

After the debasement (1544-51): Did Gresham's Law apply?

Working paper

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Introduction

Gresham's Law is one of the most widely cited propositions in discussions of commodity money, where the intrinsic value of currency often diverges from the nominal value assigned by the issuing authority. The principle that "bad" (overvalued) money drives out "good" (undervalued) money has long been applied to explain the movement of bullion in the late Middle Ages. According to Gresham's Law, differences in the gold–silver ratios among countries or regions would likely lead to the inflow of the overvalued metal and the outflow of the undervalued one, either through monetary arbitrage or through imbalances in international trade.¹

Apart from the movement of bullion, monetary alteration was another frequent phenomenon in the late Middle Ages. Such alterations—often implemented without recalling old coins—produced multiple concurrent standards of coinage in circulation. Gresham's Law is also invoked to explain the problems and consequences arising from monetary disarray. This paper focuses on the validity of Gresham's Law in a narrower sense: its effect on the composition of domestic circulation. It argues that information played a critical role in the operation of Gresham's Law. Accordingly, this paper first examines the preconditions for the law's applicability and then quantitatively assesses its effectiveness in England between 1544 and 1560.

¹ Based on Gresham's Law, the movement of bullion is generally interpreted as a consequence of divergent gold–silver ratios among countries or regions. However, scholars have advanced two competing explanations of the underlying mechanism of Gresham's Law: the monetary–arbitrage model and the trade-balance model. Watson, 'Back to Gold and Silver'. The critic of Watson's theory see Miskimin, 'The Enforcement of Gresham's Law', pp. 154-6; Munro, *Wool, Cloth, and Gold*, pp. 29-32; idem., 'Mint Policies, ratios, and Outputs in the Low Countries', p. 76 and Appendix A.

Although Sir Thomas Gresham was mistakenly identified as the first to formulate the principle that “bad money drives good money out of circulation,”² his lifetime coincided with one of the most dramatic monetary events in English history: the Great Debasement—an unprecedented deterioration of English coinage. From 1544 to 1551, vast quantities of debased coins entered circulation, and this disorder was not resolved until the Elizabethan recoinage of 1560. Owing to its extraordinary scale and far-reaching effects, the Great Debasement has long attracted scholarly attention. Yet questions such as the extent to which the money market was affected, and whether Gresham’s Law held during this monetary turbulence, have not been quantitatively assessed. Evaluating the efficacy of Gresham’s Law during the Great Debasement can not only shed light on the social and economic impact of the debasement but also enhance our understanding of bullion movements in response to changes in coinage.

The paper is organized as follows. First, it reviews the recent literature on Gresham’s Law, before employing an asymmetric-information model to interpret the mechanism of the law. Second, it presents the historical context—namely, the successive debasements experienced in mid-Tudor England. Third, two empirical approaches are developed to test Gresham’s Law: (1) comparing the estimated quantity of fine silver coins remaining in circulation on the eve of Elizabeth’s recoinage with the total output of fine silver between 1551 and 1558; and (2) examining the divergence between actual and par exchange rates between London and Antwerp during and after the Great Debasement. Finally, the paper draws these two strands of evidence together to assess the overall validity of Gresham’s Law in this historical context.

Gresham’s Law

In a commodity-money economy, a buyer holds two types of coins: both carry the same face value, but one (the undervalued or good money) has a higher intrinsic metallic value than the other (the overvalued or bad money). Which coin will the buyer use in payment if sellers are willing to accept both equally? Naturally, the buyer will spend the bad money in exchange for the same amount of goods that could otherwise be purchased with the good money.

² Fetter, ‘Some Neglected Aspects of Gresham’s Law’.

Now, consider what happens if sellers can distinguish between good and bad money and set different prices accordingly. In that case, the buyer will be indifferent between the two currencies once their purchasing power accurately reflects their intrinsic metallic content. Under these circumstances, good and bad money could circulate side by side without displacement.

The validity of Gresham's Law—that bad (overvalued) money drives good (undervalued) money out of circulation—depends on a crucial assumption: the presence of asymmetric information. Some consumers are better informed than others, allowing them to pass off bad money to less informed parties while hoarding the good. The concept of asymmetric information has been extensively explored by economists across various fields: Akerlof linked it to the “market for lemons,” Chari to labor-market contracts, Leland to licensing, Hill to securitized assets, and Gandal and Sussman to the emergence of national commodity money.³ From this perspective, Gresham's Law can be regarded as an early application of asymmetric-information theory to a commodity-money economy.

Debates over Gresham's Law have centred on the circumstances under which the law holds and on how to explain cases where either bad and good money circulated side by side or good money drove bad money out of circulation. Rolnick and Weber argue that the key determinant of Gresham's Law's operation is the transaction cost associated with imposing a premium (or discount) on good (or bad) money.⁴ In their view, undervalued large-denomination coins can circulate at a premium, whereas undervalued small-denomination coins tend to disappear because the costs of paying such a premium are prohibitive.

Greenfield and Rockoff, re-examining the same nineteenth-century American cases studied by Rolnick and Weber, contend that there is no convincing evidence against Gresham's Law: bad money did indeed drive out good money.⁵ In contrast, Selgin, adhering to the orthodox interpretation, maintains that legal-tender legislation is a necessary precondition for Gresham's Law.⁶ Such laws, “by making it costly or at least

³ Akerlof, ‘The market for ‘lemons’’; Chari, ‘Involuntary unemployment and implicit contracts’; Hill, ‘Securitization’; Gandal and Sussman, ‘Asymmetric information and commodity money’.

