MEDIEVAL AND EARLY MODERN COINAGE AND ITS PROBLEMS*

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ABSTRACT: This paper describes the chaotic monetary environment of medieval and early modern Europe. The poor quality of the coinage was a result both of problems with the supply of bullion and with deficiencies of monetary policy. The paper examines the supply and demand of bullion and the determinants of bullion flows. It then discusses the economics and politics of debasement. It concludes with a description of how commerce adapted to this inhospitable monetary environment.

JEL Categories: E31, E42, N13

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PREFACE

There are two classes of question one might ask about financial systems. The first and broader class relates to their role in the economy: What is their contribution to economic development and growth? What is their impact on the way business is organized? On the organization and behavior of government? The second and narrower class of question relates to financial systems themselves: What is their economic function? How do they evolve? What are the causes and consequences of financial innovation?

History is perhaps the most promising source of answers to both classes of question. This paper is a draft chapter in a planned work that draws on the economic and financial history of the period to 1600. The section of the work to which this chapter belongs focuses on the narrower class of question about the financial system itself during this period. Other sections will take up the broader class of question. Draft chapters of this section are available as the following working papers[1]:

1. Finance before the Industrial Revolution: An introduction
2. Medieval and early modern coinage and its problems
3. Early deposit banking
4. Bills of exchange and the money market to 1600
5. Merchant banking in the medieval and early modern economy
6. The capital market before 1600
7. Risk instruments in the medieval and early modern economy

The financial system is part of the institutional structure that facilitates economic transactions. Specifically, the financial system facilitates lending, payments, and trade in risk. While lending often steals the limelight, the role of the financial system in facilitating payments and trade in risk is no less essential. Before 1600, because of the poor quality and inadequate quantity of coin, the payments function was particularly important: the current paper discusses the problems of the coinage in this period. As commerce expanded, the pressing need for adequate means of payment prompted a great deal of financial innovation–in particular, the emergence of the deposit bank and the bill of exchange. The deposit bank (Paper 3) provided a means of payment–the transfer of deposits–that minimized the need to use actual cash. The bill of exchange (Paper 4) provided a means of remittance–of transferring funds from one place to another–without

[1]Copies may be downloaded from: http://www.dartmouth.edu/~mkohn

having to ship specie or bullion. The bill of exchange was also an instrument of credit, the basis on which merchant banks built an efficient international system of commercial credit (Paper 5). While the bill of exchange satisfied the need for short-term finance, the growing need for long-term finance was met by a developing capital market (Paper 6). Trade in risk was still in its infancy, but the period saw the development of marine insurance and the beginnings of futures and options (Paper 7). Paper 1 provides some general background on saving and investment during the period, on the effects of the prohibition of usury, and on the extensive system of 'informal' finance', out of which specialized financial institutions and markets evolved.

INTRODUCTION

The medieval and early modern economies experienced a degree of monetary chaos that it is hard today to comprehend. There was a bewildering profusion of coin, much of it of poor quality, and coin was generally in short supply. The consequent difficulty of settling trades, both commercial and financial, raised the cost of transactions and inhibited trade. Since money in this period meant precious metals minted into coin, the cause of this monetary chaos were twofold-problems in the supply of precious metals and failures of mint policy. Commerce adapted to this inhospitable monetary environment by using cash as little as possible-relying heavily on sales credit and on the offsetting of debts. Where these methods proved problematic–especially in trade among strangers–merchants developed alternative means of settlement–most notably deposit banks and bills of exchange.

MONETARY CHAOS[2]

The deterioration of the coinage began with the collapse of the Roman empire in the West. By default, minting was taken over by private goldsmiths and silversmiths (*monetarii* or moneyers) who had little incentive to maintain the quality of the coinage. Its consequent rapid decline was interrupted only briefly in the late eighth century with Charlemagne's currency reform-part of his broader attempt to reconstitute the Empire. Charlemagne introduced a standardized silver money, based on a new pound (heavier than the Roman pound) divided into 240 *deniers* or pennies, each of about 2 grams. Minting became an imperial prerogative, and private issue was suppressed. The state tried to ensure the quality of a coinage produced by a limited number of official mints.

The new monetary order did not survive the disintegration of the Carolingian empire early in the ninth century. As regional administrators, lay and ecclesiastical, became independent rulers, they usurped the right to mint. Imperial standards were soon forgotten, and by the tenth century there were dozens of monetary systems. While most were modeled on the Carolingian system, each was based on its own different pound or mark (the Scandinavian-German half-pound). The weight and fineness of the coins varied widely and deteriorated over time.

Concurrent with this monetary deterioration, invasions and raids by Moslems, Vikings, and Magyars brought long-distance trade to a standstill. As the economy fragmented into largely self-sufficient manors, there was widespread demonetization. Money is most essential in mediating exchange among strangers: it is much less

[2]For a more detailed discussion see Spufford (1988) , on which the following is largely based.

necessary within a small closed community. The collapse of long-distance trade also ended the mining of silver: bullion is a trade good *par excellance*, of little direct use to its producer. The increasing scarcity of bullion raised the value of the few remaining coins, and they were consequently hoarded rather than spent. In the tenth century, the invasions abated and long-distance trade revived. The renewed need for money was met from new sources of silver in Saxony, principally at Goslar. By the twelfth century the use of money had spread from the towns to the countryside. As feudal lords increasingly needed cash to pay for trade goods, they commuted dues in labor and in kind to payments of money rents.

The continuing currency chaos was a major impediment to the expansion of commerce. Control of minting remained highly fragmented–in the hands of French counts and dukes, German bishops, and Italian towns. The basic coin remained the silver *denier* or penny, but its weight and fineness varied greatly from place to place. While the Charlemagne *denier* of the eighth century weighed 1.7gm (1.63gm fine), by 1200, pennies ranged in weight from the English sterling at 1.46gm (1.35gm fine) down to the Venetian *denaro* at 0.25gm (0.05gm fine). Not surprisingly, it became customary to denominate prices in *labeled* pounds–for example, pounds sterling, *livres parisis*, or Venetian *lire*. Even for a single currency, say the Flemish *denier*, the coins in circulation could vary in weight and fineness. Because of the crude technology of minting, coins varied considerably in weight even when new, and they were easy to clip and to counterfeit. Moreover, the quality of a given issue deteriorated over time due to wear, to clipping, and to culling and melting of the heaviest coins. Successive issues tended to be of progressively lower weight and fineness due to debasement. Adding to the confusion, if the local coinage was particularly bad, as it was in Flanders, then better-quality foreign coins–sterlings for example-would be imported and would circulate alongside the domestic currency. The thirteenth century saw a little improvement. The increasing reassertion of central control over minting reduced the fragmentation, and major new discoveries of silver lowered its value, facilitating currency reform. From around 1200, following the example of Venice, one issuer after another began to mint new heavy silver coins, known as *grossi* or groats.[3] However, over time, the quality of these coins too began to deteriorate.

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[3]The Venetian *grossus* contained 2.1g of silver and was declared to be worth 26 of the old *denari parvi*. Since the latter would have contained a total of 2.4g of silver, *denari parvi* were driven out of circulation, now being worth more as bullion than as coin. (Lane (1977))

Not only was money generally of poor quality, but there was not enough of it. Throughout the period there was a chronic shortage of circulating medium. Beyond this, there were often acute shortages that could paralyze trade: at the height of the 'bullion famine' of the fifteenth century, coin became so scarce that "the economy of Europe ground to a halt at every level, from the humblest purchase of bundles of leeks, up to the great merchants, whose galleys had to row away with goods unsold."[4] In the early part of the period, silver was so scarce that even the smallest individual coin was too valuable to be of much use for small payments. In twelfth-century England, the daily wage of a domestic servant was a penny. That same penny could buy a quarter of a sheep but was of little use in paying for a pound of mutton, there being no coins of smaller value to serve as change. As the value of the penny declined over time–with increasing supplies of silver and with the deterioration of the coinage–its usefulness in ordinary transactions increased. It became a common practice to set the price of a loaf of bread at the value of the smallest coin–'the penny loaf'. However, since there was no coin of lower value, it was impossible to adjust the price of a loaf as the market price of wheat fluctuated. Instead, it was the size of the loaf that had to vary. A rise in the price of wheat meant a fall in the size of the loaf: for example, as the price of wheat soared during the famine of 1329, the standard *quattrino* loaf in Florence shrank from a pound to a meager six ounces. The same problem of indivisibility contributed to the rigidity of money wages. For example, the daily wage of a laborer in Florence in 1370 was two grossi, of a mason in England in the fifteenth century, one groat. Fine adjustments in the money wage were therefore impossible: while changing the size of a loaf of bread was a practical alternative, changing the length of the working day was not.

If pennies or groats were too large to be useful for small payments, they were far too small to be useful for large payments. Using them for this purpose required the counting out or weighing of perhaps millions of separate coins, the process being slowed down by the need to weed out coins of inferior fineness–either by eye (they tended to be darker) or by assay (rubbing on a touch-stone). If payment needed to be made in a different currency, in settlement of long-distance trade or to finance an expeditionary force, then the original coins had to be melted down and reminted in the required currency at great expense. The early solution for large payments, therefore, was to use unminted silver in the form of bars. These bars were of standard fineness and standard weight (typically a mark or half-mark) and often bore a seal to certify their quality. Traveling merchants

[4]Spufford (1988) p362.

carried their cash in this form; if they needed local currency, they could exchange their bar silver with the local moneychanger.

