lead to some degree of inflation, that inflation reduced real incomes – since wages normally lagged behind prices – and thus provided an additional

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[54] See sources cited in n. 53, and also Munro, 'Anglo-Burgundian Alliance', pp. 225-44; and Munro, *Wool, Cloth, and Gold*, pp. 65-126.

[55] Duchess Marie, unlike her father Charles, but following her grandfather's admonition to maintain 'la bonne monnoie', had opposed further debasements. The debasement of 18 July 1482 was thus undertaken by widower husband Maximilian (Table 1A). See Spufford, *Money*, p. 313. See also n. 61 below.

tax burden on the entire population.[56] Fourth, debasements injured creditors, by reducing the real values of their investment returns and repayments; and in that respect, they damaged Flemish international commercial relations.

Finally, coinage alterations sometimes caused social unrest: understandably so, when, as just emphasized, money wages usually lagged behind debasement-induced rises in consumer prices. But, somewhat paradoxically, the opposite monetary policy, a coinage *renforcement* (strengthening), was the more likely cause of unrest, especially industrial strikes, when Burgundian or civic leaders imposed sudden wage cuts – reductions in nominal money wages – as a necessary component of monetary reform. Yet such unrest, the product of 'money illusions', usually proved to be socially unjustified, because those reforms usually led to a deflation in which the fall in consumer prices proved to be greater than the nominal wage cuts, so that real wages actually rose (as they did in the 1390s and 1440s).[57]

Finally, the view that coinage debasements had been undertaken to remedy severe coin shortages, and thus to benefit the public, is contradicted Flemish public demands, as put forth by their Estates or Town Assemblies, which evidently regarded debasements as a cure worse than the disease. After two of Philip the Good's debasements, the assembly of Flemish towns (the Estates) forced the duke not to undertake any further coinage alterations for specified periods: in 1418-19, for fifteen years;[58] and in 1433, for twenty

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[56] See Munro, ' Urban Public Finances in Late-Medieval Flanders', pp. 973-1026; Munro, 'Wage-Stickiness', pp. 185-297.

[57] See Munro, 'Gold, Guilds, and Government', pp. 153 - 205; Munro, Wage-Stickiness, pp. 185 - 297; Munro, 'Builders' Wages', pp. 1018-28; and publications by Van Werveke in n. 33 above.

[58] See Munro, *Wool, Cloth and Gold*, pp. 74-76, and n. 34 in particular. The most important study on this issue is Spufford, 'Coinage, Taxation, and the Estates General', pp. 63-88. In March 1418, the Flemish towns or the Four Members (vier *leden*) had in fact requested no changes for the next 40 years: that 'dese munte sal ghedeurch zijn zonder angheven ofte veranderen xl jaer'; but that period was reduced to 15 years in the final ordinance, in: ARA, Rekenkamer, reg. no. 1158, fo. 7vo. When Philip became count in his own name, in 1419, after his father's murder, the Four Members required him to repeat this promise. Gilliodts-van Severen, *Estaple de Bruges*, vol. I, no. 630, p. 526. See above, n. 51.

years.[59] Philip, however, broke his first promise, chiefly by engaging in debasements in his recently acquired and neighbouring provinces of Namur, Holland-Zealand, and Brabant, but also once, within Flanders itself, at Ghent, in November 1428. Yet he did indeed keep his second promise (at least for silver), and for more than thirty years, up to the final year of his reign, in 1466-67. In that year, Philip resumed his long-dormant practice of debasements, of both coinages, partly in reaction to the debasements of King Edward IV of England, in 1464-65, during the Wars of the Roses.[60] But Duke Philip's debasements were mild compared to those of his successors: Duke Charles the Bold and Archduke Maximilian, from 1467 to the early 1490s: especially in the 1480s, years of costly, destructive foreign and civil wars (which again lie beyond the scope of this study).[61]

In viewing the monetary history of late-medieval western Europe, no one would contend that Burgundian Low Countries were unique: for certainly most, if not all, countries and principalities then practised very similar monetary policies, with the same observable links between warfare, coinage debasements, and seigniorage profits.[62] What does makes this study unique for this era is the documentation for those policies and their economic consequences: the fact that only the Burgundian Low Countries provide such complete archival evidence, especially in the exceptionally detailed mint accounts– with details for each

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[59] Munro, *Wool, Cloth and Gold*, pp. 101-103; Spufford, 'Coinage, Taxation, and the Estates General', pp. 143-53; Van Dusye and De Busscher, *Archives de la ville de Gand*, no. 552, p. 192: charter of 18 January 1434.

[60] Edward IV reduced the silver contents of the sterling penny by 20.00% and the gold contents of the English noble by 25.93%, thus altering the mint-ratio in favour of gold. Duke Philip (d. 15 June 1467) reduced the silver content of the penny groot by 13.57% in May 1466 and his son Duke Charles did so by another 3.77% in October 1467. The value of gold coins and the gold traite rose from £15 0s 0d in 1454 to £15 18s 4d in October 1467, with an overall change in the mint ratio favouring silver. See the details in Munro, *Wool, Cloth, and Gold*, pp. 160-77, Appendices B - K, pp. 190-211; and nn. 26, 30, and 32 above.

[61] See p. 24, and n. 55, above.

[62] See note 1. For the principal offenders, see Spufford, *Money and Its Use*, chapter 13, 'The Scourge of Debasement', pp. 289-318, especially Table 5, p. 295, and graph III (for 12 currencies, 1252-1500), pp. 296-299. The two principal exceptions were: England before Henry VIII's 'Great Debasement', of 1542-52; and Spain (Castile), from 1497 to 1686. See also the next note.

coin denomination issued, brassage, seigniorage, total outs in both fine metal struck and money-account values of coin issued – reports of monetary officials, consumer prices, industrial data, to permit us to measure the causes, processes, and consequences of these monetary policies.[63]

[63] See the tables and their sources; and the list of my publications in the List of References. While similar documentation and archival sources can also be found for late-medieval England, there are some significant differences: in particular, the Tower Mint accounts do not provide as detailed evidence on coin denominations, brassage, and seigniorage. The more important difference is that, apart from Edward IV's monetary changes of 1464-65, which came after a half-century of monetary stability, England was one of the few exceptions in not otherwise pursuing these monetary polices, as indicated in the previous note.

APPENDIX:

Two Late-Medieval Monetary Exceptions: Spain and England

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Certainly historical studies of many principalities in late-medieval, and early-modern western Europe provide equally strong links between between warfare, coinage debasements, and seigniorage profits, i.e., similar to those examined in the monetary history of Flanders during the Burgundian era (1384-1482).[64] Nevertheless, those links were not universal in late-medieval and early-modern Europe. Notable exceptions were late-medieval England, before the reign of Edward IV – or really, before the 'Great Debasement' of Henry VIII and his successor (1542-1552); and early modern Spain, with virtually no debasements at all from 1497 to 1686, certainly none that affected the traditional gold and silver coinages.[65]

There are two possible explanations for this surprising monetary anomaly: i.e., that Spain, and to a lesser extent, England had in effect abjured coinage debasements. The first is a seductive financial explanation. Neither country had evidently required seigniorage profits to finance warfare as much as had, say, France and the Low Countries, because of alternative, lucrative sources of royal tax revenues: for England, the export taxes on wool;[66] and for Spain, the import taxes – the *quinto* or 'royal fifth' – on imports of American silver (from Bolivia-Peru and Mexico).[67]

For Spain, however, two important historical circumstances undermine or vitiate this financial theory.

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[64] See note 1. For an excellent summary, see Spufford, *Money and Its Use*, chapter 13, 'The Scourge of Debasement,' pp. 289-318.

[65] Castile (Spain) struck silver *reals* at 93.06 per cent fineness, at 67 per *marc* (230.0465 grams) during those years, except for one temporary exception in 1642 – at 83.75 per *marc*; and in 1643, the original 1497 coinage was fully restored. The gold coins were struck at 22 carats = 91.67 per cent fine. See Ulloa, 'Castilian Seignorage,' pp. 459-79; Motomura, 'The Best and Worst of Currencies,' pp. 104 - 27; Motomura, 'New Data on Minting', pp. 331-67; and Hamilton, *Price Revolution*, pp. 46-103.

[66] Bowden, *Wool Trade*, pp. 1-76.

[67] On American silver imports and government revenues, see Hamilton, *Price Revolution*, pp. 12-45; Cross, 'South American Bullion,' pp. 397-423; TePaske, 'New World World Silver,' pp. 425-45; Munro, 'Monetary Origins,' pp. 1-34, especially Table 1.2, pp. 4-5.

The first is that the commitment to abjure debasements of the gold and silver coinages dates from at least 1497, and possibly from 1471 – and thus long before any substantial amounts of 'treasure' – first gold, and then enormous amounts of silver – were imported from the Americas (Bolivia-Peru and Mexico). Those imports had begun, in very small amounts from the early sixteenth century; but imports of silver in particular did not surpass 10,000 kg a year until the later 1530s, and the very major imports did not really begin until the 1560s.[68]

The second 'inconvenient fact' is the well-known fiscal crises that Philip II and Castile underwent, especially in the 1550s. In 1557, Philip II supposedly declared 'bankruptcy'; but in fact, his government, having found itself currently unable to pay the annual interest on short-term loans called *asientos,* resolved that problem by converting them into five-percent perpetual but redeemable *juros al quittar*, equivalent to what were commonly known elsewhere as *rentes*: i.e., annuities. That pattern was repeated in 1575 and 1596. During the sixteenth century, the Spanish funded public long-term debt, in the form of these *juros*, ballooned from 2.996 million ducats (*escudos* of 375 maravedís*)* in 1504 to 80.040 million ducats in 1598 (on the death of Philip II).[69] Given indeed the continuously parlous, precarious state of Habsburg Spain's public finances, despite the revenues derived from the Spanish American silver trade, at least in the second half of the sixteenth century, one may well wonder why Philip II did not resort to the well established European fiscal custom of coinage debasements.

The answer may instead lie more in the political and constitutional realm, rather than the financial. In 1471, and thus before the Spanish unification, King Henry IV of Castile issued an ordinance known as the *Pragmatica*, which renounced the regal right to debase the gold and silver coinages, and to alter the seigniorage rates. That renunciation was deemed to be a necessary component of the crown's monetary reform policy to suppress all competing baronial mints (about 150) in Castile. It is certainly worth noting

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[68] See sources in note 65; and Munro, 'Monetary Origins', Table 1.2, pp. 4-5.

[69] Van der Wee, 'Monetary, Credit, and Banking Systems', pp. 373-76, Table 28; Munro, 'Medieval Origins of the Financial Revolution', pp. 535-36; Gelabert, 'Castile', pp. 207-212

that, before this agreement, the kings of Castile had been amongst the worst offenders, later-medieval Europe, in debasing their coinages: as much as 95 percent, from ca. 1300.[70] But this reformed coinage policy may not have been fully implemented until 1474, when Ferdinand of Aragon and his wife Isabella confirmed this *Pragmatica,* as joint rulers of Castile, with the parliamentary Cortes; and the right to debase the coinage and to augment the seigniorage rates was again formally revoked with their new coinage of 1497.[71] From 1497 to 1686, the Spanish crown consistently minted (with one exceptional, minor deviation in 1642-43) two silver coins at 93.06 percent fineness, that is, without any debasements or any other coinage alterations – an experience unique in early-modern European monetary history. All of the available evidence does indeed indicate that from 1497 to 1686 the Spanish monarchs did consistently refuse to accept the repeated advice to debase the coinages.[72]

The Spanish crown's commitment to abjure, forswear debasements and restrict seigniorage on its gold and silver coinages did not apply, however, to its petty *vellon* coinages, which underwent severe debasements from 1599 (becoming pure copper coins) with greatly augmented seigniorage fees to the mid-seventeenth

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[70] Spufford, *Money and Its Use*, Table 5, p. 295, and graph III, pp. 296-99. See also p. 314: 'The very worst sequence of debasements in the whole of fourteenth- and fifteenth-century Europe can be seen in Castile. By 1480, the unchanging Florentine florin was exchanged for around 375 Castilian maravedis, whereas 130 years earlier it had been exchanged for 20 maravedis. In other words, the Castilian money-of-account had lost around 95% of its value, a greater long-term fall in value than that of any other European money.'

[71] In his *Price Revolution*, Hamilton erred, however (p. 52), in stating that 'the Crown exacted no seigniorage' on gold and silver coinages, but only brassage fees; and that error was repeated in Boyer-Xambeu, Deleplace, and Gillard, *Private Money and Public Currencies*, p. 110 (but without citation). In fact, the Crown exacted seigniorages on both coinages (except for those issued on behalf of the king himself): for gold, 1 *escudo* (= 400 maravedís) per *marc* (230.0465 g); and for silver, 50 maravedís per *marc*. Since 67 silver *reals* were struck from a *marc* of silver, at a value of 34 maravedís each, that seigniorage amounted to 1.4706 *reals* = 2.195% of the fine silver bullion coined, a higher rate than that normally exacted at the Flemish and English mints (See Table 1B). The brassage fees, in addition to the seigniorage, on the Castilian coinages were normally 34 maravedís (= 1 *real*) per *marc* of fine silver and 125 maravedís per *marc* of fine gold. During this period (1497-1686) the mint fees remained unchanged. See sources cited in n. 62 above.

[72] See n. 65 above.

century: at the very time of increased warfare and sharply declining imports of Spanish American silver.[73]

In the case of medieval England, for reasons noted earlier in this paper, the crown's reluctance or inability to imposed coinage debasements was also probably more political and constitutional, at its root, than financial. Before England, under Edward III, finally adopted an effective gold coinage (1343-51), its sterling silver coins, 92.5 percent pure silver, had served as an international medium of exchange in northern Europe – a fact that had led to various continental imitations, especially in the early fourteenth century[74]. Evidently the commercial benefits as well as the national prestige from having such a universally admired currency were factors that had inhibited English coinage debasements. Shortly after the Black Death (1348), which unleashed a combination of real and monetary forces that led to severe inflation, Edward III chose to implement what must be regarded as a very minor and purely defensive debasement of silver, following a prolonged 'bullion famine', marked by very low mint outputs and severe deflation.[75] Parliament's immediate response to that ensuing inflation was to blame the debasement, and not the effects of the Black Death. In 1352, by its Statute of Purveyors, Parliament thus decreed that the coinage 'shall never be worsened, neither in weight nor in fineness (*aloi*)', without its consent. Not until 1411-12 did the crown again implement

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[73] Before the reign of Philip III (1598-1621), the Spanish government had issued only small amounts of these petty coins, known as *vellon* coinage. From at least 1471, the Castilian and then Spanish kings had issued a largely copper fractional coinage called *blancas*, with a nominal money-of-account value of 0.5 *maravedí* (compared to a value of 34 *maravedí*s for the silver *real*): but with a very small amount of silver 10 grains = 3.47 percent), to convince the public that it was indeed precious-metal 'money'. In 1497, that fineness was reduced to 2.43 percent (7 grains); in 1552, to 1.909 percent (5.5 grains); in 1566, to 1.39 percent (4 grains); in 1583, to a fineness of just 1.39 percent (containing only 0.0146 g silver), and a nominal value of 0.5 *maravedís*. Subsequently, in 1597, Philip II (r.1556-1598) agreed to the issue of a coin worth exactly one *maravedí* , with a fineness of only 0.34 percent (just 1 grain of silver); but whether any were actually issued is not clear. Finally, in 1599, Philip III issued *vellon* coins that contained only copper. So large were these *vellon* issues in the first half of the seventeenth century that they became the single most powerful factor in the inflation that Spain endured during this final era of the Price Revolution. See sources cited in note 65, and also Hamilton, *Price Revolution*, pp. 73-103; Hamilton, *War and Prices in Spain,* pp. 9-35.

