Comparative Perspectives
on History and Historians

Essays in Memory of Bryce Lyon (1920–2007)

Edited by David Nicholas, Bernard S. Bachrach,
and James M. Murray

Contents

Coinage Debasements in Burgundian Flanders, 1384–1482: Monetary or Fiscal Policies?

John H. A. Munro

Coinage Debasements in Late Medieval Europe

Coinage debasements were one of the most prominent and most harmful features of the later medieval and early modern European economies, though they can also be found in the ancient and earlier medieval worlds. In the later medieval era, the first monarch to undertake large-scale aggressive debasements was Philip IV of France (r. 1285–1314), in 1295, thereby inciting a two-century-long "guerre monétaire."[1] The subsequent Burgundian rulers of the Low Countries (r. 1384–1482), which included the French royal fief of Flanders, 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 counselor of King Charles V (r. 1364–80), had thoroughly condemned—unless undertaken with public approval—on the eve of the Burgundian era, in his famous *Treatise on Coins* (*De origine, natura, jure et mutationibus monetarum*).[2] The first Valois 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 economic and social consequences of medieval and early modern coinage debasements remain very

---

[1] Serres, *Le variations monétaires*; Girard, "La guerre des monnaies"; Graus, "La crise monétaire"; Grunzweig, "Les incidences internationales"; Cipolla, "Currency Depreciation"; Cazelles, "Quelques reflexions."

[2] The tract is also known as *De moneta*, written ca. 1355; see Johnson, *"De moneta."* On Oresme see also Spufford, *Money and Its Use*, pp. 295–304; Bridrey, *La théorie de la monnaie*; and the discussion below.

contentious issues in an ongoing vexatious debate. Two central issues must be resolved. First, were coinage debasements pursued principally as monetary policies or as fiscal policies? Second, whatever the rationale, were the consequences beneficial or harmful to the economies and societies of this era?

Two eminent economists, Thomas Sargent and François Velde, in a much-praised monograph on *The Big Problem of Small Change* (2002), have recently set forth a compelling view that is substantially different from Oresme's hostile verdict. They contend that most medieval and early modern coinage debasements were rational and public-spirited monetary policies undertaken to remedy the chronic, pervasive shortages of "small change," or petty coins.[3] "Small change," as they rightly contend, was generally a "big problem" for premodern Europe, for these were the coins, and the only coins, that the poor, most of the peasantry and laboring classes, and the substantial majority of the population used to purchase food, drink, and other basic necessities.[4]

In support of their arguments, Sargent and Velde cite conclusions from an important article of Debra Glassman and Angela Redish: namely, that "the motive for most debasements was to maintain adequate supplies of coins, not to raise government revenues."[5] While Glassman and Redish analyzed the monetary problems of only early modern Europe, many historians of later-medieval Europe have similarly contended that coinage debasements had often been a necessary remedy for the periodic deflationary "bullion famines" and thus general monetary scarcities of this era.[6]

---

[3] Sargent and Velde, *Big Problem*, pp. 5, 7–8, 10, 40, 152, 187, 261, 321, 324, and esp. p. 161: "We interpret many of these debasements as having been designed to cure shortages of small change, not primarily to gather seigniorage."

[4] A basic fault in their book, however, is the failure to define such terms as "small coins" and "full-bodied coins." For most medieval economic historians, small or petty coins were those that were a fraction of the silver penny, such as the English half-pence and farthings, and the Flemish mites (*mijten*), but even pennies also became, after centuries of debasement, such "small change" (e.g., in later medieval France, Italy, Castile).

[5] The quotation is from Sargent and Velde, *Big Problem*, p. 261n1. See Glassman and Redish, "Currency Depreciation." Their thesis is, however, more complex: that coin shortages or disappearances were due to periodic undervaluations of especially silver coins (in relation to gold), primarily the result of wear and tear, clipping, counterfeiting, and "bimetallism," and thus that "depreciation [debasement] was frequently a response to undervaluation, rather than a trade policy or a means to raise revenue or reduce government debt" (pp. 75, 95). Their thesis does not, in these terms, differ from my explanations for defensive coinage debasement, as explained below.

[6] For this debate, see Munro, *Bullion Flows and Monetary Policies*; Munro, "Wage-Stickiness"; Miskimin, *Economy of Early Renaissance Europe*, pp. 25–32, 132–50; Miskimin, "Money and Money Movements"; Day, *Medieval Market*; Spufford, *Money and Its Use*, pp. 339–62; and the sources cited in n.1, above. Note that these views differ from those of Sargent and Velde, which concern only shortages of "small change."

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 between 790 and 802, in which 1 pound weight of fine silver was valued at 1 *libra* or pound of money of account, consisting of 20 shillings (s.), each of which contained 12 pence (d.), so that 1 pound = 240d.[7] One pence in money of account was always equal or tied to the currently circulating silver penny, whatever its current fineness and weight. That original link between the pound weight of silver and the pound money of account was severed forever by subsequent coinage debasements, over many centuries.

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: the penny, the shilling, and the pound. Such physical reductions in the precious metal of the coin itself took place either by reducing the weight of the coin itself or by diminishing its precious metal fineness by adding proportionately more base metal—usually copper—or, most commonly, by both methods combined.[8] The consequence was to increase the number of coins with a given face value (the penny or the shilling) minted from a pound or *marc* weight (244.753 g) of commercially fine silver.[9]

[7] According to Fournial, *Histoire monétaire*, pp. 24–27, the weight of the Carolingian pound was 489.6 grams; and that is the accepted weight for the later livre (pound) of Paris. Until 1201, when Venice struck its matapan, the penny was the largest silver coin struck in western Europe. See Spufford, *Money and Its Use*, pp. 226–27.

[8] 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 percent pure, with 4.167 percent copper alloy. *Argent le roy* was reckoned in terms of 12 deniers, each of which contained 24 grains, and thus 288 grains in total (see tables 1 and 3). 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 percent pure gold, with 0.53 percent 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.

[9] 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 nn. 7–8, 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 contained 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, "Maze"; Munro, "Money and Coinage"; and especially Tye, *Early World Coins*, pp. 128–41, 163–66.

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 can be seen in tables 1 and 3, 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 terms of the silver-based money of account that had been established for that particular jurisdiction or territory. 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 typical bimetallic mint ratio for these two metals 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 favor silver and thus to "disfavor" 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 to favor 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 favor of one metal (e.g., silver) would have led to the outflow of the other metal (gold). To prevent that exodus, the prince would have had to raise the official exchange rate or money-of-account value of the gold coins, or debase the gold coins as well, by the physical means just discussed.[10]

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 rationale for debasements in medieval and early modern Europe. First, almost everywhere it was illegal to trade or to make transactions in bullion. For the law in most medieval countries or principalities stipulated that all precious metals deemed to be bullion (*billon*)—excluding metals for licensed goldsmiths—had to be surrendered to the prince's mint for coinage.[11] Secondly, even if it had been legal to make transactions in bullion, doing so would

[10] 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 1.

[11] 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 jewelry, plate, objets d'art, dress, and raw materials legitimately acquired by jewelers and goldsmiths for their crafts. See Munro, "Billon—Billoen—Billio."

not have been economically feasible in terms of the required transaction costs: the cost of weighing the bullion, 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.[12] As 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.[13] Usually those precious metals so exported were sold to a 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 twofold. The first was to increase the number of coins of any given coin denomination that could be 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 1 and 3. The second objective was to induce a much greater influx of precious metals into the ruler's mint: from both domestic and foreign bullion, including demonetized coins.[14]

Burgundian Coinage Debasements as Monetary Policies: The Debate about the Late Medieval "Bullion Famines," Deflation, and Their Resolution

The foregoing 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 periodic or even chronic coin scarcities during the well-known "bullion famines" of

[12] For the economics of these mintage fees—brassage and seigniorage—see below, pp. 331–32, and table 1.

[13] For reasons why coins would lose that *agio*, see below, pp. 322, 328.

[14] See n. 11, above.

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.[15]

Since then, however, my research convinced me that much of western Europe, and especially the Low Countries and England, did indeed experience 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.[16] Furthermore, my research on Burgundian monetary history also convinced me that there were good prima facie grounds for contending that the late medieval Low Countries experienced a chronic and severe shortage of petty coins: for the Burgundian mint accounts show that rarely was more than 1 percent of the bullion received minted into these petty coins, known as *monnaies noires* (because they were largely copper).[17]

The evidence for such monetary scarcities can be found in the drastic declines in mint outputs—often verging on a complete cessation of new coinages—and of deflations that prevailed in northwestern Europe during these two periods (see figs. 1–4). Several of my publications since then have been devoted to this theme, in particular to demonstrating the seriously negative economic consequences of deflation, that is, of a serious, continuous, sustained fall in the price level. I also contended that the late medieval bullion famine era came to an end in the 1470s, after low commodity prices (i.e., deflation) had provided the economic motivation or profit incentive for the two technological innovations that resolved this monetary problem: by increasing the purchasing power of silver. 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).[18] From the 1550s, Europe began receiving even larger influxes of silver from the new Spanish American colonies.[19]

Neither coinage debasements nor any reputed advances in late medieval banking and finance had ever played an effective role in combating the periodic

---

[15] For such views, which I no longer endorse, see Munro, *Wool, Cloth and Gold*, esp. pp. 11–41.

