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Early modern copper money: multiple currencies and trimetallism in Sweden 1624–1776

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In 1624–1776, Sweden implemented a complicated trimetallic monetary system. Five different copper, silver, and gold currencies circulated. The heaviest copper coins weighed 20 kg. Gresham's law worked differently for various coins. Swedish trimetallism was asymmetric. Copper money could not replace silver and gold coins. When the latter became undervalued they circulated at a premium. Due to high transaction costs in using copper coins at a premium, they were sometimes driven out when becoming dear money. However, complaints about money shortage and Sweden's monopoly position at the European copper markets implied that the copper standard was not abandoned until 1777.

I. Introduction

Sweden in 1624–1776 had a very intricate monetary system, composed of at least five metallic currencies based on silver, copper, and gold (Wolontis 1936; Lagerqvist and Nathorst-Böös 1968; Tingström 1995). Since authorities attempted to fix the value relations between these monetary instruments, there was, in a sense, a trimetallic system. In addition, fiat monies circulated at periods at a floating market exchange rate.

Up to the nineteenth century, the multi-commodity standard prevailed in Europe (Redish 2000, p. 26). Its operation is still not fully understood. As Marc Flandreau notes, there is “a dearth of data, and an inadequate supply of theory” (Flandreau 2004, p. 9).

Bimetallism has primarily been analysed in relation to gold and silver. The traditional account of bimetallism is that since the prices of the two metals fluctuate relative each other, the undervalued metallic currency is driven out in accordance with Gresham's law, causing bimetallism to alternate between two mono-metallic systems—generating the so-called “knife-edge”. According to this view, multi-metallism should not exist. An alternative view is that under bimetallism there are stabilizing factors (Velde and Weber 2000; Flandreau 2004, pp. 9–10). According to Flandreau, the bimetallic value ratio cannot be considered an exogenous factor; bimetallic equilibriums, if they exist, are undetermined (Flandreau 2004, pp. 17 and 20).

An earlier view on the period with Swedish copper money was that the monetary system alternated between silver and copper standards, due the fluctuations in the copper–silver value ratio and Gresham's law (Nordencrantz 1767, p. 32; Davidson 1919). In the 1930s, this view was questioned by Heckscher (Heckscher 1936, pp. 602–623) and Wolontis (Wolontis 1936, pp. 184–196). They argued that various metallic currencies continued to exist alongside each other and that silver and gold coins, when being dear monies, were

usually paid a market premium above their official rates. Since then, not much analytical advance has been made concerning the economic role of Swedish copper money, which may explain why it is often omitted in the international literature.¹

The overarching problem focused in this paper concerns the viability of Swedish trimetallism. Considering that monetary authorities fixed the value relation between various coins, why did not fluctuations in the relative prices of the monetary metals drive out the dear monies? To address this problem, the present study utilizes a new extensive monetary data base.

While analyses of bimetallism based on gold and silver often assume that the two metals are perfect substitutes for monetary purposes (Chen 1972, p. 90), Swedish trimetallism was asymmetric in this sense, and differed from the classical bimetallism in several aspects: (1) the transaction costs of handling copper money was higher than for silver and gold monies; (2) the Swedish copper standard rested on a monopoly position in European copper markets; (3) free minting did not apply to copper coins, but only, in some periods, to silver and gold coins.

The next section presents a historiography of the Swedish monetary system 1624–1776. The third section analyses the operation of Gresham's law, showing that fluctuations in the copper–silver value ratio did not inevitably cause a “knife-edge”. The fourth section investigates factors affecting minting policy, how monetary authorities changed the mint equivalents to maintain a fixed relation between coins of different metals, and what effects this had for the relation between cheap and dear monies. The paper ends by discussing the composition of the money supply.

2. The Swedish monetary system 1624–1776

Coins in Early Modern Europe were mainly made from gold and silver (Redish 2000, p. 108; Fantacci 2008). Current monies, commonly silver coins that were prone to depreciation, were used in domestic trade. In addition, international silver and gold trading coins of stable intrinsic value circulated—at a floating exchange rate against the current monies (McCusker 1978).

Before copper coins were minted, Sweden had a similar monetary system. It had two silver currencies at a fluctuating exchange rate relative to each other. The mark was used in domestic trade. The *riksdaler* (rix-dollar) and to some extent gold coins were international hard currencies. The mark was a larger silver coin that was divisible into eight *öre*, which, in turn, were minted as billon coins (with a silver content below 50 percent). The relation between the mark and *öre* was fixed, and they, therefore, formed a common domestic currency. Four marks or 32 *öre* were also counted as one *daler* (dollar). The latter term originally referred to the Joachim-taler, which later became the *riksdaler*, with a stable fine silver content. In the 1570s, the silver *daler* was set equal to four marks. Because of the debasement of the silver mark, the market value of the silver *daler* rose above four marks. From the late sixteenth century, the *daler* was used as a pure unit of account for current coins, becoming ghost money.² This ghost *daler* was distinguished from the *riksdaler* that became the new

¹ An exception is Sargent and Velde (2002, pp. 249–250).

² Ghost money is a unit of account without counterparts in real coins (Allen 2009, p. 164).

name of the real silver *daler* (Heckscher 1935, p. 219), which was valued roughly at par with the Hamburg and Amsterdam banco rix-dollar.

After the introduction of the copper standard in 1624, the number of current currencies increased from one to three—based on the copper coins, the petty (*öre*) silver coins, and the larger (mark) silver coins, respectively. The fixed relation between *öre* and mark silver coins was broken already in the 1620s since the premium paid on the silver mark was somewhat higher than for the silver *öre* (the premium measures the percentage paid for dear money above its official value expressed in cheap money or the main unit of account). In total five metallic currencies were in use, if the international gold ducat and the silver *riksdaler* are included. Furthermore, inconvertible (or only partly convertible) paper notes circulated in the 1660s and 1745–1776, and token coins in 1715–1719, forming separate currencies at a floating exchange rate relative the metallic coins. Table 1 presents the various currencies in use, the physical objects that were linked to respective currency, and the systems of account for each currency.

Table 1. *The main currencies in Sweden 1624–1776*

Currency	Physical object	Denominations	Fine metal content ^a	System of account
1. Copper money	Petty copper coins (“slantar”)	Öre, öre KM, öre SM	9–49 g copper per öre SM	1 daler SM = 32 öre SM.
	Copper plates (“plåtar”)	Daler SM	756–1812 g copper per daler SM	1 daler KM = 32 öre KM
2. Courant	Petty silver coins	Öre	0.23–0.5 g silver per öre	1 daler courant ^b = 32 öre courant
3. Carolins	Larger silver coins in mark denomination. The carolin was a 2-mark coin	Mark	3.61–4.13 g silver per mark	1 daler carolin = 2 carolins = 4 marks in larger silver coins ^b
4. Riksdaler	International silver coin minted in Sweden	Riksdaler, daler SM (1770s)	25.27–25.7 g silver per riksdaler	From 1777: 1 riksdaler = 48 skilling = 576 runstycken
5. Ducat	International gold coin minted in Sweden	Ducat	3.34–3.4 g gold per ducat	
6. Representative monies	Stockholm Banco paper notes 1661–1667	Daler SM, daler KM, riksdaler, ducat		1 daler SM = 3 daler KM = 12 mark KM = 32 öre SM
	Token coins 1715–1719 Riksbanken paper notes from 1707	Daler SM Mostly daler KM		

Source: Wallroth (1918) and Wolontis (1936).

Note: SM, silvermynt; KM, kopparmynt.

^aFor mint equivalents, see table 3.