[74] Mayhew, 'Sterlings', pp. 54-68.

[75] Munro,'Black Death', pp. 335-64; Munro, 'Wage-Stickiness', pp. 207-16; Mayhew, 'Numismatic Evidence', 1-15.

another debasement, another purely defensive debasement, and it did so with an Act of Parliament.[76] The crown in fact did observe that parliamentary statute for over a century – until Edward IV's debasement of 1464.[77] Edward's debasement, it must be noted, again occurred after a half century of monetary stability; and had the debasement (20 percent for silver) and the seigniorage rate been more modest, it may well also have been deemed defensive.[78] We have also noted how, though with much less success, the parliamentary Estates in Burgundian Flanders had also sought the Duke of Burgundy's agreements to maintain stable coinage, without debasements.[79]

Nevertheless, one cannot disregard the fiscal-financial aspects of the English crown's reluctance to pursue the continental monetary policies of coinage debasements; for not for another sixty years, not until 1526, did the crown, under Henry VIII (1509-1547), again implement a debasement, and one that was also purely defensive. This was therefore, long before and distinctly different from Henry's later 'Great Debasement' (1542-1547). There can be no doubt that the crown's principal source of revenues came from the taxation of trade, most especially from the export taxes levied on both raw wool and woollen textiles, especially after the large increases in the wool export-tax rates from the 1330s, on the eve of the Hundred Years' War. Subsequently, despite the long-term decline of the English wool trade from the 1420s – in part because of both export taxes and bullionist impositions on the wool trade, those export tax revenues still remained substantial up until the end of the fifteenth century. But not long before Henry VIII's Great Debasement , the wool export tax revenues had virtually disappeared . By the 1520s, the cloth export trade

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[76] Munro, *Wool, Cloth, and Gold*, pp. 60-62. The statute required a parliamentary review of the coinage within two years. See *Rotuli Parliamentorum*, III, 658-9: no. 2; Feavearyear, *Pound Sterling*, pp. 37-39.

[77] *Statutes of the Realm*, vol. I, p. 322: Stat. 25 Edwardi III, stat. 5, c. 13. See Munro, *Wool, Cloth, and Gold*, pp. 35, 159-63; Feavearyear, *Pound Sterling*, pp. 15-45.

[78] Munro, *Wool, Cloth, and Gold*, pp. 168-71; Mayhew, 'Yorkist Recoinage', pp. 62-73. See also n. 60, above.

[79] See nn. 58-59 above.

had almost totally displaced the wool trade, but cloth exports still remained very lightly taxed before 1558.[80] Possibly that major increase in the cloth export taxes trade was a factor in permitting Elizabeth I to restore the English coinage, or partly restore it, in 1561 and allowed subsequent English rulers thereafter to eschew coinage debasements, apart from one minor weight reduction, in 1601, until 1817.[81]

If the Henrician Great Debasement seems to be an anomaly in English monetary history, we may also contend that the monetary histories of medieval England and of early-modern Spain are themselves anomalies in European history, and that the debasement-ridden monetary histories of Flanders and the Low Countries, France, Italy, Germany, etc., represent the historic norm. Certainly, the Burgundian rulers of the Low Countries and the French kings had enjoyed no such alternative sources of commercial revenues – non akin to English wool exports or Spanish silver imports – to permit them to forgo the seigniorage revenues from coinage debasements. At the same time, they also were not encumbered with constitutional institutions that were as relatively effective in curbing debasements as were those of late-medieval England and early-modern Spain.

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[80] See Munro, *Wool, Cloth, and Gold*; Munro, 'Medieval Woollens', pp. 278-98.

[81] In 1601, the number of pence cut to the Troy pound was changed from 720d to 744d, reducing the penny's weight from 0.5184 g to 0.5017 grams. Otherwise, from the Elizabethan recoinage of 1560 to 1817, the English silver coinage retained its traditional sterling fineness: 11 oz 2 dwt silver and 18 dwt copper = 92.50 percent pure silver. Feavearyear, *Pound Sterling*, Appendix I, p. 435; Appendix III.ii, p. 439.

List of References:

Archival Sources:

Belgium: Algemeen Rijksachief [ARA], Rekenkamer, register no. 1158

[See also: sources for the tables, in the Appendix]

Published Sources:

Bigwood, Georges. *Le régime juridique et économique du commerce de l'argent dans la Belgique du moyen âge*. Academie Royale de Belgique, Classe des Lettres, vol. XIV, 2 vols. Brussels: Academie Royale, 1921-22.

Blockmans, Willem. 'Le poids des deniers carolingiens.' *Revue belge de numismatique et de sigillographie* 119 (1973): 179-81.

Bordo, Michael. 'Money, Deflation, and Seigniorage in the Fifteenth Century.' *Journal of Monetary Economics* 18 (1986): 337 - 46.

Borrelli de Serres, *Les variations monétaires sous Philippe le Bel* (Chalon-sur-Saône, 1902).

Bowden, Peter, *The Wool Trade in Tudor and Stuart England* (London: MacMillan, 1962).

Boyer-Xambeu, Marie-Thérèse; Ghislain Deleplace, and Lucien Gillard. *Private Money and Public Currencies: The 16th Century Challenge*. London: M.E. Sharpe, 1994. Trans. by Azizeh Azodi: from *Monnaie privée et pouvoir des princes: l'économie des relations monétaire à la Renaissance.* Paris: Editions de CNRS, 1986.

Bridrey, Émile. *La Théorie de la monnaie au XIVe siècle: Nicole Oresme: étude d'histoire des doctrines et des faits économiques.* Paris, Girard et Brière, 1906.

Calmette, Joseph. *The Golden Age of Burgundy: the Magnificent Duke and their Courts.* New York: Norton, 1963. Translated from *Les grands ducs de Bourgogne*. Paris: Albin Michel, 1949.

Cazelles, Raymond. 'Quelques reflexions à propos des mutations monétaires de la monnaie royale française (1295-1360)'. *Le moyen âge* 72 (1966): 83-105, and 251-78.

Chalon, Renier. *Recherches sur les monnaies des comtes de Hainaut.* Brussels, 1818.

Cipolla, Carlo M. 'Currency Depreciation in Medieval Europe', *Economic History Review*, 2nd ser. 15:3 (1963): 413-33. Reprinted with a few changes in Sylvia Thrupp, ed. *Change in Medieval Society: Europe North of the Alps, 1050-1500.* New York: Appleton-Century-Crofts, 1964; reissued University of Toronto Press, 1988, pp. 227-36.

Cross, Harry E. 'South American Bullion Production and Export, 1550 - 1750.' In John F. Richards, ed. *Precious Metals in the Later Medieval and Early Modern Words.* Durham, North Carolina. Carolina Academic Press, 1983, pp. 397-423.

Day, John. ‘ ‘Crise du Féodalisme’ et conjoncture des prix à la fin du moyen âge’, *Annales: Economies, Sociétés, Civilisations*, 34 (1979): 305-18; reissued in translation as ‘Late Medieval Price Movements and the ‘Crisis of Feudalism’,’ in John Day. *The Medieval Market Economy*. Oxford: Basil Blackwell, 1987, pp. 90 - 107.

Day, John. ‘The Question of Monetary Contraction in Late Medieval Europe.’ *Nordisk Numismatisk Arsskrift: Nordic Numismatic Journal*, 1981: *Coinage and Monetary Circulation in the Baltic Area, c. 1350 - c. 1500.* Copenhagen, 1981, pp. 12-29. Reprinted in Day, *The Medieval Market Economy*, pp. 55-71.

Day, John, ‘The Fisher Equation and Medieval Monetary History’ In Mario Gomes Marques, ed. *Problems of Medieval Coinage in the Iberian Area.* Sanartem, 1984, pp. 139 - 46. Reprinted in Day, *The Medieval Market Economy*, pp. 108-17.

Day, John, ed. *Études d'histoire monétaire, XIIe-XIXe siècles.* Lille: Université de Paris VII, 1984.

Day, John. ‘Colonialisme monétaire en Méditerranée au moyen âge.’ In *Actes du IIe colloque internationale d'histoire: Economies méditerranéennes: équilibres et intercommunications, XIIIe - XIXe siècles.* Athens, Centre de recherches néohelléniques, 1985, pp. 305 - 19. Reprinted in translation as ‘Monetary Colonialism in the Medieval Mediterranean.’ In Day, *The Medieval Market Economy*, pp. 116-28.

Day, John. *The Medieval Market Economy.* Oxford: Basil Blackwell, 1987.

Day, John; and Huguette Bertand. ‘Les frappes de monnaies en France et en Europe aux XIVe - XVe siècles.’ In Georges Depeyrot, Tony Hackens, and Ghislaine Moucharte, ed. *Rythmes de la production monétaire, de l'antiquité à nos jours.* Ottignies: Université de Louvain-la-Neuve, 1987, pp. 537-77.

Deschamps de Pas, Louis. ‘Essai sur l’histoire monétaire des comtes de Flandre de la Maison de Bourgogne et description de leurs monnaies d’or et d’argent: Philippe le Hardi (1384-1404).’ *Revue numismatique*, nouvelle série 6 (1861): 106-39.

Deschamps de Pas, Louis. ‘Essai sur l’histoire monétaire des comtes de Flandre de la Maison de Bourgogne et description de leurs monnaies d’or et d’argent: Jean Sans-Peur (1405-1419).’ *Revue numismatique*, nouvelle série 6 (1861): 211-37.

Deschamps de Pas, Louis. ‘Essai sur l’histoire monétaire des comtes de Flandre de la Maison de Bourgogne et description de leurs monnaies d’or et d’argent: Philippe le Bon (1419-1467): première partie.’ *Revue numismatique*, nouvelle série 6 (1861): 458-78.

Deschamps de Pas, Louis. ‘Essai sur l’histoire monétaire des comtes de Flandre de la Maison de Bourgogne et description de leurs monnaies d’or et d’argent: Philippe le Bon (1419-1467): Suite.’ *Revue numismatique*, nouvelle série 7 (1862): 117-43.

Deschamps de Pas, Louis. ‘Essai sur l’histoire monétaire des comtes de Flandre de la Maison de Bourgogne et description de leurs monnaies d’or et d’argent: Charles le Téméraire (1467-1477).’ *Revue*

numismatique, nouvelle série 7 (1862): 351-65.

Deschamps de Pas, Louis. 'Essai sur l'histoire monétaire des comtes de Flandre de la Maison de Bourgogne et description de leurs monnaies d'or et d'argent: Marie (1477-1481.' *Revue numismatique*, nouvelle série 7 (1862): 460-80.

Deschamps de Pas, Louis. 'Supplement à l'essai sur l'histoire monétaire des comtes de Flandre de la Maison de Bourgogne.' *Revue numismatique*, nouvelle série 11 (1866); 172-219.

Deschamps de Pas, Louis. 'Histoire monétaire des comtes de la Flandre de la maison d'Autriche et classement de leurs monnaies (1482-1556): Philippe-le-Beau (1482-1506).' *Revue numismatique*, nouvelle série 14 (1869-70), 86-114, 243-266, 319-334, 419-440; 15 (1874-77), 80-104, 151-63.

Feavearyear, Sir Albert. *The Pound Sterling: A History of English Money,* 2nd rev. edn. by E. V. Morgan. Oxford: Clarendon Press, London, 1963.

Fournial, Etienne, *Histoire monétaire de l'Occident médiéval.* Paris: F. Nathan, 1970.

Gaillard, Victor, ed. *Recherches sur les monnaies des comtes de Flandre*, 2 vols, Ghent: H. Hoste, 1856. Vol. II: *Sous les règnes de Louis de Crécy et de Louis de Male.*

Gandal, Neil; and Nathan Sussman. 'Asymmetric Information and Commodity Money: Tickling the Tolerance in Medieval France.' *Journal of Money Credit and Banking* 29:4 (November 1997): 440-457.

Gelabert, Juan, 'Castile: 1504 - 1808', in Richard Bonney, ed., *The Rise of the Fiscal State in Europe, c. 1200-1815* (Oxford and New York: Oxford University Press, 1999), pp. 201-41.

Gilliodts-van Severen, Louis, ed. *Cartulaire de l'ancienne estaple de Bruges*, 2 vols. Bruges: Société d'Emulation de Bruges, 1906-08.

Girard, Albert. 'La guerre des monnaies.' *Revue de synthèse* 19 (1940-45) [also: *Synthèse historique* 60 (1940-45)]: 83-101.

Graus, F. 'La crise monétaire du XIVe siècles.' *Revue belge de philologie et d'histoire* 29 (1951): 445-54.

Great Britain, Parliament. *Rotuli Parliamentorum ut et petitiones et placita in Parliamento*, 6 vols. London, 1767-77.

Great Britain, Record Commission (T.E. Tomlins, J. Raithby, et. al) eds. *The Statutes of the Realm*, 6 vols. London: Record Commission, 1810-22).

Grierson, Philip. 'Coin Wear and the Frequency Table.' *Numismatic Chronicle*, 7th ser. 3 (1963): i-xvi. Reprinted in Philip Grierson, *Later Medieval Numismatics (11th - 16th Centuries): Selected Studies.* London: Variorum Reprints, 1979, no. 19.

Grierson, Philip. 'Weight and Coinage.' *Numismatic Chronicle*, 7th ser. 4 (1964): iii-xvii. Reprinted in Philip Grierson, *Later Medieval Numismatics (11th - 16th Centuries): Selected Studies.* London:

Variorum Reprints, 1979, no. 20

Grierson, Philip. *Numismatics.* Oxford: Oxford University Press, 1975.

Grierson, Philip. 'Medieval Numismatics.' In J. Powell, ed. *Medieval Studies: An Introduction*. Syracuse, 1976, pp. 103-36. Reprinted in Philip Grierson, *Later Medieval Numismatics (11th - 16th Centuries): Selected Studies.* London: Variorum Reprints, 1979, no. 1

Grierson, Philip. *Later Medieval Numismatics (11th - 16th Centuries): Selected Studies.* London: Variorum Reprints, 1979.

