Periodic Re-Coinage as a Monetary Tax: Conditions for the Rise and Fall of the Bracteate Economy

Roger Svensson *

18 September 2015

Abstract
Archaeology and numismatics have long been familiar with the phenomenon of periodic re-coinage (renovatio monetae), which dominated monetary taxation in medieval Europe for almost 200 years. However, this form of monetary taxation is seldom, if ever, discussed in the literature of economics or economic history. No economic theory has ever been proposed to explain periodic re-coinage. The present study aims to make up for this absence. It examines the qualities that typically differentiate regions with periodic re-coinage from those with other monetary systems and analyzes how periodic re-coinage was monitored and enforced. The principal example of frequently renewed coins is uni-faced bracteates, which were often subject to annual or even biannual re-coinages. Although bracteates were not the cause of periodic re-coinage, their features facilitated frequent renewals. The study discusses the economic consequences of periodic re-coinage and links the breakdown of this monetary system with the end of bracteates’ role as the principal coin in the 14th century.

* Research Institute of Industrial Economics (IFN), P.O. Box 55665, SE–10215 Stockholm, Sweden. Correspondence: roger.svensson@ifn.se
I would like to thank Per Hortlund, Andreas Westermark, the seminar participants at the SNEE conference in Mölle and the numismatic conferences in Mikulov and Taormina as well as two anonymous referees for their insightful comments. The author gratefully acknowledges financial support from the Torsten Söderberg Foundation, the Sven Svensson Foundation for Numismatics and the Sven and Dagmar Salén Foundation.
In the Middle Ages, there were numerous religious prohibitions against charging interest or otherwise earning unmotivated profits, but these rules did not prevent the authorities from utilizing coinage and other institutions for their own pecuniary purposes. One goal of the minting authorities in medieval Europe was to create a preference for the issuer’s coins compared to competing foreign coins, with sustained acceptance enhancing the coin issuer’s profit. Therefore, laws typically stated that foreign coins and bullion were precluded from circulation and were to be exchanged for current coins at the mints. Here, the minting authority had an exchange monopoly and could thereby charge a gross seignorage.

However, other revenues were derived from minting, and a well-known fiscal policy was to manipulate the weight and fineness of coins. Such debasements often occurred in times of war or epidemics, when finances were volatile and in disarray. Profits from debasements were partly based on secrecy and asymmetric information about the fineness on the part of the coin issuer vis-à-vis the public. Thus, there were large transaction costs for people to detect debasements of fineness. Profits were also based on increased re-minting. However, debasement could also occur through monetary issues, for example, when there was an excess demand for money and a shortage of bullion or to counter Gresham’s law when old coins became worn or defective.

From the vantage point of today’s economists, a less well-known minting policy was periodic re-coinage, also known as coin renewals or renovatio monetae, when old coins were declared invalid and exchanged for new ones at publicly announced exchange rates and dates. Empirical evidence shows that periodic re-coinage was the dominant monetary taxation method for almost 200 years in large parts of medieval Europe. An exchange fee was

---

1 Wood, Medieval economic thought, ch. 4.
2 There are also other reasons for issuing coins, for example, to increase the prestige of the ruler and to use the design of the coins as a marketing platform for the ruler; Bolton, Medieval English economy, p. 20. Another important reason for coining is to decrease transaction costs in economic life; see below, Section I(i).
3 Kluge, Numismatik, pp. 62–63.
4 Gross seignorage = net seignorage + production costs.
6 If consumers used coins according to their face value, they would melt down old coins with high fineness and bring the bullion to the mint to have it re-minted into a larger nominal sum. Thereby, both re-minting and seignorage increased; Ibid., p. 3.
7 In the first case, the debasement of coins helps meet the excess demand for money. By lowering the silver fineness, more coins could be struck from a given amount of bullion. In the second case, wear and tear lower the intrinsic value of old coins, but they have the same face value as new ones. Old coins will then crowd out newly issued coins (Gresham’s law). The stepwise debasement of new coins would counter this process and equalize the intrinsic value of old and new coins; Ibid., pp. 3–4.
8 See below, Section I(ii).
charged as a way to tax trade and inhabitants. Re-coinage could occur twice per year, and a common exchange fee was four old coins for three new ones. In practice, periodic re-coinage in the Middle Ages was implemented by changing the main design when re-minting the coins, whereas the monetary standard of the coinage (weight, fineness, diameter, shape of the flan) largely remained unchanged. Thereby, it was easy for the users of the coins to distinguish between valid and non-valid types.

The disciplines of archaeology and numismatics have long been familiar with periodic re-coinage. Remarkably, however, this form of monetary tax is seldom, if ever, analyzed in the literature on economics or economic history. No economic theory has ever been proposed that aims to explain periodic re-coinage. The purpose of the present study is to make up for this absence and articulate a theoretical framework that explains periodic re-coinage.

The principal example of frequently renewed coins is uni-faced bracteates, which were often subject to annual or biannual re-coinages. Bracteates are thin, uni-faced silver coins that were struck with only one coin die. A piece of soft material, such as leather or lead, was placed under the thin flan (planchet) so that the design of the obverse was a mirror image on the reverse of the bracteates. Although the leaf-thin bracteates are the most fragile coins in monetary history, they were the main coin type for almost two centuries (1140–1320) in central, northern and eastern parts of medieval Europe.