⁴ Rolnick and Weber, ‘Gresham's law or Gresham's fallacy’.

⁵ Greenfield and Rockoff, ‘Gresham's Law in nineteenth-century America’.

⁶ Selgin, ‘Salvaging Gresham's Law’.

risky for sellers to communicate their monetary preference to buyers,”⁷ effectively eliminate the possibility of discriminating among different currencies.

In a more formal theoretical treatment, Velde, Weber, and Wright (hereafter VWW) developed a search-based model in which transactions between well-informed and less-informed agents generate two possible equilibria: by-weight and by-tale.⁸ Under the by-weight equilibrium, heavy coins circulate mainly among informed agents who assess coins by their metallic content, while under the by-tale equilibrium, well-informed agents impose a premium on heavy coins, but less-informed agents accept coins indiscriminately by face value. As Volckart has recently emphasized, the assumption of heterogeneous information among consumers is fundamental to currency competition.⁹ Hence, Gresham’s Law applies only when participants differ in their knowledge of coin quality and when the transaction costs of assigning discounts or premiums are not prohibitively high.

During the Great Debasement, England’s circulating medium consisted of two types of coins: those of the old standard fineness and the newly debased issues. Gresham’s Law predicts that coins of higher fineness would be culled, melted down, hoarded, or exported, leaving primarily debased coins in circulation. Both contemporary evidence and modern scholarship suggest that Gresham’s Law operated at least partially in mid-Tudor England: coins of higher standard fineness indeed became scarce.¹⁰ The disappearance of fine coins is beyond dispute, yet questions remain. To what extent were fine coins displaced by the influx of debased issues? How rapidly did the withdrawal occur? And how far can Gresham’s Law account for these developments? Before turning to these questions, the following section reviews the historical background.

The Great Debasement

Since the Middle Ages, English coinage had enjoyed a long-standing reputation for stability and fineness and had, for centuries, been widely accepted across the Continent. However, when Henry VIII faced mounting military expenditures in his

⁷ Ibid., p. 641.

⁸ Velde, Weber, and Wright, “A model of commodity money’.

⁹ Volckart, “The Big Problem of the Petty Coins”.

¹⁰ Oman, ‘The Tudors and the currency’, p. 184; Challis, *Tudor Coinage*, p. 116; Ruding, *Annals of the Coinage of Great Britain*, p. 334.

campaigns against France and Scotland, and after exhausting other fiscal resources, he resorted to debasing the coinage. His son, Edward VI, carried the process even further before efforts were made to restore the standard.

Over the eight years of debasement (1544–1551), the fine metallic content of silver coins was reduced by approximately 83 per cent and that of gold coins by 27 per cent. The magnitude of this alteration was unprecedented after centuries of monetary stability and had a profound impact on English monetary policy.¹¹ In the history of money, this episode has become known as the Great Debasement.

Table I The English silver coins, 1526-1560

Date	Fineness	Grams of pure silver per £ sterling	Mint equivalent (£)	Seigniorage (£)	Mint Price (£)
Nov. 1526	0.9250	153.4464	2.4333	0.0542	2.3784
May 1542	0.7583	117.9308	3.1650	0.7650	2.4000
June 1544	0.7500	116.6400	3.2000	0.5792	2.6000
Apr. 1545	0.5000	77.7600	4.8000	2.0000	2.8000
April 1547	0.3333	51.8400	7.2000	4.0000	3.2000
Oct. 1548	0.3333	51.8400	7.2000	3.8000	3.4000
Jan. 1549	0.6667	51.8400	7.2000	not given	not given
Oct. 1549	0.5000	51.8400	7.2000	3.6000	3.6000
April 1550	0.5000	51.8400	7.2000	2.9000	4.3000
Aug. 1550	0.5000	51.8400	7.2000	3.2000	4.0000
April 1551	0.2500	25.9200	14.4000	8.4000	6.0000
Oct. 1551	0.9208	114.5623	3.2583	0.0541	3.2042
Aug. 1553	0.9166	114.0397	3.2708	0.0791	3.1917
Aug. 1557	0.9166	114.0397	3.2708	0.0812	3.1896
Nov. 1560	0.9250	115.0848	3.2417	0.0813	3.1604

Source: C.H. Challis, *A New History of the Royal Mint*, p. 235

¹¹ Although there had been several debasements in the previous three centuries, the scale of adulteration either in weight or in fineness had never been seen before. Henry VIII and his successor were able to extract approximately £1,285,000 during the Great Debasement. Challis, 'The debasement of the coinage', p. 453. The experience of the Great Debasement also influenced the 1696 recoinage, which deliberately retained the old standard fineness rather than reducing it.