Grunzweig, A. 'Les incidences internationales des mutations monétaires de Philippe le Bel.' *Le moyen âge* 59 (1953): 117-72.

Hamilton, Earl. *American Treasure and the Price Revolution in Spain, 1501-1650.* Cambridge, Mass.: Harvard 1934; reissued New York: Octagon Books, 1965.

Hamilton, Earl J. *War and Prices in Spain, 1651-1800.* Cambridge, Mass: Harvard University Press, 1947).

Johnson, Charles, ed. *The 'De Moneta' of Nicholas Oresme and English Mint Documents.* London: Thomas Nelson and Sons, 1956.

Landry, Adolphe. *Essai économique sur les mutations des monnaies dans l'ancienne France de Philippe le Bel à Charles VII.* Paris: H. Champion, 1910; reissued Paris: H. Champion, 1969.

Laurent, Henri. 'Crise monétaire et difficultés économiques en Flandre aux XIVe et XVe siècles.' *Annales d'histoire économique et sociale*, 5 (1933), 156-60.

Lopez, Robert S. ; Harry A. Miskimin, and A.L. Udovitch. 'England to Egypt, 1350-1500: Long-Term Trends and Long-Distance Trade.' In M.A. Cook, ed. *Studies in the Economic History of the Middle East: From the Rise of Islam to the Present Day.* London: Oxford University Press, 1978, pp. pp. 93-128. Reprinted in Harry A. Miskimin, *Cash, Credit, and Crisis in Europe, 1300-1600*. London: Variorum Reprints, 1989, no. VIII.

Lopez, Robert. *The Shape of Medieval Monetary History.* London: Variorum Reprints, 1986.

Mayhew, Nicholas. 'Numismatic Evidence and Falling Prices in the Fourteenth Century.' *Economic History Review*, 2nd ser., 27:1 (Feb. 1974): 1-15.

Mayhew, Nicholas. 'The Monetary Background to the Yorkist Recoinage of 1464-1471', *British Numismatic Journal*, 44 (1974), 62-73.

Mayhew, Nicholas. 'The Circulation and Imitation of Sterlings in the Low Countries', in Nicholas J. Mayhew, ed., *Coinage in the Low Countries (800 - 1500): The Third Oxford Symposium on Coinage and Monetary History*, British Archeological Reports, BAR International Series 54 (Oxford, 1979) pp. 54 - 68.

Miskimin, Harry. 'Le problème de l'argent au Moyen Âge.' *Annales: Économies, sociétés, civilisiations* 17:6 (1962): 1125-1130. Reprinted in Harry A. Miskimin. *Cash, Credit and Crisis in Europe, 1300-1600.* London: Variorum Reprints, 1989, no. IV.

Miskimin, Harry. *Money, Prices, and Foreign Exchange in Fourteenth-Century France.* New Haven: Yale University Press, 1963).

Miskimin, Harry. 'Monetary Movements and Market Structures: Forces for Contraction in 14th and 15th Century England.' *Journal of Economic History* 24 (1964): 470-90. Reprinted in Miskimin, *Cash, Credit, and Crisis in Europe, 1300-1600*, no. VII.

Miskimin, Harry. 'Money and Money Movements in France and England at the End of the Middle Ages.' In John Richards, ed. *Precious Metals in the Later Medieval and Early Modern Worlds.* Durham, N.C.: Carolina Academic Press, 1983, pp. 79-96. Reprinted in Miskimin. *Cash, Credit, and Crisis in Europe, 1300 - 1600*. London: Variorum Reprints, 1989.

Miskimin, Harry. *Money and Power in Fifteenth-Century France.* New Haven and London: Yale University Press, 1984.

Miskimin, Harry. 'L'or, l'argent, et la guerre dans la France médiévale.' *Annales: E.S.C.* 40 (1985): 171 - 84. Reprinted in Harry A. Miskimin. *Cash, Credit and Crisis in Europe, 1300-1600*. London: Variorum Reprints, 1989, no. XII.

Miskimin, Harry. 'The Enforcement of Gresham's Law.' In Anna Vannani Marx, ed. *Credito, banche e investimenti, secoli XIII-XX: Atti della quarta Settimana di Studio (Prato, 14-21 aprile 1972)*, Istituto Internazionale di Storia Economica 'Francesco Datini'. Florence: Le Monnier, 1985, pp. 147-61. Republished in Harry Miskimin. *Cash, Credit, and Crisis in Europe, 1300 - 1600.* London: Variorum Reprints, 1989.

Miskimin, Harry. 'Money, the Law, and Legal Tender.' In Georges Depeyrot and Tony Haeckens, eds. *Rythmes de la production monétaire, de l'Antiquité à nos jours: Actes du Colloque international Paris, 10-12 janvier 1986*, Numismatica Lovaniensia 7: Louvain-la-Neuve, 1987, pp. 697-705. Republished in Harry Miskimin. *Cash, Credit, and Crisis in Europe, 1300 - 1600.* London: Variorum Reprints, 1989.

Motomura, Akira. 'The Best and Worst of Currencies: Seigniorage and Currency Policy in Spain, 1597 - 1650.' *The Journal of Economic History* 54:1 (March 1994): 104 - 27.

Motomura, Akira. 'New Data on Minting, Seigniorage, and the Money Supply in Spain (Castile), 1597 - 1643.' *Explorations in Economic History* 34:3 (July 1997): 331-67.

Mueller, Reinhold. 'Guerra monetaria tra Venezia e Milano nel quattrocento.' *La zecca di Milano: Atti del Convegno internazionale di studio Milano, 9-14 maggio 1983.* Milan, 1984, pp. 341-55.

Munro, John H. 'An Economic Aspect of the Collapse of the Anglo-Burgundian Alliance, 1428-1442.' *English Historical Review* 85: 335 (April 1970): 225-44. Reprinted in John Munro, *Bullion Flows and Monetary Policies in England and the Low Countries, 1350 - 1500*, Variorum Collected Studies series CS 355 (Aldershot, Hampshire; and Brookfield, Vermont: Ashgate Publishing Ltd., 1992).

Munro, John H. *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.

Munro, John H. 'Billon - Billoen - Billio: From Bullion to Base Coinage.' , *Revue belge de philologie et d'histoire/ Belgisch tijdschrift voor filologie en geschiedenis* 52 (1974): 293-305. Reprinted in John Munro. *Bullion Flows and Monetary Policies in England and the Low Countries, 1350 - 1500*. Variorum Collected Studies series CS 355, Aldershot, Hampshire; and Brookfield, Vermont: Ashgate Publishing Ltd., 1992.

Munro, John H. 'Money and Coinage of the Age of Erasmus: An historical and analytical glossary with particular reference to France, the Low Countries, England, the Rhineland and Italy.' In Sir Roger Mynors, Douglas Thomson, and Wallace Ferguson, eds. *The Collected Works of Erasmus: The Correspondence of Erasmus*, Vol. 1: *Letters 1 to 151, A.D. 1484 - 1500.* Toronto: University of Toronto Press, 1974, pp. 311-48.

Munro, John H. 'Bullionism and the Bill of Exchange in England, 1272-1663: A Study in Monetary Management and Popular Prejudice.' In Center for Medieval and Renaissance Studies, University of California (Fredi Chiappelli, director), ed. *The Dawn of Modern Banking.* New Haven and London: Yale University Press, 1979), pp. 169-239. Reprinted in John Munro. *Bullion Flows and Monetary Policies in England and the Low Countries, 1350 - 1500*, Variorum Collected Studies series CS 355. Aldershot, Hampshire; and Brookfield, Vermont: Ashgate Publishing Ltd., 1992.

Munro, John H. 'Monetary Contraction and Industrial Change in the Late-medieval Low Countries, 1335 - 1500.' In Nicholas J. Mayhew, ed. *Coinage in the Low Countries (800 - 1500): The Third Oxford Symposium on Coinage and Monetary History*, British Archeological Reports, BAR International Series 54. Oxford, 1979, pp. 95 - 162.

Munro, John H. 'Mint Policies, Ratios, and Outputs in England and the Low Countries, 1335-1420: Some Reflections on New Data.' *The Numismatic Chronicle*, 141 (1981): 71-116. [formerly listed as: 8th series, Vol. I. Reprinted in John Munro. *Bullion Flows and Monetary Policies in England and the Low Countries, 1350 - 1500*, Variorum Collected Studies series CS 355. Aldershot, Hampshire; and Brookfield, Vermont: Ashgate Publishing Ltd., 1992.

Munro, John H. 'Bullion Flows and Monetary Contraction in Late-Medieval England and the Low Countries.' In John F. Richards, ed. *Precious Metals in the Later Medieval and Early Modern Worlds.* Durham, North Carolina: Carolina Academic Press, 1983, pp. 97-158. Reprinted in John Munro, *Bullion Flows and Monetary Policies in England and the Low Countries, 1350 - 1500*, Variorum Collected Studies series CS 355. Aldershot, Hampshire; and Brookfield, Vermont: Ashgate Publishing Ltd., 1992.

Munro, John H. 'Mint Outputs, Money, and Prices in Late-Medieval England and the Low Countries.' In Eddy Van Cauwenberghe and Franz Irsigler, eds. *Münzprägung, Geldumlauf und Wechselkurse/ Minting, Monetary Circulation and Exchange Rates.* Trierer Historische Forschungen, vol. 7: Akten des 8th International Economic History Congress, Section C-7, Budapest 1982. Trier: Trier University Press, 1984, pp. 31-122.

Munro, John H. 'Monnayage, monnaies de compte, et mutations monétaires au Brabant à la fin du moyen âge.' In John Day, ed. *Études d'histoire monétaire, XIIe - XIXe siècles*. Études de l'Université de Paris VII et du Centre National des Lettres. Lille: Presses Universitaires de Lille, 1984, pp. 263-94. Reprinted in John Munro. *Bullion Flows and Monetary Policies in England and the Low Countries, 1350 - 1500*. Variorum Collected Studies series CS 355. Aldershot, Hampshire; and Brookfield, Vermont: Ashgate Publishing Ltd., 1992.

Munro, John H. '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. Reprinted in John Munro. *Bullion Flows and Monetary Policies in England and the Low Countries, 1350 - 1500*. Variorum Collected Studies series CS 355. Aldershot, Hampshire; and Brookfield, Vermont: Ashgate Publishing Ltd., 1992.

Munro, John H. 'The Central European Mining Boom, Mint Outputs, and Prices in the Low Countries and England, 1450 - 1550.' In Eddy H.G. Van Cauwenberghe, ed. *Money, Coins, and Commerce: Essays in the Monetary History of Asia and Europe (From Antiquity to Modern Times)*. Studies in Social and Economic History, Leuven: Leuven University Press, 1991, pp. 119 - 83.

Munro, John H. *Bullion Flows and Monetary Policies in England and the Low Countries, 1350 - 1500*. Variorum Collected Studies series CS 355. Aldershot, Hampshire; and Brookfield, Vermont: Ashgate Publishing Ltd., 1992.

Munro, John H. 'Patterns of Trade, Money, and Credit.' In James Tracy, Thomas Brady Jr., and Heiko Oberman, eds. *Handbook of European History in the Later Middle Ages, Renaissance and Reformation, 1400 - 1600*, 2 vols. Leiden: E.J. Brill, 1994-95, Vol. I: *Structures and Assertions* (1994), pp. 147-95.

Munro, John H. 'English 'Backwardness' and Financial Innovations in Commerce with the Low Countries, 14th to 16th Centuries.' In Peter Stabel, Bruno Blondé, and Anke Greve, eds. *International Trade in the Low Countries (14th - 16th Centuries): Merchants, Organisation, Infrastructure*. Studies in Urban, Social, Economic, and Political History of the Medieval and Early Modern Low Countries (Marc Boone, general editor), no. 10. Leuven-Apeldoorn: Garant, 2000, pp. 105-67.

Munro, John H. 'A Maze of Medieval Monetary Metrology: Determining Mint Weights in Flanders, France and England from the Economics of Counterfeiting, 1388 - 1469.' *The Journal of European Economic History* 29:1 (Spring 2000): 173-99.

Munro, John H. '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.

Munro, John H. 'Gresham's Law.' In Joel Mokyr, et al, eds. *The Oxford Encyclopedia of Economic History*. 5 vols. Oxford and New York: Oxford University Press, 2003, vol. II, pp. 480-81.

Munro, John H. '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.

Munro, John H. '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* . Brookfield, Vt: Ashgate Publishing, 2003, pp. 1-34.

Munro, John H. 'The Medieval Origins of the Financial Revolution: Usury, *Rentes*, and Negotiablity', *The International History Review*, 25:3 (September 2003), 505-62.

Munro, John H. '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).

Munro, John H., '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. 1018-28,

Munro, John H. '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 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.

Munro, John H. '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.

Munro, John H. '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.

Nicholas, David. *Medieval Flanders.* Longman: London and New York, 1992.

Patterson, C. C. 'Silver Stocks and Losses in Ancient and Medieval Times.' *Economic History Review*, 2nd ser. 25:2 (May 1972): 205-35.

Phelps Brown, E. H.; 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: Edward Arnold, 1954-62, vol. 2, pp. 168-78, 179-96. Also in E.H. Phelps Brown and Sheila V. Hopkins. *A Perspective of Wages and Prices.* London: Methuen, 1981 , pp. 13-39 (with price indexes not in the original).

Rolnick, Arthur J., and Warren E. Weber. 'Gresham's Law or Gresham's Fallacy.' *Journal of Political Economy* 94:1 (Feb. 1986): 185-99.

Rolnick, Arthur J., François R. Velde, and Warren E. Weber. 'The Debasement Puzzle: An Essay on Medieval Monetary History.' *Journal of Economic History* 56:4 (December 1996): 789-808.

Rymer, Thomas, ed. *Foedera, conventiones, literae, et cujuscunque generis acta publica*. 12 vols. London, 1709-12. Reissued: London, Public Record Office, 1816-1869.

Sargent, Thomas; and Bruce D. Smith. 'Coinage Debasements and Gresham's Laws.' *Economic Theory* 10:2 (1997): 197 - 226.

Sargent, Thomas J. ; and François R. Velde. 'The Big Problem of Small Change.' *Journal of Money, Credit, and Banking* 31:2 (1999): 137-61.

Sargent, Thomas; and François Velde. *The Big Problem of Small Change.* Princeton and Oxford: Princeton University Press, 2002.

Selgin, George. 'Salvaging Gresham's Law: The Good, the Bad, and the Illegal.' *Journal of Money, Credit, and Banking* 28:4, Part I (November 1996): 637-49.