During the fourteenth century, bar silver was largely replaced in international commerce by gold coin. Although Europe was a major producer of silver, it had little gold of its own. Before the discovery of America, most gold came from West Africa, crossing the Sahara to the Maghreb or Egypt. With the prolonged interruption in Mediterranean trade during the Dark Ages, gold became extremely scarce in Europe and ceased to be used as money: money came to mean *argent*. In mirror image, Byzantium and the Muslim world were cut off from the European sources of silver. When their only alternative source in Central Asia was lost in the tenth century to Turkish and Mongol invaders, silver became increasingly scarce and the Mediterranean switched almost entirely to minting and using gold coin. With the Crusades and the resumption of Mediterranean trade, silver began to flow south again and gold north. Italian merchants became increasingly active, not only in trade across the Mediterranean, but also in trade between the Muslim West and the Muslim East and Byzantium. In the thirteenth century, this intra-Mediterranean trade was threatened by the rapid deterioration of its principle means of exchange–the Byzantine gold hyperpyron and the Muslim gold dinar. The Italians responded by minting their own gold coins–the *genovino* and florin in 1252 and the Venetian ducat in 1284. Initially, these coins circulated mostly in the Mediterranean basin, but gradually their use spread northwards. With the beginning of the Hundred Years' War in the early fourteenth century, both the English and the French borrowed heavily from Italian bankers, who shipped large quantities of gold coin to northwest Europe.

Gold increasingly displaced bar silver for large payments. The growing supply, and falling value, of silver in the thirteenth and early fourteenth century meant that ever larger quantities of silver were needed to make a given payment. For example, when Edward I sent a subsidy to his allies in the Low Countries, it took seventeen ships to carry the 120 tonnes of silver. By the 1320s, when the silver price of gold reached its peak, a payment in silver was fourteen times the weight of the same payment in gold or twenty-six times the volume. Moreover, as we shall see, gold coins–unlike silver–generally remained of good quality, so that payments in gold could be made by tale (by count) rather than by weight. The discovery of gold in Hungary in the 1320s increased the supply of gold bullion in Europe and northern Europeans began to strike gold coins of their own. By the end of the fourteenth century, Europe had switched from a purely silver currency, to a bimetallic currency with gold in the primary position.

However, the introduction of gold coins only added to the dizzying profusion of types and qualities of money:

> In his report of his management for 1362, the bookkeeper of the papal treasury notes that he has received 15,654 florins, 1,397 leopards, 299 *écus*, 103 sheep, 5 royals, and 60 pounds 6 *sous* and 2 *deniers* in silver. And that was not the half of it: 'Of the florins there are 4,223 Chamber florins, 3,869 Sentence florins, 7,438 heavy florins, 16 ducats, 5 Genoese florins, 31 Aragonese florins, 7 French florins, 59 florins of lesser weight, 6 Cambrai florins. Of the *écus*, there are 271 old *écus* of good weight, 1 English *écu*, 1 Bavarian *écu*, 2 old *écus* not of good weight, 16 counterfeit old *écus*, 8 Philip *écus*.'[5]

By the fourteenth century, there existed three levels of coinage. At the top were the gold coins–national gold coins like the English noble or the French *écu*, but predominantly the florin and ducat. Gold coins were the medium of international trade and of large international and domestic payments; ordinary people rarely if ever saw them. At the next level, there were the large silver coins–groats and *grossi.* These were used for large local payments–urban wages, urban purchases of agricultural harvests, rural rents and taxes. At the lowest level came the descendants of the venerable penny, now mainly copper alloy with very little silver content–'black money', *billon*, or *piccoli*. This was the small change of daily commerce, used mainly in urban markets.[6] As an example of this three-level system, the principal coins of early fifteenth-century Florence were the gold florin, the silver *grosso*, and the black *quattrino* (a piece of 4 *piccoli*). One gold florin was worth 14 *grossi*; each of the latter were worth 16.5 *quattrini*. Of course, these relative values did not remain constant. As we shall see, they fluctuated with the relative abundance of gold and silver and with the policy of the mint with respect to the metal content of the different coins.

With three types of money, of changing relative value, some precision was required in denominating contractual payments such as wages, rents, and debts. Until the thirteenth century, the only coin in existence was the *denaro* (*denier*, penny). Amounts of

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[5]Favier (1998) p133

[6]By the late sixteenth century this structure was changing. With major new sources of silver in Central Europe and America, a new type of very large silver coin of good quality began to be minted (the Joachimstaler was the first, issued initially in 1519). With gold once again scarce, these new silver coins took over as the international currency. At the other end of the spectrum, billon was being replaced by token coins of pure copper and lead.

money, including contractual payments, were typically denominated in *soldi* (*sous*, shillings) or *lire* (*livres*, pounds), but there were no actual coins corresponding to these larger units. They simply represented numbers of *denari*: 12 *denari* to the *soldo*, 240 *denari* to the *lira.* When *grossi* and gold coins were first introduced, they were intended initially to give physical expression to these imaginary large units: the *grosso* was initially worth 12 *denari*; the florin one *lira*. However, as the values of the different coins changed over time, this equivalence broke down.

While it was possible in principle to denominate contractual payments in any one of the three levels of money, in practice only *grossi* and gold coins were used as 'moneys of account'. Typically, financial and international payments were denominated in gold coin–most commonly in florins–while rents and wages were denominated in *grossi.* Whatever the denomination of a contractual payment, it could be settled in any type of coin at current rates of exchange. For example, a debt of 140 *lire grossi* (the *lira grossi* was an imaginary unit of 20 *grossi*) could obviously be discharged by the payment of 2,800 *grossi*. However, if the current values of the different coins were 16.5 *quattrini* to the *grosso* and 14 *grossi* to the florin, then the debt could also be discharged by payment of 46,200 *quattrini* or of 200 florins, or of any combination of the three types of coin with the same total value.[7] While this sounds relatively simple, the poor quality of the coinage could make it a nightmare in practice, especially for large payments. For example, when the English Crown borrowed a substantial sum in Antwerp in the sixteenth century, the counting of money could take *weeks*, 'owing to the number and variety of the coins to be checked.'[8]

Why was the coinage in such a mess? There were two underlying and interrelated reasons–fluctuations in the abundance of bullion and the failings of mint policy that determined how bullion was converted into coin. We address each of these in turn.

THE ABUNDANCE OF BULLION

SUPPLY AND DEMAND

The abundance of bullion depended, of course, on supply and demand. The demand for bullion derived from its principal uses–monetary and non-monetary. Monetary demand depended on the volume of transactions using coin for settlement–on the size of

[7]Matters were further complicated by the existence of other imaginary units. For example, Florence had the *lira affiorino*, which was defined as 20/29 florins. For the origins of this unit, as well as an excellent discussion of moneys of account, see Evans (1931) .

the economy and on its degree of monetization. It depended, too, on methods of settlement: as the financial system developed, commercial and financial transactions came increasingly to be settled without the use of coin. Monetary demand could increase quite rapidly when a precious metal was monetized: the decision in Europe to monetize gold and the decision in the Islamic world–and later in China and in India–to monetize silver had powerful effects on monetary demand in these regions.[9]

Beyond the monetary demand, there was also a significant non-monetary demand for bullion for decorative purposes and as a liquid asset. These two uses are hard to separate since plate or jewelry was readily pawned or melted down, while bullion held as an asset could serve double duty as tableware or jewelry. Because of the general lack of liquid financial assets, the hoarding of bullion was the best or even the only alternative for most people. Changes in hoarding behavior tended to reinforce any change in the underlying abundance of bullion: an increase in its scarcity and a rising value tended to encourage hoarding, and this further increased its scarcity; an increase in the abundance of bullion and a falling value, tended to encourage dishoarding, and this further increased its abundance. Because hoards were large relative to the quantity of coin in circulation, the impact of hoarding and dishoarding on the overall abundance of bullion was significant.

The supply of bullion–the existing stock–was increased by new production. Output fluctuated as new sources were discovered and as old sources ran out. Output depended, too, on technology: better technology made it possible to increase the output of existing sources and to extract silver from new sources and from new types of ore. Of course, output was to some extent endogenous, since scarcity stimulated the search for new sources and for better technology. The stock of existing bullion was depleted by a variety of causes-wear of circulating currency, losses due to shipwrecks and lost hoards, and wastage in the process of coining and recoining. In total, losses could amount to as much as one per cent per year–a reduction of 50% in 70 years.[10] Consequently, in the absence of sufficient new production, the coinage tended to deteriorate in quality and to become increasingly scarce.