[16] Munro, "Mint Policies"; Munro, "Bullion Flows and Monetary Contraction"; Munro, "Mint Outputs"; Munro, "Monnayage"; Munro, "Deflation"; Munro, *Bullion Flows and Monetary Policies*; Munro, "Wage-Stickiness"; Munro, "Monetary Origins"; Munro, "Before and After."

[17] Munro, "Deflation," in particular table 3, p. 396.

[18] Munro, "Central European Mining Boom"; Munro, "Monetary Origins."

[19] Munro, "Money, Prices, Wages"; Hamilton, *American Treasure*.

late medieval monetary scarcities and deflation.[20] Nor have I ever been able to find any evidence, in the vast documentation now available for Burgundian Flanders, that its rulers ever undertook coinage debasements as monetary policies specifically to pursue any such reflationary monetary objectives, with one minor, indeed trivial, exception.

On August 31, 1457, during the worst phase of the mid-century bullion famine, the Burgundian monetary authorities instructed the Bruges mintmaster 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. Two perspectives may be offered on the resulting mint outputs for the quinquennium 1456–60. On the one hand, only 51.302 kg of fine silver were minted—compared to 112 times as much in 1426–30: 5,724.645 kg. On the other hand, 11.4 percent of the fine silver struck in the Flemish mints in the later 1450s (none from October 1458 to June 1466) was coined into mites—and that high percentage may be compared to a typical percentage, as previously noted, of about 1 percent of such silver coined in mites during the rest of the Burgundian era.[21]

Late Medieval "Bullionism" and Defensive Motives for Coinage Debasements

Although late medieval mint and monetary policies in northwestern 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. "Bullionism"—producing 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.[22] Late medieval bullionist policies may be attributed not just to a ruler's mint-profit motives, but also to the strong, almost universal conviction

[20] See Munro, "Bullionism"; Munro, "Patterns of Trade"; Munro, "English 'Backwardness,'"; Munro, "Wage-Stickiness."

[21] These *courtes* had a fineness of 12 grains silver = 4.17 percent *argent le roy*. See Deschamps de Pas, "Histoire monétaire," pp. 123–24, and Munro, "Deflation," in particular table 3, p. 396. This exception is nowhere mentioned in Sargent and Velde, *Big Problem*.

[22] See Munro, *Wool, Cloth and Gold*, pp. 11–41; Munro, "Bullionism"; Munro, "Bullion Flows and Monetary Contraction." Medieval and early modern England was an exception. From 1364 to 1663 Parliament banned the export of all English legal tender coins. See statute 38, Edwardi III, stat. 1, cap. 2 (Jan. 1364), in Tomlins, *Statutes of the Realm*, 1:383, and Rymer, *Foedera*, 3.2:728; and statute 15, Carolus II, cap. 7 (May 1663), in Tomlins, *Statutes of the Realm*, 5:452, sec. 9. See also Munro, "Bullionism," pp. 187–205, 216–39.

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 practiced by so many late medieval princes may be viewed as aggressive, their victims would have been not only their own subjects but also residents of neighboring 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 defense is offense, many princes 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 import 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 to the prince's mints.[23] What these rulers clearly perceived, correctly, was the operation of what is called "Gresham's Law": in essence, that cheap money—debased or counterfeit and thus bad money—drives out dearer coins, in the form of better-quality, higher-silver or higher-gold content coins.[24]

Though without specific references to Gresham's Law, Peter Spufford has contended that periodic coinage debasements, instead of alleviating coin scarcities, too often acted only to exacerbate hoarding, with negative consequences for the economy.[25] Gresham's Law assumes that the good coin that is driven out by the influx of debased foreign coins or by the circulation of domestic debased coins is either hoarded, converted into plate, or exported.[26] 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

[23] See n. 11, above.

[24] See Munro, "Gresham's Law"; Munro, *Wool, Cloth and Gold*, pp. 11–41; and nn. 30, 38, below. This law is attributed to Sir Thomas Gresham (1519–79), 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). But he did not formulate the law as such, and it was well known centuries before.

[25] 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."

[26] See nn. 24, above, 30 and 38 below.

were more the consequence of reduced monetary flows than of reduced monetary stocks, including supposed outflows of bullion in trade with the East.[27]

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

The same consequences, however, could also have been produced by simple wear and tear of the coins over time, since both silver and gold are soft metals, even when alloyed with copper as a necessary hardening agent.[28] When such clipping, wear and tear, or other diminutions in the precious-metal content 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 would have ceased to flow into the prince's mints.[29] That would have forced the prince to engage in a defensive 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 also renewed an influx of bullion into the prince's mints.[30]

Finally, if many medieval debasements were indeed merely defensive, many of those coinage alterations can be understood properly only as reactions to aggressive debasements in neighboring realms.

Burgundian Coinage Debasements:
Aggressive Motives for Fiscal Policies to Finance Warfare

Almost all late medieval mint ordinances, certainly those from France and the Low Countries, include virtual renditions of Gresham's Law, and citations of these

---

[27] See Munro, *Bullion Flows and Monetary Policies*; Munro, "Patterns of Trade"; Munro, "Wage-Stickiness."

[28] See Patterson, "Silver Stocks"; and Mayhew, "Numismatic Evidence." Feavearyear, *Pound Sterling*, pp. 1–45, argues that most English debasements, before those of Henry VIII, were undertaken for such defensive reasons; but medieval England was a monetary anomaly. See nn. 30 and 64, below.

[29] For the concept of coinage *agio*, or its premium in value over bullion, see above, pp. 318, 328.

[30] On this, see Feavearyear, *Pound Sterling*, pp. 1–45. For early modern Europe, see very similar arguments in Glassman and Redish, "Currency Depreciation." For the importance of both coinage "wear and tear" and Gresham's Law in Henry VIII's defensive debasement of 1526, see Munro, "Monetary Policies of Henry VIII," pp. 437–50.

very adverse circumstances, to justify defensive motives for the prince's coinage debasements.[31] Obviously it was 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, Edward IV's debasement of 1464, was only partly defensive and certainly much more aggressive.[32] Virtually all debasements in late medieval France and the Low Countries, where the evidence can be weighed carefully, were essentially aggressive in nature even when retaliatory.

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 operated with a goal of producing profits. The term *seigniorage* is still used for the same purpose: to indicate a source of government revenue from printing money.[33] In medieval and early modern Europe, those profits came from the revenues that most (if not all) governments of this era earned by virtue of their rigid monopoly on coinage in their own states or principalities.

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

The mint and the coinage, however, were the prince's exclusive prerogative, even though that prerogative was sometimes challenged.[34] Often late medieval

[31] See Munro, *Wool, Cloth and Gold*, pp. 28, 33, 35n24, 40, 44n6, 49, 58n54, 60, 74n33, 87n58, 101n20, 150n76, 161n19, 169.

[32] Feavearyear, *Pound Sterling*, pp. 15–45; Munro, *Wool, Cloth and Gold*, chs. 1–6.

[33] Investopedia Dictionary, http://www.investopedia.com/dictionary (accessed August 2011): "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."

[34] 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. Tomlins, *Statutes of the Realm*, 1:322 (stat. 25, Edwardi III, stat. 5, cap. 13). See Munro, *Wool, Cloth, and Gold*, pp. 35, 159–63; Mayhew, "Monetary Background," pp. 62–73. See below for Flanders, in 1418 and 1433, on pp. 334–35; and Spufford, "Coinage"; Spufford, *Monetary Problems*, pp. 1–46.

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).[35] 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, as stated in his treatise *De moneta* (ca. 1355): "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."[36]

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 3, below. It compares the coinage of the Flemish double *groot*, 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 grams, or 11.77 percent of its former (1418) fine silver content. That diminution in silver content had been achieved by reducing both the fineness and the weight of the double *groot*: the former, from 50.00 percent fineness (6 deniers *argent le roy*) or 47.92 percent purity, to 42.59 percent purity (5 deniers 8 grains); the latter from a weight of 1.800 grams (68 cut to the *marc de Troyes*) to 1.588 grams (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 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 × 2d.) to 25s. 8d. 6 mites.[37] The consequences can be seen in table 4.

[35] Van Werveke, "De economische"; Van Werveke, "Currency Manipulation."

[36] Johnson, *"De Moneta,"* 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."

[37] Note, in table 3, that the reduction in the coin's silver content, by 11.77 percent, resulted in a 13.33 percent increase in the value of the *traite per marc de Troyes* of commercially fine silver. Thus, the number of double *groot* coins struck from that *marc* in November 1428, namely 154.125, is 13.33 percent greater than the 136 double *groot* coins struck from the same *marc* from June 1418 to October 1428: that is, 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, pp. 328–31. For definitions of the monetary terms, see nn. 8–9, above.