Spufford, Peter. 'Coinage, Taxation, and the Estates General of the Burgundian Netherlands.' *Anciens pays et assemblées d'états (Standen en Landen)* 40 (1966): 63-88.

Spufford, Peter. *Monetary Problems and Policies in the Burgundian Netherlands, 1433 - 1496.* Leiden: Brill, 1970.

Spufford, Peter. *Money and Its Use in Medieval Europe.* Cambridge: Cambridge University Press, 1988.

Sussman, Nathan. 'Debasements, Royal Revenues, and Inflation in France during the Hundred Years' War, 1415 - 1422.' *The Journal of Economic History* 53 (March 1993): 44 - 70.

Sussman, Nathan. 'The Late-Medieval Bullion Famine Reconsidered.' *Journal of Economic History*, 58:1 (March 1998): 126-54.

Sussman**,** Nathan; and Joseph Zeira. 'Commodity Money Inflation: Theory and Evidence from France in 1350-1430.' *Journal of Monetary Economics* 50:8 (November 2003): 1769-93.

TePaske, John T. 'New World Silver, Castile and the Philippines, 1590 - 1800.' In John F. Richards, ed. *Precious Metals in the Later Medieval and Early Modern Words.* Durham, North Carolina. Carolina Academic Press, 1983, pp. 425-45.

Ulloa, Modesto. 'Castilian Seigniorage and Coinage in the Reign of Philip II.' *Journal of European Economic History* 4:2 (Fall 1975): 459-79.

Van der Wee, Herman. 'Monetary Policy in the Duchy of Brabant, Late Middle Ages to Early Modern Times.' In H. Van den Eerenbeemt, ed. *Het geld zoekt zien weg: the Van Lanshot Lectures on Banking in Brabant* (Tilberg: Katholieke Universitet Leuven, 1987); special issue of *Bijdgragen tot*

de geschiedenis van het Zuiden van Nederland, pp. 37-58. Republished in Herman Van der Wee. *The Low Countries in the Early Modern World* . London, Variorum; and Cambridge: Cambridge University Press, 1993, pp. 167-82.

Van Dusye, Prudent; and Edmond De Busscher, eds. *Inventaire analytique des chartes et documents appartenant aux archives de la ville de Gand.* Ghent: Annoot-Braeckman, 1867.

Van Werveke, Hans. 'De economische en sociale gevolgen van de muntpolitiek der graven van Vlaanderen (1337 - 1433).' *Annales de la Société d'Emulation de Bruges* 74 (1931): 1 - 15. Reprinted in his Hans Van Wereveke. *Miscellanea Mediaevalia: verspreide opstellen over economische en sociale geschiedenis van de middeleewuen.* Ghent: E. Story-Scientia, 1968, pp. 243-55.

Van Werveke, Hans. 'Currency Manipulation in the Middle Ages: The Case of Louis de Male, Count of Flanders.' *Transactions of the Royal Historical Society*, 4th ser. 31 (1949): 115-127. Reprinted in his *Miscellanea Mediaevalia*, pp. 255-67.

Vaughan, Richard. *Philip the Bold: the Formation of the Burgundian State.* London: Longmans Green, 1962.

Vaughan, Richard. *John the Fearless: the Growth of Burgundian Power* . London: Longmans Green, 1966.

Vaughan, Richard, *Philip the Good: the Apogee of Burgundy.* London: Longmans Green, 1970.

Vaughan, Richard. *Charles the Bold: the last Valois Duke of Burgundy.* London: Longmans Green, 1973.

Velde, François R., Warren E. Weber, and Randall Wright. 'A Model of Commodity Money, with Applications to Gresham's Law and the Debasement Puzzle.' *Review of Economic Dynamics* 2:1 (1999): 291-333.

Verlinden, Charles; E. Scholliers, et al, eds. *Documents pour l'histoire des prix et des salaires en Flandre et en Brabant/Dokumenten voor de geschiedenis van prijzen en lonen in Vlaanderen en Brabant*, 4 vols. Bruges: De Tempel, 1959 - 65.

Table 1A. The Flemish Silver Groot: silver contents and values 1300 - 1482

Date	Fineness in Argent-le-Roy in deniers	Fineness in Argent-le-Roy in grains	Fineness as a Percent-age	Taille to Marc de Troyes	Grams Pure Silver in the Groot	Traite of Marc de Troyes in Shillings	Value of 1 kg Pure Silver in £ groot	Index 1351 = 100.00
	1 d groot	1 d groot	1 d groot	1 d groot	1 d groot	1 d groot	1 d groot	1 d groot
1300-4-2	11	11.50	95.660%	59.133	3.7944	5.1513	1.0981	50.73
	10	12.00	87.500%	57.000	3.6006	5.4286	1.1572	53.46
1331-8-8	10	6.00	85.417%	57.500	3.4843	5.6098	1.1958	55.25
1332-3-13	10	6.00	85.417%	57.500	3.4843	5.6098	1.1958	55.25
1335-5	9	0.00	75.000%	60.500	2.9077	6.7222	1.4330	66.20
1337-5-25	8	0.00	66.667%	66.000	2.3692	8.2500	1.7587	81.25
1343-4-16	8	0.00	66.667%	66.000	2.3692	8.2500	1.7587	81.25
1344-1	8	0.00	66.667%	66.000	2.3692	8.2500	1.7587	81.25
1344-8	8	0.00	66.667%	66.000	2.3692	8.2500	1.7587	81.25
1345-9	7	16.00	63.889%	66.000	2.2705	8.6087	1.8351	84.78
1346-1-20	7	16.00	63.889%	66.000	2.2705	8.6087	1.8351	84.78
1346-8	6	23.50	58.160%	66.000	2.0669	9.4567	2.0159	93.13
1346-11-24	6	12.00	54.167%	66.000	1.9250	10.1538	2.1645	100.00
1351-5-28	6	12.00	54.167%	66.000	1.9250	10.1538	2.1645	100.00

Date	Fineness in Argent-le-Roy in deniers	Fineness in Argent-le-Roy in grains	Fineness as a Percent-age	Taille to Marc de Troyes	Grams Pure Silver in the Groot	Traite of Marc de Troyes in Shillings	Value of 1 kg Pure Silver in £ groot	Index 1351 = 100.00
	1 d groot	1 d groot	1 d groot	1 d groot	1 d groot	1 d groot	1 d groot	1 d groot
1351-7	6	8.00	52.778%	67.500	1.8340	10.6579	2.2719	104.96
1353-9-7	6	4.00	51.389%	69.000	1.7469	11.1892	2.3852	110.20
1354-12-20	6	0.00	50.000%	70.000	1.6754	11.6667	2.4870	114.90
1359-10-22	6	0.00	50.000%	72.000	1.6289	12.0000	2.5580	118.18
1361-12-4	6	0.00	50.000%	78.000	1.5036	13.0000	2.7712	128.03
1363-12-1	8	0.00	66.667%	114.000	1.3717	14.2500	3.0377	140.34
1365-4-12	7	12.00	62.500%	114.000	1.2859	15.2000	3.2402	149.70
1368-1-21	7	4.00	59.722%	114.000	1.2288	15.9070	3.3909	156.66
1369-4-21	6	0.00	50.000%	100.000	1.1728	16.6667	3.5528	164.14
1369-9-22	6	12.00	54.167%	114.000	1.1145	17.5385	3.7387	172.73
1373-6-18	6	0.00	50.000%	116.000	1.0110	19.3333	4.1213	190.40
1380-1-30	5	18.00	47.917%	116.000	0.9689	20.1739	4.3005	198.68
1383-9-12	6	0.00	50.000%	100.000	1.1728	16.6667	3.5528	164.14
1384-9-10	5	8.00	44.444%	102.000	1.0220	19.1250	4.0769	188.35
1386-10-29	5	4.00	43.056%	119.000	0.8486	23.0323	4.9098	226.83

Date	Fineness in Argent-le-Roy in deniers	Fineness in Argent-le-Roy in grains	Fineness as a Percent-age	Taille to Marc de Troyes	Grams Pure Silver in the Groot	Traite of Marc de Troyes in Shillings	Value of 1 kg Pure Silver in £ groot	Index 1351 = 100.00
	1 d groot	1 d groot	1 d groot	1 d groot	1 d groot	1 d groot	1 d groot	1 d groot
1387-4-3	4	20.00	40.278%	121.000	0.7808	25.0345	5.3366	246.55
1388-10-1	5	0.00	41.667%	96.000	1.0180	19.2000	4.0929	189.09
1389-12-20	5	0.00	41.667%	82.667	1.1822	16.5333	3.5244	162.83
1409-8-17	4	4.00	34.722%	85.000	0.9581	20.4000	4.3487	200.91
1416-12-6	5	0.00	41.667%	115.000	0.8498	23.0000	4.9029	226.52
1418-6-12	4	12.00	37.500%	117.500	0.7486	26.1111	5.5661	257.15
1428-11-7	6	0.00	50.000%	144.000	0.8144	24.0000	5.1161	236.36
1433-10-12	5	0.00	41.667%	139.000	0.7031	27.8000	5.9261	273.79
1466-5-23	4	12.00	37.500%	130.000	0.6766	28.8889	6.1582	284.51
1467-10-13	4	0.00	33.333%	131.000	0.5968	32.7500	6.9813	322.54
1474-12-10	3	12.00	29.167%	131.000	0.5222	37.4286	7.9786	368.61
1477-9-20	3	3.00	26.042%	131.000	0.4663	41.9200	8.9361	412.85
1482-7								

Table 1 B. **Alterations of the Flemish Silver Coinages: 1384 - 1482**

Date and names of the silver coins Double Groot Single Groot	**Value in d. groot**	**Fineness Percent Argent-le-Roy**	**Percent Purity**	**Weight Taille**	**Weight in Grams**	**Grams Pure Silver**	**Traite of marc AR £ gr**	**Bullion Price £ gr**	**Seign-iorage £ gr**	**Brassage £ gr**
1384 - 07 - 16										
Double Groot	2.000	50.00%	0.4792	50.00	4.8951	2.3455	0.8333	0.7167	0.05000	0.06667
Groot	1.000	50.00%	0.4792	100.00	2.4475	1.1728	0.8333	0.7167	0.05000	0.06667
1386-10-29										
Double Groot	2.000	50.00%	0.4792	57.00	4.2939	2.0575	0.9500	0.8833	0.01042	0.05625
Groot	1.000	44.44%	0.4259	102.00	2.3995	1.0220	0.9563	0.8833	0.01667	0.05625
1387-04-03										
Double Groot	2.000	43.06%	0.4126	59.50	4.1135	1.6973	1.1517	1.0375	0.03507	0.07917
Groot	1.000	43.06%	0.4126	119.00	2.0567	0.8486	1.1517	1.0375	0.03507	0.07917
1388-10-01										
Double Groot	2.000	40.28%	0.3860	60.50	4.0455	1.5615	1.2566	1.1000	0.03333	0.12326
Groot	1.000	40.28%	0.3860	121.00	2.0228	0.7808	1.2566	1.1000	0.03333	0.12326
1389 - 12 - 20										
Double Groot	2.000	50.00%	0.4792	57.00	4.2939	2.0575	0.9500	0.8500	0.01667	0.08333
Groot	1.000	41.67%	0.3993	96.00	2.5495	1.0180	0.9600	0.8500	0.01667	0.09332
1391 - 01 - 24										

Date and names of the silver coins Double Groot Single Groot	**Value in d. groot**	**Fineness Percent Argent-le-Roy**	**Percent Purity**	**Weight Taille**	**Weight in Grams**	**Grams Pure Silver**	**Traite of marc AR £ gr**	**Bullion Price £ gr**	**Seign-iorage £ gr**	**Brassage £ gr**
Double Groot	2.000	50.00%	0.4792	57.50	4.2566	2.0396	0.9583	0.8583	0.01667	0.08333
1393 - 08 - 24										
Double Groot	2.000	50.00%	0.4792	57.00	4.2939	2.0575	0.9500	0.8750	0.01667	0.05833
Groot	1.000	41.67%	0.3993	96.00	2.5495	1.0180	0.9600	0.8750	0.01667	0.06832
1409 - 08 - 17										
Double Groot	2.000	50.00%	0.4792	49.00	4.9950	2.3934	0.8167	0.7583	0.00833	0.05000
Groot	1.000	41.67%	0.3993	82.67	2.9607	1.1822	0.8266	0.7583	0.00833	0.05998
1416 - 12 - 06										
Double Groot	2.000	41.67%	0.3993	50.00	4.8951	1.9546	1.0000	0.8625	0.06667	0.07083
Groot	1.000	34.72%	0.3328	85.00	2.8794	0.9581	1.0208	0.8625	0.06667	0.09167
1418 - 06 - 12										
Double Groot	2.000	50.00%	0.4792	68.00	3.5993	1.7247	1.1333	1.0583	0.01667	0.05833
Groot	1.000	41.67%	0.3993	115.00	2.1283	0.8498	1.1500	1.0583	0.01667	0.07500
1428 - 11 - 07										
Double Groot	2.000	44.44%	0.4259	68.50	3.5730	1.5218	1.2840	1.2000	0.02500	0.05903
Groot	1.000	37.50%	0.3594	117.50	2.0830	0.7486	1.3056	1.2000	0.02917	0.07639
1433 - 10 - 12										
Double Groot	2.000	50.00%	0.4792	72.00	3.3993	1.6289	1.2000	1.1375	0.00833	0.05417

Date and names of the silver coins Double Groot Single Groot	**Value in d. groot**	**Fineness Percent Argent-le-Roy**	**Percent Purity**	**Weight Taille**	**Weight in Grams**	**Grams Pure Silver**	**Traite of marc AR £ gr**	**Bullion Price £ gr**	**Seign-iorage £ gr**	**Brassage £ gr**
Groot	1.000	50.00%	0.4792	144.00	1.6997	0.8144	1.2000	1.1375	0.00833	0.05417
1466 - 05 - 23										
Double Patard	4.000	95.83%	0.9184	79.50	3.0787	2.8274	1.3826	1.3375	0.00625	0.03885
Double Groot or Patard	2.000	50.00%	0.4792	82.50	2.9667	1.4215	1.3750	1.3167	0.00625	0.05208
Groot	1.000	41.67%	0.3993	139.00	1.7608	0.7031	1.3893	1.3167	0.00625	0.06641
1467 - 10 - 13										
Double Patard	4.000	91.67%	0.8785	77.50	3.1581	2.7743	1.4091	1.3667	0.00625	0.03617
Double Groot or Patard	2.000	50.00%	0.4792	84.50	2.8965	1.3879	1.4083	1.3500	0.00625	0.05208
Groot	1.000	37.50%	0.3594	130.00	1.8827	0.6766	1.4444	1.3458	0.00625	0.09236
1474 - 10 - 27										
Double Patard	4.000	83.33%	0.7986	80.00	3.0594	2.4433	1.6000	1.5333	0.02500	0.04167
Double Groot or Patard	2.000	41.67%	0.3993	80.00	3.0594	1.2216	1.6000	1.5167	0.02500	0.05833
Groot	1.000	33.33%	0.3194	131.00	1.8683	0.5968	1.6375	1.5167	0.02500	0.09583
1477 - 12 - 20										
Double Patard	4.500	83.33%	0.7986	80.00	3.0594	2.4433	1.8000	1.7333	0.02500	0.04167
Double Groot or Patard	2.250	41.67%	0.3993	80.00	3.0594	1.2216	1.8000	1.7167	0.02500	0.05833
Groot	1.000	29.17%	0.2795	131.00	1.8683	0.5222	1.8714	1.7167	0.02500	0.12969
1482 - 07 - 18										
Double Patard	5.000	83.33%	0.7986	80.00	3.0594	2.4433	2.0000	1.9406	0.01354	0.04583
Double Groot or Patard	2.500	41.67%	0.3993	80.00	3.0594	1.2216	2.0000	1.9198	0.01354	0.06667