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[8]Buckley (1924)

[9]"In both regions [Europe, Islam], therefore, changes in *supply* of precious metals seem to have initiated the monetary revolutions; yet the switches in minting policy were in turn to bring about great changes in the *demand* for gold and silver–changes which made the revolutions enduring." (Watson (1967) p 30)

[10]Patterson (1972)

TABLE 1

	From	*To*	
Saxony (esp. Goslar)	960s	1040s	silver
Freiberg	1160s	1300	silver
Tuscany (Montieri)	"	1300	silver
Frisach	1190s	1300	silver
Bohemia (Jihlava/Iglau)	1220s	1290s	silver
Sardinia (Iglesias)	"	1330s	silver
Serbia	1252	1260s	gold
Kutna Hora	1298	1360s	silver
Sweden	c1300	--	copper
Hungary (Kremnica)	1320s	1450s	gold
Bosnia and Serbia	1410	1430	silver
Tyrol (Schwaz), Saxony (Schneeberg)	1460s	1610	silver, copper
West Indies	1500	1530	gold
Saxony (Annaberg), Bohemia (Joachimsthal)	1490s	1620	silver, copper
Peru (Potosì)	1545	--	silver
Mexico (Zacatecas)	1546	--	silver

Table 1 lists the major discoveries of the period. They may usefully be divided into three periods of high output, separated by two periods of hiatus. As we have seen, during the first period of high output, Saxon silver contributed to the recovery of European trade and to its remonetization. The Saxon mines ran out quite suddenly in the eleventh century, and the consequent shortage of coin was exacerbated by a significant outflow due to the Crusades. As a result, the coinage deteriorated and trade slumped. In the twelfth and thirteenth centuries, a series of important new discoveries again flooded Europe with silver. The consequent recovery of trade contributed to the economic resurgence of the 'long thirteenth century'. As silver grew increasingly abundant, goods prices rose steadily as did the price of gold. While gold came mainly from Africa, its rising price (in terms of silver) stimulated European exploration, and discoveries in Serbia and Hungary facilitated the minting of gold coins that began in 1252. With a lull in new discoveries after the 1320s, and with the output of existing mines declining, silver

became increasingly scarce from the 1360s to the 1460s (with some relief from 1410-1430 as a result of new discoveries in Bosnia and Serbia); gold remained relatively plentiful until the 1450s, after which it too became increasingly scarce. As a result of the increasing scarcity of bullion, goods prices fell and trade suffered. The so-called 'bullion famine' reached its peak in the early 1460s, with mints silenced, coin of every kind universally scarce, and trade at a standstill.

The bullion famine promoted widespread prospecting and significant technical progress that brought the famine to an end quite abruptly in the mid-1460s.[11] Major new discoveries in Central Europe and new techniques of mining and refining produced a growing flood of copper and silver.[12] The bullion famine was also an important motivation for the voyages of discovery, and by the late sixteenth century the Americas had became a major source of bullion. Initially, this consisted mostly of gold, but from the 1540s, silver began to flow from the mines of Potosì and Zacatecas, and by the early seventeenth century their prodigious output and low costs had driven most European silver mines out of business. The increasing abundance of bullion caused goods prices to rise steadily and contributed to a revival of trade.[13]

BULLION FLOWS

While the overall supply of bullion depended mainly on production, *local* supply depended primarily on bullion flows. Most regions acquired their bullion not through mining but through trade. Because the demand for bullion–monetary and non-monetary–was universal while its sources were highly localized, there were significant geographic differences in its relative scarcity. These expressed themselves as differences in purchasing power. Traders from a region rich in bullion found goods elsewhere comparatively cheap in terms of bullion. They therefore imported goods and exported bullion to pay for them. For example: "[b]ecause of much higher value placed on silver in North Africa [the local] goods seemed relatively cheap to European merchants who brought their silver across the Mediterranean to buy them. This cheapness of African goods, when paid for in silver, made commerce with North Africa very profitable, and encouraged the European merchants, who dominated the trans-Mediterranean trade, to expand their operations constantly."[14]

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[11] There are obvious parallels between the response to the bullion famine of the fifteenth century and the response to the oil crisis of the 1970s.

[12] See Nef (1987) .

[13] See Hamilton (1952)

Until the middle of the sixteenth century, most new silver originated in Central Europe. From there, it flowed out in every direction to pay for the lavish spending of the miners and of the feudal recipients of mining royalties. This silver flowed first to the Low Countries and to Venice, and from there onward to the rest of Europe. From Europe, silver flowed to North Africa and the Levant and from there to the Indian Ocean and China.[15] When the American mines began to dominate the production of silver from the 1540s, the pattern of bullion flows changed. Now it was American miners, and their sovereigns in Spain, who were the lavish spenders of the new silver.[16] From Spain, silver flowed to the rest of Europe and to Asia.[17]

Flows of bullion were not always uni-directional. Differences in the relative value of gold and silver often caused the two precious metals to flow simultaneously in opposite directions. Until the sixteenth century, the principal source of gold was West Africa, from where it crossed the Sahara to Tunis and Cairo. In Tunis, gold was therefore relatively abundant and silver relatively scarce: around 1200, gold there bought 6.5 times its weight in silver. In contrast, across the Mediterranean in Genoa, where gold was relatively scarce and silver relatively abundant, the 'silver ratio' at that time was between 8 and 9. Not surprisingly, Genoese merchants found it profitable not only to export silver to Tunis (as we have seen), but also to import gold. Consequently, bullion flowed across the Mediterranean in both directions.[18]

Over time, flows of bullion tended to equalize its value in different places. For example, the countervailing flows of gold and silver across the Mediterranean tended to equalize the silver ratio on both shores. However, the volume of trade and the corresponding flow of bullion were relatively small, so the process was a slow one. By 1300, with the output of silver growing rapidly in Europe, the silver ratio had risen to 11

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[14]Spufford (1988) p171

[15]There was also a direct flow of silver from central Europe eastwards, to eastern Europe and from there to Asia.

[16]See Miskimin (1977) .

[17]"In the second half and especially the last years of the sixteenth century, silver which was abundant and cheaper in Europe, was transferred in massive quantities to the East, where it was much more highly valued and paid for more products." (Vilar (1976) p 101)

[18]See Watson (1967) . Gold was not always more valuable in Italy than in North Africa: the flood of Hungarian gold into Venice from the 1330s so lowered its value there that it was worth less there than in

in Genoa, but it was still only 9 in Tunis. The process of equalization was especially slow over long distances: silver was to remain more valuable in Asia than in Europe for centuries.[19]

Flows of bullion were not driven by economic forces alone. War was a major cause of bullion flows: payments to armies in the field and subsidies to allies required the movement of enormous sums of money. The Crusades and support of the Latin kingdoms in the Holy Land drained huge amount of silver out of Europe. Financing the war against France reduced the silver coinage of England by half between 1324 and 1350 (as we saw earlier, the same war caused a large inflow of gold to northwestern Europe). The Spanish campaigns in the Low Countries in the sixteenth century generated massive flows of silver from Spain to Genoa; in exchange, Genoese bankers delivered gold in Antwerp to pay the Spanish troops. Between 1567 and 1632, the Spanish government transferred over 500 million florins to the Netherlands, mostly in this fashion.[20] Apart from war, there were other payments of a political nature. The ransom of Richard Coeur de Lion from captivity in Austria in 1192 cost England some 150,000 marks of silver–over 30 tonnes. Tributes paid to feudal overlords were also often substantial; so too were taxes and revenues paid to the Church from all over Europe.

While production was the primary determinant of the abundance of bullion and of bullion flows in the long run, in the short run monetary policy could be far more important. The prolonged period of monetary crisis from the 1360s to the 1460s has been blamed on falling production, but, while this certainly contributed, monetary policy was probably the main culprit. Recent research suggests that there was no general scarcity of bullion before the 1430s: until then, 'coin famines' were localized and were primarily the result of mint policy.[21] Even for the period of general scarcity from the 1430s to the 1460s, there is reason to believe that monetary policy played a crucial role–monetary policy not in Europe, but in China. China, and with it most of Asia, had traditionally relied on a token copper currency. However, when copper became increasingly scarce in the region from the tenth century, the Chinese supplemented copper coin with paper

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the Levant. As a result, from 1350-1410, Venetian galleys carried gold to the Levant rather than silver (see Spufford (1988)).

[19]In the eighteenth century, bullion shipments accounted for 70-90% of exports of the East India Company (see Chaudhuri (1968)). Wages in specie terms were much lower in Asia than in Europe, making it difficult to sell European manufactures there at a profit.

[20]See Van Houtte (1977) .

[21]Sussman (1998) is the most recent contribution.

money. Overissue of this paper money led to a series of inflationary crises, and private transactions began increasingly to rely on silver as a means of settlement. In 1433, the Imperial government finally acknowledged the complete loss of confidence in its paper currency and in its place it began to mint silver. By 1450 the Chinese economy had largely converted to using silver money. This increase in the monetary demand for silver must have had an enormous impact. At the time, China's economy was much larger than Europe's: its population was 200 million, compared to Europe's 40 million, and its standard of living was significantly higher. China acted as a magnet for silver, sucking it out of the Islamic world and, indirectly, out of Europe. This must have been a major contributor to the European 'silver famine' that peaked from 1435 to 1465.[22] In the sixteenth century, the silver ratio in China was between 5 and 6, while in Europe, after Potosì, it was 14. This differential was a powerful incentive for trade and for the shipment of silver.[23]

MINT POLICY

As the Chinese example shows, a decision to monetize a precious metal–to begin minting coins in that metal–could increase local demand enormously and stimulate a large inflow of bullion. The spreading monetization of gold in Europe from 1252 and the parallel monetization of silver in Islam did much to stimulate the countervailing flows of silver and gold within Europe and across the Mediterranean. However, while monetization could have an enormous impact, the more routine year-to-year conduct of monetary policy was no less important. Monetary policy in this period meant mint policy. To understand mint policy, we need to examine the economics of coinage.