^bThe terms *daler carolin* and *daler courant* were used from mid-1660s. Before, the terms *daler* in white coins, *daler silvermynt specie*, or *daler* in petty silver coins were widespread.

Several countries introduced intrinsic value copper coins in the early modern period (Jevons 1875, p. 202; Habib 1987, pp. 140–141 and 157), but these were smaller in size than the heaviest Swedish copper coins—copper plates—which were also important for larger monetary transactions.

In Spain, copper tokens were minted (from Swedish copper) in the early seventeenth century, replacing the silver currency as the main means of exchange by the 1620s (Sargent and Velde 2002, pp. 230–250). It caused high international copper prices, which was one reason why Sweden introduced the copper standard (in expectation of even higher prices in the future).

The first Swedish copper coins were minted as petty coins. One copper *öre* was set equal to one silver *öre*, and one *daler* in copper coins (32 copper *öre*) to one *daler* in silver coins (four silver marks or 32 silver *öre*). However, the mint equivalent of the copper coins was set too high in the 1620s, based on unrealistic expectation of further increases in copper prices. When Spain stopped minting copper coins in 1626, international copper prices fell (Wolontis 1936, p. 33). If minting would have been restricted, such petty copper coins could de facto circulate as tokens at par with the silver coins. Still in 1627, the equality between silver and copper *öre* could be upheld, but since the minting of copper coins became large, the exchange rate of silver coins in copper coins increased rapidly in the late 1620s and early 1630s. The petty copper coins turned from de facto semi-tokens to intrinsic value coins.

In 1633, the copper *öre* was devalued to 1/2 silver *öre* (Stiernstedt 1863, p. 109). Two counting systems arose, one in *daler silvermynt* (dollar silver coin) and one in *daler kopparmynt* (dollar copper coin), both divisible into four marks or 32 *öre*. In 1643, one *daler silvermynt* was increased from two to 2.5 *daler kopparmynt*, and in 1665 to three *daler kopparmynt*. The last relation held until 1777 (Wallroth 1918, p. 57).

While the *daler* had been a common label for the current monies in 1624, during the course of the seventeenth century four different units of account that were termed *daler* came into use (if not counting the *riksdaler*): *daler kopparmynt*, *daler silvermynt*, *daler courant*, and *daler carolin* (see table 2).

The *daler kopparmynt* and *daler silvermynt* together formed a common system of account for the main currency. Even if they were originally meant to differentiate between copper and silver coins, they became abstract units detached from actual coins, i.e. ghost monies. All coins were officially valued by these two units, although de facto a premium was in most periods paid on *riksdaler*, the ducat and the two current silver coins. Such a distinction between the unit of account and means of payment is considered a distinctive feature of the pre-modern monetary system (Fantacci 2008, p. 57). To make it more confusing, to cement the fixed relation between copper and silver coins, some petty copper coins were minted in the denomination of *öre silvermynt*, while copper plates were always minted in the denomination of *daler silvermynt*. The ghost *silvermynt* and ghost *kopparmynt* tended to follow the main currency in use, which, with a few exceptions, was the cheap money: petty copper coins in 1633–1686, petty silver coins in 1686–1716, token coins in 1716–1719, copper plates in 1719–1745, and paper notes in 1745–1776.

The peculiarity with Swedish trimetallism was not only that a fluctuating market exchange rate was established between the copper, silver, and gold currencies, but also that the circulation of copper money caused fluctuating exchange rates between the two types of silver coins that were intended for domestic trade, i.e. the silver mark and the silver *öre*. (Heckscher 1935, p. 205; Wolontis 1936, p. 183)

Table 2. *The official value relations between currencies and units of accounts in Sweden 1624–1777*

Period	Daler SM in daler KM	Daler courant in daler KM	Daler carolin in daler KM	Riksdaler in daler KM	Ducat in riksdaler	Daler SM in copper plates in daler SM in notes/tokens	Daler carolin in daler courant
1624–1633	1 ^a	1 ^a	1 ^a	1.625 ^a			1
1633–1643	2	2	2	3			1
1643–1665	2.5	2.5	2.5	3.75		1	1
1665–1681	3	3	3	4.875	1.923	1	1
1681–1686	3	3	3.5	6	2		1 $\frac{1}{6}$
1686–1716	3	3	3.75 ^b	6	2		1.25 ^b
1716–1719	3	3		6	2	1	
1719–1776	3	3	4.6875	9	2	1	1.5625
1777	3	6	9.375	18	1.958	1 $\frac{1}{3}$	1.5625

Source: See Figure 1.

Note: For abbreviations and different terms, see Table 1.

^aFor 1624–1633, the term *daler kopparmynt* (in use from 1633) refers to the *daler* in copper coins.

^bIn December 1717 to April 1719, the previously minted *carolin* coins were decreed invalid means of payment. The co-called Görtz' *carolin* was minted in 1718, and set equal to 16 *öre silvermynt* (one *daler* of Görtz' *carolin* = three *daler kopparmynt*), in an attempt to restore the old parity between the two domestic silver coins, but their minting was discontinued afterwards. From 1719: 1 Görtz' *carolin* = 16/25 "old" *carolin*.

To differentiate the ghost *daler silvermynt* from the *daler* in real silver coins, the terms *daler carolin* and *daler courant* came into use. From the 1660s, the term *carolin* came to refer to the larger silver coins in mark denomination and *courant* to petty silver coins in *öre* denomination. One *carolin* was a two-mark silver coin, and one *daler carolin* was equal to two *carolin*. One *öre courant* was the same as one-*öre* silver coin, and one *daler courant* was equal to 32 *öre courant*. Officially, before 1681, the *daler courant*, and the *daler carolin*, was equal in value to the *daler silvermynt* (although the markets often disagreed). In 1681 and 1686, the official value of the *daler carolin* was raised relative to the *daler courant* and *daler silvermynt*, and once more in 1716, to 25/16 *daler silvermynt* or *daler courant*, so that the official equality between *daler carolin* and *daler courant* disappeared as well.

Up to the 1620s gold coins were minted in the mark denomination, based on a fixed relation between the gold and silver mark coins. From 1654 the ducat was the only gold coin that was minted. The market exchange rate between the ducat and the *riksdaler* floated, but followed fluctuations in the gold–silver value ratio (Wallroth 1918).

According to Velde and Weber a bimetallic standard de jure is one in which two metals have unlimited legal tender at a fixed rate and coins from both metals are freely minted (Velde and Weber 2000), i.e. it is a form of mono-currency, multi-commodity standard. According to Heckscher, while *bimetallism* is based on a fixed relation between coins of the two metals, the *parallel standard* entails a floating exchange rate (Jevons 1875, p. 95; Heckscher 1936, p. 607). A distinctive feature of bimetallism is its instability. After some time it usually de facto transforms to a parallel or a mono-metallic standard, or a readjustment takes place between the official values of the currencies. However, the difference between these types is not always clear-cut. As Sargent and Velde argue, free minting did

not imply free of charge, and in the absence of free minting policy, authorities could approximate such by purchasing unlimited amounts of metals at a mint price (Sargent and Velde 2002).

Since the relation between various coins was officially fixed (see table 2), the Swedish monetary system was a mono-currency trimetallism. At periods monetary authorities attempted to outlaw premium on coins paid above their official values.³ In this sense, the Swedish trimetallism could be contrasted to, for example, the Mughal monetary system, which lacked any legal ratios between copper, silver, and gold coins (Habib 1987, pp. 140–141 and 157). However, since, in reality, premium on dear money was difficult to prevent, the Swedish monetary system *de facto* turned into a parallel standard with multiple currencies, similar to the Mughal system.