Date and names of the silver coins Double Groot Single Groot	Value in d. groot	Fineness Percent Argent-le-Roy	Percent Purity	Weight Taille	Weight in Grams	Grams Pure Silver	Traite of marc AR £ gr	Bullion Price £ gr	Seign-iorage £ gr	Brassage £ gr
Groot	1.000	26.04%	0.2496	131.00	1.8683	0.4663	2.0958	1.9198	0.01354	0.16250

Date and names of the silver coins	Total Mint Charges £ gr	SUM BP+MC = Traite £ gr	Seign-iorage as % of Traite	Brassage as % of Traite	Bullion Price as % of Traite	Percent Change in Silver Content	Percent Change in the Traite
1384 - 07 - 16							
Double Groot	0.1167	0.8333	6.00%	8.00%	86.00%		
Groot	0.1167	0.8333	6.00%	8.00%	86.00%		
1386-10-29							
Double Groot	0.0667	0.9500	1.10%	5.92%	92.98%	-12.28%	14.00%
Groot	0.0729	0.9563	1.74%	5.88%	92.37%	-12.85%	14.75%
1387-04-03							
Double Groot	0.1142	1.1517	3.04%	6.87%	90.08%	-17.51%	21.24%
Groot	0.1142	1.1517	3.04%	6.87%	90.08%	-16.96%	20.44%
1388-10-01							
Double Groot	0.1566	1.2566	2.65%	9.81%	87.54%	-8.00%	9.10%
Groot	0.1566	1.2566	2.65%	9.81%	87.54%	-8.00%	9.10%

Date and names of the silver coins	Total Mint Charges £ gr	SUM BP+MC = Traite £ gr	Seign-iorage as % of Traite	Brassage as % of Traite	Bullion Price as % of Traite	Percent Change in Silver Content	Percent Change in the Traite
1389 - 12 - 20							
Double Groot	0.1000	0.9500	1.75%	8.77%	89.47%	31.76%	-24.40%
Groot	0.1100	0.9600	1.74%	9.72%	88.54%	30.39%	-23.60%
1391 - 01 - 24							
Double Groot	0.1000	0.9583	1.74%	8.70%	89.57%	-0.87%	0.88%
Groot	0.1100	0.9600	1.74%	9.72%	88.54%	0.00%	0.00%
1393 - 08 - 24							
Double Groot	0.0750	0.9500	1.75%	6.14%	92.11%	0.88%	-0.87%
Groot	0.0850	0.9600	1.74%	7.12%	91.15%	0.00%	0.00%
1409 - 08 - 17							
Double Groot	0.0583	0.8167	1.02%	6.12%	92.86%	16.33%	-14.04%
Groot	0.0683	0.8266	1.01%	7.26%	91.74%	16.13%	-13.89%
1416 - 12 - 06							
Double Groot	0.1375	1.0000	6.67%	7.08%	86.25%	-18.33%	22.45%
Groot	0.1583	1.0208	6.53%	8.98%	84.49%	-18.95%	23.49%
1418 - 06 - 12							
Double Groot	0.0750	1.1333	1.47%	5.15%	93.38%	-11.76%	13.33%
Groot	0.0917	1.1500	1.45%	6.52%	92.03%	-11.30%	12.65%

Date and names of the silver coins	Total Mint Charges £ gr	SUM BP+MC = Traite £ gr	Seign-iorage as % of Traite	Brassage as % of Traite	Bullion Price as % of Traite	Percent Change in Silver Content	Percent Change in the Traite
1428 - 11 - 07							
Double Groot	0.0840	1.2840	1.95%	4.60%	93.46%	-11.76%	13.30%
Groot	0.1056	1.3056	2.23%	5.85%	91.91%	-11.91%	13.53%
1433 - 10 - 12							
Double Groot	0.0625	1.2000	0.69%	4.51%	94.79%	7.03%	-6.54%
Groot	0.0625	1.2000	0.69%	4.51%	94.79%	8.80%	-8.09%
1466 - 05 - 23							
Double Patard	0.0451	1.3826	0.45%	2.81%	96.74%		
Double Groot or Patard	0.0583	1.3750	0.45%	3.79%	95.76%	-12.73%	14.58%
Groot	0.0727	1.3893	0.45%	4.78%	94.77%	-13.67%	15.78%
1467 - 10 - 13							
Double Patard	0.0424	1.4091	0.44%	2.57%	96.99%	-1.88%	1.92%
Double Groot or Patard	0.0583	1.4083	0.44%	3.70%	95.86%	-2.37%	2.42%
Groot	0.0986	1.4444	0.43%	6.39%	93.17%	-3.77%	3.97%
1474 - 10 - 27							
Double Patard	0.0667	1.6000	1.56%	2.60%	95.83%	-11.93%	13.55%
Double Groot or Patard	0.0833	1.6000	1.56%	3.65%	94.79%	-11.98%	13.61%
Groot	0.1208	1.6375	1.53%	5.85%	92.62%	-11.79%	13.37%

Date and names of the silver coins	Total Mint Charges £ gr	SUM BP+MC = Traite £ gr	Seign-iorage as % of Traite	Brassage as % of Traite	Bullion Price as % of Traite	Percent Change in Silver Content	Percent Change in the Traite
1477 - 12 - 20							
Double Patard	0.0667	1.8000	1.39%	2.31%	96.30%	0.00%	12.50%
Double Groot or Patard	0.0833	1.8000	1.39%	3.24%	95.37%	0.00%	12.50%
Groot	0.1547	1.8714	1.34%	6.93%	91.73%	-12.50%	14.28%
1482 - 07 - 18							
Double Patard	0.0594	2.0000	0.68%	2.29%	97.03%	0.00%	11.11%
Double Groot or Patard	0.0802	2.0000	0.68%	3.33%	95.99%	0.00%	11.11%
Groot	0.1760	2.0958	0.65%	7.75%	91.60%	-10.71%	12.00%

Table 2. Outputs of the Mints in Flanders and the Burgundian Low Countries in Kilograms of Fine Metal, Silver and Gold, and in Flemish Pounds Groot in quinquennial means, 1351-55 to 1496-1500

Year	SILVER Flanders kg.	SILVER Flanders £ groot	SILVER Total LC kg	SILVER Total LC £ groot	GOLD Flanders kg	GOLD Flanders £ groot	GOLD Total LC kg	GOLD Total LC £ groot	Low Countries £ groot	Per Cent silver	Per Cent gold
1351-55	5,178.951	11,397.252	5,178.951	11,397.252	1,096.661	24,811.554	1,096.661	24,811.554	36,208.806	31.48%	68.52%
1356-60	8,820.730	21,251.516	8,820.730	21,251.516	3,191.827	80,870.028	3,191.827	80,870.028	102,121.544	20.81%	79.19%
1361-65	3,992.165	11,141.966	3,992.165	11,141.966	2,629.891	77,350.494	2,629.891	77,350.494	88,492.460	12.59%	87.41%
1366-70	10,347.518	33,290.674	10,347.518	33,290.674	1,636.694	51,788.717	1,636.694	51,788.717	85,079.391	39.13%	60.87%
1371-75	4,852.022	18,208.349	4,852.022	18,208.349	1,807.028	72,090.390	1,807.028	72,090.390	90,298.739	20.16%	79.84%
1376-80	1,898.960	7,567.387	1,898.960	7,567.387	541.721	21,890.920	541.721	21,890.920	29,458.308	25.69%	74.31%
1381-85	2,816.883	11,467.496	2,816.883	11,467.496	529.809	22,941.630	529.809	22,941.630	34,409.126	33.33%	66.67%
1386-90	2,013.492	8,723.712	2,013.492	8,723.712	465.426	22,891.085	465.426	22,891.085	31,614.797	27.59%	72.41%
1391-95	3,676.062	14,958.400	3,676.062	14,958.400	368.614	14,458.242	368.614	14,458.242	29,416.642	50.85%	49.15%
1396-1400	5,791.306	23,507.520	5,791.306	23,507.520	324.589	12,731.424	324.589	12,731.424	36,238.944	64.87%	35.13%
1401-05	691.661	2,826.540	691.661	2,826.540	31.535	1,236.902	31.535	1,236.902	4,063.442	69.56%	30.44%
1406-10	1,113.700	3,887.994	1,113.700	3,887.994	19.025	636.250	19.025	636.250	4,524.244	85.94%	14.06%
1411-15	2,484.269	8,665.846	2,484.269	8,665.846	5.884	196.762	5.884	196.762	8,862.608	97.78%	2.22%

Year	SILVER Flanders kg.	SILVER Flanders £ groot	SILVER Total LC kg	SILVER Total LC £ groot	GOLD Flanders kg	GOLD Flanders £ groot	GOLD Total LC kg	GOLD Total LC £ groot	Low Countries £ groot	Per Cent silver	Per Cent gold
1416-20	2,828.980	13,624.106	3,124.468	15,052.698	2.278	85.550	4.308	181.634	15,234.332	98.81%	1.19%
1421-25	11,427.611	55,349.868	12,143.547	57,614.792	36.533	1,949.216	41.056	2,195.696	59,810.488	96.33%	3.67%
1426-30	5,724.635	30,932.966	7,999.913	43,326.036	372.372	22,373.694	1,105.072	69,470.308	112,796.344	38.41%	61.59%
1431-35	4,568.739	23,495.926	6,609.816	34,252.100	313.963	17,491.002	1,774.868	115,363.244	149,615.344	22.89%	77.11%
1436-40	3,505.132	17,981.664	5,015.219	25,788.306	241.904	13,483.328	511.935	28,534.390	54,322.696	47.47%	52.53%
1441-45	102.683	527.552	102.683	527.552	111.931	6,466.290	111.931	6,466.290	6,993.842	7.54%	92.46%
1446-50	5.911	40.786	5.911	40.786	2.550	148.084	2.550	148.084	188.870	21.59%	78.41%
1451-55	53.164	283.980	164.611	880.316	322.409	19,759.234	827.293	50,701.692	51,582.008	1.71%	98.29%
1456-60	51.302	336.654	64.066	408.310	160.791	9,854.308	253.139	15,513.918	15,922.228	2.56%	97.44%
1461-65	0.000	0.000	0.000	0.000	6.596	404.224	6.596	404.224	404.224	0.00%	100.00%
1466-70	2,975.690	17,957.102	4,628.964	27,867.694	186.880	12,116.676	253.594	16,400.726	44,268.420	62.95%	37.05%
1471-75	4,619.347	28,258.168	7,313.984	45,191.724	140.215	10,042.534	261.202	18,927.514	64,119.238	70.48%	29.52%
1476-80	4,078.520	28,866.250	9,341.495	67,636.248	186.598	14,335.372	380.051	29,208.498	96,844.746	69.84%	30.16%
1481-85	1,997.516	16,669.166	6,534.304	56,337.178	27.255	2,470.546	58.536	5,216.392	61,553.570	91.53%	8.47%
1486-90	940.931	9,235.614	6,803.602	78,323.898	0.000	0.000	144.641	24,136.964	102,460.862	76.44%	23.56%
1491-95	1,039.270	7,332.372	2,780.071	19,521.098	9.272	623.804	20.320	1,336.340	20,857.438	93.59%	6.41%

Year	SILVER Flanders kg.	SILVER Flanders £ groot	SILVER Total LC kg	SILVER Total LC £ groot	GOLD Flanders kg	GOLD Flanders £ groot	GOLD Total LC kg	GOLD Total LC £ groot	Low Countries £ groot	Per Cent silver	Per Cent gold
1496-1500	2,071.913	17,066.911	5,345.911	44,764.905	293.421	27,548.326	474.633	44,464.280	89,229.185	50.17%	49.83%

Table 3 **Basket of Consumables Price Index for Flanders (Bruges and Ghent)**
In quinquennial means: 1351-55 to 1496-1500

Mean of 1451-75 = 100 = 126.295 d groot Flemish
values in d. groot Flemish

Year	Basket Consumables Total Value in d groot Flemish	Commodity Basket Index 1451-75= 100 126.295 gr Flemish	Grains Group Index 1451-75= 100 56.354 gr Flemish	Dairy Group Index 1451-75= 100 44.665 gr Flemish	Textiles Group Index 1451-75= 100 25.276 gr Flemish	Grains as per cent of total basket by value	Dairy as per cent of total basket by value	Textiles as per cent of total basket by value
1351-55	76.593	60.646	68.466	63.048	38.968	50.37%	36.77%	12.86%
1356-60	110.558	87.540	102.100	93.151	45.160	52.04%	37.63%	10.32%
1361-65	119.255	94.425	108.636	98.228	56.023	51.34%	36.79%	11.87%
1366-70	135.641	107.401	126.994	101.825	73.568	52.76%	33.53%	13.71%
1371-75	145.519	115.222	121.901	112.359	105.388	47.21%	34.49%	18.31%
1376-80	141.024	111.662	105.597	121.366	108.038	42.20%	38.44%	19.36%
1381-85	150.534	119.193	110.799	135.714	108.711	41.48%	40.27%	18.25%
1386-90	157.514	124.719	132.745	122.655	110.470	47.49%	34.78%	17.73%
1391-95	111.784	88.510	82.803	99.235	82.282	41.74%	39.65%	18.60%
1396-00	113.407	89.796	92.733	92.132	79.118	46.08%	36.29%	17.63%
1401-05	111.810	88.531	95.190	80.675	87.565	47.98%	32.23%	19.79%