Table II The English gold coins, 1526-1560

Date	Fineness	Grams of pure gold per £ sterling	Mint equivalent (£)	Seigniorage (£)	Mint Price (£)
Nov. 1526	0.9948	13.7521	27.1417	0.1386	27.0031
	0.9166	13.6167	27.4083	0.1628	27.2455
May 1542	0.9583	12.4196	30.0500	1.2500	28.8000
April 1545	0.9166	11.4040	32.7271	2.7271	30.0000
Jan. 1546	0.9166	11.4040	32.7271	2.1271	30.6000
Oct. 1546	0.8333	10.3676	36.0000	4.8000	31.2000
March 1547	0.8333	10.3737	36.0000	1.2000	34.8000
Feb. 1549	0.9166	10.0623	37.0917	1.0971	36.0000
Dec. 1550	0.9948	12.8926	28.9505	0.1379	28.8126
Oct. 1551	0.9948	10.3141	36.1875	0.1375	36.0500
	0.9166	10.3672	36.0000	0.1646	35.8354
Aug. 1553	0.9948	10.3141	36.1875	0.2000	35.9875
Aug. 1557	0.9948	10.3141	36.1875	0.2000	35.9875
Jan. 1559	0.9948	10.3141	36.1875	0.2000	35.9875
	0.9166	10.3672	36.0000	0.2187	35.7813

Source: C.H. Challis, *A New History of the Royal Mint*, p. 235

The debasement occurred in several stages (Table I and II). In 1544, Henry VIII reduced the fineness of silver and gold coins to 75 per cent and 95.83 per cent, respectively. Soon afterwards, the fineness of silver coins was further reduced to 50 per cent, and that of gold coins to 91.66 per cent. By late 1548, the supply of silver to the mint had begun to dry up, and the Crown continued to face acute fiscal pressure. The mint price was now too low to attract bullion, leaving the government no choice but to compel subjects to surrender previously issued coins through a forced recoinage.

Edward VI withdrew the base testoons (twelve-penny pieces) issued since the onset of the debasement—namely, silver coins of 75, 50, and 33.3 per cent fineness—and re-coined them either into pieces of the old weight but lower fineness or of the same fineness but lighter weight.¹² In April 1551, at the final stage of the Great Debasement,

¹² The recoinage of 1548–49 occurred amid stagnating bullion supplies. It was justified under the pretext of combating counterfeiting: “what fraud and corruption hath of late time been used in the falsing of his highness’s coin now current, specially of the pieces of 12d...for the greatness and facility of counterfeiting...the practicers whereof (as is known) are not only men here dwelling, but also for the most part have been strangers dwelling in foreign parts who have found the means to convey privily

the fineness of silver coins fell to 25 per cent, with pure silver content amounting to only about 17 per cent of that in pre-debasement issues. Before Edward restored the fineness standard to 92 per cent in October 1551, two principal types of silver coins likely circulated concurrently: one containing 51.84 grams of fine silver per pound sterling, and the other—the basest coins issued from April 1551—containing only 25.92 grams per pound.

In August 1551, all debased silver coins were officially devalued to half their former face value. Even so, the prevailing mint price between the end of the Great Debasement and the eve of Elizabeth's restoration remained insufficient to attract the remaining base money back to the mint (Table II).¹³ After the halving of face values, the remaining base coins contained roughly 90 per cent as much pure silver as the fine coins struck later in Edward VI's reign and under Mary. Consequently, debased and fine coins circulated side by side, and this situation persisted until Elizabeth's restoration. Only when the face value of base money was further reduced could the government afford to undertake a comprehensive reform of the coinage.

Assessing Gresham's Law

As discussed earlier, information plays a pivotal role in the operation of Gresham's Law: when information costs are high, the distinction between good and bad money becomes blurred. Accordingly, the concept of well- and less-informed agents developed in Velde, Weber, and Wright's (VWW) model is applied here to analyse Gresham's Law during the Great Debasement. Two types of consumers can be distinguished in mid-sixteenth-century England. A small and informed minority, consisted of merchants, goldsmiths, money-changers, and other professionals or tradesmen. The remainder of the population, described by the Earl of Bedford as

and disperse the said counterfeit piece abroad." Hughes and Larkin, *Proclamations*, vol. 1, no. 302, 420. Silver coins of three different finenesses but the same mint equivalent were issued during the 1548–49 recoinage: (1) 66.67 per cent; (2) 50 per cent; and (3) 33.33 per cent. Challis, *Tudor Coinage*, Appendix II, 306.

¹³ A few debased silver coins of 50 per cent fineness issued between 1545 and 1547 likely remained in circulation by the autumn of 1551. Part of these 50 per cent coins had been re-coined in 1548–49, while another portion was withdrawn and reminted into the basest issues during early 1551. However, the prevailing mint price was insufficient to draw coins of 50 per cent fineness back to the mint before April 1551. After the revaluation of that year, the mint price (£3.2 per pound weight of silver) rose significantly above the mint equivalent of these coins (£2.4). As a result, coins of 50 per cent fineness were likely driven out of circulation before Elizabeth's recoinage. Gould, *Great Debasement*, pp. 47–8.

“thunlerved and unplandyshe people”,¹⁴ comprised the less-informed agents. It is reasonable to regard the former as better positioned to identify the intrinsic value of coins because of their superior access to information and resources.

In principle, anyone could calculate a coin’s intrinsic value by multiplying its weight by its fineness. In practice, however, the touchstone test—the standard technology for assaying precious metals—was accurate only within two or three percentage points and required specialised instruments and expertise.¹⁵ For most consumers, therefore, the transaction costs of assessing a coin’s intrinsic value were prohibitively high, and coins were typically passed by tale (i.e. by count). Merchants engaged in large-scale or international trade, along with government officials handling bullion, by contrast, valued coins by weight, according to their metallic content.¹⁶

The two bodies of evidence used in this paper to assess the operation of Gresham’s Law during the Great Debasement—namely, the composition of Elizabeth’s recoinage and the movement of the exchange rate—correspond respectively to the behaviour of less-informed and well-informed agents. Although both gold and silver coins were affected by the debasement, the discussion of Elizabeth’s recoinage focuses on silver, partly because silver coins experienced far greater adulteration and partly because gold coins were not re-coined in 1560. However, as the standard medium of international settlement, gold coins play a crucial role in the analysis of exchange-rate movements.