Table 3 displays the mint equivalents, which are different for each coin depending on what unit of account is used. For silver coins, the mint equivalent in *daler silvermynt* was highest for the one-*öre* silver coin and (in 1633–1719) lowest for *riksdaler*. The mint equivalent was also different for various copper coins. From 1644 copper plates were minted, weighing between 0.4 and 20 kg. Therefore, copper coins also formed two different types of means of exchange, one in petty coins (“*slantar*”) and one in plates (“*plåtar*”). Although they never formed two distinct currencies in the same way as the two domestic silver coins, their market value sometimes moved in different directions. Copper coins tended to depreciate. *Öre courant* coins were also prone to depreciation, in consequence of the attempts to fix their value in relation to the copper coins. In contrast, the mint equivalent of the *carolin* in *daler carolin* only increased slightly during the investigated period. The *riksdaler* and the ducat were not debased at all, although their mint equivalents expressed in *daler silvermynt* increased substantially.

The difference between a coin’s face value and its intrinsic value could be described as its “fiat component” (Sargent and Velde 2002, p. 19). Coins whose metal value constitutes a major part of its face value are a kind of semi-commodity, semi-fiat currency. At periods Swedish copper money approached such state, not least since free minting was not applied to them. Although private copper was minted, its amount was always predetermined (Heckscher 1936, p. 606). This implied a deviation from bi/trimetallism in a narrow sense. After 1680, the mint equivalent was made higher for petty coins than for copper plates (see table 3). The difference was initially quite small, but after 1719 petty coins had a 40 percent lower intrinsic copper content per unit of value than copper plates. Before 1719 both “*slantar*” and “*plåtar*” were intrinsic value coins, but after 1719 this was true only for plates (Stiernstedt 1863, pp. 418–419). Since only a limited amount of petty copper coins was minted after 1719, their value could be upheld.

The large transaction costs involved in transporting copper plates implied that they contained the seed for their own replacement. In 1661 Stockholm Banco issued the first paper notes in Europe (Brisman 1918, p. 62). Because of over-issuing, the bank collapsed and was reorganized in 1668 as Sveriges Riksbank, the world’s oldest central bank. The banknotes were withdrawn from circulation. For the rest of the seventeenth century, the role of the Riksbank was limited, but in the eighteenth century representative money was once again introduced on a larger scale.

³ For example, in 1686 (Wolontis 1936, p. 167).

Table 3. *Mint equivalents of various coins in Sweden 1624–1776 according to official rates*

Period	1 kg Ag was minted into			1 kg Cu was minted into			1 kg Au into daler SM of gold coins
	daler SM of		riksdaler of	daler SM of		daler KM of	
	daler	daler carolin		copper plates	petty coins		
	riksdaler	carolins	2- to 12-öre coins	1-öre coins			
1624–1633	63.5	61.7	66.5	77.2	39.1	61.7	1.1 ^a 921 ^b
1633–1637	58.6	64.1	67.7	67.7	39.1	64.1	0.74 1.47
1638–1643	59.3	60.5	(67.7)	(67.7)	39.6	60.5	0.61 1.21
1644–1649	59.3	60.5	(67.7)	(67.7)	39.6	60.5	0.49 1.27
1649–1660	(59.3)	64.1	(67.7)	67.7	(39.6)	64.1	0.49 1.38
1660 7/ 3-17/11	(59.3)	64.1	(67.7)	67.7	(39.6)	64.1	0.49 1.55
1660–1664	(59.3)	64.1	(67.7)	67.7	(39.6)	64.1	0.66 1.66
1665–1673	63.2	69.2	80.1	81.2	38.9	69.2	0.63 1.9
1674–1680	63.2	69.2	80.1	81.2	38.9	69.2	0.74 2.21
1681–1685	(77.8)	80.8	80.1	81.2	(38.9)	69.2	0.74 2.21
1686–1709	(77.8)	86.5	100	101	(38.9)	69.2	0.74 2.21
1710–1715	(77.8)	86.5	100	101	(38.9)	69.2	0.88 2.65
1715–1719	(77.8)	108 ^f	114 ^g	134 ^g	(38.9)	69.2 ^f	1.1 ^e 3.31 ^e
1719–1776	117	108	120	134	38.9	69.2	1.32 4.73
							6.6 ^h 1766 ^d

Source: Wallroth, 1918.

In parenthesis—coins not minted in this period, the mint equivalent refers to the coins last minted.

^aThe mint equivalent of the copper coins minted in 1624 was 0.97 daler per kg Cu.

^bGold coins in mark denomination.

^cFor 1/6-öre silvermynt coins: 0.74 daler silvermynt, or 2.21 daler kopparmynt, per kg Cu.

^dDucats. Before 1665, the ducat had no official value.

^eFor 1/6-öre silvermynt coins: 1.23 daler silvermynt, or 3.68 daler kopparmynt, per kg Cu.

^fThe mint equivalent of the so-called Görtz' carolin was 108 daler silvermynt or daler carolin per kg Ag (the same as for old carolin in daler silvermynt, but higher in daler carolin).

^gIn December 1717 to May 1719, one- and two-öre silver coins were temporarily revalued by 100 percent.

^hFor two-öre silvermynt coins in 1766–1768: 3.42 daler silvermynt, or 10.2 daler kopparmynt, per kg Cu.

At the end of the Great Nordic War, 1715–1719, so-called emergency coins were minted, which were fiat money, since their intrinsic value was only 0.5 to 1 percent of their face value. In 1719, they were devalued by 50 percent and demonetized.

In the 1720 and 1730s, most of the banknotes issued by the Riksbank were denominated in *daler koppermynt*, and convertible into the copper plates. However, by a decree in October 1745 the Riksbank made its paper notes inconvertible. The petty copper coins continued to follow the value of the notes. Copper plates were mostly paid a premium, but their role as means of payment became limited.

In 1716–1719 as well as in 1745–1776, various metallic currencies continued to circulate alongside the fiat monies. In both periods, a fiat standard was, therefore, combined with trimetallism, forming a very complex multi-currency system.

In 1777, the sole silver standard was reintroduced (although gold ducats continued to be minted). Paper notes continued to circulate, but were devalued by 50 percent and made convertible into *riksdaler*, which became the main unit of account. The *öre courant* and *carolin* were exchanged at par with the *riksdaler*, while the copper plates were devalued by one-third against the *riksdaler* as a consequence of lower copper prices (see table 2).

3. Gresham's law, premiums, and the silver–copper value ratio

3.1 Gresham's law and premiums

How could the Swedish multi-currency trimetallism exist for such a long time, and why did not one of the currencies replace the others in accordance with Gresham's law? It must be considered that Gresham's law only applies when there is a fixed exchange rate between two types of coins (Friedman and Schwartz 1963, p. 27). A premium on dear money allows it to stay in circulation.

Rolnick and Weber argue that the existence of premium does not entail that cheap money never drives out dear money, but only that the relation cannot be formulated as an unconditional law (Rolnick and Weber 1986, p. 186). There is a transaction cost involved in using dear money at a premium. Cheap money drives dear money out when the transaction costs involved in using the dear money at a premium are significant. Without such transaction costs dear money would always stay in circulation.

In models of Gresham's law agents are with some probability either informed or uninformed of the fine metal content of a coin (Velde *et al.* 1999). A high ratio of informed agents increases the likelihood that dear money circulates by weight (i.e. in accordance with their intrinsic metal value) rather than by tale (i.e. in accordance with their face value). In Sweden 1624–1776, all agents could be assumed to be informed since authorities probably did not cheat with mint equivalents. This also explains the large occurrence of premiums on silver and gold coins, which allowed them to stay in circulation.