Year	Basket Consumables Total Value in d groot Flemish	Commodity Basket Index 1451-75= 100 126.295 gr Flemish	Grains Group Index 1451-75= 100 56.354 gr Flemish	Dairy Group Index 1451-75= 100 44.665 gr Flemish	Textiles Group Index 1451-75= 100 25.276 gr Flemish	Grains as per cent of total basket by value	Dairy as per cent of total basket by value	Textiles as per cent of total basket by value
1406-10	132.939	105.261	115.682	91.056	107.127	49.04%	30.59%	20.37%
1411-15	120.370	95.309	93.652	92.417	104.114	43.84%	34.29%	21.86%
1416-20	135.616	107.381	110.755	104.677	104.636	46.02%	34.48%	19.50%
1421-25	141.680	112.182	112.756	114.392	106.998	44.85%	36.06%	19.09%
1426-30	148.741	117.773	122.830	114.511	112.262	46.54%	34.39%	19.08%
1431-35	155.989	123.512	132.917	115.130	117.353	48.02%	32.97%	19.02%
1436-40	177.022	140.166	172.289	109.153	123.350	54.85%	27.54%	17.61%
1441-45	143.350	113.504	111.205	113.067	119.403	43.72%	35.23%	21.05%
1446-50	138.904	109.984	107.703	110.051	114.952	43.70%	35.39%	20.92%
1451-55	127.434	100.902	95.302	102.660	110.282	42.14%	35.98%	21.87%
1456-60	148.845	117.855	131.873	107.281	105.288	49.93%	32.19%	17.88%
1461-65	112.030	88.705	83.052	90.737	97.721	41.78%	36.18%	22.05%
1466-70	121.900	96.520	93.351	101.206	95.304	43.16%	37.08%	19.76%
1471-75	121.264	96.017	96.422	98.116	91.406	44.81%	36.14%	19.05%
1476-80	148.034	117.213	125.644	118.347	96.410	47.83%	35.71%	16.46%

Year	Basket Consumables Total Value in d groot Flemish	Commodity Basket Index 1451-75= 100 126.295 gr Flemish	Grains Group Index 1451-75= 100 56.354 gr Flemish	Dairy Group Index 1451-75= 100 44.665 gr Flemish	Textiles Group Index 1451-75= 100 25.276 gr Flemish	Grains as per cent of total basket by value	Dairy as per cent of total basket by value	Textiles as per cent of total basket by value
1481-85	198.097	156.853	198.728	131.927	107.537	56.53%	29.75%	13.72%
1486-90	233.028	184.511	190.773	187.098	165.979	46.14%	35.86%	18.00%
1491-95	183.104	144.981	156.841	122.174	158.841	48.27%	29.80%	21.93%
1496-00	126.617	100.255	82.119	93.309	152.966	36.55%	32.92%	30.54%

BASKET OF CONSUMABLES COMMODITY PRICE INDEXES

Commodity	**FLANDERS**			
Farinaceous	**Amount**	**Unit**	**Value in in d gr. Flemish**	**Percent**
Wheat	45.461	l.	13.279	10.51%
Rye	36.369	l.	7.062	5.59%
Barley	18.184	l.	2.867	2.27%
Peas	24.243	l.	7.341	5.81%
Sub-total	**124.257**	**l.**	**30.549**	**24.19%**

Commodity	**FLANDERS**			
Farinaceous	**Amount**	**Unit**	**Value in in d gr. Flemish**	**Percent**
Drink				
barley (or malt)	**163.659**	**l.**	**25.805**	**20.43%**
Total Farinaceous	**287.917**	**l.**	**56.354**	**44.62%**
Meat, Fish, 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%**
Industrial				
Coarse Woollens	1.225	m.	25.276	20.01%
Sub-total			**25.276**	**20.01%**
TOTAL			**126.295**	**100.00%**

Table 4 **Flemish Silver Coinage Changes and Price Changes, 1380-1482**

Relationship between coinage debasement and the money of account value of a kilogram of pure silver, in coin

Δ T (traite) = [1/(1 - x)] - 1 x = percentage change in silver contents of 1d groot

Flemish Price Index: Mean of 1451-1475 = 100 = 126.295 d groot Flemish

Date of coinage change	Year 1 Jan - 31 Dec	Silver grams in 1d groot	% change in silver	Traite of Silver Marc AR in shillings groot	Value of 1 kg Pure Silver in £ groot 1 d groot	% change in value	Value of Flemish Basket in d groot Flemish	Flemish Price Index from 1350	% change
1380-1-30	**1380**	1.0110	**-9.28%**	19.333	4.121	**10.23%**	134.373	**106.396**	-0.46%
	1381	1.0110	0.00%	19.333	4.121	0.00%	133.718	**105.878**	-0.49%
	1382	1.0110	0.00%	19.333	4.121	0.00%	145.040	**114.843**	8.47%
1383-9-12	**1383**	0.9689	**-4.17%**	20.174	4.300	**4.35%**	143.218	**113.400**	-1.26%
1384-9-10	**1384**	1.1728	**21.04%**	16.667	3.553	**-17.39%**	154.314	**122.185**	7.75%
	1385	1.1728	0.00%	16.667	3.553	0.00%	176.381	**139.658**	14.30%
1386-4-18	**1386**	1.0220	**-12.85%**	19.125	4.077	**14.75%**	167.336	**132.496**	-5.13%
1386-10-29	**1386**	1.0061	**-1.56%**	19.429	4.142	**1.59%**	167.336	**132.496**	0.00%
1387-4-3	**1387**	0.8486	**-15.65%**	23.032	4.910	**18.55%**	169.142	**133.926**	1.08%
1388-10-1	**1388**	0.7808	**-8.00%**	25.035	5.337	**8.69%**	132.960	**105.278**	-21.39%
1389-12-20	**1389**	1.0180	**30.39%**	19.200	4.093	**-23.31%**	153.323	**121.401**	15.32%
	1390	1.0180	0.00%	19.200	4.093	0.00%	164.806	**130.493**	7.49%
1391-1-24	**1391**	1.0075	**-1.03%**	19.400	4.135	**1.04%**	134.037	**106.130**	-18.67%
	1392	1.0075	0.00%	19.400	4.135	0.00%	113.614	**89.959**	-15.24%
1393-6-20	**1393**	1.0180	**1.04%**	19.200	4.093	**-1.03%**	99.657	**78.908**	-12.28%
	1394	1.0180	0.00%	19.200	4.093	0.00%	110.844	**87.766**	11.23%

Date of coinage change	Year 1 Jan - 31 Dec	Silver grams in 1d groot	% change in silver	Traite of Silver Marc AR in shillings groot	Value of 1 kg Pure Silver in £ groot 1 d groot	% change in value	Value of Flemish Basket in d groot Flemish	Flemish Price Index from 1350	% change
	1395	1.0180	0.00%	19.200	4.093	0.00%	100.768	**79.788**	-9.09%
	1396	1.0180	0.00%	19.200	4.093	0.00%	105.820	**83.788**	5.01%
	1397	1.0180	0.00%	19.200	4.093	0.00%	128.543	**101.780**	21.47%
	1398	1.0180	0.00%	19.200	4.093	0.00%	117.823	**93.292**	-8.34%
	1399	1.0180	0.00%	19.200	4.093	0.00%	104.026	**82.368**	-11.71%
	1400	1.0180	0.00%	19.200	4.093	0.00%	110.824	**87.751**	6.54%
	1401	1.0180	0.00%	19.200	4.093	0.00%	113.341	**89.743**	2.27%
	1402	1.0180	0.00%	19.200	4.093	0.00%	116.456	**92.209**	2.75%
	1403	1.0180	0.00%	19.200	4.093	0.00%	122.507	**97.001**	5.20%
	1404	1.0180	0.00%	19.200	4.093	0.00%	102.946	**81.512**	-15.97%
	1405	1.0180	0.00%	19.200	4.093	0.00%	103.799	**82.188**	0.83%
	1406	1.0180	0.00%	19.200	4.093	0.00%	105.226	**83.318**	1.37%
1407-4-30	**1407**	1.1043	**8.47%**	19.200	4.093	0.00%	124.277	**98.402**	18.10%
1407-7-7	**1407**	1.0180	**-7.81%**	19.200	4.093	0.00%	124.277	**98.402**	0.00%
1409-8-17	**1408**	1.1822	**16.13%**	16.533	3.524	**-13.89%**	133.170	**105.444**	7.16%
	1409	1.1822	0.00%	16.533	3.524	0.00%	166.534	**131.861**	25.05%
	1410	1.1822	0.00%	16.533	3.524	0.00%	135.488	**107.279**	-18.64%
	1411	1.1822	0.00%	16.533	3.524	0.00%	100.492	**79.569**	-25.83%
	1412	1.1822	0.00%	16.533	3.524	0.00%	114.743	**90.853**	14.18%
	1413	1.1822	0.00%	16.533	3.524	0.00%	126.848	**100.438**	10.55%
	1414	1.1822	0.00%	16.533	3.524	0.00%	124.889	**98.887**	-1.54%
	1415	1.1822	0.00%	16.533	3.524	0.00%	134.880	**106.798**	8.00%
1416-12-6	**1416**	0.9581	**-18.95%**	20.400	4.349	**23.39%**	150.185	**118.916**	11.35%
	1417	0.9581	0.00%	20.400	4.349	0.00%	168.555	**133.461**	12.23%
1418-6-12	**1418**	0.8498	**-11.30%**	23.000	4.903	**12.75%**	116.493	**92.239**	-30.89%
	1419	0.8498	0.00%	23.000	4.903	0.00%	118.932	**94.170**	2.09%
	1420	0.8498	0.00%	23.000	4.903	0.00%	123.917	**98.118**	4.19%
	1421	0.8498	0.00%	23.000	4.903	0.00%	135.816	**107.538**	9.60%
	1422	0.8498	0.00%	23.000	4.903	0.00%	141.966	**112.408**	4.53%

Date of coinage change	Year 1 Jan - 31 Dec	Silver grams in 1d groot	% change in silver	Traite of Silver Marc AR in shillings groot	Value of 1 kg Pure Silver in £ groot 1 d groot	% change in value	Value of Flemish Basket in d groot Flemish	Flemish Price Index from 1350	% change
	1423	0.8498	0.00%	23.000	4.903	0.00%	130.379	**103.234**	-8.16%
	1424	0.8498	0.00%	23.000	4.903	0.00%	149.826	**118.632**	14.92%
	1425	0.8498	0.00%	23.000	4.903	0.00%	150.416	**119.099**	0.39%
	1426	0.8498	0.00%	23.000	4.903	0.00%	135.544	**107.323**	-9.89%
	1427	0.8498	0.00%	23.000	4.903	0.00%	146.895	**116.311**	8.37%
1428-11-7	**1428**	0.7486	**-11.91%**	26.111	5.566	**13.53%**	141.851	**112.317**	-3.43%
	1429	0.7486	0.00%	26.111	5.566	0.00%	160.475	**127.064**	13.13%
	1430	0.7486	0.00%	26.111	5.566	0.00%	158.941	**125.849**	-0.96%
	1431	0.7486	0.00%	26.111	5.566	0.00%	155.796	**123.359**	-1.98%
	1432	0.7486	0.00%	26.111	5.566	0.00%	147.576	**116.851**	-5.28%
1433-10-12	**1433**	0.8144	8.80%	24.000	5.116	**-8.09%**	175.816	**139.210**	19.14%
	1434	0.8144	0.00%	24.000	5.116	0.00%	164.300	**130.092**	-6.55%
	1435	0.8144	0.00%	24.000	5.116	0.00%	136.456	**108.046**	-16.95%
	1436	0.8144	0.00%	24.000	5.116	0.00%	122.225	**96.777**	-10.43%
	1437	0.8144	0.00%	24.000	5.116	0.00%	140.259	**111.057**	14.76%
	1438	0.8144	0.00%	24.000	5.116	0.00%	234.974	**186.052**	67.53%
	1439	0.8144	0.00%	24.000	5.116	0.00%	241.337	**191.090**	2.71%
	1440	0.8144	0.00%	24.000	5.116	0.00%	146.317	**115.854**	-39.37%
	1441	0.8144	0.00%	24.000	5.116	0.00%	156.040	**123.552**	6.65%
	1442	0.8144	0.00%	24.000	5.116	0.00%	136.240	**107.875**	-12.69%
	1443	0.8144	0.00%	24.000	5.116	0.00%	178.214	**141.109**	30.81%
	1444	0.8144	0.00%	24.000	5.116	0.00%	126.467	**100.136**	-29.04%
	1445	0.8144	0.00%	24.000	5.116	0.00%	119.790	**94.850**	-5.28%
	1446	0.8144	0.00%	24.000	5.116	0.00%	144.775	**114.632**	20.86%
	1447	0.8144	0.00%	24.000	5.116	0.00%	160.241	**126.879**	10.68%
	1448	0.8144	0.00%	24.000	5.116	0.00%	142.056	**112.479**	-11.35%
	1449	0.8144	0.00%	24.000	5.116	0.00%	118.072	**93.490**	-16.88%
	1450	0.8144	0.00%	24.000	5.116	0.00%	129.378	**102.441**	9.57%
	1451	0.8144	0.00%	24.000	5.116	0.00%	124.475	**98.559**	-3.79%

Date of coinage change	Year 1 Jan - 31 Dec	Silver grams in 1d groot	% change in silver	Traite of Silver Marc AR in shillings groot	Value of 1 kg Pure Silver in £ groot 1 d groot	% change in value	Value of Flemish Basket in d groot Flemish	Flemish Price Index from 1350	% change
	1452	0.8144	0.00%	24.000	5.116	0.00%	121.500	**96.203**	-2.39%
	1453	0.8144	0.00%	24.000	5.116	0.00%	136.156	**107.808**	12.06%
	1454	0.8144	0.00%	24.000	5.116	0.00%	133.161	**105.437**	-2.20%
	1455	0.8144	0.00%	24.000	5.116	0.00%	121.880	**96.505**	-8.47%
	1456	0.8144	0.00%	24.000	5.116	0.00%	149.444	**118.330**	22.62%
	1457	0.8144	0.00%	24.000	5.116	0.00%	164.206	**130.018**	9.88%
	1458	0.8144	0.00%	24.000	5.116	0.00%	150.723	**119.342**	-8.21%
	1459	0.8144	0.00%	24.000	5.116	0.00%	132.542	**104.947**	-12.06%
	1460	0.8144	0.00%	24.000	5.116	0.00%	147.310	**116.640**	11.14%
	1461	0.8144	0.00%	24.000	5.116	0.00%	125.656	**99.494**	-14.70%
	1462	0.8144	0.00%	24.000	5.116	0.00%	121.121	**95.903**	-3.61%
	1463	0.8144	0.00%	24.000	5.116	0.00%	103.168	**81.688**	-14.82%
	1464	0.8144	0.00%	24.000	5.116	0.00%	98.413	**77.923**	-4.61%
1466-5-23	**1465**	0.7031	**-13.67%**	27.800	5.926	**15.83%**	111.793	**88.518**	13.60%
	1466	0.7031	0.00%	27.800	5.926	0.00%	121.154	**95.930**	8.37%
1467-10-13	**1467**	0.6766	**-3.77%**	32.750	6.158	**3.92%**	129.006	**102.146**	6.48%
	1468	0.6766	0.00%	37.429	6.158	0.00%	121.436	**96.153**	-5.87%
	1469	0.6766	0.00%	37.429	6.158	0.00%	121.243	**96.000**	-0.16%
	1470	0.6766	0.00%	37.429	6.158	0.00%	116.661	**92.372**	-3.78%
	1471	0.6766	0.00%	37.429	6.158	0.00%	125.794	**99.604**	7.83%
	1472	0.6766	0.00%	37.429	6.158	0.00%	120.760	**95.617**	-4.00%
	1473	0.6766	0.00%	37.429	6.158	0.00%	104.770	**82.957**	-13.24%
	1474	0.6766	0.00%	37.429	6.158	0.00%	136.661	**108.208**	30.44%
1474-12-10	**1475**	0.5968	**-11.79%**	32.750	6.981	**13.37%**	118.337	**93.699**	-13.41%
	1476	0.5968	0.00%	32.750	6.981	0.00%	116.659	**92.370**	-1.42%
1477-9-20	**1477**	0.5222	**-12.50%**	37.429	7.979	**14.29%**	124.747	**98.775**	6.93%
	1478	0.5222	0.00%	37.429	7.979	0.00%	164.072	**129.911**	31.52%
	1479	0.5222	0.00%	37.429	7.979	0.00%	188.593	**149.327**	14.95%
	1480	0.5222	0.00%	37.429	7.979	0.00%	146.097	**115.679**	-22.53%