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 for their bullion (including previous and demonetized domestic coin issues) than that offered by any competing mints. The merchants' actual gains depended on the fulfillment of three conditions. First, 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. Secondly, 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 goods and services within the domestic economy, within the "short run"—in time for the merchants to spend their new coins.

Comparing the number and the money-of-account values of the double *groot* coins that merchants received for their bullion in June 1418 with those received after the debasement of November 1428, as indicated in table 3, we find that in June 1428 they received, per *marc* of commercially fine silver, 127 double *groot* coins worth 21s. 2d. *groot* (93.38 percent of the bullion delivered); and in November 1428, 144 double *groot* coins, now worth 24s. 0d. *groot* (93.43 percent of the bullion delivered). Their purely *nominal* gain of the extra 17 coins (or 34d.: or 2s. 10d. *groot*) was 13.38 percent. 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 practiced, and for several centuries. The critics' 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, that is, in proportion to the amount of silver contained in the immediately preceding coin issue. Such discounting would thus have 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 that it is therefore a modern fallacy.[38]

[38] See Rolnick and Weber, "Gresham's Law"; Rolnick, Velde, and Weber, "Debasement Puzzle"; Sargent and Smith, "Coinage Debasements"; and Velde, Weber, and Wright, " Model of Commodity Money." A much more nuanced, highly modified view appears in Sargent and Velde, "Big Problem," 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." For even earlier views, influencing Rolnick and Weber, see Miskimin, "Enforcement of Gresham's Law"; and Miskimin, "Money, the Law, and Legal Tender." For my own views, see Munro, "Gresham's Law" (and n. 24, above).

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.[39]

Medieval Hammered Coinages:
Problems of Detecting Changes in Weight and Fineness

An even more compelling argument to explain the general acceptance of even debased legal 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 mintmaster's employees first cut out circular disks, known as blanks. The mintmaster or his trained deputy then placed each blank 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 the 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*: that is, 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 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. From a comparison of the two mint ordinances, we can well understand 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 to one hundred coins to detect differences on such scales. Needless to say, most retail merchants, let alone individual customers, would not have been so equipped to undertake such costly tests.

Detecting changes in the coin's fineness was even more difficult, especially when the changes were as small as those indicated in table 3, for the Flemish debasement of November 1428. For, 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 color comparisons, as a gauge of the fineness, or the mixture of silver and

---

[39] See above, pp. 317–18.

copper alloy. Under the best of circumstances, they were very crude measuring devices that were rarely accurate within 5 or even 10 percent.[40] The only certain way to detect and measure changes in silver content 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 mintmasters, without debasements.

Indeed, contrary to some erroneous views in the economic history literature, most people—whether merchants, tradesmen, artisans, laborers, or peasants—almost always accepted coins by *tale*—that is, by number, at face value, without ever weighing, assaying, or otherwise testing them.[41] Indeed, as contended earlier, coins with the prince's official stamp certifying their 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 transaction costs, vital for all trades. To be sure, in foreign trade transactions, some wealthy merchants, particularly Italians or Hanseatic Germans, might have tested gold coins in large-value transactions, because the transaction costs of doing so were relatively lower, while the potential costs of fraud were much 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*, with 11 deniers 12 grains *argent le roy* (95.83 percent fine = 91.84 percent pure), contained 3.794 grams pure silver. But in 1384, when the Burgundian era commenced, its fineness had been reduced to just 6 deniers *argent le roy* (50.00 percent fine), and it contained only 1.173 grams pure silver, only 30.92 percent as much as in 1300 (table 1). Over those years, would its exchange value have been discounted to just one-third of a penny *groot*? Of course not: the 1384 *groot* still circulated at the same nominal value of 1d., just as it had done in 1300.[42] Nevertheless, if confidence in the coin-

[40] Grierson, *Numismatics*, pp. 100–111, 150–55; Grierson, "Medieval Numismatics," pp. 124–34; Grierson, "Coin Wear"; Grierson, "Weight and Coinage"; Girard, "Guerre des monnaies"; Fournial, *Histoire monétaire*, pp. 9–38.

[41] See pp. 317–18, above. But Sargent and Velde, *Big Problem*, pp. 16–19, 22, 75, did conclude subsequently that commercial transactions using coin were generally conducted by *tale*, rather than by weight.

[42] If the debasement reduced the silver content by exactly 10 percent, then by the formula given in n. 37 for changes in the *traite* values—ΔT (*traite*) = $[1/(1 - x)] - 1$—the requisite discount, by this approach, would have been 11.11 percent. Such a discount could not have been achieved and translated into any practical money-of-account.

age in general did wane, especially with increased supplies of counterfeit coins, merchants and tradesmen would finally have resorted to discounting the entire coinage: by raising their prices and thus eliminating, as suggested earlier, the *agio* on coinage, with negative consequences for the prince's mint outputs (see p. 318).

Did Inflation Eliminate the Potential Gains from Debasements?

The second and seemingly compelling objection or counterargument 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 figures 1–4. That evidence provides convincing proof that these periodic coinage debasements did indeed increase the Flemish coined money supply, and that such increases did lead to some periodic inflations. The pure silver content of the Flemish penny *groot* had fallen even more, during the century-long Burgundian era: from the aforesaid 1.173 grams in 1384 to 0.522 grams in 1482, a loss of 0.651 grams = 55.49 percent of its 1384 content (table 1). During this same era the Flemish Consumer Price Index (base 1451–75 = 100) rose from 122.185 to 193.932, an increase of 71.75 = 58.72 percent (fig. 4).[43] Those figures seem comparable.

But these statistics are misleading in several ways. In the first place, a comparison of diminutions in metal content 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 silver contents with the expected rise in the money-of-account value of a *marc* weight of commercially fine silver (244.753 g)—that is, its *traite* value:[44] ΔT (*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 percent reduction in the fine silver content of the penny would have produced an 11.11 percent rise in the nominal value of the new coined *marc* of silver and thus a potential increase of 11.11 percent in the coined money supply.

---

[43] For the construction of the Flemish Consumer Price Index, see Munro, "Wage-Stickiness," table 1, p. 231, and Munro, "Builders' Wages," esp. table 1, pp. 1048–49.

[44] For definitions of fineness and weight in terms of the *marc de Troyes*, see nn. 8–9, 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 *alloyed 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; and finally that sum is divided by the fineness of the alloy (as a percentage of purity). Thus the *Traite* = (*taille* * face value)/percentage fineness.

By the crude, simplistic Quantity Theory of Money, that should also have been the rate of inflation. In Flanders, however, the expected rate of inflation over the century 1384–1482, resulting from a 55.47 percent reduction in the penny's silver content, should have been 124.57 percent, by this formula—instead of the far more modest 58.72 percent rise in prices that did occur.[45] While this snapshot is useful for purely heuristic purposes, the real statistical tests would have to be undertaken by measuring the year to year changes in the domestic price index, following each coinage debasement.

The historical lesson is clearly demonstrated in table 2, which relates changes in the Flemish silver coinages to changes in the price level, for each year from 1380 to 1482. 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 should have compelled merchants to surrender all their own current coins to the mint. But many would have chosen to retain their higher-weight specimens, knowing that their higher bullion content would later fetch a higher market value. Second, even if a silver debasement was also designed to attract other sources of bullion, especially from neighboring lands, the expected monetary loss would have been in some outflow of the other metal, gold, for reasons noted earlier. Third, coins did not account for the entire money supply. We must therefore also take account of changes in credit instruments and the supply of credit, a subject that I have considered in several other publications.[46]

Fourth, consider the logic of the modernized Quantity Theory of Money, whose basic formula is M.V = P.y. Any inflationary consequences—that is, a rise in P (Consumer Price Index or CPI)—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 an increase in y: net national product (NNP) and income (NNI). 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, that is, 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, rather than profitably investing those funds or spending them. The reasons for holding cash balances are known collectively as *liquidity preference*, involving a mixture 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

---

[45] See table 1, below, and the mathematical relationships indicated in nn. 37, 42, and 44, above.
[46] See pp. 319–20 and nn. 20 and 22, above.

balances held). That is the equivalent to a reduction in V, the income velocity of money.

Fifth, perhaps the most important factor was simply the failure of coinage debasements (along with credit instruments) to counteract or fully offset the prevailing deflationary consequences of long-term, widespread monetary scarcities: the prevalent bullion famines noted earlier. 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 impact. Furthermore, four series of coinage debasements in Burgundian and then Habsburg Flanders were 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, 1389–90, 1433–35, and 1492–93. By necessarily contracting the money supply, in reminting debased coins into necessarily fewer but stronger coins, these *renforcements* themselves had severely deflationary consequences that are readily apparent in figure 4.[47]

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 was necessary for the increased number 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 ultimately have 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.[48] Provided, therefore, that the merchants spent those double *groot* coins quickly enough after receiving their newly debased coins, and spent them on the right selection of goods and services, before prices rose, they would certainly have realized a genuine net *real* gain.