In this study, the usefulness of the bracteates is linked to periodic re-coinage. The analysis will demonstrate that periodic re-coinage works particularly well in small currency areas and in economies that were undeveloped and had low monetization. These characteristics facilitate both re-minting and monitoring in such a monetary system. Empirical evidence from

---

11 Sporadic re-coinage in the form of ‘coinage reforms’ often occurred in the Middle Ages, e.g., in England in 1247, 1279, and 1351. Re-coinage was then accomplished for debasement or adjustment of the physical specifications of the coinage. However, the key point here is that such coinage reforms were not ‘periodic’.
12 The Latin expression *bracteae* (which means thin piece of metal) for these uni-faced coins is used for the first time in a document from 1368; Höfken, *Brakteatenkunde*, p. VI. At the end of the 17th century, the term ‘bracteates’ began to be used for these uni-faced coins in scientific publications; Olearius, *Isagoge*.
13 A coin die is a metallic cylinder that contains an engraved inverse image to be struck on the coin.
14 Kühn, ‘Mittelalterliche Prägungstechnik’, p. 2. The diameter of the bracteates varies from 10 to 50 mm, and the weight is between 0.05 and 1.00 g. The bracteates are only 0.05–0.20 mm in thickness. A high relief often stabilizes the bracteates. A common misunderstanding is that all uni-faced coins are bracteates. Uni-faced coins that have not been minted through the specific technology of using soft materials under the flan are not called bracteates.
hoards shows that periodic re-coinage worked better with longer intervals between re-coinage dates. As long as bracteates were the principal coin, they were firmly connected to periodic re-coinage. Bracteates were not the reason for periodic re-coinage, but they facilitated frequent renewals. Periodic re-coinage had several consequences: 1) a stable coinage with respect to fineness and no *long-term* inflation; 2) *short-term* disturbances in the velocity of money, price levels and the volume of transactions; 3) the coins’ function as a store of value deteriorated; and 4) inhibitions on trade, business and the division of labor. When periodic re-coinage broke down and the bracteates lost their role as the principal coin in the 14th century, it was likely due to increased monetization and trade.

The paper is organized as follows. I discuss the fundamentals of medieval coins and describe the extension of periodic re-coinage through time and space in medieval Europe in Section I. The theoretical framework and conditions of periodic re-coinage are outlined in Section II. In Section III, bracteates are linked to periodic re-coinage. The consequences of periodic re-coinage are analyzed in Section IV. The final section draws conclusions.

I. Periodic re-coinage through time and space

*I(i) The fundamentals of medieval coins*

A coin is a piece of hard material of standardized weight and fineness, which are guaranteed/controlled by an authority with a hallmark. To work as ‘general purpose money’, coins must perform three basic functions: they provide a medium of exchange, a standard of value/unit of account and a store of value. Generally, coins in medieval Europe performed all three jobs adequately, primarily as commodity money; i.e., the face value was very close to the intrinsic value, although this relationship became attenuated over time. Fiat money, where the value is not determined by the raw material value but by the issuer’s credibility or economy, did not then exist in pure form. Precious metals (gold and silver) best fulfilled the requirements of commodity money; coins then became durable, portable and of a size that

---

15 In the Middle Ages, weight and fineness were not always carefully maintained for low-value coins. Laws stated that a specific number of coins were to be struck from a fixed amount of precious metal; Haupt, *Sächsische Münzkunde*, p. 24. Coins are usually made of metals, while tokens are coin-like objects that are made with either hard or soft material (e.g., card or leather). The key difference is that a coin is issued by a governmental, local or national authority and is freely exchangeable for goods or other coins, whereas a token has a much more limited use and is often issued by a private company or association.
could be stored easily. Silver was the most commonly used raw material for medieval coins because there was a relatively abundant supply of silver from several European mines.

When conducting daily (small) transactions, it is easier to count coins than to weigh and ascertain the fineness of silver. This practice implies that the medium of exchange and standard of value functions are better performed by coins than by bullion. Therefore, people are generally willing to pay a premium to have their silver transformed into standard coins. The premium component also enables the coin-issuing authority to generate profits from minting (*gross seignorage*). Although the monetization of society increased in medieval Europe, commodities other than coins were also used as money, or direct barter was employed. For larger transactions, silver ingots or bullion were often used.

Until around 1300, the king/emperor possessed the rights to mint, charge market dues and operate mines. Coinage rights could be delegated, sold or pawned to other authorities (laymen, church authorities, citizens). In general, these authorities were required to observe the king’s guidelines for valid coins and the monetary standard. The rights to mint and charge market customs were typically delegated together because the coin issuer also had to control the market. The market due was a fee levied on artisans and merchants’ goods brought to and sold in the town market. The stated purpose of this fee was to support the market, but it also served as important recurring revenue for the authority.

The size of the currency areas bounding the right to mint could vary substantially during the Middle Ages. In England, Sweden and Denmark, the king normally retained coinage rights and maintained a pure monopoly, with the exception of some mints controlled by bishops.

---

16 Precious metals 1) exist in limited quantities; 2) are well known; 3) are of a high value compared with their size; 4) are resistant to corrosion and oxidation; and 5) are relatively soft and thereby easy to manipulate. The last characteristic implies that gold or silver are mixed with zinc or copper when minting coins. Otherwise, the coins would become worn with routine use.
19 Furthermore, coins are a typical network good. That is, the value (of holding coins) increases as more people accept coins as a medium of exchange and a standard of value, which reinforces and tends to increase the premium; Dowd and Greenaway, ‘Currency’, p. 1180.
20 Buck et al., *Goslar*, p. 28.
21 Coinage rights encompassed the right to 1) decide which coins are legitimate and valid as a medium of exchange; 2) determine the monetary standard, including the denomination, weight, fineness, diameter and relief; 3) mint the coin and determine the design; and 4) generate profits from minting. Kamp, *Moneta regis*, pp. 27–28; Kluge, *Numismatik*, p. 52.
22 Ibid., p. 53.
23 Ibid., p. 53.
The whole of England was a single currency area, whereas Sweden and Denmark each had 2–3 areas. These large currency areas each had several mints.\footnote{Allen, Mints and money, pp. 2–12; Jonsson, ‘Utländsk metall’, p. 51; Grinder-Hansen, Kongamagten kris, pp. 53–60, 81–88.} In contrast, in Germany and France, minting rights were delegated to many ecclesiastical and civil authorities,\footnote{Kluge, Numismatik, pp. 96, 143.} and a city (mint) and its surroundings could constitute a single currency area.\footnote{Spufford, Money, p. 100.}

\textbf{I(ii) Geographical extension of short-lived and long-lived coinage systems}