¹⁴ During the Elizabethan recoinage, the Earl of Bedford complained to the Lord Treasurer, William Cecil, that the “thunlerved and unplandyshe people” found it difficult to distinguish between the silver coins of 50 per cent and 25 per cent fineness. To mitigate confusion, officers were dispatched to the counties to stamp distinguishing marks upon the two types of coins: a portcullis was impressed on the less debased coins before the King’s head, and a greyhound on the basest coins behind it. Palliser, *The Age of Elizabeth*, p. 135; Craig, *The Mint*, p. 119.

¹⁵ Gandal and Sussman, op. cit., p. 444. Around the mid-fourteenth century, however, in Venice, the needles used in the touchstone test could measure fineness to within a few thousandths of a percentage point, though the authors express some scepticism regarding this precision. Lane and Mueller, *Money and Banking in Medieval and Renaissance Venice*, p. 150. Although the cost of conducting a touchstone test is unknown, the price of a balance and a complete set of coin weights in Elizabeth’s reign ranged from 37d to 54d—when the daily wage of a master mason was approximately 7d in the 1550s. Dyson, *Proclamations*, p. 258.

¹⁶ Lane and Mueller maintain that the general population passed coins by tale; merchants, on the other hand, handled coins by weight. Lane and Mueller, op. cit., pp. 59-60.

Assessment: re-coinage

In October 1551, the government began to restore the standard of silver coinage by calling down the face value of the debased coins and issuing new fine silver coins. However, it failed to provide sufficient incentive to remint the remaining debased coins (Table I). When Elizabeth acceded to the throne in 1558, four types of silver coins were in circulation: (1) those of 50 per cent fineness issued in 1549–51; (2) those of 33 per cent fineness issued in 1546–50; (3) the basest coins of 25 per cent fineness struck in 1551; and (4) the fine silver coins minted after the Great Debasement.

According to Gresham's Law, the debased coins—having lower intrinsic value—should have driven the fine silver coins of 1551–60 out of circulation. Many scholars have assumed that this was indeed the case. Oman remarked that “the copious stream of finer pieces [that] poured out from the mint [...] seemed to vanish just as it touched the trading world,”¹⁷ though he provided neither quantitative evidence nor a theoretical explanation. Feavearyear likewise observed that the fine coins of Edward VI and Mary “immediately disappeared,” noting that “the price of silver was much too high to permit coins as fine and as heavy as his new ones to stay in circulation.”¹⁸

Contemporary observers had similar concerns. Sir John Price wrote to Queen Mary that “as one testoon is better than another, the fine new coin better than the base universally [...] which inequality is cause of much robbing of the treasure of the realm, while the best money is ever picked and carried over, and the worst only left us.”¹⁹ Yet Gould, citing the mint official Thomas Stanley's estimates, argued that “a large part of the fine-gold and sterling-silver coinages of the last years of Edward VI and of Mary's reign [had] survived to 1559,” thereby casting doubt on the absolute validity of Gresham's Law.²⁰

To address the question of whether Gresham's Law accurately described events after the Great Debasement, it is necessary to calculate to estimate how much fine silver money was issued during this period and how much remained in circulation by 1560. If bad money did indeed drive out good, the quantity of fine silver coins still circulating on the eve of Elizabeth's recoinage should have been significantly smaller

¹⁷ Oman, *op. cit.*, p. 184.

¹⁸ Feavearyear, *op. cit.*, pp. 66 and 69.

¹⁹ Archbold, ‘A Manuscript Treatise on the Coinage by John Pryse’, pp. 709–10.

²⁰ Thomas Stanley was a senior mint official, and controlled the mint from 1551 to 1571. He also charged Elizabethan re-coinage in the old mint in the Tower. Gould, *op. cit.*, p. 55.

than the total fine output. This serves as a measure of the effectiveness of Gresham's Law.

In preparation for recoinage, the government required a basic understanding of the composition of the circulating medium. In 1559, Thomas Stanley produced an estimate of the characteristics of the coinage then in use (Table III). The following year, the government further reduced the face value of the lesser debased silver coins (50 and 33.33 per cent fineness) to 4½d—representing a 25 per cent reduction—and of the basest issues (25 per cent fineness) to 2½d, a 62.5 per cent reduction in face value (Table I).²¹

Table III Stanley's estimate of Jan. 1559

Sovereigns, half-sovereigns, angels, half-angels, and crowns	£100,000
Spanish rials and pistolets and French crowns	£50,000
Fine gold and sterling silver coined under Edward VI	£100,000
Fine gold and sterling silver coined under Mary	£370,000
Base silver coins	£1,200,000
	£1,820,000

Source: SP 65/6; Add. MSS. 40061, fols. 11-12; J.D. Gould, *The Great Debasement*, (Oxford, 1970), p.55.