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[22]It is notable that the shortage of silver was much more acute in southern Europe, nearer to the Levant. Southern Europe lost silver to Islam and gold to northern Europe, while the Levant was in a similar position, caught between Europe and China. The monetary upheavals in the Levant contributed to its economic decline and set it up for the Ottoman conquests. See Watson (1967) .

[23]The Asian demand for silver was further boosted by the monetization of silver in Northern India in 1530. Before this the Portuguese had mostly shipped European goods, including copper, and African gold in exchange for their Oriental imports; after this, they increasingly shipped silver.

THE ECONOMICS OF COINAGE[24]

Early mints were small and served only a small area: there were hundreds of them scattered across Europe. Often, a prince would grant the right to open a mint to a town together with the right to hold a market: trade required the provision of a medium of exchange. The prince controlled mint policy–the price the mints paid for bullion and the quality of coin they produced–but he did not operate the mints directly. Rather, he delegated the task to private individuals. To ensure his instructions were followed, the prince generally appointed a warden to check the quality of the mint's output; the merchant community was sometimes allowed to appoint additional inspectors of its own. Initially, the office of mintmaster was a hereditary feudal fief. Bruges, for example, had four enfeoffed mintmaster-moneychangers well into the thirteenth century. However, with the growing monetization of the feudal economy, princes began to auction the office of mintmaster to the highest bidder; by the fifteenth century, this practice was almost universal and had become an important source of princely revenue. Bidders promised to pay in advance a fixed sum based on the weight of metal they expected to coin over the life of the contract: this varied from one year in France to as long as six in Germany. Since the sum involved was substantial, as was the working capital needed to operate the mint, mintmasters were drawn only from among the very wealthy.[25] As the demand for money grew, mints became larger and more efficient. Indeed, by the late Middle Ages they ranked among the largest and most technologically advanced industrial establishments, each turning out coins by the million and employing hundreds of workers. As mints grew in size, local mintmasters were increasingly displaced by specialized professionals, usually Italian, who commanded greater resources and better technical expertise.[26]

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[24]The economics of medieval coinage has generated a great deal of confusion and controversy (for a recent discussion of some of the puzzles, see Rolnick, et al. (1996)). In trying to provide a coherent explanation, I have tried to construct a story that makes economic sense and is consistent with the historical descriptions. The best of the latter is de Roover's discussion of the English debasements of the sixteenth century (de Roover (1949)).

[25]While the mintmaster was expected to provide the working capital, the fixed capital–the mint itself–was provided by the prince.

[26]Not all mints were run for private profit: in the same Italian cities that provided mintmasters to the rest of Europe–Florence, Genoa, and Venice–the mints were run by officials elected for a six-month or one-year term. See Lane and Mueller (1985) on Venice and Cipolla (1982) on Florence.

Usually, the mint dealt with the public only indirectly, via the local moneychangers.[27] The business of these moneychangers was domestic rather than international exchange–among the different levels of domestic currency rather than among different currencies. As we have seen, they also purchased bullion in exchange for local currency. Moneychangers were usually licensed and often enjoyed a monopoly. In return for this privilege, their fees were regulated and they were expected to act as semi-official agents of the mint–reporting on the state of the currency, paying only in good money, and withdrawing from circulation any false coins coming into their hands. Most important, they were expected to purchase bullion at the official prices posted by the mint and to resell it to the mint for coining. Of course, when official prices were out of line with market prices, the temptation to break the rules was strong and it was rarely resisted.

The mint set its price at so many standard coins per unit weight of bullion–for example, 24 groats per pound weight of silver. However, when struck into coin, this amount of bullion would actually produce a larger number of coins–say, 26 groats per pound. The difference–2 groats per pound of bullion–was kept by the mint as seigniorage. A part of this–the brassage–covered the cost of minting. The remainder-the net seigniorage-was essentially a tax on the minting of coin. The cost of minting included the loss of bullion in the minting process, the cost of the alloy that had to be added to the bullion, and the capital and labor employed in manufacturing coin. Since the cost of manufacture was largely independent of the value of the coin minted, the cost was proportionately higher for low-valued coins: from half a per cent to one per cent of value for gold coins, from five to ten per cent for silver coins, and much higher for *billon* or 'black money'. Because the lowest-value coins were less profitable to mint, they tended to be produced the least even though the need for them was the greatest: consequently, small change was always especially scarce.[28]

The existence of seigniorage implied that the value of a coin was at a premium over its bullion content. Supposing, in our example, that the market price of bullion was equal to the mint price, then a groat coin containing only 1/26 of a pound of silver could purchase 1/24 of a pound of unminted silver–a premium of 8.3%. This premium was supported by the market, because coin was more useful than unminted bullion.

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[27]England was an exception in this respect: there, only the Royal mint was allowed to trade in bullion and coin, and private moneychanging was prohibited.

[28]The problem was not really solved until governments began to mint token subsidiary coinage, beginning in the sixteenth century, with the cost of minting borne by the government. See Velde (1998) .

Of course, the market price of bullion did not have to equal the mint price. While the mint price was set by the mintmaster, according to the wishes of the prince, the market price was determined by supply and demand. With the mint always ready to purchase at the mint price, the market price could not fall below it. However, nothing prevented the market price from rising above the mint price.

One reason for a rising market price of bullion was the steady deterioration in the quality of coin. As the quality, and so the value, of coins in circulation deteriorated, the price in coin of all goods–including bullion–tended to rise. The coinage deteriorated for a number of reasons. Gold and silver coins were relatively soft, and circulation gradually wore them down, reducing their weight. Because the relatively crude manufacturing process produced coin of varying weight and shape, it was easy to 'clip' coins without fear of detection. Also, because of the poor quality of the genuine article, it was easy to circulate inferior counterfeit coins.[29] Moreover, the variation in the weight of circulating coin–whether due to the manufacturing process or to wear, clipping, and counterfeiting–made it profitable to 'cull' the heavier coins. For example, a market price of silver of, say, 24 groats, reflected the bullion content of the *average* circulating coin: the bullion content of individual coins might fluctuate quite widely about this average. An individual coin containing more than 1/24 of a pound of silver was worth more as bullion than as a coin, and it would be removed from circulation to be hoarded, melted down, or exported for sale as bullion.

The second reason for a rising market price of bullion was an increasing in its scarcity. This was generally the result of an outflow of bullion or of a reduction of its inflow. This might happen because of a general international scarcity of bullion: we have seen some possible reasons for this. However, a more common cause, since most areas acquired bullion through trade, was a fall in the export of goods or a rise in their import. A local scarcity could result, too, from war-related outflows–payments to troops overseas or subsidies to allies–which could rapidly empty a territory of its bullion. Finally, foreign mints could cause bullion to flow out of a territory by offering a better price for it than domestic mints.

Of course, once the market price of bullion rose above the mint price, the flow of bullion to the mint would stop and with it the production of new coin. A halt in production meant a halt in seigniorage revenue for both mintmaster and prince. A halt in

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[29]The source of counterfeit coins was usually foreign mints. These could turn a handsome profit from the coining of debased imitations. For example, both French and Flemish mints struck counterfeit English sterlings in the early fourteenth century (see Van Houtte (1977)).

production also meant an increasing scarcity of circulating coin that hindered trade. Generally, a government's first response to a scarcity of coin was to attempt to increase the inflow of bullion and to decrease its outflow. The result was a range of policies–known collectively as 'bullionism'–that included prohibiting the export of bullion, restricting the imports of goods, and promoting exports of goods. When these measures proved ineffective, as they always did, the government's only recourse was to raise the mint price of bullion to match the market price. This would draw bullion to the mint again, providing the prince and the mintmaster with seigniorage and providing the public with much-needed coinage. However, an increase in the mint price meant that a larger number of coins would now have to be struck from the same weight of bullion. More coins per quantity of bullion meant less bullion per coin–a debasement.

To see how this worked, let us return to our numerical example. Suppose that over time the quality of the coinage has deteriorated, reducing the bullion content of the average circulating groat from its original 1/26 of a pound of silver to 1/29. The market price of silver has correspondingly risen to, say, 26.5 groats per pound, well above the mint price which has remained at 24. No bullion is brought to the mint in these circumstances and no new coins are produced. Note that coin still commands a premium over its bullion content: a penny now contains only 1/29 of a pound of silver but still purchases 1/26.5 of a pound. The premium persists for the same reason it existed in the first place: coin is more useful than unminted bullion, because many transactions require coin for settlement. Indeed, because no new coin is being produced, coin has become increasingly scarce, and the premium has risen from its original 8.3% to 9.4%.

The only way to reactivate the mint in these circumstances is to raise the mint price. The authorities decide to 'ratify' the deterioration of the currency by reducing the bullion content of newly minted coins to equal that of coins in circulation–1/29 of a pound of silver. With a pound of silver now minted into 29 new groats, the mint can afford to raise the mint price to 27. The market price, of course, immediately rises from 26.5 to 27. But at this price, people are once again willing to bring new bullion to the mint. Notice, however, that the price is not so high as to make it worth their while to bring circulating coin in for reminting (29 old coins–a pound in weight–would be needed to obtain 27 new coins of equal individual value).