Third, we may observe further that money changers and merchants who gained from delivering bullion to the mints and from quickly spending their increased number of coins benefited from what is now known in economics as asymmetric information: that they were privy to the knowledge of the mint changes that remained unknown, for some time, to the general public.[49] But

[47] See table 1.

[48] See above, pp. 327–28; table 2 and figure 4. See also, in support of these views, the evidence cited in Munro, "Monetary Contraction"; Munro, "Mint Outputs"; Munro, "Deflation"; Munro, "Wage-Stickiness"; Munro, "Money, Prices, Wages"; Munro, "Monetary Origins"; Munro, "Before and After."

[49] See Gandal and Sussman, "Asymmetric Information." 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.

inevitably such information was disseminated to most of 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 10 percent (table 1), for the stipulated mintage fees, which comprised two items: the brassage, for the mintmaster; and the seigniorage, for the prince. The brassage fee can be readily understood: it cost money to make money. Obviously, the mintmaster had to be compensated for his production expenses: the copper alloy added, the labor costs of production, the capital costs of his tools (hammers, dyes, furnaces, forges, melting pots, shears), and the administrative costs of operating the mint.[50] Those costs were normally modest, except for the petty coinage, the *monnaies noires*, with high copper contents. In accordance with the Flemish mint ordinance of June 1418, the mintmaster retained 7 of the 136 double *groot* coins struck (table 3). That amounted to 1s. 2d. *groot* or 5.15 percent of the bullion delivered. But the mint ordinance for the debasement of November 1428 awarded the mintmaster a miniscule 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 percent to 4.62 percent, an amount that likely was insufficient to cover his increased costs for labor and copper alloy. So much for the view that mintmasters had instigated most debasements for their own profit.

The other mintage fee was seigniorage: the tax that the prince imposed on minting coins, 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 on coinage and indeed of his sovereignty, and it was usually treated therefore as a capital crime.[51] Clearly, at least in proportional terms, the agent who realized the greatest gain was the prince; in this case 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 percent rise, increasing his share of the bullion delivered to the mint from 1.47 percent to 1.95 percent (table 3).

Indeed, the single best test for whether a coinage debasement was aggressive, motivated by profit seeking, or merely defensive is whether the prince increased his

---

[50] Since the mint was the property of the prince, he was responsible for the capital and maintenance costs of the mint buildings, but not of the mintmaster's equipment.

[51] See Munro, "Profits of Counterfeiting"; Munro, "Maze."

seigniorage rate.[52] If the debasement had been designed to remedy deficiencies in the coin supply, why would the prince have raised his seigniorage rate? We should consider especially 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 indeed a skilled art.

The prince's increased mint profits were based on two factors: the increase in the seigniorage rate itself, and the debasement's success in increasing the Flemish mint output, subject to the constraints on total mintage fees just noted. As table 4 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 percent (from 1,078.65 kg to 16,996.01 kg); the current value coinage output, in pounds *groot* Flemish, by 1666.02 percent (from £5,267.28 to £93,021.38 *groot*); and the seigniorage revenues by 1554.47 percent (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 princes, 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 reform the Flemish coinage and impose a monetary unification on his Low Countries's domains, in 1433–35.[53]

Debasements and Warfare in the Burgundian Low Countries

Of course, it would be an enormous and tedious task to demonstrate that each of the numerous Flemish coinage debasements was undertaken primarily for such fiscal motives, specifically to finance warfare and defense. Only the major wars need to be cited here.[54] First, under Duke Philip the Bold (r. 1384–1404): the second Van Artevelde or Ghent rebellion (aided by English intervention), from 1379 to 1385; and the Guelders war of 1388. Under Duke John the Fearless (r. 1404–19): 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 in 1415. From 1424 to 1428, during his wars with Charles, Philip also became involved in the Hoek/Kabeljauw civil

[52] See table 1. Note the increase in the seigniorage rates with all the major debasements and their reductions with a return to stronger and stable coinages. For changes in seigniorage charge under Henry VIII (r. 1509–47), for these reasons, see Munro, "Monetary Policies," pp. 442–56, and table 1: part 3, pp. 461–63; table 2: part 3, pp. 470–75.

[53] See p. 334 and nn. 60–61, below.

[54] See Vaughan, *Philip the Bold*; Vaughan, *John the Fearless*; Vaughan, *Philip the Good*; Vaughan, *Charles the Bold*; Calmette, *Golden Age*; Nicholas, *Medieval Flanders*, pp. 317–99.

war in Holland-Zeeland, which also embroiled him in conflict with England, and ended with Burgundian acquisition of these imperial counties. Duke Philip subsequently complained to his subjects how costly these wars were:

> 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.[55]

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 of 1436–39, complicated by the separate Dutch-Wendish wars of 1438–41.[56] Then, relative peace, and an absence of coinage debasements, ensued over the next two decades, until Philip's son Charles the Bold (r. 1467–77) renewed the Burgundian conflicts with Louis XI's France. That struggle began with the rebel League of the Common Weal in 1465–66, before Charles became duke. That in turn led to Charles's 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's death at the hands of the Swiss, at Nancy in 1477. In that year, his daughter Mary married the Habsburg archduke Maximilian (d. 1519). Her accidental death in March 1482 and Maximilian's succession led to protracted civil wars in Flanders and to even more horrendous coinage debasements, ending only in 1492–93. These events are all beyond the scope of this study.[57]

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

[55] Speech before the deans of Ghent's craft guilds in January 1447, cited (and translated) by Vaughan, *Philip the Good*, pp. 307–8, quoted from the Flemish texts in *Dagboek van Gent*, 1:57–68.

[56] See the sources cited in n. 54, above, and also Munro, "Economic Aspect"; and Munro, *Wool, Cloth, and Gold*, pp. 65–126.

[57] Duchess Mary, unlike her father Charles but following her grandfather's admonition to maintain "la bonne monnoie," had opposed further debasements. The debasement of July 18, 1482, was thus undertaken by the widower Maximilian (see table 1). See Spufford, *Money*, p. 313. See also nn. 62, 64, below.

scarcity and deflation. Indeed, as stressed earlier as a crucial point in this study, the Burgundian rulers always ended their rounds of debasements with severely deflationary *renforcements*. Secondly, as also observed earlier, the combination of coinage debasements and related bullionist measures generally served only to aggravate monetary scarcities by impeding 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 tax burden on the entire population.[58] 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," proved to be socially unjustified, because those reforms always led to a deflation in which the fall in consumer prices was greater than the nominal wage cuts, so that real wages actually rose (as they did in the 1390s, 1440s, and 1490s).[59]

Finally, the view that coinage debasements had been undertaken to remedy severe coin shortages, and thus to benefit the public, is contradicted by Flemish public demands, as put forth by the Four Members (*vier leden*: Ghent, Ypres, Bruges, Franc de Bruges), and also by the Burgundian Estates-General, which regarded debasements as a cure worse than the disease. After two of Philip the Good's debasements, Flanders' Four Members forced Philip not to undertake any further coinage alterations for specified periods: in 1418–19, for fifteen years;[60] and in 1433, for another twenty years.[61] Philip, however, broke his first promise, chiefly

---

[58] See Munro, "Usury Doctrine"; Munro, "Wage-Stickiness."

[59] See Munro, "Gold, Guilds, and Government"; Munro, "Wage-Stickiness"; Munro, "Builders' Wages"; and the publications by Van Werveke cited in n. 35, above.

[60] See Munro, *Wool, Cloth and Gold*, pp. 74–76, and p. 75n34 in particular. The most important study on this issue is Spufford, "Coinage." In March 1418 the Four Members of Flanders (*vier leden*) had in fact requested no changes for the next forty years, that "dese munte sal ghedeurch zijn zonder angheven ofte veranderen xl jaer"; but that period was reduced to fifteen years in the final ordinance, in Algemeen Rijksachief, Rekenkamer, reg. no. 1158, fol. 7v. When Philip became count in his own name in 1419, the Four Members required him to repeat this promise; Gilliodts–Van Severen, *Cartulaire*, 1:526, no. 630. See above, n. 51.

[61] Munro, *Wool, Cloth and Gold*, pp. 101–3; Spufford, "Coinage," pp. 63–88; Van Dusye and Busscher, *Archives de la ville de Gand*, no. 552, p. 192: charter of January 18, 1434.

by engaging in debasements in his recently acquired and neighboring provinces of Namur, Holland-Zeeland, and Brabant, but also once in Flanders itself, at Ghent, in November 1428 (table 3). Yet he did keep his second promise (at least for silver) 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.[62] But Philip's debasements were mild compared to those of his successors, Duke Charles the Bold and Archduke Maximilian, from 1467 to 1492, especially in the 1480s.[63]

In viewing the monetary history of late medieval western Europe, no one would contend that the Burgundian Low Countries were unique. Most, if not all, countries and principalities practiced very similar monetary policies, with the same observable links between warfare, coinage debasements, and seigniorage profits.[64] 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 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.[65]

---

[62] Edward IV reduced the silver contents of the sterling penny by 20.00 percent and the gold contents of the English noble by 25.93 percent, thus altering the mint-ratio in favor of gold. Duke Philip (d. June 15, 1467) reduced the silver content of the penny *groot* by 13.57 percent in May 1466 and his son, Duke Charles, did so by another 3.77 percent 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 favoring silver. See the details in Munro, *Wool, Cloth, and Gold*, pp. 160–77, appendices B–K, pp. 190–211; Mayhew, "Monetary Background'; and n. 34, above.