Table IV Estimation of the production of silver and gold coinage, 1551-1558

	Gold	Silver	total
Edward VI (Mich. 1551-July 1553)	£21,153	£124,179 17s 6d	£145,332 17s 6d
Mary (July 1553-July 1556)	£78,634 10s	£216,459 5s	£295,093 15s
Mary (July 1553-Nov. 1558)	£116,413 10s	£262,603 5s	£379,016 15s
Total (Mich. 1551-Nov. 1558)	£137,566 10s	£386,783 2s 6d	£524,349 12s 6d

Sources: C. E. Challis and C. J. Harrison, 'A Contemporary Estimate of the Production of Silver and Gold Coinage in England, 1542-1556', *Economic History Review*, 88 (1973), p.831.

Note: row 3 = row 2 + the estimated mint output of 1556-8.

The change in the quantity of fine silver coin after the Great Debasement can be assessed by comparing Stanley's 1559 estimate with the total output of fine silver issued between 1551 and 1558. However, the mint accounts for 1551-58 are

²¹ Proclamations, No. 471.

fragmentary. Of these eight years, only thirty months' accounts survive—covering October 1551 to March 1552 and December 1553 to December 1555. Because of this discontinuity, the calculation of total output must rely heavily on the 1556 Privy Council estimate and the first-year output of Elizabeth's reign (Table IV).

According to Stanley's estimate, the value of gold and fine silver coins struck under Edward VI that remained in circulation in 1559 amounted to £100,000. This figure falls £45,332 short of the total mint output of £145,332 17s 6d (Table IV, column 4). If the entire discrepancy were attributed to the disappearance of fine silver coins, then at most 36.5 per cent (£45,332 out of £124,179) of Edwardian fine silver had vanished from circulation by 1559.

Did Mary's fine silver coinage experience a similar rate of attrition? Since mint accounts from the latter part of her reign (1556–58) are missing, the outputs for these years must be reconstructed to infer the loss rate of fine silver. Mary's marriage to Philip of Spain in July 1554 temporarily boosted bullion supplies to England. Craig vividly describes the brisk activity at the Mint: "Twenty carts of bullion drawn by ninety-nine horses and two wagons of foreign coin lumbered into the Mint... Reinforced by men and tools from Spain, it re-minted nearly £17,600 of Spanish ryals."²²

The mint output of the first year of Elizabeth's reign provides a better proxy for the missing accounts of July 1556–January 1559 than the inflated figures from the early years of Mary's reign.²³ Between January 1559 and July 1560, the mint produced £25,636 in gold and £31,312 in silver. Consequently, £37,779 in gold and £46,144 in fine silver should be added to Mary's recorded mint output, yielding an estimated total coinage of £379,016 for her reign (Table IV, row 3).²⁴

Comparing this to Stanley's 1559 estimate of £370,000 reveals a discrepancy of only £9,016. Then merely 3.4 per cent of Mary's fine silver had vanished from circulation—

²² Craig, *op. cit.*, p. 118.

²³ The mint was likely idle during Mary's final years, see Gould, *op. cit.*, p. 53. Challis, however, argues that there may be modest mint output during the second part of Mary's reign. Challis, 'Contemporary estimate', p. 832.

²⁴ The average monthly mint output during the period Jan. 1559–July 1560 was £1,648 in silver and £1,349 in gold. Therefore, the estimated mint output from Aug. 1556 to Nov. 1558 (28 months) is £46,144 in silver and £37,779 in gold.

a figure rising modestly to 4.2 per cent under the alternative assumption of zero mint output in the last years of her reign.

If (1) these estimates are broadly correct, and (2) the discrepancy between the estimated total output of fine silver coins and Stanley's 1559 estimate reflects the disappearance of fine silver coins, then the above calculation suggests that roughly 14 per cent of good money had vanished from circulation between the end of the Great Debasement and Elizabeth's recoinage.²⁵ Before drawing any conclusions about the validity of Gresham's Law from this figure, several points require clarification.

First, there was a substantial difference in the disappearance rates of fine silver under Edward VI (36.5 per cent) and under Mary (3.4–4.2 per cent). One possible explanation is chronological: Edwardian fine silver had circulated longer and was therefore more exposed to culling, hoarding, and export. Moreover, public confidence in English coinage likely remained fragile in the years immediately following the Great Debasement, sustaining a strong incentive to withdraw fine silver from use. Once confidence was gradually restored, the motivation to hoard good money would have diminished.

Second, although the fine silver coins issued between 1551 and 1558 did not return to the pre-debasement standard, their fineness was substantially improved. Since the standard of sterling was more or less restored and the mint's production of fine silver coins appeared continuous, the public could no longer profit significantly from hoarding. No new debased issues were produced to compete with the fine coinage.

Third, the 1551 revaluation reduced the nominal money supply by approximately 50 per cent.²⁶ The contraction of the circulating medium forced economic agents to use existing coins more efficiently, making hoarding costly and less attractive.

Lastly, the physical appearance of the fine silver coins differed sharply from the debased issues—especially those of Mary's reign—making them relatively easy to distinguish. Even ordinary people were likely able to identify the superior coins. The

²⁵ £470,000 (Table III, rows 3–4) out of £524,349 (Table IV, column 4) represents 86 per cent retention, implying a 14 per cent disappearance. If the loss of gold coin is included, the proportion of fine silver remaining in circulation would be slightly higher.

²⁶ £2,405,000 out of 2,455,000 total circulating medium in July 1551 was debased silver. The revaluation of 1551 resulted in halving the money, in terms of face value, in circulation. Challis, 'Circulating medium', *op. cit.*, p. 132.

lower the cost of information, the greater the likelihood that monies of differing intrinsic values could circulate side by side.