'Defensive' debasements of this sort-in response to a deteriorating coinage–were necessary periodically for even the best-managed currencies. Even sterling, that monetary paragon of the Middle Ages, underwent a series of defensive debasements to compensate for the secular deterioration of circulating coin. The mint price of 240 sterlings in 1156 had risen to 450 by 1464–an average decline in silver content of about 0.2% a year. Such

defensive debasements were, however, infrequent: they were necessary perhaps once every fifty years. Defensive debasements were also usually of modest scale–10-15% was normal. During the 'long thirteenth century'–a period of political stability, economic growth, and plentiful bullion–what debasements there were were mostly of this kind.

From the fourteenth century, however, as political stability broke down, a new, much more severe, type of debasement became increasingly common. The motivation for these 'aggressive' debasements was not monetary–to reactivate the mint–but fiscal–to boost the prince's revenue from seigniorage. Usually, it was the exigencies of war that precipitated a sequence of major debasements. For example, from 1542 to 1551, England's Henry VIII ordered some ten debasements, each of 30-40%. In all, Henry's 'Great Debasement' reduced the silver content of the pound sterling from 6.4 troy ounces to less than one troy ounce. The seigniorage rate, 2% before the debasements, rose to 57%, and, at its peak, seigniorage accounted for 25% of crown revenue. Aggressive debasements, like these, differed from the defensive variety in being large (up to 50%), in the sharp increase in the seigniorage rate, and in the importance of seigniorage as a source of revenue (in 1349, Philip VI of France derived 70% of his total revenue from seigniorage).

An aggressive debasement was able to raise this much revenue, not only because of the higher seigniorage rate, but also because it increased enormously the volume of coin minted (Henry VIII had to open six new mints to accommodate the increased business). To see why, let us return to our numerical example. Suppose the average silver content of circulating pennies is 1/28 and the market price 26. The prince decides to reduce drastically the silver content of new groats: one pound of silver will now be struck into 43 new groats (a debasement of 54% relative to circulating coin). The mint will pay 30 of the new groats for a pound of silver, so that seigniorage is 13 groats–a seigniorage rate of 30%. The market price of bullion responds quickly to this debasement and rises to 36.

Since the market price is substantially higher than the mint price, there seems to be little incentive to bring bullion to the mint. Notice, however, that the market price still implies a premium of coin over its bullion content. Indeed, at 19%, the premium is very high. It is high because coin has become extremely scarce. At the current market price of bullion, pre-debasement coin is now much more valuable as bullion than it is as coin, and it therefore disappears from circulation (into hoards, or exported as bullion). Because the existing coinage has effectively been demonetized, the need for means of payment must be satisfied almost exclusively with new coin. If they can, people will presumably acquire new coin in exchange for bullion (including old coin) at the market rate of 36; but because of the scarcity of new coin, they may be hard to find.

The only alternative is to sell old coin to the mint as bullion in exchange for new coin at the mint price of 30. While this is not as advantageous as buying new coin in the open market, it is still a good deal. To see why, suppose the legal-tender value of the groat is 10 pennies, where the penny is the money of account. A contractual payment of £1 5s. ($1 \times 240 + 5 \times 12 = 300$ pennies) will therefore require the payment of 30 groats. Before the debasement, that would have meant 30 old groats. Now the payment can be discharged with 30 *new* groats, which have the same legal-tender value as the old ones. But 30 new groats can be obtained at the mint in exchange for one pound of bullion–28 old groats. For the payer, this represents a gain of 2 old groats or nearly 7% of the amount in question. So people will bring bullion to the mint, mostly in the form of pre-debasement coin. They will do so, however, only to the extent of the payments they have to make. Because the amount of new coin in circulation is at first very small, people will initially be induced to bring quite large quantities of old coin to the mint. However, as the stock of new coin in circulation increases, it will become easier to obtain new coin without going to the mint, and the flow of bullion to the mint will dry up.

Generally, the benefit of a debasement to the prince came entirely from seigniorage revenue: the debasement caused a large inflow of bullion to the mint and a substantial fraction of this was retained by the prince as seigniorage. However, princes, too, understood the benefits of paying off debts in debased currency. In 1551, the government of Edward VI halved the silver content of the testoon and raised the mint price:

> "It is doubtful whether many merchants availed themselves of this opportunity to deliver silver to the Mint. Most of the minting was done instead on public account and about £130,000… were issued. The entire issue was presumably used by the government to pay off the king's creditors. Thus the Crown made a huge profit and eliminated its internal debt by the simple process of making two pennies out of one."[30]

A series of aggressive debasements would eventually run into diminishing returns and into increasing political opposition from those segments of society harmed by the falling value of the currency (we shall discuss this presently). The opposition could be placated, and the ground laid for a renewed cycle of debasements, by a return to 'strong

[30]See de Roover (1949) p.56. Apparently, the government even found it worthwhile to purchase silver in the open market at a price above the mint price in order to have it minted into coin.

money'–the minting of a completely new coin of a weight and fineness comparable to that of the old coin before the current series of debasements began.[31]

Returning to our example, suppose that some time after the debasement that we analyzed the prince announces the minting of a new coin-the testoon. The testoon is to have a silver content of 1/28 of a pound of silver, and the mint price for a pound of silver is to be 22 of the new coins. For such a 'strengthening' to generate significant seigniorage revenue, there needs to be a strong incentive for people to bring in old debased groats to the mint to be reminted into shiny new testoons. To provide such an incentive, the value of the circulating groat is 'cried down'. The prince announces–by town crier, since that is the fastest way to communicate with the public–that the legal-tender value of the circulating groat will henceforth be reduced from 10 pennies to 5 pennies; the legal-tender value of the new testoon will be 12 pennies.[32]

Now consider a debt of £10 ($10 \times 240 = 2{,}400$ pennies). To discharge it in groats now requires 480 at their cried-down value. But, since a groat contains 1/43 of a pound of silver, the same 480 groats can instead be sold to the mint as bullion for $22 \times 480/43 = 246$ testoons. To discharge the £10 debt, at 12 pennies to the testoon, requires only 200 testoons, leaving a gain of 46 testoons over direct payment in groats. The effect of a strengthening, therefore, like the effect of an aggressive debasement, is to make the existing coinage more valuable as bullion than it is as means of payment. The consequences are the same–an acute shortage of circulating medium as the existing coinage disappears into hoards or is exported as bullion.[33]

The management of the coinage, and the consequences of debasements and strengthenings, were complicated by the fact that most mints struck coins not only in silver but also in gold. It was quite possible for one metal to be undervalued at the mint (mint price below market price) at the same time that the other was not. If it was gold that was undervalued, new minting of the domestic gold coin would cease and it would soon become scarce. However, this was rarely a problem, because it was easy to find

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[31]Strong money–*monnaie forte* or *moneta forte*–in contrast with weak money–*monnaie faible* or *moneta debole*. Strengthening–*renforcement*, *rinforzamento*–in contrast with weakening–*affaiblissement*, *indebolimento*, or *peggioramento.*

[32]Often after an initial period at the lower rate, the old coinage would be completely demonetized–declared no longer to be legal tender.

substitutes to settle payments contracted in gold–silver coin or international gold coin such as florins or ducats. On the other hand, if it was silver that was undervalued and silver coin that was scarce, there were no good substitutes. Gold coin was of little use: for most payments, the value of even a single gold coin was too great. Because it was easy to find substitutes for domestic gold coin, aggressive debasements of gold coin were unprofitable: they did not succeed in creating the acute scarcity of circulating coin that would draw bullion to the mint despite the unfavorable mint price. Debasements of silver coin were both more common and more severe. It was therefore not unusual to find gold coin plentiful at the same time that there was an acute shortage of circulating silver.

Both gold and silver coins had declared values in terms of money of account. These declared values implicitly defined an official exchange rate between gold and silver coins. For example, suppose the mint strikes both a silver groat and a gold noble. If the declared value of the former is 10 pennies and of the latter 200 pennies, then the official exchange rate is 20 groats to the noble. This is the rate at which they substitute for each other as legal tender: for instance, a payment of £10 (2,400 pennies) can be settled either with 240 groats or with 12 nobles.

Distinct from the official exchange rate, there is a *market* exchange rate implicit in the market prices of bullion in terms of gold and silver coin. For example, suppose the market price of silver bullion is 26 groats per pound or 1.30 nobles, while the market price of gold bullion is 310 groats or 15.5 nobles.[34] The market exchange rate between groats and nobles is the ratio of the price of silver in groats to its price in nobles or, alternatively, the ratio of the price of gold in groats to its price in nobles–20 groats to the noble in both cases.