[63] See p. 333 and nn. 57, 62, above.

[64] See n. 1, above. For the principal offenders, see Spufford, *Money and Its Use*, ch. 13, "The Scourge of Debasement," pp. 289–318, esp. table 5, p. 295, and graph 3 (on twelve currencies, 1252–1500), pp. 296–99. The two principal exceptions were England before Henry VIII's "Great Debasement" of 1542–52 and Spain (Castile), from 1497 to 1686. See n. 65, below. See also Mayhew, "Monetary Background," pp. 62–73; Munro, "Monetary Policies of Henry VIII," pp. 423–76; Ulloa, "Castilian Seigniorage," pp. 459–79; Motomura, "Best and Worst of Currencies," pp. 104–27; Motomura, "New Data," pp. 331–37; and the next note.

[65] See the tables and their sources, and the list of my publications in the bibliography, below. 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 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 the debasement monetary polices, as indicated in nn. 62, 64, above.

Table 1. The Flemish Silver Coinages: from 1300 to 1482

Table 1 A. The Flemish Silver Groot: Silver Contents and Values of a Kilogram of Silver 1300–1482

Silver Groot: Constant Nominal Value of 1d Groot Flemish

Date	Fineness in Argent-le-Roy in deniers	Fineness in Argent-le-Roy in grains	Fineness as a Percentage	Taille to Marc de Troyes	Grams Pure Silver in the Groot	Percentage Change of Silver in the d groot	Traite of Marc de Troyes in Shillings	Value of 1 kg Pure Silver in £ groot	Index 1351 = 100.00
1300-04-02	11	11.50	95.660%	59.133	3.7944		5.1513	1.0981	50.73
1331-08-08	10	12.00	87.500%	57.000	3.6006	-5.11%	5.4286	1.1572	53.46
1332-03-13	10	6.00	85.417%	57.500	3.4843	-3.23%	5.6098	1.1958	55.25
1335-05	10	6.00	85.417%	57.500	3.4843	0.00%	5.6098	1.1958	55.25
1337-05-25	9	0.00	75.000%	60.500	2.9077	-16.55%	6.7222	1.4330	66.20
1343-04-16	8	0.00	66.667%	66.000	2.3692	-18.52%	8.2500	1.7587	81.25
1344-01	8	0.00	66.667%	66.000	2.3692	0.00%	8.2500	1.7587	81.25
1344-08	8	0.00	66.667%	66.000	2.3692	0.00%	8.2500	1.7587	81.25
1345-09	8	0.00	66.667%	66.000	2.3692	0.00%	8.2500	1.7587	81.25
1346-01-20	7	16.00	63.889%	66.000	2.2705	-4.17%	8.6087	1.8351	84.78
1346-08	7	16.00	63.889%	66.000	2.2705	0.00%	8.6087	1.8351	84.78
1346-11-24	6	23.50	58.160%	66.000	2.0669	-8.97%	9.4567	2.0159	93.13
1351-05-28	6	12.00	54.167%	66.000	1.9250	-6.87%	10.1538	2.1645	100.00
1351-07	6	12.00	54.167%	66.000	1.9250	0.00%	10.1538	2.1645	100.00
1353-09-7	6	8.00	52.778%	67.500	1.8340	-4.73%	10.6579	2.2719	104.96
1354-12-20	6	4.00	51.389%	69.000	1.7469	-4.75%	11.1892	2.3852	110.20
1359-10-22	6	0.00	50.000%	70.000	1.6754	-4.09%	11.6667	2.4870	114.90
1361-12-04	6	0.00	50.000%	72.000	1.6289	-2.78%	12.0000	2.5580	118.18
1363-12-01	6	0.00	50.000%	78.000	1.5036	-7.69%	13.0000	2.7712	128.03

1365-04-12	8	66.667%	0.00	114.000	1.3717	-8.77%	14.2500	3.0377	140.34
1368-01-21	7	62.500%	12.00	114.000	1.2859	-6.25%	15.2000	3.2402	149.70
1369-04-21	7	59.722%	4.00	114.000	1.2288	-4.44%	15.9070	3.3909	156.66
1369-09-22	6	50.000%	0.00	100.000	1.1728	-4.56%	16.6667	3.5528	164.14
1373-06-18	6	54.167%	12.00	114.000	1.1145	-4.97%	17.5385	3.7387	172.73
1380-01-30	6	50.000%	0.00	116.000	1.0110	-9.28%	19.3333	4.1213	190.40
1383-09-12	5	47.917%	18.00	116.000	0.9689	-4.17%	20.1739	4.3005	198.68
1384-09-10	6	50.000%	0.00	100.000	1.1728	21.04%	16.6667	3.5528	164.14
1386-04-18	5	44.444%	8.00	102.000	1.0220	-12.85%	19.1250	4.0769	188.35
1386-10-29	5	43.750%	6.00	102.000	1.0061	-1.56%	19.4286	4.1416	191.34
1387-04-03	5	43.056%	4.00	119.000	0.8486	-15.65%	23.0323	4.9098	226.83
1388-10-01	4	40.278%	20.00	121.000	0.7808	-8.00%	25.0345	5.3366	246.55
1389-12-20	5	41.667%	0.00	96.000	1.0180	30.39%	19.2000	4.0929	189.09
1391-01-24	5	41.667%	0.00	97.000	1.0075	-1.03%	19.4000	4.1355	191.06
1393-06-20	5	41.667%	0.00	96.000	1.0180	1.04%	19.2000	4.0929	189.09
1407-04-30	5	41.667%	0.00	88.500	1.1043	8.47%	17.7000	3.7731	174.32
1407-07-07	5	41.667%	0.00	96.000	1.0180	-7.81%	19.2000	4.0929	189.09
1409-08-17	5	41.667%	0.00	82.667	1.1822	16.13%	16.5333	3.5244	162.83
1411-11	5	41.667%	0.00	82.667	1.1822	0.00%	16.5333	3.5244	162.83
1416-12-06	4	34.722%	4.00	85.000	0.9581	-18.95%	20.4000	4.3487	200.91
1418-06-12	5	41.667%	0.00	115.000	0.8498	-11.30%	23.0000	4.9029	226.52
1428-11-07	4	37.500%	12.00	117.500	0.7486	-11.91%	26.1111	5.5661	257.15
1433-10-12	6	50.000%	0.00	144.000	0.8144	8.80%	24.0000	5.1161	236.36
1464-08	6	50.000%	0.00	144.000	0.8144	0.00%	24.0000	5.1161	236.36
1466-05-23	5	41.667%	0.00	139.000	0.7031	-13.67%	27.8000	5.9261	273.79
1467-10-13	4	37.500%	12.00	130.000	0.6766	-3.77%	28.8889	6.1582	284.51
1474-12-10	4	33.333%	0.00	131.000	0.5968	-11.79%	32.7500	6.9813	322.54
1477-09-20	3	29.167%	12.00	131.000	0.5222	-12.50%	37.4286	7.9786	368.61
1482-07	3	26.042%	3.00	131.000	0.4663	-10.71%	41.9200	8.9361	412.85

Sources: See Sources for Tables and Figures

Table 1 B. Alterations of the Flemish Silver Coinages: 1384–1482
with Bullion Prices, Seigniorage and Brassage Fees

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	Seigniorage £ 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									
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
Groot	1.000	50.00%	0.4792	144.00	1.6997	0.8144	1.2000	1.1375	0.00833	0.05417

Table 1 B (continued)

Date and names of the silver coins	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	Seigniorage £ gr	Brassage £ gr
Double Groot										
Single Groot										
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	Total Mint Charges £ gr	SUM BP+MC = Traite £ gr	Seigniorage 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%
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%

Table 1 B (continued)

Date and names of the silver coins	Total Mint Charges £ gr	SUM BP+MC = Traite £ gr	Seigniorage as % of Traite	Brassage as % of Traite	Bullion Price as % of Traite	Percent Change in Silver Content	Percent Change in the Traite
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%
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%		14.58%
Double Groot or Patard	0.0583	1.3750	0.45%	3.79%	95.76%	-12.73%	15.78%
Groot	0.0727	1.3893	0.45%	4.78%	94.77%	-13.67%	
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%
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. 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 1451–75 = 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 1kg 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%
	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%

Date	Year								
	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%
	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%

Table 2 *(continued)*

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
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%

	Year								
	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%
	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 3. 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] in argent-le-roy (AR)	6 deniers AR = 50.0% fine / 47.92% pure	5 deniers 8 grains AR = 44.44% fine / 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] argent-le-roy	68.0 x 2d = 136d / 6/12 0.5 = 22s 8d / 5.333/12 0.444	68.5 x 2d = 137d = 25s 8d 6 mites

Division of the Traite Value per marc argent-le-roy	Value in groot Flemish (June 1418)	Number of coins	Percentage of the traite	Value in groot Flemish (November 1428)	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 4. The Flemish Silver Coinage Debasement of November 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.