For purposes of analysis, the coinage systems in the High Middle Ages of Europe (c. 1000–1300) are divided into two main systems. One system had ‘long-lived coins’ that were valid during the whole reign of the coin issuer or longer.\footnote{Sometimes, successors minted variants of the same coin type. These are called ‘immobilized types’ and could be valid for very long periods—occasionally centuries—and survive through the reigns of several new rulers; Kluge, Numismatik, p. 63.} The other system had ‘short-lived coins’ that were valid only for specific intervals of the issuer’s reign.\footnote{The term ‘regional coins’ is widely used instead of short-lived coins in the numismatic literature. However, this term is misleading inasmuch as long-lived coins also had a geographic constraint and were regional.} In the latter system, periodic re-coinage occurred. In the numismatic literature, three methods have been used to identify periodic re-coinage and its frequency (ranked by confidence): 1) written documents; 2) the number of coin types per ruler and year; and 3) the distribution of coin types in hoards.\footnote{See Appendix.}

Based on these methods, there is a consensus in drawing conclusions about the extension through time and space of long-lived and short-lived coinage systems.\footnote{Kluge, Numismatik, pp. 62–64.} Long-lived coins were common in many parts of northern Italy, France and Christian Spain from 1000–1300; see Figure 1. This system spread to England when the ‘sterling’ was introduced during the second half of the 12\textsuperscript{th} century. In areas with long-lived coins, the same type was produced in all mints in the currency area. Examples are the ‘denier tournois’ in France and the sterling in England. The mint was marked on the coin either as details in the field (e.g., French royal coins) or in the legends (e.g., English sterling). In France in the 11\textsuperscript{th} and 12\textsuperscript{th} centuries, long-lived coins dominated in most regions where the rights to mint were distributed to many civil authorities.\footnote{Ibid., p. 143.} In northern Italy, where towns took over the minting rights in the 12\textsuperscript{th} century, long-lived coins also dominated.\footnote{Spufford, Money, p. 100.}
The purpose of long-lived coins was to create a high degree of acceptance for the issuer’s coins—both inside and beyond his own currency area. The issuer hoped his coins would be perceived as so stable that neighboring areas would confidently accept them as a means of payment. The coin issuer would thus gain a larger circulation area for his coins. With this expansion, he could strike more coins and make a higher profit. The most important source of income for the minting authority in such a system was likely the monopoly over the exchange of foreign coins and bullion for current, local coins.33

**Figure 1**

In central, northern and eastern parts of Europe in the period from 1000–1300, short-lived coinage systems were the dominant monetary system. A well-known example is England, where periodic re-coinage occurred every sixth year between 973 and 1035. From 1035–1125, the coinage was renewed every second or third year.34 However, these coins were valid throughout England, a large geographic area.

Northern and eastern parts of France and western parts of Germany had periodic re-coinage in the 10th, 11th and 12th centuries.35 However, the best examples of short-lived and geographically constrained coins can be found in central and eastern Germany and eastern parts of Europe, where currency areas were relatively small. Here, periodic re-coinage started in the middle of the 12th century and mostly lasted until c.1290–1320; it was particularly frequent in areas where uni-faced bracteates were minted, usually annually but sometimes biannually.36 Further, Austria had annual re-coinage until the end of the 14th century, Brandenburg until 1369,37 and for the Teutonic Order in Eastern Prussia, every tenth year between 1237 and 1364.38 Individual German mints could have annual renewals until the beginning of the 15th century (e.g., Brunswick until 1412).39

Sweden operated a system with the periodic re-coinage of bracteates in two of three currency areas (particularly in Svealand and, to some extent, in western Götaland) from 1180–1290. This conclusion is supported by evidence of numerous coin types per period and the

37 Ibid., pp. 108, 119.
38 Paszkiewicz, ‘Chronology’, p. 178.
composition of coin hoards. Denmark introduced periodic re-coinage (mostly annual) in all currency areas in the middle of the 12th century; it continued for 200 years, with some interruptions. Similar to Germany, Poland had many currency areas and minting authorities. King Boleslaw (1102–38) started with irregular re-coinage—every third to seventh year. At the end of the 12th century, coin renewals were annual, and in the 13th century, they occurred twice per year. Bohemia also had re-coinage at least once per year in the 12th and 13th centuries.

The exchange fee in Germany was generally four old coins for three new ones, which represents a gross seignorage of 25 percent. This fee can be observed at work at the mint in Magdeburg (12 old for 9 new coins). In Denmark, the fee was higher—three old coins for two new ones—or 33 percent. In Cologne, the exchange fee was six old for five new coins. The Teutonic Order in Prussia had a relatively generous exchange fee of seven old coins for six new ones.

II. Conditions and enforcement of periodic re-coinage

II(i) Conditions for periodic re-coinage

In a short-lived coinage system, the minting authority in competition with other coin issuers tries to create a monopoly position for its coins. Laws stated that foreign coins were ipso facto invalid, and such coins had to be exchanged for current local coins along with the payment of an exchange fee in an amount determined by the coin issuer (exchange monopoly). Although the geographical currency constraint increased the seignorage, it also made the currency more uniform, which facilitated daily transactions for common people. The frequency and exchange fee of periodic re-coinage could and did vary. Periodic re-coinage normally occurred on a specific date. Afterward, the new local coins were the only valid coins for transactions in the city; the use of older local or foreign coins was prohibited.

41 Grinder-Hansen, Kongamagtens krise, pp. 61–70.
44 Röblitz, Arnstadt, p. 21. According to Spufford (Money, p. 92), four old coins were also exchanged for three new ones in England, but this conclusion is based on a rather uncertain weight analysis.
45 Mehl, Magdeburg, p. 33.
46 Grinder-Hansen, Kongamagtens krise, p. 85.
48 Paszkiewicz, ‘Chronology’, p. 179.
49 Kluge, Numismatik, p. 63.
50 Kamp, Moneta Regis, p. 365.
51 See above, Section I(ii).
In both long-lived and short-lived coinage systems, the following conditions must be fulfilled:

- No foreign coins should be allowed to circulate (geographical currency constraint).
- The coin issuer has an exchange monopoly.
- The minting authority must control both the local market and the coinage. In medieval Europe, the rights to charge market customs and to mint were usually possessed by a single authority.\(^5^2\)

For a short-lived coinage system to work, some further conditions must be fulfilled:

- Only one local coin type can be considered current. Exceptions were possible if more than one coin issuer had the right to mint in a currency area.
- Coin types representing various issues must have clearly visible markers to differentiate them so that people can easily distinguish between valid and invalid types. In general, the main design was changed, but the monetary standard (weight, fineness, diameter, shape of the flan) largely remained unchanged between issues.
- To complete re-minting in a currency area on a timely basis, an essential requirement is that the volume of coins in circulation is limited.\(^5^3\) This is a key factor.