Date of coinage change	Year 1 Jan - 31 Dec	Silver grams in 1d groot	% change in silver	Traite of Silver Marc AR in shillings groot	Value of 1 kg Pure Silver in £ groot 1 d groot	% change in value	Value of Flemish Basket in d groot Flemish	Flemish Price Index from 1350	% change
	1481	0.5222	0.00%	37.429	7.979	0.00%	174.173	**137.910**	19.22%
1482-7	**1482**	0.4663	**-10.71%**	41.920	8.936	**12.00%**	244.926	**193.932**	40.62%

Table 5. **Flemish Coinage Debasement: The Flemish Mint Ordinances of June 1418 and November 1428**

Double Groot (Gros)	**June 1418**			**November 1428**		
Value in money-of-account [a]	2d *groot* [or *gros* Flemish]			2d *groot* [or *gros* Flemish]		
Fineness [b]	6 deniers AR =		50.0% fine	5 deniers 8 grains AR =		44.44% fine
in *argent-le-roy* (AR)	=		47.92% pure	=		42.59% pure
Weight (Taille) [c] in grams	68 cut to the marc		3.599 grams	68.5 cut to the marc =		3.573 grams
Fine silver content AR in g.			1.800 g.			1.588 g.
Pure silver content in g.			1.725 g.			1.522 g.
Traite per *marc* [d]	68.0 x 2d. = 136d =		22s 8d	68.5 x 2d. = 137d =		25s 8d 6 mites
argent-le-roy	6/12 0.5		5.333/12	0.444		
Division of the Traite Value per marc argent-le-roy	**Value in groot Flemish**	**Number of coins**	**Percentage of the traite**	**Value in groot Flemish**	**Number of coins**	**Percentage of the traite**
Brassage	1s 2d	7	5.15%	1s 2d 6m	7 1/8	4.62%
Seigniorage	4d	2	1.47%	6d 0m	3	1.95%
Total Mint Charges (of the above)	1s 6d	9	6.62%	1s 8d 6m	10 1/8	6.57%
Mint Price: for merchants' bullion	21s 2d	127	93.38%	24s 0d 0m	144	93.43%
Traite per Marc argent-le-roy	**22s 8d**	**136**	**100.00%**	**25s 8d 6m**	**154 1/8**	**100.00%**

[a] **Values in money-of-account:** 1 penny or 1d groot = 24 mites = 12d or 1s parisis
12d groot = 1s (sou, sol, schelling); 1 livre or pond (£1 pound) = 20 shillings = 240d (pence)

[b] **Fineness:** reckoned out of 12 **deniers argent-le-roy**, with 24 **grains** per **denier**: 23/24 or 95.833% pure

[c] **Weight:** reckoned in terms of the **taille** or number cut from the **marc de Troyes** of 8 **onces**: 244.753 g.

[d] **Traite per marc:** official value of coinage struck per **marc argent le roy**: T = taille * face value/fineness
fineness: (Fineness/12 deniers Argent-le-Roy)

Table 6. **The Flemish Silver Coinage Debasement of Nov 1428 and its Aftermath**

Year	Mint Outputs in Marcs argent le roy *	Mint Outputs Kilograms of pure silver	Percentage Change	Output in £ groot Flemish	Percentage Change	Seigniorage in £ groot Flemish	Percentage Change
1428	4,598.700	1,078.647		5,267.280		123	
1429	72,460.700	16,996.010	1475.68%	93,021.380	1666.02%	2,035	1554.47%
1430	34,992.400	8,207.638	-51.71%	45,065.400	-51.55%	1,316	-35.33%
1431	5,595.200	1,312.381	-84.01%	7,240.240	-83.93%	283	-78.50%
1432	104.300	24.464	-98.14%	135.140	-98.13%	55	-80.57%

* *Marc argent-le-roy* = 244.7529 grams commercially fine silver, at 23/24 or 95.833% purity, with 4.167% copper.

Sources for the Tables and Figures:

A. Mint Accounts and monetary ordinances: 1350 - 1500: Archival sources

I: County of FLANDERS

a) Ghent:

Algemeen Rijksarchief (België), Rolrekeningen (Comptes en Rouleaux), nos. 580, 788, 790 - 831, 2138-39, 2877-880.

Algemeen Rijksarchief (België), Acquits de Lille, Liasses nos. 936: 1 - 7, 937: 1-26.

Algemeen Rijksarchief (België), Rekenkamer (Chambre de Comptes), registers nos. 18,195 - 200

Archives Départementales du Nord (at Lille), Chambre de Comptes: Série B. 612/7751, 7796, 7822, 7834, 20932; Série B. 613/8736, 8806, 8862, 8964, 18366-70; Série B. 621/18968; B. 1606; B. 6121.

b) Bruges:

Algemeen Rijksarchief (België), Rolrekeningen (Comptes en Rouleaux), nos. 771-787, 794.

Algemeen Rijksarchief (België), Rekenkamer (Chambre de Comptes), registers nos. 18, 103 - 18,123.

Archives Départementales du Nord (at Lille), Chambre de Comptes: Série B. 612/775, B. 644/15, B. 19,960.

c) Mechelen (Malines):

Algemeen Rijksarchief (België), Rolrekeningen (Comptes en Rouleaux), nos. 803, 2135-41, 2143, 2145-46.

Algemeen Rijksarchief (België), Acquits de Lille, Liasses nos. 1512: 2, 3, 5.

Algemeen Rijksarchief (België), Rekenkamer (Chambre de Comptes), register no. 18,242: 1 - 3.

d) Valkenberg (Fauquemont):

Algemeen Rijksarchief (België), Rolrekeningen (Comptes en Rouleaux), no. 2586 (1396-98 only: for the Count of Flanders)

II: Duchy of BRABANT

a) Brussels

Algemeen Rijksarchief (België), Rekenkamer (Chambre de Comptes), register no. 17,985 - 989

b) Leuven (Louvain)

Algemeen Rijksarchief (België), Rolrekeningen (Comptes en Rouleaux), nos. 2588 - 2592.

Algemeen Rijksarchief (België), Rekenkamer (Chambre de Comptes), register nos. 18,064 - 072

c) Vilvoorde

Algemeen Rijksarchief (België), Rolrekeningen (Comptes en Rouleaux), nos. 2590, 2592

Algemeen Rijksarchief (België), Rekenkamer (Chambre de Comptes), register no. 18,094; no. 48,967

d) Antwerp

Algemeen Rijksarchief (België), Rolrekeningen (Comptes en Rouleaux), no. 2504.

Algemeen Rijksarchief (België), Rekenkamer (Chambre de Comptes), register nos. 17,880 - 882

e) Maastricht

Algemeen Rijksarchief (België), Rekenkamer (Chambre de Comptes), register nos. 18,701, 18703.

III: County of Namur

Algemeen Rijksarchief (België), Rekenkamer (Chambre de Comptes), register no. 18,203: nos 1 - 21,

IV: County of Hainaut: Valenciennes

Algemeen Rijksarchief (België), Acquits de Lille, Liasses nos. 937, 1512.

Archives Départementales du Nord (at Lille), Chambre de Comptes: Série B. 31, B. 17,651, B. 19/975/402

V: County of Holland-Zealand: **Dordrecht**

Algemeen Rijksarchief Nederland, Grafelijkheidsrekenkamer, Rekeningen no. 4937 - 38.

VI: Duchy of Gelderland (Guelders): **Nijmegen, Arnhem, Zaltbommel**

Algemeen Rijksarchief (België), Rekenkamer (Chambre de Comptes), register no. 18,100-101, no. 48,969

B. Mint Accounts and Monetary Ordinances: published documents in:

Victor Gaillard, ed., *Recherches sur les monnaies des comtes de Flandre*, Vol. II: *Sous les règnes de Louis de Crécy et de Louis de Male* (Ghent: H. Hoste, 1856). The two reigns cover the years 1322-1346, and 1346-1384.

Louis Deschamps de Pas, 'Essai sur l'histoire monétaire des comtes de Flandre de la Maison de Bourgogne et description de leurs monnaies d'or et d'argent: Philippe le Hardi (13 84-1404)', *Revue numismatique*, nouvelle série, 6 (1861), 106-39.

Louis Deschamps de Pas, 'Essai sur l'histoire monétaire des comtes de Flandre de la Maison de Bourgogne et description de leurs monnaies d'or et d'argent: Jean Sans-Peur (1405-1419)', *Revue numismatique*, nouvelle série, 6 (1861), 211-37.

Louis Deschamps de Pas, 'Essai sur l'histoire monétaire des comtes de Flandre de la Maison de Bourgogne et description de leurs monnaies d'or et d'argent: Philippe le Bon (1419-1467): première partie', *Revue numismatique*, nouvelle série, 6 (1861), 458-78.

Louis Deschamps de Pas, 'Essai sur l'histoire monétaire des comtes de Flandre de la Maison de Bourgogne et description de leurs monnaies d'or et d'argent: Philippe le Bon (1419-1467): Suite', *Revue numismatique*, nouvelle série, 7 (1862), 117-43.

Louis Deschamps de Pas, 'Essai sur l'histoire monétaire des comtes de Flandre de la Maison de Bourgogne et description de leurs monnaies d'or et d'argent: Charles le Téméraire (1467-1477)', *Revue numismatique*, nouvelle série, 7 (1862), 351-65.

Louis Deschamps de Pas, 'Essai sur l'histoire monétaire des comtes de Flandre de la Maison de Bourgogne et description de leurs monnaies d'or et d'argent: Marie (1477-14 81)', *Revue numismatique*, nouvelle série, 7 (1862), 460-80.

Louis Deschamps de Pas, 'Supplement à l'essai sur l'histoire monétaire des comtes de Flandre de la Maison de Bourgogne', *Revue numismatique*, nouvelle série, 11 (1866), 172-219.

C. Prices and the Flemish Price Index (Table 3.

Stadsarchief Gent, Stadsrekeningen, 1350-51 to 1499-1500: cloth prices from the Ghent town accounts.

Charles Verlinden, E. Scholliers, et al, eds., *Documents pour l'histoire des prix et des salaires en Flandre et en Brabant/Dokumenten voor de geschiedenis van prijzen en lonen in Vlaanderen en Brabant*, 4 vols. (Bruges, 1959 - 65)

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, '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.

D. Prices and the English Price Index (graphs)

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), II, 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 price indexes not in the original).

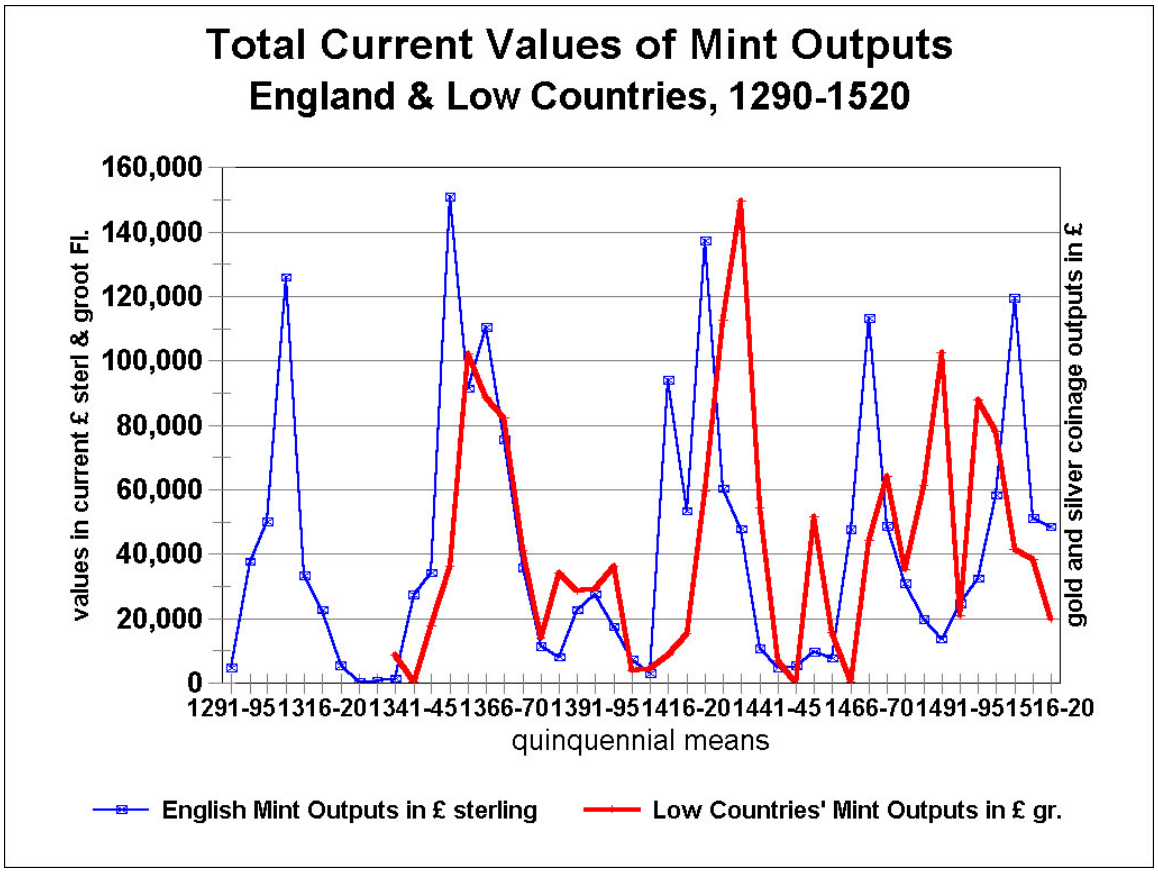

Figure 1:

The outputs of gold and silver coinages (combined), in current moneys-of-account, in England and the Low Countries, from 1291-95 to 1516-20, in five-year means.