Figure 1. The Mint Outputs of England and Flanders (Burgundian Low Countries: from 1420)

Gold and Silver Coinage Outputs expressed in terms of the value of a constant pound sterling (English value: 1351–1411), in quinquennial means, from 1346–50 to 1496–1500
Sources: see Sources for Tables and Figures

Mint Outputs of England and Flanders/LC 1346–1500 in constant £ sterling:
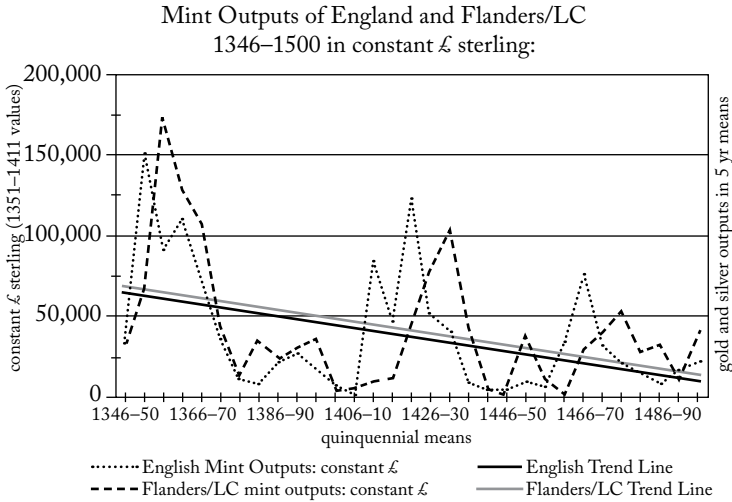
Figure 2. The Gold and Silver Mint Outputs of Flanders and Brabant, in Current Pounds Groot of Flanders, in Quinquennial Means, from 1336–40 to 1496–1500

Flanders/Brabant: Gold and Silver Outputs in £ groot Flemish: 1336–40 to 1496–1500
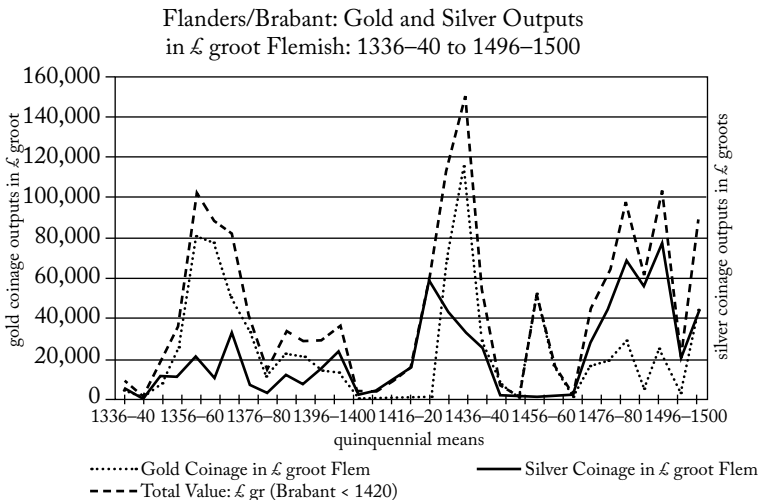
Figure 3. Flemish Commodity Price Indexes and the Composite Flemish Price Index, in Quinquennial Means, from 1346–50 to 1496–1500, with the Index Base: Mean of 1451–75 = 100

Flemish Commodity Prices, 1346–1500
in 5 yr means: 1451–75 = 100

.... farinaceous index   dairy products index
- - - Industrial (textile) index   Composite Price Index 1451–75 = 100
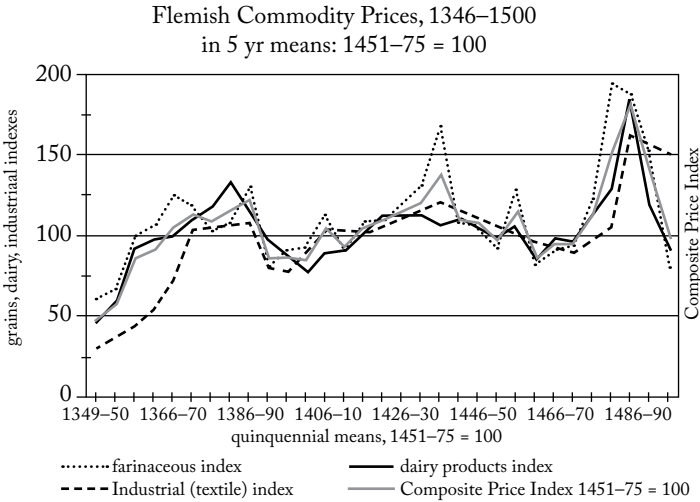
Figure 4. The Relationship between Coinage Outputs and Prices in Flanders and the Burgundian Low Countries, in Quinquennial Means: from 1351–55 to 1496–1500

The value, in current pounds groot Flemish, of the combined gold and silver mint outputs of Flanders (and the Burgundian Low Countries, from 1420) and the Flemish Composite Price Index (base: mean of 1451–75 = 100)

Coinage and Prices in Low Countries
Mint Outputs in £ gr and CPI, 1351–1500

.... Mint Outputs in £ groot   - - - CPIndex: 1451–75 = 100
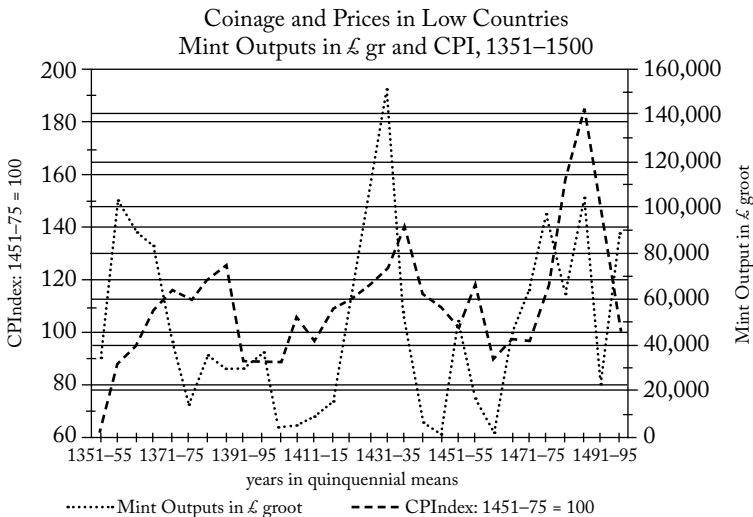
Sources for Tables and Figures

Mint Outputs and Monetary Ordinances: 1350–1500 (Tables 1, 2, and 4)

See the archival and other sources (published documents) cited in John H. Munro, *Wool, Cloth and Gold: The Struggle for Bullion in Anglo-Burgundian Trade, 1340–1478*, Centre d'histoire économique et sociale (Brussels: Editions de l'Université de Bruxelles; Toronto: University of Toronto Press, 1973), appendix, tables B–K, pp. 190–213.

John H. 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.

Prices and the Flemish Price Index (Table 3)

Stadsarchief Gent, Stadsdrekeningen, 1350–51 to 1499–1500.

Charles Verlinden 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).

John H. 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 H. 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 *L'Edilizia prima della rivoluzione industriale, secc. XIII–XVIII*, ed. Simonetta Cavaciocchi, Atti delle "Settimana di studi" e altri convegni 36 (Florence: Le Monnier, 2005), pp. 1013–76.

Prices and the English Price Index (Figures 1–4)

E. H. Phelps Brown and Sheila V. Hopkins, "Seven Centuries of the Prices of Consumables, Compared with Builders' Wage Rates," *Economica* 23, no. 92 (1956): 296–314. Reprinted in *Essays in Economic History*, ed. E. M. Carus-Wilson, 3 vols. (London: Edward Arnold, 1954–62), 2:168–78, 179–96; and in *Perspective of Wages and Prices*, by E. H. Phelps Brown and Sheila V. Hopkins (London: Methuen, 1981), pp. 13–39 (with price indexes not in the original).

Bibliography

Archival Sources

Belgium, Algemeen Rijksachief, Rekenkamer, register no. 1158.

Published Sources

Note: for all of the following publications that have been reprinted in Ashgate's Variorum Reprint series, Ashgate has presented them with the original pagination, while indicating each reprint by Roman numerals (as indicated in the following list).

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 14. 2 vols. Brussels: Académie royale de Belgique, 1921–22.

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

Borrelli de Serres, Léon Louis. *Les variations monétaires sous Philippe le Bel*. Chalon-sur-Saône: E. Bertrand, 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. First published as *Monnaie privée et pouvoir des princes: L'économie des relations monétaire à la Renaissance*. Trans. Azizeh Azodi. Paris: 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 Dukes and Their Courts*. Trans. Doreen Weightman. New York: W. W. Norton, 1963. First published as *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, 251–78.