The basic similarities and differences between regions that chose short-lived and long-lived coinage systems are shown in Table 1. A common characteristic for cities and regions where a short-lived coinage system was in force is that the local economy was relatively undeveloped.\(^5^4\) Historical records suggest that cities and regions with limited coinage experience and with markets that were focused on local trade often started with periodic re-coinage.\(^5^5\) In the High Middle Ages, these cities and regions could be found in the central, eastern and northern parts of Europe (see Figure 1).

**Table 1**

There are several explanations regarding why periodic re-coinage works particularly well in relatively undeveloped economies. Such economies had a small volume of coins in

\(^{5^2}\) Kluge, *Numismatik*, p. 63.
\(^{5^3}\) Spufford, *Money*, p. 94.
\(^{5^4}\) Ibid., p. 104.
\(^{5^5}\) Kluge, *Brakteaten*, p. 5.
circulation, which facilitates re-minting. Furthermore, when monetization is low, there tends to be few places where coins are used for transactions and few groups in society who use the coins. These factors facilitate close monitoring of the coinage.

Periodic re-coinage is also facilitated by small currency areas, which make it easier to monitor coin circulation. Above all, a weak central power and strong civil and ecclesiastical authorities lead to small currency areas. The small currency areas in Germany and Poland had the highest frequency of renewals.

Systems with short-lived coins typically applied to only a limited area, such as a town or a region. In Germany, the city border demarcated the area that included the jurisdiction of the city. Therefore, the right to coin and the right to charge market customs in effect were closely intertwined. The use of foreign and retired local coins at the city’s markets was forbidden. The geographical currency constraint was not limited to the city markets but rather applied to the whole area within the city border. A document from Erfurt (1248/51) shows that only current local coins could be used for transactions in the town, but retired local coins and foreign coins were allowed for transactions outside the city border. In 1231, the German king Henry VII (1222–35) published an edict in Worms stating that in towns in Saxony with their own mint, goods could not be exchanged for anything other than the coins from the local mint. However, when this edict was published, the system with coins constrained through time and space had been in force for a century in large parts of Germany.

Periodic re-coinage in large currency areas requires many mints and places of exchange, whereas such areas with long-lived coins need only a few mints. When the volume of coins increases in a short-lived system, there is often a transition to a long-lived coinage system, which makes it possible to utilize scale economies and the division of labor in coin production. This transformation allows coining to be concentrated and centralized in

---

57 This state of affairs is well documented in an 1188 letter from Emperor Friedrich I (1152–90) to the Bishop of Merseburg regarding an extension of the city. The document plainly states that the market area boundary includes the whole city and not just the physical marketplaces; Hess, ‘Münzverrufungen’, p. 16.
58 Ibid., p. 16.
selected, key mints. The exemplary case is no doubt England.\(^{61}\) Around the millennium, when England had short-lived coinage, there were more than 70 mints.\(^{62}\) However, by the 13\(^{th}\) century, when England had long-lived coinage, there were only two principal mints (London and Canterbury) left, along with very few others that were temporary and minor.\(^{63}\) The volume of minting was considerably larger in the latter period.\(^{64}\)

**II(ii) Efficiency of periodic re-coinage**

The coin hoards discovered to date can tell us a great deal about the efficiency of periodic re-coinage. Hoard evidence from England indicates that periodic re-coinage was partly successful. Table 2 shows that 83 percent of the coin hoards from 973–1035 contain only one coin type, compared with 33 percent of the hoards from 1035–1125. In terms of the number of coins, 86 percent of the coins are of the last issue in hoards from 973–1035, whereas 54 percent of the coins are of the last issue in hoards from 1035–1125. This difference indicates that the system worked well when coins were exchanged every sixth year (973–1035) but worse when coins were exchanged every second or third year (1035–1125). One logical reason for this result is that the *seignorage* for the latter period was higher due to the shorter time period between re-coinage dates (at an unchanged exchange fee).

**Table 2**

Re-coinage was even more frequent in Germany.\(^{65}\) Hoards in Germany from the re-coinage period (1150–1325) mostly contain many different issues of the local coinage and many issues of foreign coinage, i.e., locally invalid coins.\(^{66}\) In fact, only five of 83 hoards from Thuringia, where re-coinage was annual, contain less than three coin types; see Table 3.\(^{67}\) For hoards found in Upper Lusatia, only one of 28 hoards has less than three types, and small

---

\(^{61}\) A similar pattern can be observed in Bohemia. In the 13\(^{th}\) century, there were many mints because frequent re-coinages occurred. In the 14\(^{th}\) century, when the long-lived Prague Groschen was introduced, minting was concentrated in Kutná Hora; Ibid., p. 193.

\(^{62}\) Four or five of the mints accounted for more than 50 percent of the total mint output. Many mints were likely active at the re-coinages and at market days but otherwise were used sporadically; Allen, *Mints and money*, pp. 20–21.

\(^{63}\) Ibid., pp. 396–97.


\(^{65}\) See above, Section I(ii).


\(^{67}\) One common sense interpretation of these hoards would be that short-lived coinage systems were not as strict as previously assumed. However, periodic re-coinages must have been lucrative sources of revenue for minting authorities that they would have struggled to retain. The critical importance of these minting revenues is underscored by the value of pawned minting rights in mints that operated periodic re-coinage; Nau, ‘Münzen und Geld’, p. 92.
hoards with 3–10 coins often contain several types. Although the size of the currency areas in England and Germany were considerably different, more frequent renewals seem to make people less willing to re-mint their coins. Thus, higher tax rates make periodic re-coinage less efficient.