Figure 1 presents the premiums paid on the three silver currencies in Sweden. The median premium in 1624–1744 was nil for *öre courant*, 1.9 percent for *carolin*, and 7.7 percent for *riksdaler*. The premium on ducats was somewhat larger than on the *riksdaler*. Henceforth, at least for copper and silver coins in smaller denominations, a fixed relation could be maintained during most of the copper standard up to the rise of the paper standard in 1745, although at the price of regular readjustments in the mint equivalents.

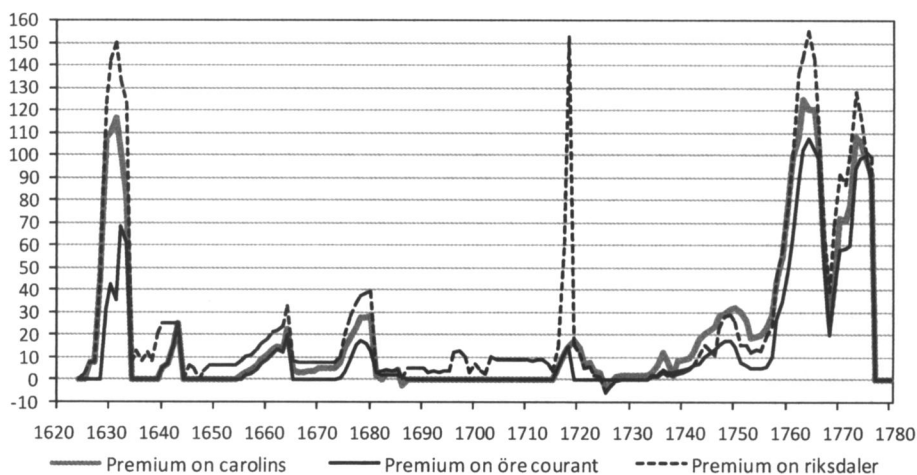


Figure 1. *The premium (the market price of coin X in daler kopparmynt in percent above its official valuation in daler kopparmynt) on the three silver currencies in Sweden 1624–1776, annual averages. Sources: Wallroth (1918), Sveriges Riksbank (1931), Riksarkivet, Sandbergska samlingen, vol. O:1, O:2 and OO; Riksbankens arkiv, "Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803", Stockholms stads priscourant, Wolontis (1936), Swenne (1933).*

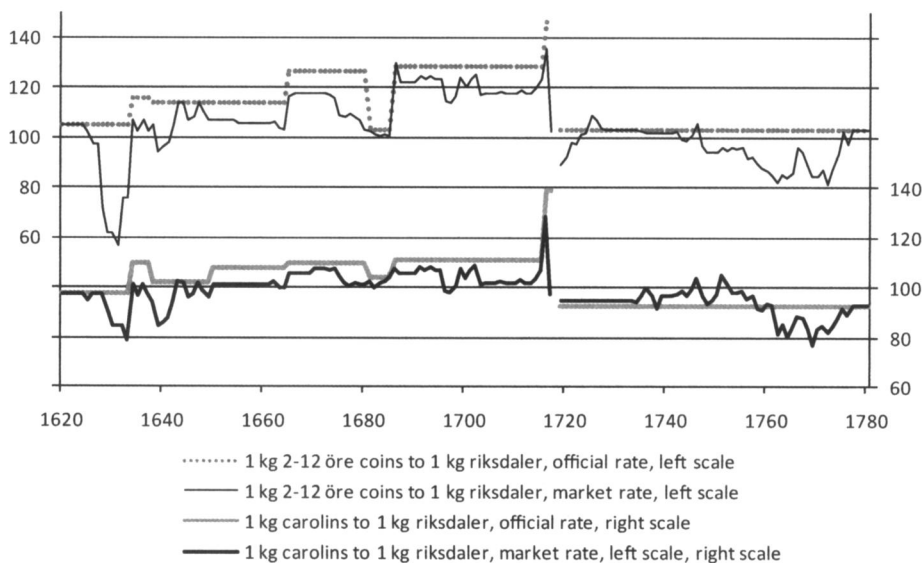


Figure 2. *The value ratios (in percent) of 1 kg silver in carolin and larger öre coins, respectively, to 1 kg silver in riksdaler coins, 1620–1780 (excluding 1718). Sources: figure 1 and table 3.*

The variations in the premiums on silver coins reflected differences in their mint equivalents measured in *daler silvermynt* (see table 3). Figure 2 presents the ratio of the value of 1 kg silver minted into *carolin* and larger *öre* coins, respectively, to the value of 1 kg silver minted

into *riksdaler*. Both official and market rates are estimated (1718 is excluded because the data is uncertain for that year). On average, in 1624–1776, official rates overvalued the *carolin* by 2 percent, and the larger *öre* coins by 13 percent, compared with the *riksdaler*. However, the markets partly corrected these overvaluations. On average, market rates undervalued the *carolin* by 2 percent, and overvalued larger *öre* coins by 3 percent.

During the investigated period, each of the currencies had its own legal status. Debts made in one coin generally had to be paid back with the same type of coin, i.e. there were clearly different standards of deferred payment. Stockholm Banco, and later the Riksbank, had to be liquid in all currencies that were in use, even though all loans and debts were, for accounting purposes, counted in *daler silvermynt* or *daler kopparmynt* (Davidson 1919, pp. 117–120; Sveriges Riksbank 1931, pp. 40–42 and 72–74; Heckscher 1936, p. 607; Wolontis 1936, p. 203). Even if monetary authorities attempted to impose a single currency, no fully all-purpose money could yet be established.

In contrast to traditional bimetallism based on silver and gold, the working of Gresham's law was asymmetric. Silver and gold coins tended to be paid a premium when they were dear money. They could not be substituted within their sphere of circulation. However, copper coins tended to be driven out when undervalued. The transaction costs (per unit of value) involved in using copper plates at a premium were higher than for silver and gold coins, which, in accordance with the Rolnick and Weber model, explains why plates were driven out when they became dear money, at least when no effective measures were taken to ban their export. For example, when copper prices stood high in the late seventeenth century, copper plates were largely exported or saved as treasure. This also occurred when they became undervalued compared with paper notes in 1745–1776 (Tingström 1984).

Another question is why copper money caused the formation of two separate domestic silver currencies (*öre courant* and *carolin*)? There were several reasons. The Rolnick and Weber model of transaction costs can provide an explanation as well. Since the minting cost per unit of value was greater for smaller denomination coins, the mint equivalent of petty silver coins was somewhat higher than for the larger silver coins (see table 3).⁴ Since the higher denomination silver coins tended to be undervalued, the market tended to value these coins highest relative their official values, but this also depended on the transaction costs involved in paying a premium. When the premium for better silver coins (containing more fine silver per nominal value) relative inferior silver coins was small, the transaction cost to circulate the coin at a premium may have been greater than the premium itself, which tended to fix the relation between these coins. This is also what happened before 1624, or when the copper plates disappeared from circulation around 1690–1710. However, when all the silver currencies were paid a significant premium relative a copper currency (the new cheap money), there was not much increase in the transaction cost if a larger premium was paid for the better silver coins. Furthermore, there were attempts to at least fix the relation between the petty silver coins and the copper currency—mainly by debasing the small silver coins in *öre* denomination or by increasing their nominal value—which, in turn, aggravated the difference between the petty and larger silver coins.

⁴ See also Sargent and Velde (2002, p. 322).