While, in this example, the official and the market exchange rates are equal, problems can arise if they differ. Suppose that silver becomes more abundant in the marketplace, so that the silver ratio (the number of pounds of silver bullion needed to purchase one pound

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[33]Because the initial scarcity of new coins after a strengthening was so great, there was sometimes a transition period during which old coins were recognized at their old value. Not surprisingly, this resulted in a hectic scramble to repay debts in the old coin (Van der Wee (1977))

[34]The ratio of the price of silver bullion to the price of gold bullion, 11.9, is the 'silver ratio' and it depends, as we have seen, on the relative scarcity of gold and silver. As we saw earlier, the market value of a particular coin (the inverse of the price of bullion in that coin) reflected a premium over its bullion content. However, given the market value of a given coin, the ratio of the prices of silver and gold bullion

of gold bullion) increases from 310/26 = 11.9 to 12.5. Market prices adjust immediately, so that the price of gold in groats increases to 325 and the price of silver in nobles falls to 1.24. The price of silver in silver coin and the price of gold in gold coin is unaffected by the change in relative abundance of the two metals, remaining at 26 and 15.5 respectively.[35]

The effect of this increase in the silver ratio is to raise the *market* exchange rate–the ratio of groat price of silver to noble price of silver–to 26/1.24 = 21. If there has been no change in the declared money-of-account values of the two coins, the *official* exchange rate will remain at 20: a payment of £10 still requires either 12 nobles or 240 groats at official values. But the 12 nobles are now worth 12 × 21 = 252 groats at the market exchange rate, so paying in nobles would involve a loss relative to paying in groats.[36]

Since the official exchange rate undervalues gold coin as a means of payment, the noble is effectively demonetized: nobles will be hoarded or exported, but not spent. The reduction in monetary demand for nobles will reduce the flow of gold to the mint (it may also increase the flow of silver to the mint to provide more groats to replace the demonetized nobles). The obvious solution is to raise the declared legal-tender value of the noble to 210 pennies to match its higher market value. Indeed, declared values were adjusted periodically in response to changes in the relative scarcity of gold and silver. However, for long periods the undervaluation of gold could demonetize gold coin (for domestic payments) and dry up the flow of gold to the mint. Undervaluation of silver could reduce the monetary demand for silver coin, but, since gold coin could only be a partial substitute, it could not completely demonetize silver coin.

Gold coin could also be demonetized by an aggressive debasement of the silver coinage. In our example, suppose a debasement of the groat raises the price of silver bullion from 26 to 39 groats and, with it, the price of gold bullion from 310 to 466 groats (at the original silver ratio of 11.9). With the price of gold and silver bullion in nobles unchanged at 15.5 and 1.3 respectively, the market exchange rate rises to 466/15.5 = 30 groats per noble. If the declared legal-tender values of the groat and of the noble are unchanged, then the official exchange rate remains at 20. With the market exchange rate

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in that coin had to equal the 'silver ratio', which depended only on the relative scarcity of silver and gold bullion, and was therefore the same for all coins.

[35]These prices depend only on the premium of the coins over their bullion content, and are not affected by the relative scarcity of the two precious metals.

[36]Moneychangers were supposed to exchange domestic coins at the official rate, but they were often accused (with justice, one suspects) of exchanging at the market rate.

above the official exchange rate, it again makes no sense to settle payments with gold coin: the noble is demonetized domestically and any flow of gold to the mint stops.

To prevent such a demonetization of the gold coinage, an aggressive debasement of the silver coinage was generally accompanied by a crying up of gold coin. In our example, the declared legal-tender value of the noble would have to be raised to at least 230 pennies. Conversely, a strengthening of the silver coinage was generally accompanied by a crying down of the gold coin. This is the reason for the rather puzzling custom of calling a debasement an 'enhancement of the currency' and a strengthening an 'abatement of the currency'.[37] The 'currency' referred to is the stable gold coin and not the silver coin that is the object of the debasement or strengthening. A debasement of the silver coin is accompanied by an enhancement (crying up) of the gold coin; a strengthening of the silver coin, by an abatement (crying down) of the gold coin.

THE POLITICS OF DEBASEMENT

These fluctuations in the value of the coinage had serious economic consequences, because many prices were slow to adjust. The prices of commodities–grain being the most important–were flexible enough: they were determined in the marketplace and adjusted relatively quickly to changes in the value of the coinage.[38] However, contractual payments such as land rents and wages adjusted much more slowly. Contractual payments were denominated in money of account, and they were always settled in coin at the official rate, because it was always in the interest of one party or the other to insist upon it. With debasement and a fall in the value of the coinage (inflation), the payer insisted; with strengthening and a rise in the value of the coinage (deflation), the payee insisted.[39]

When feudal dues in kind had been commuted to money payments, the level of rents had been set, in principle, in perpetuity. Any attempt to alter rents was fraught with difficulty and likely to end in violence. Consequently, the effect of the steady inflation that occurred from the mid-twelfth to the early fourteenth century–ratified by a series of defensive debasements–was to steadily impoverish the minor nobility and the monasteries. So hard was it to alter rents that there was instead some return to payments

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[37]Enhancement: *augmentation*, *aumento* or *alzamento.* Abatement: *diminution, abassemento.*

[38]Prices of some of the most important food staples, such as bread and beer, were often regulated. However, official prices were adjusted fairly rapidly in response to market changes. As we saw earlier, because the indivisibility of the coinage made it hard to adjust the price of bread, the weight of the loaf was adjusted instead.

[39]Miskimin (1985) p 149

in kind–this being easier to accomplish than a change in the level of the money payments.[40] The more severe debasements from the beginning of the fourteenth century were devastating for the land-owning classes. Not surprisingly, the nobles were adamantly opposed to debasements. Conversely, they were much in favor of strengthenings, which sharply increased the real value of their incomes.

The other major losers from debasement were wage-earners. Urban wages were usually fixed by employers' guilds so as to prevent 'ruinous' competition among guild members for labor. When debasement raised goods prices, employers were in no hurry to raise wages to compensate for their lower purchasing power. For manufactured goods that were mainly exported–cloth being the most important example–prices were effectively denominated in gold, while wages were set in domestic money of account and paid in silver. So debasement of the silver coinage lowered labor costs and made exports more profitable. Indeed, the major debasements in Flanders in the fourteenth century, by lowering wage-costs relative to the value of output, helped prop up the declining Flemish cloth industry.[41] However, the gain to employers came at a high social cost: anger over the precipitous fall in real wages was a major factor in the workers' uprisings that broke out in the Low Countries in the fourteenth century.[42] While debasements hurt urban workers, strengthenings did little to help them: employers were much quicker to adjust wages downwards than they were to adjust them upwards. Moreover, the burden of the wage and price regulations and the new taxes that generally accompanied a strengthening fell disproportionately on the poor and the weak. The result once again was riot and violence.[43]

The effect of debasement and strengthening on debtors and creditors varied. Mercantile debts and the debts of territorial governments were generally short-term and mostly denominated in gold coin or in silver by weight, so that they were unaffected by debasement of the silver currency. Issuers of long-term debt, mainly municipal governments and landowners, did gain from debasement and lose from strengthening to the extent that their debt was denominated in silver money of account.[44] However, continuing debasements rapidly reduced the availability of such credit and led to its

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[40]Pirenne (1937) p 84; Spufford (1988)

[41]Munro (1972)

[42]See Munro (1972) on the Low Countries and Cipolla (1982) on Florence.

[43]Spufford (1988) Ch 13

denomination in gold coin or in silver by weight.[45] The use of sales credit in the economy was ubiquitous at all levels.[46] The effect of sudden fluctuations in the value of money must have been devastating for this system of credit, and, given the small amounts generally involved, denomination in gold or silver by weight was not a feasible alternative.

For moneychangers and banks–the two functions were often combined–fluctuations in the value of the currency were both good and bad. They were good in that instability generated a great deal of business for moneychangers and presented many opportunities for profit. They were bad in that monetary instability could threaten banks with illiquidity and insolvency. A general shortage of circulating coin, especially if it occurred suddenly, would cause depositors to withdraw their cash, threatening the banks' liquidity. On the other hand, debasement could help the banks by increasing the value of their cash reserves–which could be recoined–while leaving the value of their deposit liabilities in money of account unchanged. A strengthening, on the other hand, by reducing the value of their reserves relative to their deposits, could be catastrophic. Mindful of this, and to protect the banks, the Burgundian strengthening of 1389-90 specified that while land rents were to be paid in the new groats (at 72 groats to the noble), other payments–including bank deposits–could be settled in old groats (at 102 groats to the noble).[47]

Given this list of potential gainers and losers, control over the coinage was a major political issue. From the time of Charlemagne, control over the coinage had been considered a royal prerogative. However, as royal power declined, control over the mints passed into the hands of the local magnates. As royal power was once again reasserted, one of the first rights kings sought to reestablish was control over the coinage. In England, where royal power remained strong, the king never lost this right. In France, the king struggled to regain it, and by the early fourteenth century, had reduced the number of vassals with a right to mint coin from 300 to 30. In Germany and in Italy, the Empire collapsed completely and control remained in the hands of princes, temporal and ecclesiastical, and cities.

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[44]To the extent that landowners had borrowed against their land rents by issuing rentes and annuities (see Kohn (1999d)), the losses from debasement and inflation were passed on to their creditors.