Chalon, Renier. *Recherches sur les monnaies des comtes de Hainaut*. Brussels: Libraire scientifique et littéraire, 1848.

Cipolla, Carlo M. "Currency Depreciation in Medieval Europe." *Economic History Review*, 2nd ser., 15 (1963): 413–33. Reprinted [with minor alterations] in *Change in Medieval Society: Europe North of the Alps, 1050–1500*, ed. Sylvia Thrupp, pp. 227–36. New York: Appleton-Century-Crofts, 1964. Reprinted Toronto: University of Toronto Press, 1988.

Cross, Harry E. "South American Bullion Production and Export, 1550–1750." In *Precious Metals*, ed. Richards, pp. 397–423.

Dagboek van Gent van 1447 tot 1470, met een vervolg van 1477 tot 1515. Ed. Victor Fris. 2 vols. Ghent: Annoot Braeckman, 1901–4.

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*, pp. 305–19. Athens: Centre de recherches néohelléniques, 1985. Reprinted in translation as "Monetary Colonialism in the Medieval Mediterranean." In *Medieval Market Economy*, by Day, pp. 116–28.

———. "'Crise du Féodalisme' et conjoncture des prix à la fin du Moyen Âge." *Annales: Économies, sociétés, civilisations* 34 (1979): 305–18. Reprinted in translation as "Late

Medieval Price Movements and the 'Crisis of Feudalism.'" In *Medieval Market Economy*, by Day, pp. 90–107.

———, ed. *Études d'histoire monétaire, XIIᵉ–XIXᵉ siècles.* Lille: Université de Paris, 1984.

———. "The Fisher Equation and Medieval Monetary History." In *Problems of Medieval Coinage in the Iberian Area*, ed. Mario Gomes Marques, pp. 139–46. Santarém: Instituto Politécnico de Santarém, 1984. Reprinted in *Medieval Market Economy*, by Day, pp. 108–17.

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

———. "The Question of Monetary Contraction in Late Medieval Europe." In *Coinage and Monetary Circulation in the Baltic Area, c. 1350–c. 1500*, ed. Jørgen Steen Jensen. Special issue, *Nordisk Numismatisk Arsskrift: Nordic Numismatic Journal* (1981): 12–29. Reprinted in *Medieval Market Economy*, by Day, pp. 55–71.

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

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*, n.s., 7 (1862): 351–65.

———. "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*, n.s., 6 (1861): 211–37.

———. "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*, n.s., 7 (1862): 460–80.

———. "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*, n.s., 6 (1861): 458–78.

———. "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*, n.s., 7 (1862): 117–43.

———. "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*, n.s., 6 (1861): 106–39.

———. "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*, n.s., 14 (1869–70): 86–114, 243–66, 319–34, 419–40; 15 (1874–77): 80–104, 151–63.

———. "Supplement à l'essai sur l'histoire monétaire des comtes de Flandre de la Maison de Bourgogne." *Revue numismatique*, n.s., 11 (1866): 172–219.

Feavearyear, Albert. *The Pound Sterling: A History of English Money.* 2nd ed. Revised E. V. Morgan. Oxford: Clarendon Press, 1963.

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

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

Gandal, Neil, and Nathan Sussman. "Asymmetric Information and Commodity Money: Tickling the Tolerance in Medieval France." *Journal of Money Credit and Banking* 29 (1997): 440–57.

Gilliodts–Van Severen, Louis, ed. *Cartulaire de l'ancienne estaple de Bruges*. 2 vols. Bruges: Louis de Plancke, 1904.

Girard, Albert. "La guerre des monnaies." *Revue de synthèse* 19 (1940–45): 83–101. Reissued as *Synthèse historique* 60 (1940–45): 83–101.

Glassman, Debra, and Angela Redish. "Currency Depreciation in Early Modern England and France." *Explorations in Economic History* 25 (1988): 75–97.

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

Grierson, Philip. "Coin Wear and the Frequency Table." *Numismatic Chronicle*, 7th ser., 3 (1963): i–xvi. Reprinted in *Later Medieval Numismatics*, by Grierson, no. XIX, pp. i–xvi.

———. *Later Medieval Numismatics (11th–16th Centuries): Selected Studies*. London: Variorum Reprints, 1979.

———. "Medieval Numismatics." In *Medieval Studies: An Introduction*, ed. James Powell, pp. 103–36. Syracuse: Syracuse University Press, 1976. Reprinted in *Later Medieval Numismatics*, by Grierson, no. I, pp. 103–36.

———. *Numismatics*. Oxford: Oxford University Press, 1975.

———. "Weight and Coinage." *Numismatic Chronicle*, 7th ser., 4 (1964): iii–xvii. Reprinted in *Later Medieval Numismatics*, by Grierson, no. XX, pp. iii–xvii.

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, MA: Harvard University Press, 1934; Reprinted New York: Octagon Books, 1965.

———. *War and Prices in Spain, 1651–1800*. Cambridge, MA: 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: Honoré Champion, 1910. Reprinted 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. *The Shape of Medieval Monetary History*. London: Variorum Reprints, 1986.

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

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

Miskimin, Harry. *Cash, Credit, and Crisis in Europe, 1300–1600*. London: Variorum Reprints, 1989.

———. *The Economy of Early Renaissance Europe, 1300–1460*. Englewood Cliffs, NJ: Prentice-Hall, 1969. Reprinted Cambridge: Cambridge University Press, 1977.

———. "The Enforcement of Gresham's Law." In *Credito, banche e investimenti, secoli XIII–XX: Atti della quarta Settimana di Studio (Prato, 14–21 aprile 1972)*, ed. Anna Vannani Marx, pp. 147–61. Florence: Le Monnier, 1985. Reprinted in *Cash, Credit, and Crisis in Europe*, by Miskimin, no. IX, pp. 147–61.

———. "Le problème de l'argent au Moyen Âge." *Annales: Économies, sociétés, civilisiations* 17 (1962): 1125–30. Reprinted in *Cash, Credit and Crisis*, by Miskimin, no. IV, pp. 1125–30.

———. "L'or, l'argent, et la guerre dans la France médiévale." *Annales: Économies, sociétés, civilisations* 40 (1985): 171–84. Reprinted in *Cash, Credit and Crisis*, by Miskimin, no. XII, pp. 171–84.

———. "Monetary Movements and Market Structures: Forces for Contraction in 14th and 15th Century England." *Journal of Economic History* 24 (1964): 470–90. Reprinted in *Cash, Credit, and Crisis*, by Miskimin, no. VII, pp. 470–90.

———. "Money, the Law, and Legal Tender." In *Rythmes de la production monétaire, de l'Antiquité à nos jours: Actes du Colloque international Paris, 10–12 janvier 1986*, ed. Georges Depeyrot and Tony Haeckens, pp. 697–705. Numismatica Lovaniensia 7 Louvain-la-Neuve: Séminaire de numismatique Marcel Hoc, 1987. Reprinted in *Cash, Credit, and Crisis*, by Miskimin, no. X, pp. 697–705.

———. "Money and Money Movements in France and England at the End of the Middle Ages." In *Precious Metals*, ed. Richards, pp. 79–96. Reprinted in *Cash, Credit, and Crisis*, by Miskimin, no. XI, pp. 79-96.

———. *Money and Power in Fifteenth-Century France.* New Haven, CT: Yale University Press, 1984.

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

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

———. "New Data on Minting, Seigniorage, and the Money Supply in Spain (Castile), 1597–1643." *Explorations in Economic History* 34 (1997): 331–67.

Mueller, Reinhold. "Guerra monetaria tra Venezia e Milano nel quattrocento." In *La zecca di Milano: Atti del Convegno internazionale di studio Milano, 9–14 maggio 1983*, ed. Giovanni Gorini, pp. 341–55. Milan: Società numismatica italiana, 1984.

Munro, John H. "An Aspect of Medieval Public Finance: The Profits of Counterfeiting in the Fifteenth-Century Low Countries." *Revue belge de numismatique et de sigillographie* 118 (1972): 127–48. Reprinted in *Bullion Flows and Monetary Policies*, by Munro, no. II, pp. 127–48.

———. "Before and After the Black Death: Money, Prices, and Wages in Fourteenth-Century England." In *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*, ed. Troels Dahlerup and Per Ingesman, pp. 335–64. Copenhagen: Royal Danish Academy of Sciences and Letters, 2009.

———. "Billon—Billoen—Billio: From Bullion to Base Coinage." *Revue belge de philologie et d'histoire* 52 (1974): 293–305. Reprinted in *Bullion Flows and Monetary Policies*, by Munro, no. III, pp. 293–305.

———. "Builders' Wages in Southern England and the Southern Low Countries, 1346–1500: A Comparative Study of Trends in and Levels of Real Incomes." In *L'edilizia prima della rivoluzione industriale, secc. XIII–XVIII*, ed. Simonetta Cavaciocchi, pp. 1013–76. Atti delle "Settimana di studi" e altri convegni 36. Florence: Le Monnier, 2005.