3.2 *The silver–copper value ratio*

One problem when analysing the bimetallic relation between copper and silver currencies is that there were several copper prices. These were not exogenously given, but partly determined by the complex interplay between monetary policy and international markets. Most important was the difference between free and unfree copper, which purely concerned their legal status. The owner of the unfree copper had to pay various taxes and fees if the copper would be shipped abroad. Free copper was exempt from these duties. Unfree copper was mainly used for domestic non-monetary purposes, which at most accounted for 20–25 percent of total copper production.⁵ Moreover, the copper price in Amsterdam was significantly higher than the free copper price in Stockholm, due to transport and transaction costs (Wolontis 1936, pp. 26–28 and 199). The differences between various copper bullion prices were much larger than similar differences for silver and gold prices.

In Sweden, the relative exchange rate between the copper and silver currencies did not automatically follow the silver–copper value ratio. This is illustrated by figure 3, displaying what we may call the “export price” (the copper price in Amsterdam less average transaction and transports costs from Sweden to Holland), and the market price of copper coins. For example, when the international copper prices fell substantially in the early 1650s, (Wolontis 1936, p. 128) it did not cause any decrease in the market price of copper coins (or an increase in the premium on *öre courant* and *carolin*, see figure 1). While the market price of copper coins was, on average, roughly equal to the export price, at periods the market price of copper coins was substantially below or above the export price (see figure 3). Such large deviations cannot simply be explained by the high transaction costs involved in handling copper coins.

In the traditional, free minting, symmetric, bimetalism, the relative metallic prices strictly determine an upper and lower bound for the movement of the market price of coins minted from one metal as valued in the second metal. The upper bound is the minting point, at which it is profitable to bring bullion to the mint and receive coins, while the lower bound is the melting or export point, at which it is profitable to turn coins into bullion (Sargent and Velde 2002, p. 11; Cottrell 1997).

The peculiarities of the Swedish copper standard substantially widened the band for the market price copper coins. Since free minting was restricted for copper coins, there was no upper bound for the price of copper coins (although high seignorage rates induced authorities to mint more copper coins, which, in turn, tended to bring their price down). Furthermore, the existence of two different domestic copper prices made the lower bound undetermined. When the export of copper coins was made free, the lower bound was the free copper price. However, the Crown often issued total or partial bans on the export of copper coins, (Tingström 1984, p. 210) which could, depending of the effectiveness of such measures, decrease the lower band down to the unfree copper price, the domestic melting point.

While it was common that the market price of copper plates decreased substantially below the free copper price, making it profitable to export copper money if such was allowed, it probably never happened that the market price of copper coins fell below the unfree copper price (see figure 3). It was, therefore, never profitable to melt down copper plates for non-monetary purposes in Sweden (but they could be saved as treasure). Therefore, they tended to be turned into bullion only when exported. While from the point of

⁵ For 1721–1775 based on minting data and export statistics (Heckscher 1949, pp. 369–378 and figure 3).

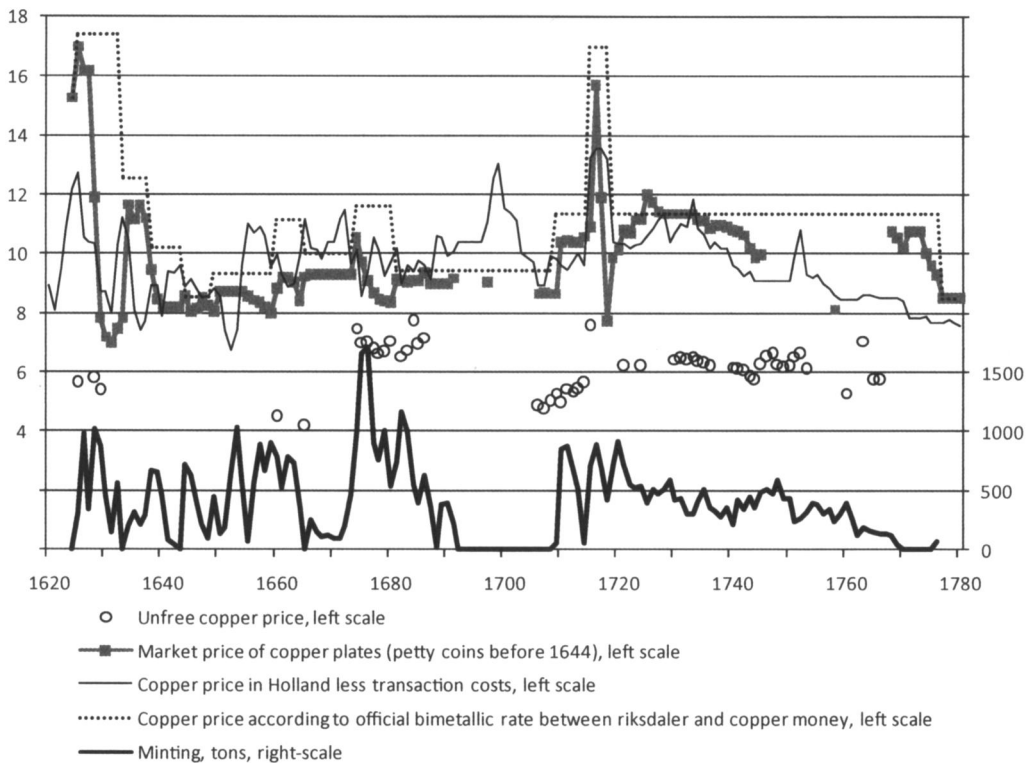


Figure 3. *The copper price expressed in grams of silver per kilogram copper (left scale) according to various rates, and annual copper minting in tons (right scale). Sources and calculations: Wallroth (1918), Furtak (1935, p. 264), Wólontis (1936), Lindeberg (1941, pp. 151 and 265), Posthumus (1946), Lindroth (1955, p. 249), van Tielhof and van Zanden (2009), Stockholms Handels-Mercurius (1733–1736), Stockholms stads priscourant (1740–1776). Missing values for Holland have been interpolated, mainly by using prices in Gdańsk and Stockholm as indicators. The transaction costs are estimated as the average difference between the price in Holland and the price of free copper in Sweden. The copper price in silver is calculated from the relation between the market prices of riksdaler and copper. For 1624–1691 and 1706–1745, the market price of copper coins is assumed to be the same as their official value. For the other periods, direct sources on the market price of copper plates (which were paid a premium relative their official value in daler kopparmynt) are used when such exist.*

international markets copper plates were intrinsic value coins, from the point of view of domestic copper markets they always contained a significant “fiat component”. Consequently, Gresham’s law worked for copper coins most evidently when the Crown allowed it to operate (i.e. allowed export), i.e. when such measure de facto made them dear money.