[45]Munro (1972)

[46]See Kohn (1999a)

Control over the coinage primarily meant the right to collect seigniorage. From the eleventh century, it was widely accepted that the king was entitled to exploit this right entirely for his own benefit. The mint was considered in this respect to be no different from any other royal property. Of course, it was obvious that the state of the coinage affected trade, but there was really no concept of 'monetary policy' as such. In normal times, this was not a problem, because the interest of the prince in collecting seigniorage coincided with the public interest in a sound coinage. The defensive debasements of the long thirteenth century, by reactivating the mints, had the effect both of boosting the income of the king (and of his mintmaster) and of mitigating the increasing scarcity and deteriorating quality of circulating coins; defensive debasements did not *cause* the gradual inflation that took place so much as ratify it. Similarly, as silver became increasingly scarce from the late fourteenth century, its rising market value halted the flow of bullion to the mints; the resulting defensive debasements reactivated the mints and also moderated the deflationary effect of monetary appreciation on the economy.[48]

The mutuality of interests broke down, however, with the aggressive debasements that began around the turn of the fourteenth century: here the interests of king and public diverged sharply. In a fiscal emergency–generally a war–seigniorage was the one form of revenue the king could increase rapidly on his own authority alone. In contrast, new taxes ('subsidies') had to be voted by parliament. Even if parliament approved, which was far from certain, it took time and often required painful concessions on other matters of contention between king and subjects. A debasement required no such approval and could raise a great deal of revenue very quickly. Moreover, by threatening the barons' main source of income–land-rents–a debasement exerted pressure on them to grant alternative subsidies. The crisis over, the granting of subsidies could be rewarded by a strengthening, restoring landowners' incomes.[49]

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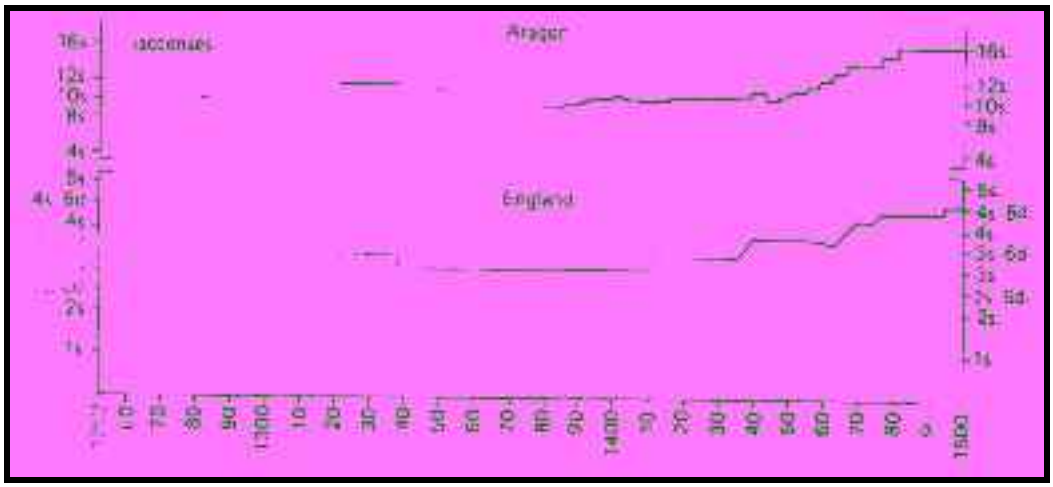
[47]de Roover (1948) Ch. 12

[48]"In view of the rigidity of the mediaeval price structure, prices did not respond readily to a contraction of the quantity of money; hence debasement was often the only means by which it was possible to restore economic prosperity and to bring the balance of payments into equilibrium." (de Roover (1948) p229).

[49]"It was this factor indeed that made control of the coinage so important a weapon for the prince. By debasing the coinage, the prince could ruin the landlord class; by threatening to do so, he could literally force landlords to grant alternative subsidies…" (Miskimin (1985) p 149). Of course, the prince too was a major landowner, and the revenues from his private estates were an important source of revenue. So he, too, lost from debasement-induced inflation and gained from strengthening.

The ability of the king to resort to debasement depended on the power of parliament and on the quality of relations between king and magnates. Where parliament was strong and the relationship on the whole cooperative, as it was in England and Aragon, aggressive debasements were rare and the currency remained relatively stable. Where parliament was weak and relations hostile, as in France, Flanders, and Castile, aggressive debasements were common. The consequences can be seen in Figure 1, which shows the exchange rates of the respective currencies against the florin over the period 1252-1500. Naturally, the barons struggled to restrict the freedom of the king to debase the currency–because of the damage they suffered from debasement, but also simply to restrict his power. They preferred taxes that were under their own control and from which they could exempt themselves. In France, the cause of the barons was championed by the Paris academic, Nicholas Oresme. In his 1355 tract, *De Moneta*, Oresme argued that the coinage should be managed not in the narrow interests of the prince but in the broader interests of the 'community' (read nobility).[50] This view gained increasing support in the fifteenth century, and aggressive debasements became less common. However, given a severe enough need, the temptation was hard to resist and a ruler often had little alternative.

[50]"On closer inspection Oresme turns out, therefore, not to be an idealistic ivory-towered thinker, but a party man writing a tract for the times." (Spufford (1988) p301)


Aragon
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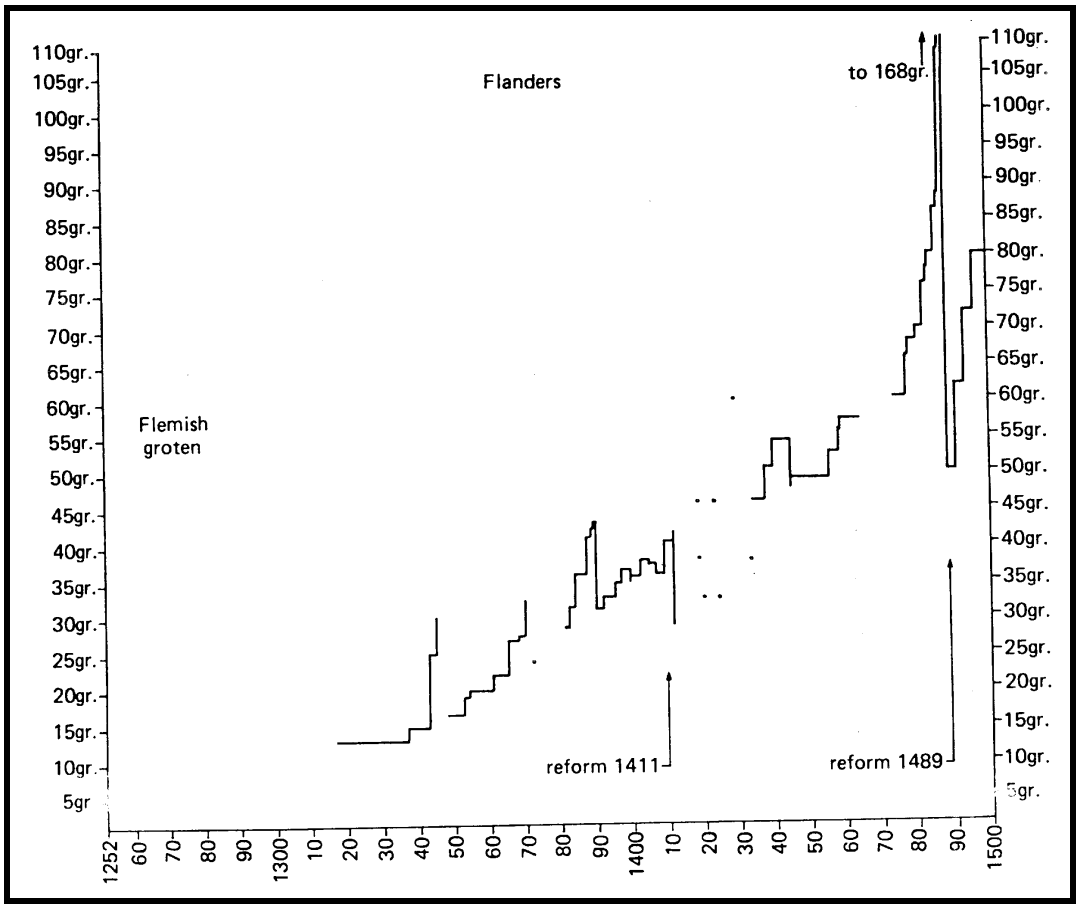
Flanders
to 168gr.
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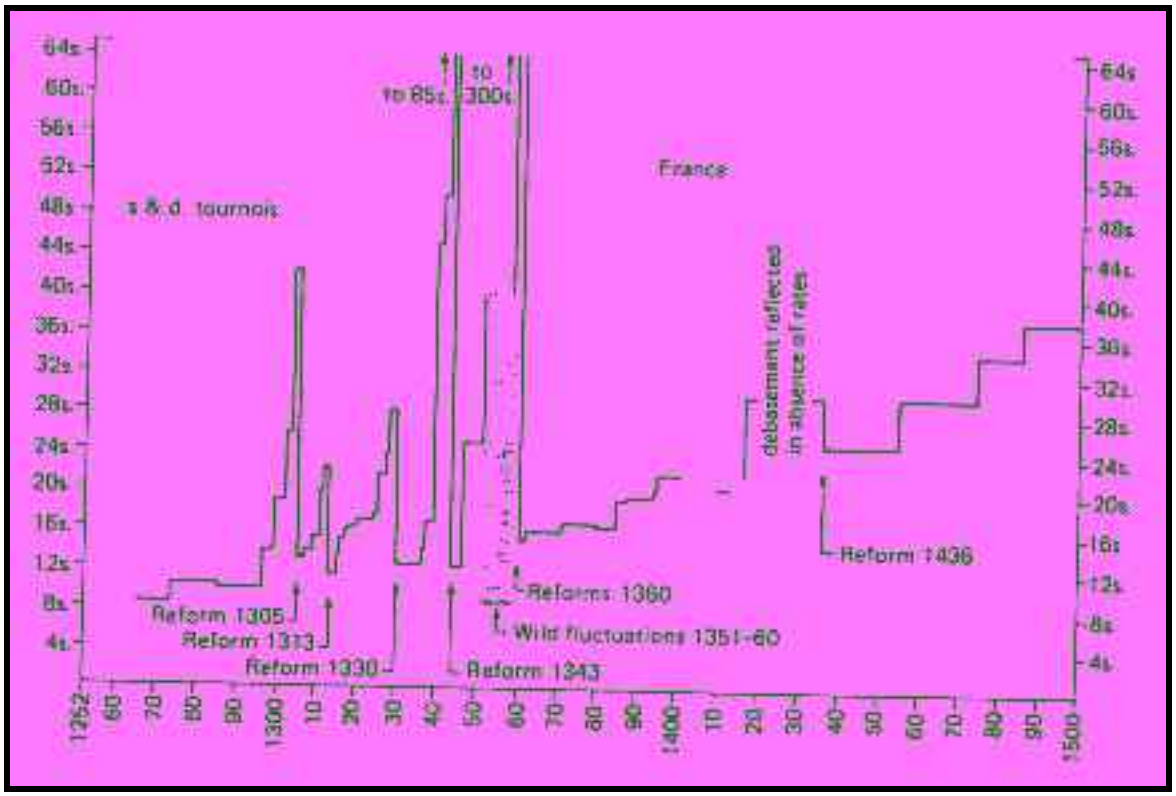