Taken together, these factors indicate that the disappearance of 14 per cent of total fine silver coinage does not necessarily imply that Gresham's Law operated only to a limited extent. However, the disappearance rate of Edwardian fine silver coins—approximately one-third within less than two years—may be viewed as a tentative quantitative measure of the effectiveness of Gresham's Law during the Great Debasement.

Assessment: the movement of exchange rates

As early as the thirteenth century, the bill of exchange had been devised to reduce the need of shipping bullion to settle commercial payments or debts.²⁷ This innovation greatly reduced transaction costs, including the seigniorage derived from manual currency exchange, and minimised the risks of delay, piracy, or confiscation associated with transporting precious metals. The exchange rate, the relative price of domestic money in terms of foreign currency, was largely determined by the ratio of their intrinsic metallic values. When monetary alterations occurred in either country, *ceteris paribus*, the exchange rate would adjust to reflect the change in intrinsic value.

During the Great Debasement—when the metallic content of English silver coins declined by approximately 83 per cent, while that of the Flemish groat remained unchanged between 1527 and 1553²⁸—the mint parity implies that one English pound should have exchanged for about 4s 6d Flemish, reflecting the depreciated value of English currency at the time. In reality, however, the London–Antwerp exchange rate reached its lowest point only at 12s 9d in July 1551.²⁹

Although the impact of the Great Debasement on exchange rates is beyond doubt, the changes in mint parity alone cannot solely decided the movement of exchange rates. As Challis observes, it was “wrong to embrace a purely mechanistic

²⁷ A series of studies by Raymond de Roover comprehensively explain the origination and the mechanism of the bills of exchange. Raymond de Roover, *Gresham on Foreign Exchange*; idem., *Money, Banking and Credit*, pp. 51-75; idem., ‘What is dry exchange?’.

²⁸ The metallic content of the Flemish groat remained stable under the 1527 mint ordinance; see Lane and Mueller, *Money and Banking in Medieval and Renaissance Venice*, p. 175

²⁹ Gould, *op. cit.*, p. 89.

interpretation of exchange movements, linking, as [Unwin] did, falling exchanges directly with adulteration of the coinage.”³⁰ The question, therefore, is whether the relationship between mint parity and actual exchange rates can be better understood by considering merchants’ reactions to the varying standards of coin produced during the debasements.

The type of coin used to settle bills of exchange undoubtedly influenced the exchange rate. Consequently, the difference between actual and par exchange rates provides an indirect measure of the degree to which bad money displaced good during the Great Debasement. If Gresham’s Law was held, debased coins would have rapidly become the dominant medium of circulation in England, and the London exchange rate would have fallen in proportion to the reduction in the metallic content of English coinage. The effectiveness of Gresham’s Law can therefore be assessed through an analysis of the movement of the London–Antwerp exchange rate relative to the theoretical parity implied by successive debasements.

Because Europe remained a bimetallic economy in the sixteenth century, bills of exchange could be paid in either silver or gold coin.³¹ Although gold clearly played an important role in international settlements, the precise metal employed in specific transactions is unknowable. Yet this issue is critical for calculating mint parity during the Great Debasement, when gold and silver experienced markedly different degrees of adulteration.

Before the debasement, the mint parities derived from both metals corresponded closely to the actual exchange rates of bills of exchange.³² However, as Figure I shows, a substantial divergence existed between theoretical and market rates. In 1541, Emperor Charles V decreed that bills of exchange and bonds in the Low Countries were to be settled in at least two-thirds recognised gold specie.³³ This decree—intended to

³⁰ Challis, ‘Currency and the economy’, pp. 313–22.

³¹ Hanham, *The Celys and Their World*, pp. 179, and 193.

³² The mint parity was approximately 26.84 Flemish shillings per pound sterling for silver and 26.07 for gold. Contemporary exchange quotations varied between 26.5 and 27.25 Flemish shillings: Van der Wee, *The Growth of the Antwerp Market*, Graph 32.

³³ Edler, ‘The effect of the financial measures of Charles V’; de Roover, *Money, Banking and Credit*, p. 81; Buckley, ‘Sir Thomas Gresham and the foreign exchanges’, p. 590.

attract gold into circulation—effectively provides a proxy for the bimetallic payment ratio used here in constructing the par exchange rate.³⁴