To investigate the effect of minting, international copper price and changes in mint equivalents on the market price of copper coins, table 4 presents a multiple regression for the period 1624–1691, 1709–1715, and 1720–1745 (excluding the years of fiat monies and when minting of copper plates was suspended). For minting and changes in the international copper price, the 1-year and 2-year lags are also included as independent variables to investigate if there was any delayed causality. To avoid autocorrelation, all variables are first

Table 4. Multiple regression for the period 1625–1691, 1709–1715, and 1720–1745, where the dependent variable is the annual change in the market price (g Ag/kg Cu) of copper plates (petty copper coins up to 1644)

Variable	Coefficient	Beta-coefficient	t-value	Significance
Constant	0.099		0.62	0.534
1. The dependent variable, 1-year lag	0.330	0.340	3.76	0.000
2. Dummy, increase in the mint equivalent of copper coins in daler silvermynt = 1, no increase = 0	1.151	0.324	3.31	0.001
3. Minting of copper coins (kt), current year	-0.890	-0.350	-2.99	0.004
4. Minting of copper coins, 1-year lag	0.209	0.083	0.60	0.551
5. Minting of copper coins, 2-years lag	0.302	0.112	1.06	0.290
6. Change in international copper price (g Ag/kg Cu), current year	0.076	0.078	0.81	0.420
7. Change in international copper price, 1-year lag	-0.030	-0.030	-0.31	0.756
8. Change in international copper price, 2-years lag	0.275	0.280	3.10	0.003

Model summary: $R = 0.580$; $R^2 = 0.336$; adjusted $R^2 = 0.321$; degrees of freedom: 91; significance: 0.000.

differences (minting could be seen as the first difference of the undepreciated stock of copper coins). A Dickey–Fuller test shows that the null hypothesis of a unit root can be rejected for all the variables. To further take into account of autocorrelation, the annual change in the dependent variable lagged by 1 year is also one of the independent variables (in table 4, variable 1). Since the data are somewhat uncertain, the regression should be interpreted with caution.

According to the regression, changes in the international copper prices (variable 6) did not seem to have any immediate impact on the value relation between copper and silver coins. However, there was a delayed, but significant, effect after 2 years (variable 8).

The impact of minting was more immediate (variable 3), i.e. the price of copper coins was partly determined by their supply. When minting increased, their value in silver fell. Despite being commodity money, the quantity theory had some relevance for copper money, a consequence of the wide band within which the market price of copper coins could fluctuate.

According to the regression an increase in the mint equivalent of copper coins increased their expected price by 1.15 g silver per kilogram copper (variable 2). Such increase should be expected, since the new copper coins initially circulated at par with the copper coins minted to the lower mint equivalent. However, the effect was often temporary, since (as discussed in the next section), increases in the mint equivalents caused larger minting, which, in turn, put downward pressure on the market price of copper coins.

4. Monetary policy

4.1 Cheap money, dear money, and changes in mint equivalents

Redish points out that while under a mono-metallic standard there is a constant tendency for depreciation, the pressure is even greater under a multi-metallic system (Redish 2000, p. 33). If a coin circulated at a premium or tended to be driven out, a common response was to

increase its mint equivalent in order to make it circulate at par with the other coins. To a large extent, which coins became dear and cheap monies, respectively, was determined by such readjustments in their mint equivalents.

Since copper coins tended to be driven out when becoming dear money, a measure to keep them in circulation was to increase their mint equivalent. The increases in the mint equivalent of copper plates often followed high copper prices (see figure 3). The new copper plates at the higher mint equivalent circulated to the same nominal value as the old copper plates at a lower mint equivalent, which tended to drive out the old copper coins. When the copper price later decreased to its long-term trend, or the exchange rate of silver coins increased, the new copper plates became overvalued. This was adjusted either by increasing the mint equivalent of the silver coins, or by revaluing existing silver coins relative to the copper plates. Such process was, however, not automatic, since monetary authorities could also ban the export of copper coins if the latter became undervalued, or let the copper coins be driven out.

The high mint equivalent set for copper coins in the 1620s was a consequence of high international copper prices. As displayed in table 3, between 1624 and 1644, although the mint equivalent of petty copper coins in *daler silvermynt* more than halved, in *daler kopparmynt* it was increased somewhat since the *daler silvermynt* was raised from one *daler* in copper coins to 2.5 *daler kopparmynt*. In this way, the premium on silver coins was eliminated (see figure 1). The mark and *öre* silver coins were roughly at par with the copper coins in 1633–1655, while the period 1655–1686 was quite messy.

The increase in the mint equivalent of copper coins in 1660 (see table 3), caused by higher copper prices, was too large, which once again brought higher premiums on silver coins (see figure 1). The older copper coins at a lower mint equivalent were exported and disappeared from circulation, causing money shortage. It was this money shortage that convinced Stockholm Banco to issue its paper notes in 1661 (Brisman 1918, pp. 56–59). Henceforth, the direct, but unintended, cause of the first paper notes in Europe was the manipulation of the mint equivalents. To accommodate the previous increases in the mint equivalent of copper coins in 1665, the official value of one *daler silvermynt* was, as mentioned above, increased to three *daler kopparmynt*, in accordance with the premiums paid on the two domestic silver currencies (see figure 1).

Higher copper prices in the early 1670s caused a new increase in the mint equivalent of copper plates in 1674 (see figure 3 and table 3). Since copper prices began to fall from 1674, the premiums on *carolin* and *öre courant* once again became high (see figure 1). This led to another readjustment in the value relations of coins. In 1681 the official values of the ducat, the *riksdaler* and the *carolin* were increased, and a further increase followed for the *carolin* in 1686 in accordance with the market exchange rates (see table 2). The *öre* silver coins were at the same time debased, in an attempt to make *öre courant* to follow the copper currency, while not decreasing the fine silver content of the *carolin*. These adjustments made the copper plates undervalued (Wolontis 1936, p. 161), which became dear money. There were instances where premium was paid for copper plates,⁶ but this did not stop them from almost completely disappearing from circulation as money.

When copper plates were once more minted on a larger scale in 1710 the mint equivalent had to be increased, but international copper prices continued to be high. Despite of the increased mint equivalent, copper plates were still dear money, and their export was

⁶ Riksbankens arkiv, Sandbergska samlingen, O:1, folio 1780.

substantial. In 1713–1714 the export of plates was prohibited temporarily (Wolontis 1936, pp. 180–181; Tingström 1984, p. 48). In 1715 all circulating copper plates were revalued by 50 percent, after being stamped, (Hegardt 1975, p. 229) which once again made them cheap money.

After 1719 the *carolin* became undervalued compared with other silver coins, especially the *riksdaler* (see figure 2 and table 3). Since the mint equivalent (in *daler silvermynt* per kilogram silver) of the *carolin* was 8 percent lower than for the *riksdaler*, given there was no premium on *carolin* or *riksdaler*, it was profitable to turn the *carolin* into silver bullion. This was clearly an exception to the general tendency for silver coins to stay in circulation. A report from 1731 stated that the weaker coin, the copper plate, had driven out the better coin, the *carolin* (Tingström 1984, p. 62). To counter this move, in the same year, free minting of silver coins was introduced at quite favourable terms (Sjöstrand 1908, pp. 12–13). From January 1734 there was a premium paid on *carolin*,⁷ which allowed this silver coin to stay in circulation, thus counteracting Gresham's law.

4.2 *The political economy of the copper standard*

According to Heckscher, there were two main reasons for implementing the copper standard: to manipulate the international price of copper and as a solution to the perceived problem of money shortage (Heckscher 1936, pp. 453–457). Both could be seen as aspects of a copper mercantilism.

In the seventeenth century, Sweden stood for more than half of Europe's supply of copper, implying that Sweden held a monopoly position, and was to some extent important to finance Sweden's war efforts. By withdrawing copper from the international markets when the copper price was perceived as being too low, the ambition was to increase its price (Heckscher 1936, pp. 275–276 and 452–457; Heckscher 1938).

Although foreign trade with copper was made free in 1632, monopoly profit could be earned through substantial taxation of copper export, which was not uncommon elsewhere under the mercantilist era. The large difference between the prices of free and unfree copper (see figure 3) shows that this profit must have been substantial. In 1660, the seignorage tax increased substantially for the private minting of copper coins that was allowed, almost to the level of copper export (Wolontis 1936, pp. 24 and 133).