**Table 3**

An obvious interpretation of the mixed hoards is that people found it advantageous not to exchange invalid coins. Bearing the high exchange fees in mind, people may well have exchanged only as many coins as was absolutely necessary to conduct their affairs in the cash nexus of the town marketplace. By skipping some re-coinages and saving their retired coins, people could accumulate silver. Irrespective of their age, old coins possessed intrinsic silver value. If the exchange fee, for example, is four old coins for three new ones, and the owner exchanges all of his coins at each re-coinage, then after just five renewals, he has only 24 percent of the coins left.68

**II(iii) Monitoring and enforcement**

In the city markets, the minting authority likely managed to control the usage of current coins with the routine assistance of exchangers and monitors. However, outside the city borders, it must have been practically impossible to control which coins were used for transactions. Unsurprisingly, in Germany, the currency constraint applied only within the city borders.69 When the currency area included large regions of a state (e.g., Denmark) or entire states (e.g., England), documents do not tell us whether periodic re-coinage exclusively applied to the city markets or to the entire country/region.

It was not the possession of invalid coins but their usage that was deemed illegal and was penalized. One can read in Freiberg’s (Saxony) city laws from 1305 that neither the mint master nor the judge was allowed to enter homes and search for invalid coins.70 These city laws state that the penalties were more severe 1) when using foreign coins rather than invalid local coins and 2) for citizens than for foreigners when using invalid coins.71 Denmark had

---

68 This percentage is calculated according to the formula $0.75^5 = 0.237$.
69 Hess, ‘Münzverrufungen’, p. 16.
70 Haupt, *Sächsische Münzkunde*, p. 29.
71 Ibid., p. 29.
severe penalties for paying with invalid coins in the market—the offender not only lost the coins he had used but all of the coins he had in his possession at the time.\textsuperscript{72}

However, the coin-issuing authority could use an economic trick to make periodic re-coinage more efficient. By designating the date of re-coinage as just prior to an important monetary event, the number of invalid coins exchanged for new coins could substantially increase; see Figure 2. For example, the date of an important tax or fee that must be paid to the king or the church could be designated shortly after the re-coinage date. Taxes then had to be paid with new coins. This strategy was used in Denmark.\textsuperscript{73} Another logical alternative was to designate the date of re-coinage in connection with an important annual fair in the city, which was common in Germany.\textsuperscript{74}

The minting authority could also indirectly control the coin circulation in an area. Fees, rents and fines were to be paid with current coins, apart from situations where payment in kind was possible. This practice was likely a more efficient and reliable way to enforce periodic re-coinage than having exchangers and other staff at the market. In Denmark, people had to pay taxes and fees with current coins. If a sheriff or other administrator accepted taxes or fees in invalid coins, he was penalized 40 Mark of pennies.\textsuperscript{75} In Cologne, interest payments were to be paid with current coins.\textsuperscript{76}

\textbf{Figure 2}

In the vast archival (German) numismatic research literature, it has been assumed that in a short-lived coinage system, new local coins were the only valid coins in the market during a specific lifecycle; see the left part of Figure 2. When a new coin was introduced, the old coins should never be used again in the market. However, a document from Denmark tells another story. During the last six weeks of the coin year, older coins could be used in the market; see the right part of Figure 2.\textsuperscript{77} The likely reason was that the king wanted older coins not to be melted down or hoarded but instead to be used in the market, where they would gradually be exchanged for new coins at the mint. During such a smooth transition, the king would make a higher profit. However, a countervailing consequence was that people then presumably had

\textsuperscript{72} Grinder-Hansen, \textit{Kongamagtens krise}, p. 69.
\textsuperscript{73} Ibid., p. 69.
\textsuperscript{74} Mehl, \textit{Magdeburg}, p. 33.
\textsuperscript{75} Grinder-Hansen, \textit{Kongamagtens krise}, p. 69.
\textsuperscript{76} Hess, ‘Münzverrufungen’, p. 19.
\textsuperscript{77} Grinder-Hansen, \textit{Kongamagtens krise}, p. 69.
stronger incentives to save old coins in the hope that they could use them during the last six weeks of the next year. Thus, there were two contrary effects, and the net effect is unsettled. Whether old local coins could be used as a means of payment at the end of the year in other areas with short-lived coins is unknown, but this possibility cannot be excluded.

### III. Bracteates – an important example of short-lived coins

#### III(i) Extension of bracteates through time and space

In the 10th century, Germany had a relatively uniform coinage with respect to weight and fineness, and the German emperor controlled the minting. Most mints in the 10th and 11th centuries were located in the western parts of Germany. The political decentralization in Germany in the 11th and early 12th centuries was reflected in the increased delegation of coinage rights to ecclesiastical and civil authorities. The Cologne penny was the most important coin; other mints related their coins to it with respect to weight and fineness, but the decentralization of the coinage implied that more mints issued coins with various monetary standards. Some mints coined ‘half-bracteates’ from 1050–1200. Half-bracteates were thin, two-faced coins where the obverse and reverse designs were superimposed upon each other. There are many examples of mints with two-faced coins that had temporal and spatial constraints from 1000–1150. The number of German mints increased substantially, from 80 (970–1000), to 215 (1140–97) to 414 (1197–1270), which reflects the opening of new silver mines in Harz and Saxony-Meissen and the founding of new towns.

The first bracteates were minted in Thuringia and Meissen (central and eastern Germany) from 1120–40. Less than a dozen different bracteate types are known from this early period. However, the spread of bracteates exploded in 1140 and subsequent years. In the period from 1140–1320, several thousand different bracteate types are known from Germany and central, eastern and northern parts of Europe. In these areas, the bracteate was the principal coin type for almost 200 years.