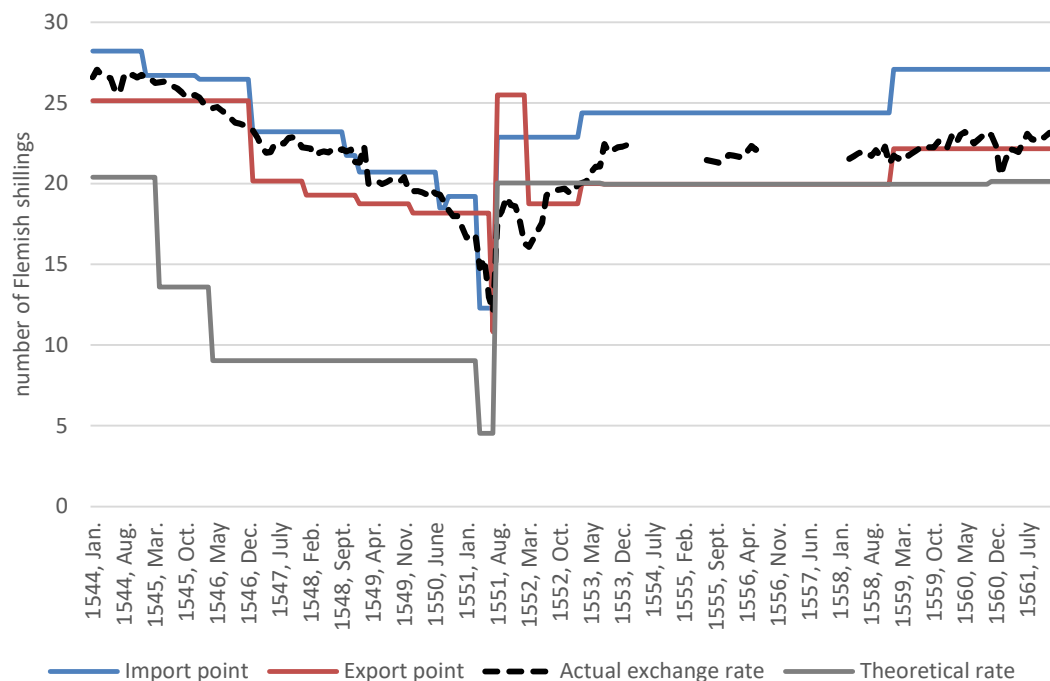


Figure 1. London-Antwerp exchange rates, 1544-61.

A further complication arises from the heterogeneous fineness of Flemish coinage. Unlike English sterling, Flemish silver lacked a uniform standard: its fineness varied by denomination. For instance, a Double Carolus valued at 6d contained silver of 0.934 fineness, whereas a Carolus of 3d fineness was only 0.457.³⁵ Given the lower transaction costs associated with large denominations (fewer coins to count and verify), it is reasonable to assume that bills of exchange in the Low Countries were remitted primarily in Double Carolus (the 6d silver coin) and Real d'or (the 10s gold coin). These coins are therefore used to construct the mint parity between the two countries.

³⁴ Gold, typically used for large and overseas payments, also suffered far less adulteration than silver during the Great Debasement. The assumed working ratio of two parts gold to one part silver is therefore adopted here. See Challis, *The Tudor Coinage*, Table 3, 232.

³⁵ Pusch, *Staatliche Münz- und Geldpolitik in den Niederlanden*, p. 48.

When both good and debased coins circulated simultaneously, as during the Great Debasement, well-informed merchants were probably able to discriminate between them. In international trade, English and foreign merchants alike possessed such information; debased coins thus circulated at a discount, while finer coins commanded a premium. Under these circumstances—when both parties to exchange are well-informed—the asymmetry required for Gresham’s Law to operate disappears. This constitutes a counter-effect: rather than driving out good money, market transparency allowed good coins to retain their role in international settlements. Moreover, the higher transaction costs associated with debased coinage (time spent counting and verifying large quantities of inferior coins, and diminished trust in their value) further inclined merchants engaged in foreign trade to prefer good or less-debased coins.

The old, “good” coins would remain in circulation so long as the mint price of new (debased) coins were below the mint equivalent of the old ones; under such circumstances, merchants continued to use the earlier issues to settle bills of exchange. For example, until 1547 the mint price was still lower than the mint equivalent of the silver coins issued in 1544 (Table I). It is therefore reasonable to assume that merchants used the 1544 silver issues for international settlements, even though the silver coins with 50 per cent fineness had been available since 1545. Based on the remaining finest coins, the *adjusted* par exchange rates are calculated. On the other hand, the *simple* par exchange rates are calculated using the latest debased issues. As shown in Figure II, the adjusted par exchange rates follow the actual trend of exchange rates more closely than the simple par rates. Nevertheless, the actual rates were consistently higher than the adjusted par rates, except during 1551.

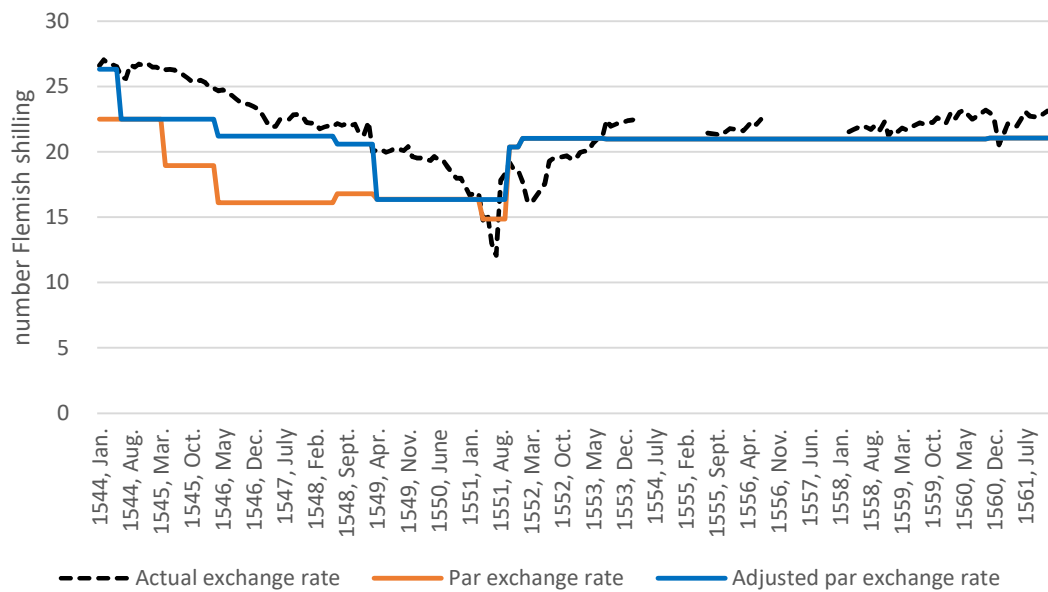


Figure 2. Adjusted par exchange rates, 1544-61.