Nevertheless, monetary policy was not simply subordinated to the copper policy. A profit-maximizing copper monopolist should, all else being equal, increase minting when copper prices were low and decrease it when copper prices were high (Edvinsson 2012). The minting of copper coins in Sweden did not entirely follow this pattern, which is evident from figure 3.

Despite the regular bans on exporting copper coins, some of the minted Swedish copper coins later went for export, counteracting the goal of the monopolistic copper policy to raise international copper prices (Heckscher 1936, pp. 460–461). Minting policy was partly determined by the struggle between opponents and advocates of the copper standard, and was, therefore, not completely predictable (Heckscher 1936, pp. 616–619).

Attempting to increase the money supply to stimulate trade was a common denominator of mercantilism. The Swedish copper mercantilism was partly a solution to the perceived

⁷ Riksbankens arkiv, "Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803".

Table 5. Multiple regression for the period 1625–1691, 1709–1715, and 1720–1745, where the dependent variable is the annual change in minting (kt)

Variable	Coefficient	Beta-coefficient	t-value	Significance
Constant	-0.029		-1.13	0.260
1. Dummy, increase in mint equivalent (in daler silvermynt) of copper coins = 1, no increase = 0	0.611	0.490	5.39	0.000
2. Annual change in international copper price (g Ag/kg Cu)	-0.088	-0.256	-2.87	0.005
3. Change in international copper price, 1-year lag	0.020	0.056	0.66	0.511
4. Annual change in market price of copper coins (g Ag/kg Cu)	-0.082	-0.232	-2.49	0.014
5. Change in market price of copper coins, 1-year lag	0.110	0.323	3.59	0.001

Model summary: $R = 0.576$; $R^2 = 0.331$; adjusted $R^2 = 0.317$; degrees of freedom: 94; significance: 0.000.

problem of shortage of coins (which mostly affected small trade), by using a commodity for money that was abundant in Sweden. For example, when the Crown attempted to reintroduce the silver standard in the mid-1660s, and stopped minting copper plates, there were complaints about money shortage, so that the minting of copper plates had to be allowed again (Wolontis 1936, p. 145). This shortage problem was not solved until the paper notes came to dominate monetary relations in the eighteenth century (Heckscher 1949, pp. 741–742).

Table 5 presents a multiple regression isolating various factors impacting on minting policy, for the same period as in table 4. The dependent variable is the annual change in minting of copper. According to a Dickey–Fuller test, the null hypothesis of a unit root can be rejected for all the variables.

The negative slope for the annual change in the international price of copper (variable 2) demonstrates that the exercise of monopoly power at the European copper markets to some degree-shaped minting policy. The effect was also immediate. However, even if the slope is significant at a 1-percent level, the beta-coefficient is only -0.23 .

The increases in mint equivalents made it highly profitable to mint, at least in the initial phases. In table 5, the beta-coefficient (at 0.49) is of highest magnitude for the dummy variable designating years when the mint equivalent of copper coins was increased (variable 1). All else being equal, according to the regression, minting increased by 0.6 kt during such years (the average annual minting in 1624–1776 was 0.4 kt).

The causal relation between minting and the price of copper coins depends on whether supply or demand is the driving factor. On the one hand, increased minting should lower the price of copper coins; on the other hand higher price of copper coins should increase minting. In the first case there should be a negative correlation, in the second a positive. Both these effects can be noted in table 5. While the slope for the change in the price of copper coins the current year (variable 4) was negative (compare also with table 4), the slope for the change lagged by 1 year (variable 5) was positive.

Exogenous political chocks also changed monetary policy, and it was initially the need to finance war efforts that caused the circulation of token coins in 1715–1719 and made paper

notes inconvertible in 1745. Although there was a discussion of using the copper currency in time of war if there would be lack of silver imports, (Heckscher 1936, pp. 617–618) minting policy was not much affected by wars, since copper minting (not considering the token coins) was not necessarily more profitable than the copper export. For the period in 1624–1776, the correlation between a war dummy and minting of copper coins was + 0.19, which is barely significant at a 5-percent level. On average, minting of copper coins was only 0.1 kt higher during years of war. The increases in the mint equivalents of copper coins were not directly connected to war efforts, but, as discussed above, rather to high copper prices.

How could trimetallism persist for such a long period, and why did not monetary authorities abolish this complicated monetary system? A mono-currency standard based on copper was unrealistic, since there was a need for the silver and gold currencies. Although monetary authorities attempted to reintroduce a mono-metallic silver standard, which was partly successful in the 1690s, the monopolistic position held at the international copper markets and the problem of shortage of coins made copper minting almost irresistible. Only the rising use of paper money and the decline of the copper production during the course of the eighteenth century finally convinced monetary authorities to abolish the copper standard.

5. The composition of the money supply

To understand the evolution of the Swedish multi-currency system, it is important to estimate how widespread various currencies were. Ducats and *riksdaler* coins were common in foreign trade and in the credit market, because of their stable fine metal content. Domestic trade was dominated by *carolin*, *öre courant* and copper plates, although during the eighteenth century they were gradually replaced by paper notes and in the 1770s by the *riksdaler*. Except for the first decades of the copper standard, petty copper coins had a limited function, as small change (Wolontis 1936, p. 140).

Taxes and prices were usually recorded in *daler silvermynt* or *daler kopparmynt*. However, with the exception of the credit market, information on what monetary instruments were used is lacking. While payments were usually made in cheap money, there are a few examples that prices were reduced if goods were paid in dear money (Hegardt 1975, pp. 294–295). Subjective statements on the prevalence of various coins are not completely reliable. For example, Heckscher notes that although the *riksdaler* was viewed as a coin mainly used in foreign trade, a special tax collected in 1613–1619, was paid to 26 percent in this coin (Heckscher 1936, p. 610).

Nevertheless, since there are data on minting and note circulation, the composition of the money supply can be guesstimated reasonably objectively. Figure 4 presents the value shares in money supply (the equivalent of Mo) of various means of payment in 1645–1775 based on their market exchange rates: the ducats, the three silver currencies, plates, petty copper coins, tokens, and notes. The circulation of coins is calculated from data on minting, with an assumption of a natural depreciation of the stock, i.e. that coins were regularly driven out of circulation.⁸ The method is based on the so-called perpetual inventory method, used in modern national accounts in estimating capital stocks indirectly from investment in

⁸ Note circulation is from Sveriges Riksbank (1931).