———. "Bullion Flows and Monetary Contraction in Late-Medieval England and the

Low Countries." In *Precious Metals*, ed. Richards, pp. 97–158. Reprinted in *Bullion Flows and Monetary Policies*, by Munro, no. VI, pp. 97–158.

———. *Bullion Flows and Monetary Policies in England and the Low Countries, 1350–1500*. Variorum Collected Studies Series 355. Aldershot: Ashgate, 1992.

———. "Bullionism and the Bill of Exchange in England, 1272–1663: A Study in Monetary Management and Popular Prejudice." In *The Dawn of Modern Banking*, ed. Center for Medieval and Renaissance Studies, University of California, pp. 169–239. New Haven, CT: Yale University Press, 1979. Reprinted in *Bullion Flows*, by Munro, no. IV, pp. 169–239.

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

———. "The Coinages and Monetary Policies of Henry VIII (r. 1509–47)." In *The Collected Works of Erasmus: The Correspondence of Erasmus*. Vol. 14, *Letters 1926 to 2081, A.D. 1528*, trans and ed. Charles Fantazzi and James Estes, pp. 423–76. Toronto: University of Toronto Press, 2011.

———. "Deflation and the Petty Coinage Problem in the Late-Medieval Economy: The Case of Flanders, 1334–1484." *Explorations in Economic History* 25 (1988): 387–423. Reprinted in *Bullion Flows and Monetary Policies*, by Munro, no. VIII, pp. 387–423.

———. "An Economic Aspect of the Collapse of the Anglo-Burgundian Alliance, 1428–1442." *English Historical Review* 85 (1970): 225–44. Reprinted in *Bullion Flows and Monetary Policies*, by Munro, no. I, pp. 225–44.

———. "English 'Backwardness' and Financial Innovations in Commerce with the Low Countries, 14th to 16th Centuries." In *International Trade in the Low Countries (14th–16th Centuries): Merchants, Organisation, Infrastructure*, ed Peter Stabel, Bruno Blondé, and Anke Greve, pp. 105–67. Leuven-Apeldoorn: Garant, 2000.

———. "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.

———. "Gresham's Law." In *The Oxford Encyclopedia of Economic History*, ed. Joek Mokyr et al., 2:480–81. 5 vols. Oxford: Oxford University Press, 2003.

———. "A Maze of Medieval Monetary Metrology: Determining Mint Weights in Flanders, France and England from the Economics of Counterfeiting, 1388–1469." *Journal of European Economic History* 29 (2000): 173–99.

———. "Mint Outputs, Money, and Prices in Late-Medieval England and the Low Countries." In *Münzprägung, Geldumlauf und Wechselkurse (Minting, Monetary Circulation and Exchange Rates)*, ed. Eddy Van Cauwenberghe and Fritz Irsigler, pp. 31–122. Trierer Historische Forschungen 7: Akten des 8th International Economic History Congress, Section C-7, Budapest 1982. Trier: Trier University Press, 1984.

———. "Mint Policies, Ratios, and Outputs in England and the Low Countries, 1335–1420: Some Reflections on New Data." *Numismatic Chronicle* 141 (1981): 71–116. [Formerly listed as 8th ser., 1]. Reprinted in *Bullion Flows and Monetary Policies*, by Munro, no. V, pp. 71–116.

———. "Monetary Contraction and Industrial Change in the Late-Medieval Low Countries, 1335–1500." In *Coinage in the Low Countries (800–1500): The Third Oxford Symposium on Coinage and Monetary History*, ed. Nicholas J. Mayhew, pp. 95–162.

British Archeological Reports, International Series, 54. Oxford: British Archaeological Reports, 1979.

———. "The Monetary Origins of the 'Price Revolution': South German Silver Mining, Merchant-Banking, and Venetian Commerce, 1470–1540." In *Global Connections and Monetary History, 1470–1800*, ed. Dennis Flynn, Arturo Giráldez, and Richard von Glahn, pp. 1–34. Brookfield, VT: Ashgate, 2003.

———. "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 *The Collected Works of Erasmus: The Correspondence of Erasmus*. Vol. 1, *Letters 1 to 151, A.D. 1484–1500*, ed. Roger Mynors, Douglas Thomson, and Wallace Ferguson, pp. 311–48. Toronto: University of Toronto Press, 1974.

———. "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 (2008): 13–71.

———. "Monnayage, monnaies de compte, et mutations monétaires au Brabant à la fin du Moyen Âge." In *Études d'histoire monétaire, XIIᵉ–XIXᵉ siècles*, ed. John Day, pp. 263–94. Lille: Presses universitaires de Lille, 1984. Reprinted in *Bullion Flows and Monetary Policies*, by Munro, no. VII, pp. 2653–94.

———. "Patterns of Trade, Money, and Credit." In *Handbook of European History in the Later Middle Ages, Renaissance and Reformation, 1400–1600*. Vol. 1, *Structures and Assertions*, ed. James Tracy, Thomas Brady Jr., and Heiko Oberman, pp. 147–95. Leiden: Brill, 1994.

———. "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 *La fiscalità nell'economia Europea, secc. XIII–XVIII (Fiscal Systems in the European Economy from the 13th to the 18th Centuries)*, ed. Simonetta Cavaciocchi, pp. 973–1026. Florence: Firenze University Press, 2008.

———. "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.

———. *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, 1973.

Nicholas, David. *Medieval Flanders.* London: Longman, 1992.

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

Phelps Brown, E. H., and Sheila V. Hopkins. *A Perspective of Wages and Prices.* London: Methuen, 1981.

———. "Seven Centuries of the Prices of Consumables, Compared with Builders' Wage Rates." *Economica* 23, no. 92 (1956): 296–314. Reprinted in *Essays in Economic History*, ed. E. M. Carus-Wilson, 2:168–78, 179–96. 3 vols. London: Edward Arnold, 1954–62; and in *Perspective of Wages and Prices*, by Phelps Brown and Hopkins, pp. 13–39 (with price indexes not in the original).

Richards, John F., ed. *Precious Metals in the Later Medieval and Early Modern Worlds*. Durham, NC: Carolina Academic Press, 1983.

Rolnick, Arthur J., and Warren E. Weber. "Gresham's Law or Gresham's Fallacy." *Journal of Political Economy* 94 (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 (1996): 789–808.

Rotuli parliamentorum ut et petitiones et placita in Parliamento. 6 vols. London, 1767–77.

Rymer, Thomas, ed. *Foedera, conventiones, literae, et cujuscunque generis acta publica*. 12 vols. London, 1709–12. Reprinted London: Public Record Office, 1816–69.

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

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

———. *The Big Problem of Small Change.* Princeton, NJ: Princeton University Press, 2002.

Selgin, George. "Salvaging Gresham's Law: The Good, the Bad, and the Illegal." *Journal of Money, Credit, and Banking* 28 (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.

———. *Monetary Problems and Policies in the Burgundian Netherlands, 1433–1496.* Leiden: Brill, 1970.

———. *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." *Journal of Economic History* 53 (1993): 44–70.

———. "The Late-Medieval Bullion Famine Reconsidered." *Journal of Economic History* 58 (1998): 126–54.

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

TePaske, John T. "New World Silver, Castile and the Philippines, 1590–1800." In *Precious Metals*, ed. Richards, pp. 425–45.

Tomlins, T. E., et al., eds. *The Statutes of the Realm*. 6 vols. London: Record Commission, 1810–22.

Tye, Robert. *Early World Coins and Early Weight Standards.* York: Early World Coins, 2009.

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

Van der Wee, Herman. "Monetary Policy in the Duchy of Brabant, Late Middle Ages to Early Modern Times." In *Het geld zoekt zien weg: Van Lanschot-Lectures over acht eeuwen geldwezen, bankieren en kapitaalbeweging in de Midden-Nederlanden*, ed. H. Van den Eerenbeemt. 's-Hertogenbosch: F. van Lanschot Bankiers, 1987. Special issue, *Bijdragen tot de geschiedenis van het Zuiden van Nederland* (1987): 37–58. Reprinted in *The Low Countries in the Early Modern World*, by Herman Van der Wee, pp. 167–82. London: Variorum, 1993.

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. "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): 115–27. Reprinted in *Miscellanea mediaevalia*, by Van Werveke, pp. 255–67.

———. "De economische en sociale gevolgen van de muntpolitiek der graven van Vlaanderen (1337–1433)." *Annales de la Société d'émulation de Bruges* 74 (1931): 1–15. Reprinted in *Miscellanea mediaevalia*, by Van Werveke, pp. 243–55.

———. *Miscellanea mediaevalia: Verspreide opstellen over economische en sociale geschiedenis van de middeleewuen*. Ghent: E. Story-Scientia, 1968.

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

———. *John the Fearless: The Growth of Burgundian Power*. London: Longmans, Green, 1966.

———. *Philip the Bold: The Formation of the Burgundian State*. London: Longmans, Green, 1962.

———. *Philip the Good: The Apogee of Burgundy*. London: Longmans, Green, 1970.

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 (1999): 291–333.

Verlinden, Charles, 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.