Several features of Figure II require comment. First, there was a time lag between the movement of actual and adjusted par exchange rates during the debasement. This lag was roughly three years in the early phase (before the recoinage of 1549) and about eighteen months after 1549, when the silver content was reduced by a further 33 per cent. After the Great Debasement (1551–53), the exchange rate did not immediately rebound from its trough; it took around twenty months to recover to the level corresponding to the intrinsic value of English and Flemish coins. This lag likely reflects the time merchants needed to realise that exchanging old coins for debased ones was profitable, gradually driving good coins from circulation. Thus, the “transmission lag” of monetary shocks in early modern England appears to have been approximately one and a half years.

Second, the most pronounced divergence between the par and adjusted exchange rates occurred between 1547 and the recoinage of 1549. Although by 1547 the metallic content of new silver coins had fallen to 51.84 grams per pound sterling, earlier debased issues bearing Henry VIII’s name—with silver contents ranging from 111.64 to 77.76 grams per pound—remained in circulation (Table I). The close correspondence between the adjusted par and actual exchange rates suggests that

merchants preferred to trade using less-debased coins, and Gresham's Law was ineffective.

Third, in the final stage of the Great Debasement (April–August 1551), the actual exchange rates fell below both the adjusted and the simple par exchange rates. The probable explanation lies in the outflow of gold from 1549 onward, when the gold–silver ratio reached its lowest point.³⁶ As gold disappeared from circulation, merchants were increasingly compelled to settle bills in debased silver. Moreover, this was the most extreme phase of debasement: the silver content fell to only 25.92 grams per pound sterling—about 17 per cent of the pre-debasement level—causing a steep fall in the exchange rate.

Although the relationship between mint parity and the exchange rate was not one-to-one, mint parity remained the underlying determinant of exchange-rate fluctuations during the Great Debasement. Yet the decisive factor was not the official mint indenture but the type of coin actually used to settle bills of exchange. In this respect, the operation of Gresham's Law—which shaped the composition of circulating money—directly influenced the extent of exchange-rate depreciation.

The effectiveness of Gresham's Law among merchants can thus be measured by the deviation between actual and adjusted par exchange rates. The results lend partial support to the Rolnick and Weber (1986) model, which predicts that coins with lower transaction costs (good money) can displace inferior ones in certain contexts. The closer correspondence between adjusted par and actual exchange rates indicates that good money—less-debased coins—incurred lower transaction costs, and therefore prevailed over bad money in the settlement of international payments.

Conclusion

Before the advent of fiduciary money, rulers faced a persistent dilemma: how to protect the integrity of their coinage. They had to prevent excessive adulteration in order to avert the outflow of coins, yet could not allow their currency to become too undervalued relative to those of neighbouring states, which would encourage

³⁶ The gold-silver ratio was 9.3 in July 1550. Gould, *op. cit.*, table VI.

counterfeiting and diminish seigniorage revenues. Through periodic debasement and enhancement, rulers sought to maintain parity with foreign standards.

The Great Debasement of 1544–51 was exceptional in English monetary history—not only for its explicitly fiscal motive but also for its unprecedented scale. At least six distinct types of coin were issued during this period. According to Gresham’s Law, when coins of differing intrinsic values circulate simultaneously, those of lower intrinsic value drive the finer coins from circulation.

Two approaches have been employed here to assess the validity of Gresham’s Law: (1) the composition of circulating coins before Elizabeth’s recoinage, and (2) the movement of London–Antwerp exchange rates. The first shows that, on the eve of Elizabeth’s restoration, about 86 per cent of the total output of fine silver coined between 1551 and 1558 remained in circulation alongside debased issues. Because the overall money supply had been halved by the 1551 revaluation and no further debasement occurred, the operation of Gresham’s Law was muted. Nevertheless, it appears that within roughly eighteen months one-third of Edward VI’s fine silver had been displaced by debased coins—evidence of Gresham’s mechanism at work when the confidence on English coins was low.

The second test, based on exchange-rate data, reveals that the adjusted par exchange rates—constructed from the less-debased coins actually used by merchants—tracked the actual market rates more closely than did the simple mint parities, albeit with a time lag of about eighteen months. This pattern indicates that well-informed international merchants, seeking to minimize transaction costs, preferred to settle bills of exchange with good money rather than debased coin.

Taken together, these findings suggest that the operation of Gresham’s Law in mid-sixteenth-century England was partial and conditional. It depended critically on the degree of information asymmetry and the relative transaction costs of different coins. Where asymmetry was high—as among the general public—bad money tended to drive out good; but where information was shared—as among international merchants—good money retained its role in settlement. The English case during the Great Debasement thus demonstrates that information and transaction costs were central to the practical effectiveness of Gresham’s Law in the pre-fiduciary era.

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