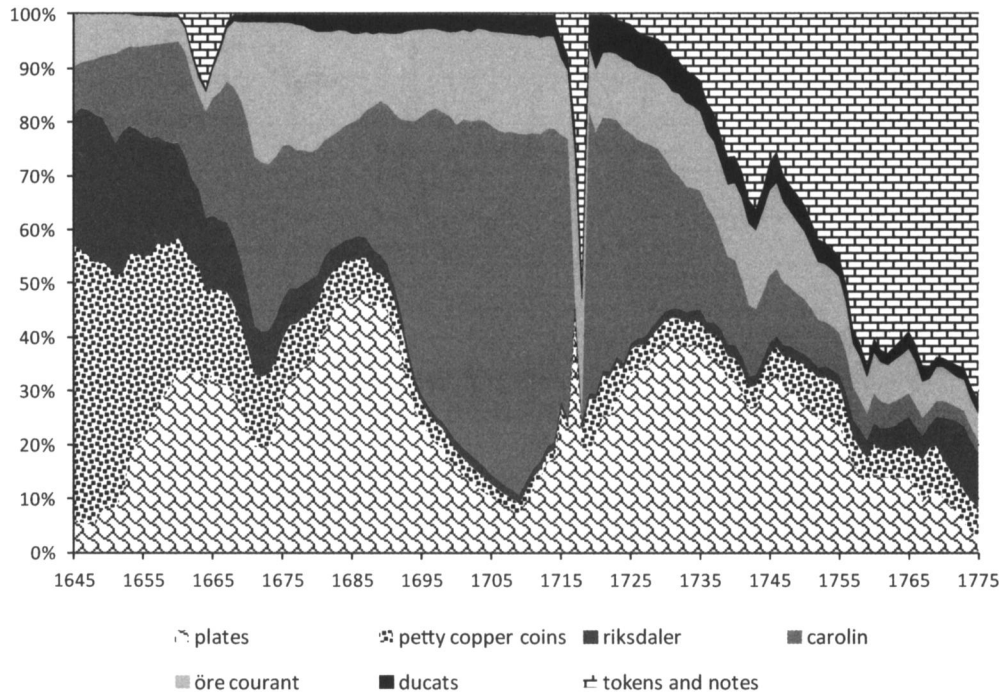


Figure 4. The value share (percent in 31 December each year) of various means of payments in the total money supply of Sweden (including Finland) 1645–1775. Source: Based on minting data (see Wallroth 1918; Brisman 1918, p. 66; Sveriges Riksbank 1931). The value shares are based on the market rate for various currencies (for sources, see figure 1), not the official rates.

preceding accounting periods (Inter-Secretariat Working Group on National Accounts 1993, pp. 148–150). Further details are given in online Supplementary material Appendix.

Figure 4 shows that there were important shifts in the composition of money supply. The first banknotes that were issued in the 1660s accounted for at most 14 percent of money supply. It was not until the late 1750s that paper notes accounted for more than 50 percent of the money supply. Although the issuing of notes in the 1660s caused a panic, the fall in the value of paper money and the cancelling of their convertibility could partly be explained by inexperience rather than over issuing (Brisman 1918, p. 66). The first Swedish experiment with fiat monies on a larger scale was instead with the token coins minted towards the end of the Great Nordic War. Towards the end of 1718 they accounted for 48 percent of money supply.

While various metallic currencies continued to exist alongside each other, their relative shares were not constant. In the 1650s, copper plates overtook petty copper coins as the most important copper money. Up to 1665, copper coins dominated money supply, while in 1665–1685 silver and copper coins roughly held equal shares. After 1685 it was the silver currencies that expanded and drove out copper plates, which was reversed from 1710. Towards the end of the investigated period the *riksdaler* came to dominate the metallic means of payment. Minting of *riksdaler* coins was extremely large in 1766–1776, in preparation for the conversion to the sole silver standard in 1777.

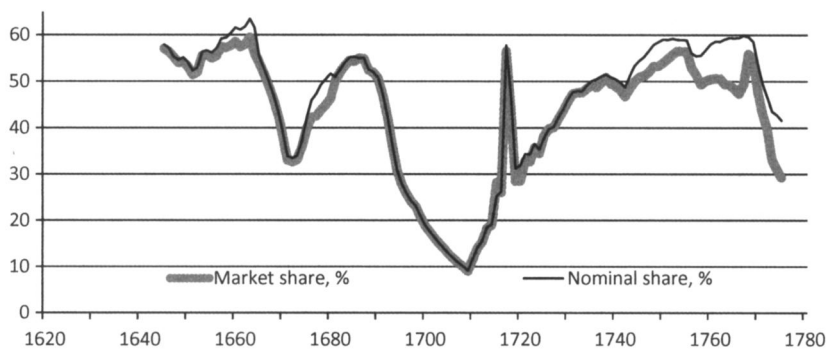


Figure 5. The value share (percent in 31 December each year) of copper coins of all metallic currencies according to market and official rates. Source: figure 4.

As can be seen from figure 4, even if ducats only constituted a smaller part of the circulating metallic coins, they should not be disregarded. They increased their share of the metallic currencies through time.

The large share of copper plates in some periods may seem surprising. However, it was because they were so common that paper notes were introduced. Furthermore, the velocity of circulation was much lower for copper plates than for other coins; henceforth, a large share in money supply does not, *per se*, mean that plates were the most common means of payment.

Figure 5 shows that the value share of copper coins of all metallic currencies was not much different whether the calculation is based on official or market rates. When the share of copper coins approached 50 percent, their market value tended to fall behind, which accords with the finding above that the quantity theory had some relevance for copper coins. The discrepancy between the two series from the 1740s can also be explained by the long-term fall in copper prices (see figure 3).

6. Conclusions

The introduction of copper money in Sweden produced a complex and evolving monetary system—a multi-commodity standard quite different from the much debated bimetallism of the nineteenth century.

Since the Swedish Crown attempted to fix relations between various coins, a mono-currency, trimetallism *de jure* was in place. All copper, silver, and gold coins were to be counted in the same unit of account—in *daler silvermynt/daler kopparmynt*. However, *de facto*, a parallel standard prevailed at most periods. The main units of account turned into ghost monies—a dollar silver coin (*daler silvermynt*) was not necessarily the same as a dollar (*daler*) in actual silver coins. Even coins minted from the same metal were not necessarily fixed in value relative to each other. This led to the formation of different currencies with semi-official status.

Swedish trimetallism was feasible; there was no inevitable knife-edge, copper, silver, and gold coins circulated alongside each other during most of the period under investigation, and since minting of copper coins was used to manipulate international copper markets the copper price was not exogenous to the monetary system. At the same time, there was no automatic stabilization, after some time fluctuations in copper prices disturbed the

monetary system, and the share in total money supply of various currencies varied. The market price of copper coins and minting policy were affected by a complex interplay of different factors. As Heckscher notes this monetary system was partly undetermined (Heckscher 1936, p. 607).

Gresham's law was sometimes in operation, especially when the mint equivalent was increased for a coin, and the old coins were driven out but the new. However, it was less common that one metallic currency drove out another, as in classical silver and gold bimetallicism. Gresham's law worked differently for copper, silver, and gold coins—Swedish trimetallicism was asymmetric. Copper coins could not replace silver and gold coins. The copper standard necessitated trimetallicism. The existence of premiums on silver and gold coins when they became dear monies allowed them to stay in circulation. Some silver coins were driven out when they became undervalued relative other silver coins; however, at no time were *all* silver coins of larger denomination subjected to Gresham's law. Gold coins were never driven out. Only when copper plates became dear money, and exports bans were ineffective or abandoned, did the monetary system approach a mono-metallic, mono-currency standard, in accordance with Gresham's law and the traditional view on bimetallicism. This occurred since the high transaction costs involved in using copper coins as means of payment tended to be higher than the premium paid for them as dear money. To retain trimetallicism, when copper prices stood high, monetary authorities sometimes responded by raising the mint equivalent of copper money, which explains why copper coins were prone to a continual depreciation.

Copper money was in a sense an experiment with a semi-fiat, semi-commodity currency. While the mint equivalent of copper coins was often at the same level as the free (export) copper price, it was mostly substantially above the unfree (domestic) copper price. This caused another asymmetry in the relation between cheap and dear monies. While from the point of view of international markets, copper coins were sometimes dear money, from the point of view of domestic copper markets, they were always cheap money, implying that there was never profitable to withdraw them from circulation for non-monetary domestic use. Even if there was a small, but lagged, positive correlation, sometimes substantial movements in the international copper price had no effect on the market price of copper coins, which differentiates Swedish trimetallicism from the classical nineteenth century bimetallicism.

Supplementary material

Supplementary material is available at *EREH* online.

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