England: in current pounds sterling

The Low Countries: in current Flemish pounds groot

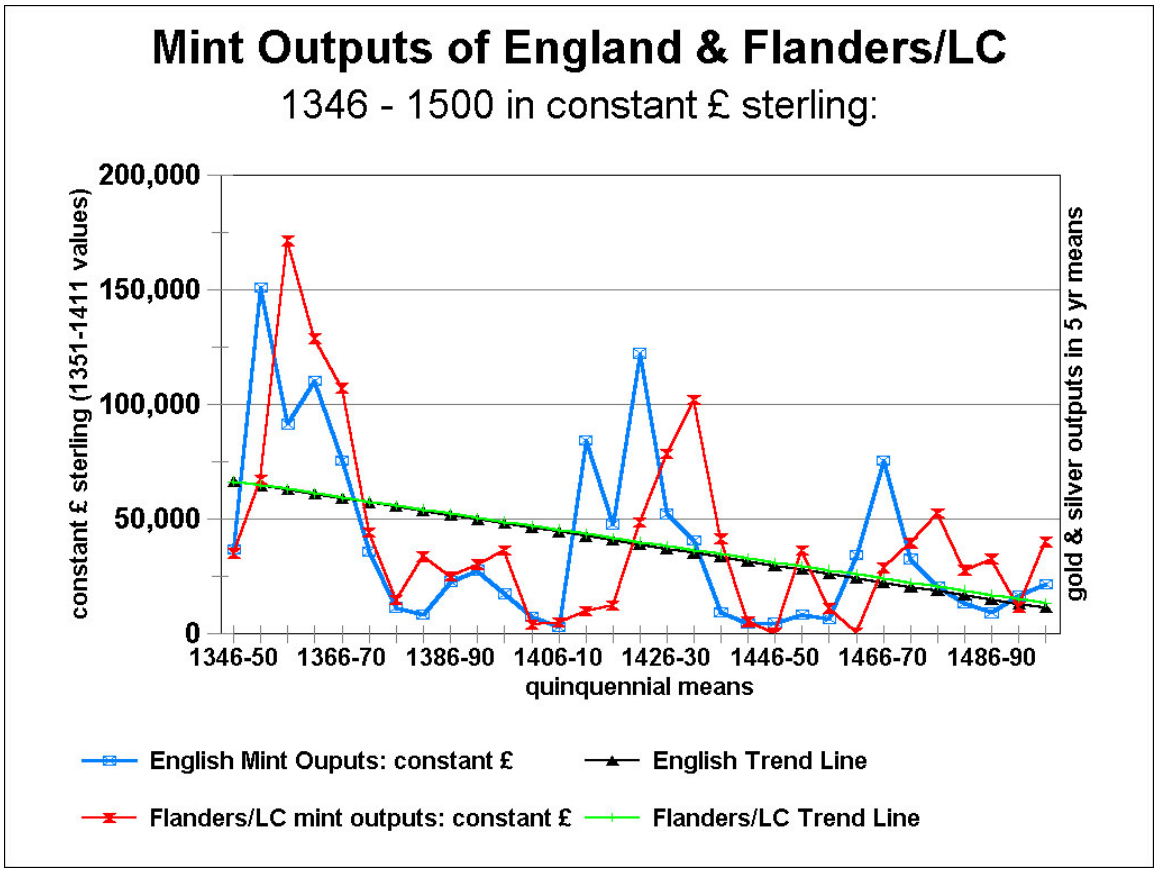

Figure 2:

The outputs of gold and silver coinages (combined) for England and the Low Countries, in five-year means, from 1346-50 to 1496-1550: expressed in constant pounds sterling of England, as a measure of real outputs

Values of a kilogram of English fine gold and of English fine silver: unchanged from 1351 to 1411

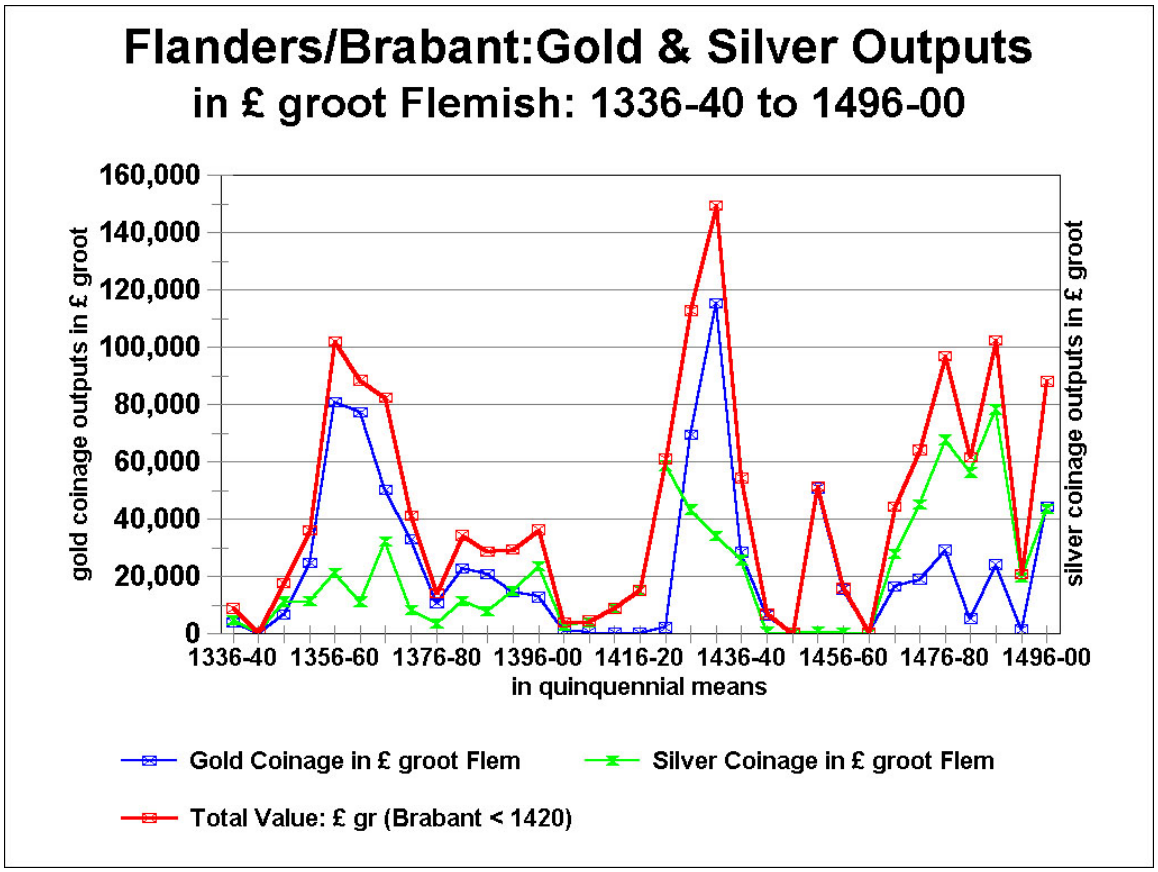

Figure 3:

The values of the gold and silver coinage outputs of Flanders and of the other Burgundian Low Countries, in five-year means, from 1336-40 to 1496-1500: in current pounds groot Flemish

Other Burgundian Low Countries: from 1420 only

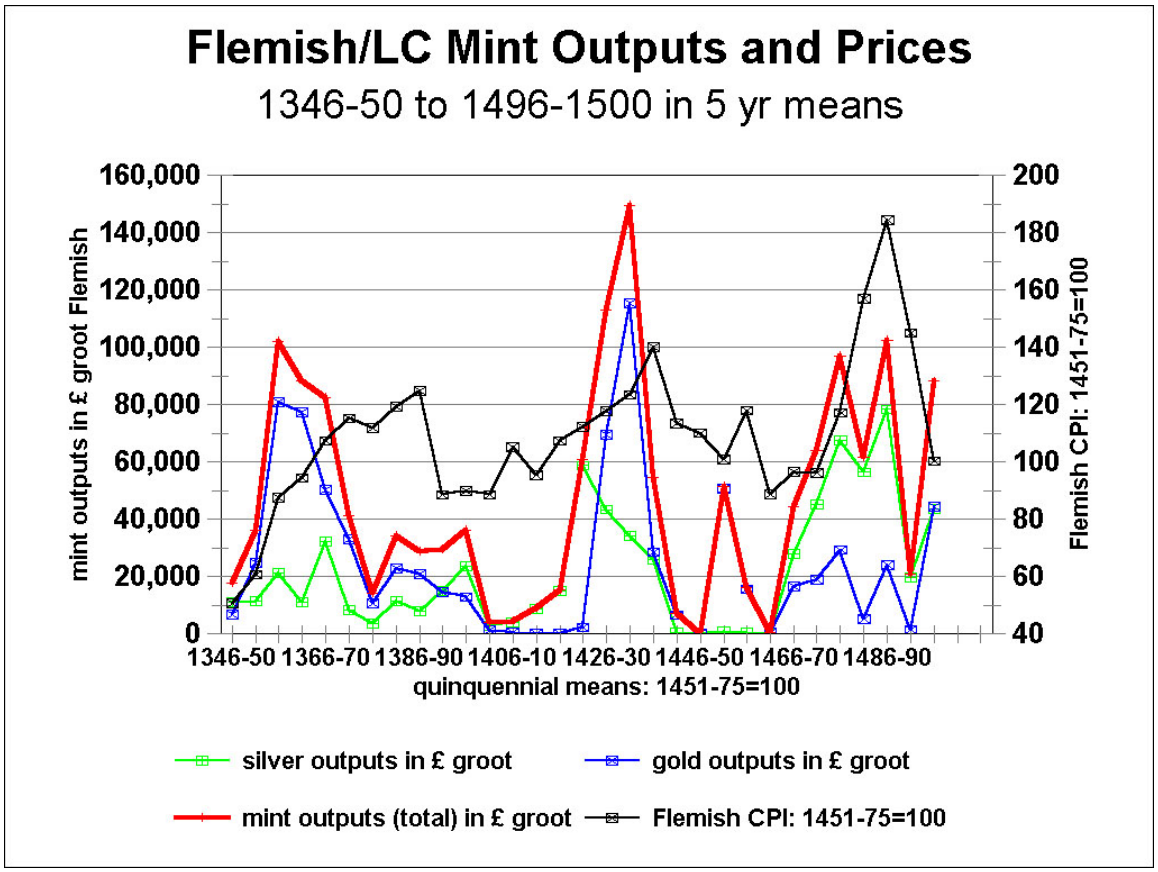

Figure 4:

The values of the gold and silver coinage outputs of Flanders and the other Burgundian Low Countries, compared with the Flemish Composite Price Index, in five-year means, from 1346-50 to 1496-1500.

Flemish composite price index: 100 = mean values of 1451-75.

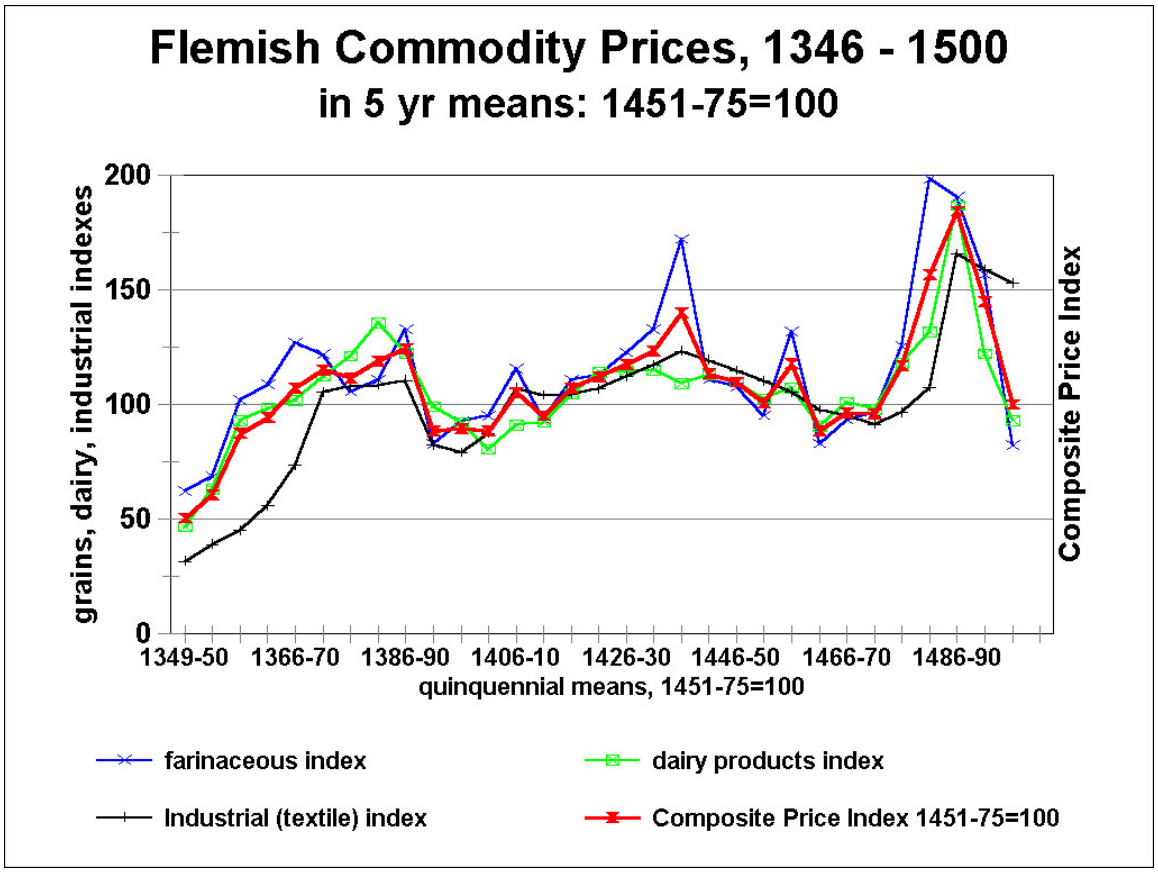

Figure 5:

Flemish commodity prices and the Flemish composite price index, from 1346-50 to 1496-1500, in five year-means

100 = means values of 1451-75

Farinaceous price index: composite of wheat, rye, oats, barley, and malt prices

Dairy products index: composite of butter and cheese prices

Industrial: composite of wool-based textile prices