---

78 Suhle, *Geldgeschichte*, maps I and II.
84 The exact number is unknown because a complete reference publication does not exist. Most bracteates are anonymous because they do not have any legends, which makes categorization difficult; Kluge, *Numismatik*, pp. 99, 101.
In Germany (1140–1320), bracteates dominated in the northern and central parts; see Figure 3. Mints in southern Germany and northern Switzerland also coined bracteates. In the rest of Germany—particularly in Rhineland, Westphalia and Franconia—the traditional two-faced penny dominated. Bracteates also spread to Poland, Norway and Sweden in the 12th century and to Bohemia, Moravia, Austria, Hungary, Eastern Prussia (Teutonic Order) and the Baltic Area (Livonian Order) in the 13th century.\(^{85}\)

**Figure 3**

**III(iii) The first bracteates**

A reliable explanation for why the first bracteates were minted at all has been presented by Kühn.\(^{86}\) He argues that the first bracteates were a temporary solution to supply a medium of exchange in the growing local markets in Thuringia.\(^{87}\) In the early 12th century, increased population growth in Germany accelerated the cultivation of more land and the division of labor. For new, specialized occupational groups, such as craftsmen, it was necessary to obtain food in exchange for handicraft products at weekly or monthly local markets. These markets were often located close to administrative centers (bishops’ residences, monasteries or castles), which quickly matured into small towns. If the local markets were to work efficiently, coins were needed that had the functions of being both a medium of exchange and a standard of value. However, the new towns struggled to find any well-apprenticed mint personnel. In the beginning of the 12th century, there was only one mint in Thuringia, Erfurt, which was unable to satisfy the demand for coins in the whole region.\(^{88}\)

This problem was likely solved by a couple of monasteries in Thuringia that stored relatively large deposits of silver and had goldsmiths available. These goldsmiths had never minted coins but had a long tradition of engraving thin panels of precious metals using a soft material such as leather or lead under the panels.\(^{89}\) Hoard evidence shows that three Thuringia monasteries, in Pegau, Saalfeld and Nordhausen, started minting bracteates from 1115 to 1130.\(^{90}\) Technical analysis shows that these early bracteates must have been struck by

\(^{85}\) Ibid., pp. 99–102, 117–19, 160–70.


\(^{87}\) The conventional view has been that the uni-faced bracteates (first struck in the 1120s) were direct successors of the half-bracteates minted in Germany from 1050–1200. Imagine that a mint master one day just decided to only use one die, thinking thereby that the design would be better and the minting would become more efficient. However, this speculation now appears to be unfounded.

\(^{88}\) Ibid., p. 17.

\(^{89}\) This manufacturing technique is similar to that used to decorate panels on reliquaries; Ibid., p. 18.

\(^{90}\) Ibid., pp. 20–22.
individuals without any prior apprenticeship in coining and with a technology similar to that used by goldsmiths.\textsuperscript{91} A serious problem for the monasteries was that they did not have the right to coin from the emperor. However, by striking uni-faced pieces of silver that were unlike earlier known coins, the issuers were in a legal grey zone.\textsuperscript{92}

The local population certainly had no difficulty accepting the bracteates as a medium of exchange because they had almost no experience with coins. It was more difficult to persuade local and foreign merchants to accept the bracteates. It was then necessary to introduce a geographical currency constraint such that the local bracteates were exclusively the currently sanctioned coins. Thereby, from the beginning, the bracteates were valid in a limited, local circulation area.\textsuperscript{93} It must be stressed, however, that there is absolutely nothing in the historical record to indicate that the first bracteates were linked to periodic re-coinage. To the contrary, they seem to have circulated during relatively long time periods based on evidence of many die variants of specific issues.\textsuperscript{94} Furthermore, coin hoards show that the earliest bracteates circulated for long periods,\textsuperscript{95} and only a few bracteate types were issued during two decades (1120–40).\textsuperscript{96} However, the inherent fragility of the bracteates was thereby an endemic problem that forced the issuer to substitute new for damaged bracteates from the same issue.\textsuperscript{97}

\textit{III(iii) Bracteates as short-lived coins}

Many researchers and collectors have wondered why such thin coins were minted over such a long time period—from 1120 to c. 1630, serving as the principal coin c. 1140–1320. Many pieces of the puzzle fall into place once bracteates are linked to periodic re-coinage, which required a continuous re-minting of coins. Even if the first bracteates had nothing to do with periodic re-coinage, bracteates turned out to be well suited to function as short-lived coins:

- Only one die was needed, which reduced production costs and time.

\textsuperscript{91} For example, on some bracteates, the legend is retrograde. On other bracteates, the main design has a relief that is higher than the surrounding circle of pearls. This type of elevation is very rare because the perimeter should protect the main design from being worn down. Finally, some bracteates have been struck with a positive die from the reverse. All of these bracteates were struck with a soft material under the flan; Ibid., pp. 26–29.
\textsuperscript{92} Ibid., pp. 25–26.
\textsuperscript{93} Ibid., p. 19.
\textsuperscript{95} Ibid., p. 16.
\textsuperscript{96} Kühn, ‘Anfänge der Brakteatenprägung’, pp. 20–21, 31–33.
\textsuperscript{97} Ibid., p. 19; Röblitz, ‘Umbruch’, p. 16.
• Bracteate dies lasted longer than those used for two-faced coins for two reasons. The soft material (leather or lead) under the thin flan implied that the hammer hit was cushioned, and the thin flan required less power when striking coins. Thus, a far larger number of coins could be minted with a specific die.

• The relatively large diameter (up to 50 mm) made it possible to display various images on the coins, which made recognition of valid and invalid coins fast and reliable.

• Old bracteates were easy to hammer out and overstrike.\textsuperscript{98}

• The bracteates were fragile but were not in circulation for a long period due to routine, frequent renewals.