Source: Spufford (1988) pp296-299

FIGURE 1. VARIOUS CURRENCIES AGAINST THE FLORIN, 1252-1500

In this battle between princes and magnates, other members of society were largely innocent bystanders. The common people, especially in the towns, suffered from debasement and from strengthening alike. However, they had little say in the matter, other than through armed revolt. Since monetary instability interfered with trade, merchants strongly preferred, and were constantly demanding, a stable currency. However, outside the Italian city-states, the merchant class generally lacked political power. While merchant-manufacturers did benefit from the effect of debasement on real wages, this was generally an unintended side effect rather than a motivation for debasement.[51]

In the Italian city states, merchant interests were much better represented. However, the pressures of incessant warfare made recourse to debasement a frequent necessity. The conflicting needs of commerce and public finance were reconciled by relying, much more

[51]Florence was possibly an exception. There is, at the least, a strong suspicion that the merchant oligarchy supported debasement of the silver currency as a way of lowering real wages.

so than in northern Europe, on parallel monetary systems in silver and in gold, with parallel moneys of account. The integrity of the gold coinage was considered sacrosanct, and most mercantile and wholesale transactions were denominated in gold money of account. In Florence, everything from wholesale transactions in grain to professional fees of doctors and lawyers were denominated in gold. Wages, on the other hand, were denominated in silver money of account: a Florentine statute prohibited the fixing of wages in gold. Merchant-manufacturers were therefore not entirely averse to debasement of the silver currency. However, as in the Low Countries, debasement had its cost in terms of civil unrest.

In Venice, the calculus of debasement was somewhat different, because the city was a major exporter of international currency. Until the sixteenth century, when Antwerp took over this role, Venice was the center of the European bullion trade. Silver flowed in across the Alps from Central Europe and gold flowed in from North Africa, Hungary, and the Black Sea. The Venetian mint added value to this bullion, minting much of it into good coin for re-export. Because of its high quality, Venetian gold and silver coin was the predominant means of payment in the Levant; it also circulated widely in Italy and the rest of Europe.[52] Aggressive debasement would have wiped out the international demand for Venetian coinage–other, better coins would quickly have taken its place–and would have caused a precipitous drop in mint revenue. Aggressive debasement was a profitable strategy only when there was a captive market for the debased coin. For suppliers of international currency, such as Venice and Florence (with respect to the florin), stability was a far more profitable strategy than debasement.

COMMERCE IN A WORLD OF MONETARY CHAOS

Clearly, then, the monetary environment of the period was atrocious: there was a chronic shortage of coin, punctuated by periods of acute shortage, and the value of coin was subject to sudden and violent fluctuations. How did commerce nonetheless manage to thrive?

Commerce adapted to the shortage and poor quality of coin by relying on cash payment as little as possible, finding a variety of ways to economize on the use of actual coin in transactions. The overwhelming majority of trade, at every level, was conducted on the basis of credit: “Unstinting credit was the great lubricant of the Commercial Revolution.”[53] Very few transactions involved the immediate payment of cash: currency

was not so much the means of payment as it was the standard of value and the means of final settlement. The credit on which trade was based was denominated in currency units (money of account), and when debts had eventually to be settled, currency provided a means of final settlement.[54]

The need for cash settlement could, however, be minimized by offsetting one debt against another. The extended periods for which debts were often carried made it easier to set off debts bilaterally: a baker who sold bread on credit to a shoemaker would eventually need a new pair of shoes. If bilateral netting proved insufficient, as it generally did with merchants, the debt of a third party could be assigned in settlement. For example, if a merchant owed 100 florins to a supplier and was owed 80 florins by a customer, he could assign the customer's debt to the supplier in partial payment. The assignment of debts was common even in the countryside and could involve quite complex arrangements. For example, in the fourteenth and fifteenth centuries, Bavarian monasteries purchased wine from the South Tyrol using extended chains of assignment of debt linking local officials, wholesalers, shippers, customs officials, and financiers.[55]

The extension of credit and the assignment of debts was feasible, however, only among people who knew each other well. Within a community–whether a community of merchants or a small village–each knew the other's credit, and continuing and repeated transactions gave each the incentive to honor his debts. In trading with strangers, however, credit was unknown and incentives for good behavior were weak or absent. A natural alternative in these circumstances was immediate payment in cash. However, the failings of the coinage made this impractical, especially for wholesale commerce where the required payments were large. It was the search for a solution to this problem–how to extend credit and to assign debts in the absence of mutual trust–that motivated the important financial developments of the period. Deposit banks and the market for bills of

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[52]"By 1400 Venetian money circulated from London to Yemen." (Robbert (1983)) , *q.v.* on the international circulation of Venetian coin. See also Lane and Mueller (1985) on the operation of the Venetian mint and on Venetian monetary policy.

[53]Lopez (1976) p 72.

[54]See Kohn (1999a) , Van der Wee (1993) ch. 10; Van der Wee (1977) ; Spufford (1988) Ch. 14. Sales credit at the retail level helped not only with the shortage of currency but also with the problem of the large minimum denomination of coins: a debt could accumulate until its value was large enough to equal the value of an available coin.

[55]Toch (1986)

exchange, often in combination, provided a highly effective solution.[56] This solution was available, however, only in the main commercial centers (so-called 'banking places'): only there did the scale and the volume of payments justify the necessary investment in specialized institutions. Neither deposit banks nor bills of exchange were to be found in most towns and certainly not in rural areas. Moreover, even where deposit banks and bills of exchange were available, the large fixed transactions costs involved in using them made them suitable only for large payments. For smaller transactions and for transactions in smaller towns, coin, however bad, remained the only option, and its deficiencies were a major handicap to trade.

Commerce adapted to instability in the value of the coinage by using the currency whose value was the most stable. Large-scale and long-distance commerce was mostly invoiced in gold, because, as we have seen, the gold coinage was much less prone to debasement than the silver coinage. On the other hand, the credit on which local and retail trade was based, because of the smaller sums involved, was generally denominated in silver coin: here the cycles of debasement and strengthening must have been highly disruptive. On the other hand, the longer-term fluctuations in the value of the coinage caused by its gradual deterioration or by changes in the overall abundance of bullion made little difference to anyone: "From the point of view of the merchant community, the short-term tensions in the relative value of gold and silver, the efforts of governments to adjust to them, and the short-term fluctuations in prices, from season to season, from year to year, and from place to place were of greater importance than the long-term trend."[57]

A commercial system based on credit was susceptible to liquidity risk. Each individual, to be able to settle his own debts, relied on timely settlement by others. Delay in settlement by one party could lead to a cascade of delays and defaults by others. In the informal network of credit within communities this was less of a problem: with better information and greater trust, it was relatively easy for creditors to extend the term of a debt to accommodate temporary illiquidity.[58] In dealings among strangers, such flexibility was impossible. So merchants, to protect themselves against liquidity risk, had

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[56]See Kohn (1999b and 1999c) .

[57]Ball (1977) p57.

[58]"For example, if Thomas had to pay John in cash for a purchase but did not have the money at hand, Thomas would probably not need to take out a loan, for he could postpone payment to John until he had been able to collect the cash already owed to him by William from an earlier obligation. There is no indication that either creditor in this arrangement charged for his forbearance in collecting the sum due." (McIntosh (1988) pp560-1)

to be able to borrow when necessary in order to settle their debts. As we shall see, the system of deposit banks and bills of exchange provided them with the necessary loans. And it was out of this lending, a necessary adjunct to the system of payment, that more general types of finance evolved.

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