There may well also have been political motives for striking bracteates. Artistically designed bracteates from 1150–1200 were excellent marketing instruments for the coin issuer. The artistic style deteriorated after 1200, but bracteates were still the principal coin for approximately 100 years. The thin flan also proved practical because they made it easy to cut the bracteates into halves (‘Hälblinge’) or quarters (‘Vierlinge’) when the need arose. Sometimes, these cuts were performed at the mint.\textsuperscript{99} Halved bracteates are common in German coin hoards.\textsuperscript{100}

It is possible that after c. 1250, multiple bracteates were simultaneously struck by placing several flans above each other, which would increase the efficiency of coining. This technique is particularly valuable when renewals are frequent. However, nobody has yet been able to persuasively demonstrate that this method of coining occurred.\textsuperscript{101}

Another economic motive might have been that the minting authority hoped the fragile coins would be damaged when circulating. In that circumstance, they could then be exchanged at a discount, which would give the issuer an extra profit. During the Middle Ages, people routinely clipped silver from the edges of their coins, which over time could yield a tidy sum. Bracteates were so fragile that it was almost impossible to clip silver from the edge without damaging the whole coin. By virtue of coining bracteates, mints severely hindered silver thieves.

\textsuperscript{98} Dobras, \textit{Mainzer Erzbischöfe}, p. 9.
\textsuperscript{99} Ibid., p. 9.
\textsuperscript{100} Hävernick, \textit{Mittelalterlichen Münzfunde}, pp. 26–79; Gaettens, \textit{Wirtschaftsgebiete}, p. 18.
\textsuperscript{101} Kühn, ‘Mittelalterliche Prägungsriten’, p. 13.
Another factor that encouraged the minting of bracteates was that they were far more difficult to counterfeit than two-faced coins. One written document states that this reason was cited when Brandenburg planned to reintroduce bracteates (hohlpfennigs) instead of two-faced coins in the 1340s.\textsuperscript{102}

**III(iv) Bracteates vis-à-vis two-faced coins**

Among established mints in the 12\textsuperscript{th} century, a few in central Germany that had previously minted half-bracteates continued to mint bracteates,\textsuperscript{103} which was certainly a consequence of the poor artistic design of the half-bracteates together with the fact that they were so weakly struck. Presumably, it was easier for people to accept the fragile bracteates in areas where coins had not circulated before or where weakly struck half-bracteates had circulated rather than stable two-faced coins. Otherwise, a rule of thumb is that bracteates gained a foothold in German regions with comparatively little recent experience with minting and a money economy, and where no monetary standard was established; see Figure 3.\textsuperscript{104}

Comparing the spread of bracteates inside (Figure 3) and outside\textsuperscript{105} Germany with Figure 1, it can easily be concluded that bracteates in their main period (1140–1320) were minted exclusively in relatively undeveloped areas with short-lived coinage systems. However, two-faced coins were also minted in areas with periodic re-coinage, such as in western parts of Germany (Rhineland, Westphalia and Franconia), Austria and Denmark and in Bohemia and Moravia before 1225. Thus, although the minting of bracteates was clearly not a necessary condition in itself for periodic re-coinage, it was in effect a sufficient condition. Whenever one finds a bracteate struck in central or eastern parts of Europe from 1140–1320, it is almost certainly linked to periodic re-coinage.

**Table 4**

Table 4 shows the basic differences between German mints that struck short-lived coins in the form of two-faced coins and bracteates. Bracteates were often annually or biannually re-

\textsuperscript{102} Mäkeler, *Reichsmünzwesen*, p. 36.

\textsuperscript{103} For example, Magdeburg, Erfurt, Halberstadt and Quedlinburg.

\textsuperscript{104} The Archbishops of Mainz controlled several mints. Mainz, which was home to their main mint, had extensive experience with monetary economics; hence, two-faced coins were routinely minted. However, in their mints in relatively undeveloped regions such as Thuringia and Hessen, bracteates were coined; Dobras, *Mainzer Erzbischöfe*, p. 9.

\textsuperscript{105} See above, Section III(i).
minted, whereas the two-faced pennies were re-minted at longer intervals.\textsuperscript{106} The higher frequency of re-coinage in regions with bracteates is logical because these regions in central and eastern Germany were less economically developed and had fewer coins in circulation. The difference in monetary stocks is evidenced by the higher value of pawned minting rights in mints in western Germany (two-faced coins) than in eastern/central Germany (bracteates).\textsuperscript{107} The fact is that when the bracteates started to spread in the eastern regions in the 1140s, the more developed western regions of Germany (e.g., Rhineland-Westphalia and Franconia) had already passed the zenith of periodic re-coinage.\textsuperscript{108}

\textit{III(v) Breakdown of the short-lived coinage system and bracteates}

Periodic re-coinage continued in Germany until the end of the 13\textsuperscript{th} or the beginning of the 14\textsuperscript{th} century. The decline of the short-lived coins depended on developing economies, growing cities and increased local and inter-regional trade. Another reason was that a growing number of peasants paid rents and taxes in coins to their landlords and kings rather than in kind or in services.\textsuperscript{109} This increased monetization required more coins in circulation, which progressively made short-lived coins with geographical constraints impractical.\textsuperscript{110} There was neither sufficient time to re-mint all of the circulating coins nor the capacity to monitor the increased volume of coins in circulation. Finally, there was a rapid expansion in the use of coins without regional constraints, both with higher (e.g., Sterling, Groschen, Goldgulden, Ducats) and lower (e.g., Heller) denominations.\textsuperscript{111} These coins often crowded out local coins and were increasingly used in international trade. Local minting authorities tried to counterstrike the influence of inter-regional coins by prolonging the interval between re-coinage dates for their own coins, as evidenced by the fewer types in the second half of the 13\textsuperscript{th} century.\textsuperscript{112} However, these factors all blended together and made it nearly impossible for abbeys and laymen to hold onto their local coin monopolies.

\textsuperscript{106} Hävernick, ‘Münzverrufungen’, pp. 133–34; Kluge, \textit{Numismatik}, p. 63. Cologne was the principal mint in western Germany. There should have been 5–6 years between renewals in Cologne during the period from 1130–1250 based on the number of types per time period; Hävernick, \textit{Köln}, catalogue.

\textsuperscript{107} Nau, ‘Münzen und Geld’, p. 92.

\textsuperscript{108} Hess, ‘Münzverrufungen’, p. 21.


\textsuperscript{110} The higher monetization is evidenced by the fact that the number of coin hoards from 1250–1300 more than tripled in Germany (Thuringia, Saxony, Westphalia, Baden-Württemberg) compared with earlier 50-year periods; Fried, \textit{Münzprägung}, pp. 107–08.


\textsuperscript{112} Ibid., p. 15.
Even if periodic re-coinage was abolished in c. 1300, bracteates continued to be struck until the 17th century. From 1300 onward, the contraction in the diameter of the bracteates led to the minting of so-called ‘hohlpfennigs’, which were still bracteates.113 The extensive minting of hohlpfennigs mostly occurred in northern and central Germany and in Scandinavia. The hohlpfennigs worked as small change for a larger two-faced coin type (Groschen, Witten, Schilling or Örtug), which was a replacement for the bracteate as the main denomination. Hohlpfennigs were changed only when the coinage was reformed. Thus, they could circulate for many years, as indicated by the many worn specimens found in coin hoards. The high relief that had evolved came in handy to stabilize the hohlpfennigs, which passed through many hands and purses.

**IV. Consequences of periodic re-coinage**

It is difficult to empirically estimate the economic consequences of periodic re-coinage because data on, e.g., prices, the number of transactions and the velocity of money in the Middle Ages are lacking. However, the coins themselves (e.g., weight and fineness), coin hoards, written documents and economic theory can tell us something about the consequences.

The chief negative consequence of periodic re-coinage was that the traditional function of money as a store of value deteriorated. People had little incentive to save their current coins. Indeed, coin hoards from Germany contain many old issues.114 If old, invalid coins were always exchanged for their intrinsic value irrespective of age, they could still work as a store of value. In that case, the age of old, invalid coins would not matter because they always held their intrinsic silver value.

Let us look closer at what could happen with the volume of coins in an economy ($M$), the velocity of money ($V$), the price level ($P$) and the volume of transactions ($T$) when a re-coinage date approaches. We turn to the formalism of the equation of exchange:115

$$M \times V = P \times T$$

---

113 Kluge, *Numismatik*, pp. 105–08. Hohlpfennigs are only 12–20 mm in diameter and were struck with a very high relief. Normally, they weigh between 0.20 and 0.40 g.

114 See above, Section II(ii).

This formula must always be correct. The right-hand side, \( P^*T \), indicates the value of all transactions made with the coins. In the case of periodic re-coinage, \( M \) is the same before and after the re-coinage date; the exchange fee indicates that some coins that belonged to people earlier are now possessed by the coin issuer. Thus, periodic re-coinage did not cause long-term inflation.

The hypothesis that periodic re-coinage is associated with a long-term stable coinage is supported by the coins themselves. In many areas with periodic re-coinage, the silver fineness of the bracteates was sustained at a high level of at least 90 percent until the middle or end of the 13th century. This was the case in e.g., northern (Lower Saxony/Holstein), central (Hessen), eastern (Magdeburg and Saxony) and southern (Baden-Württemberg and Bavaria) Germany.\(^{116}\)

Nevertheless, it is not implausible that when the date of re-coinage approached, people wanted to spend their coins; nobody wanted to pay the extra tax (exchange fee). Thus, \( V \) should increase; i.e., the left-hand side acquires a higher value, and the right-hand side then also must increase. A likely outcome is that \( P \) increases more or less to the same degree. The alternative is that \( P \) and \( T \) both increase so that the equation holds. \( V, P \) and \( T \) could then increase slowly during the whole lifecycle of the current coin type and should return to normal levels after the re-coinage date. The intrinsic silver value of the coins and the gross seignorage set the limits of how high or low prices can temporarily fluctuate.\(^{117}\)

However, there was a commonplace situation in which some people in society had no choice but to exchange their expired coins for new ones. For example, if the re-coinage occurred in connection with a tax payment or an annual fair.\(^{118}\) The effects on \( V, P \) and \( T \) should then be smaller as the date of re-coinage approaches.

The fact that foreign tradesmen, when travelling, had to constantly exchange their coins and bullion to do business must have had a negative effect on both trade and business. However, the exchange fees at periodic re-coinages were particularly hard for common people and small-scale trading because large-scale trading and trade houses legally used silver ingots for


\(^{117}\) The lower limit value of the coin is its intrinsic value, and the upper limit value is the intrinsic value + gross seignorage; Sargent and Velde, *Big problem*, pp. 18–21.

\(^{118}\) See above, Section II(iii).
larger transactions. Pennies and other small coins were, of course, impractical for such transactions. If coins were used for larger transactions, they were weighed rather than counted.

There was a contradiction for the market and minting authority to tax trade and common people via periodic re-coinage. This method created larger revenues for the ruler in feudal society but was detrimental for trade, business, local markets and the division of labor. Economic activity was thereby normally inhibited in a region with such periodic re-coinage. This problem was likely one reason why, at the close of the 13th century, some minting authorities chose to give priority to trade and growth rather than periodic re-coinage.

Both periodic re-coinage and debasements created discontent among inhabitants and tradesmen. Written documents reveal complaints. When trade increased at the end of the 13th century, the pressure on short-lived coins from inter-regional coins increased. In this context, the minting authorities often signed agreements that promised to preserve a stable value of the coinage in exchange for other taxes. Such an effort to defend the coinage emerged in 12th century France. The written sources are rare, but it is telling that the new taxes were called by the same name as the minting tax—monetagium. Written documents from southern Germany show that citizens could pay a fee to prolong the validity of coins and avoid periodic re-coinage for a certain period. Another example is Denmark, where King Valdemar II Sejr (1202–41) introduced a plough tax c. 1234 in exchange for a stable coinage. The plough tax disappeared after 20 years, and the coinage again became unstable.

V. Conclusions

Periodic re-coinage was an important monetary taxation method for almost 200 years in large parts of medieval Europe. The main purpose of this study has been to establish for the first time a theoretical framework regarding the basic conditions for short-lived coinage systems. Both short-lived and long-lived coinage systems require a geographical currency constraint

119 Hävernick, ‘Münzverruftungen’, p. 139; Haupt, Sächsische Münzkunde, p. 32.
120 Gaettens, Wirtschaftsgebiete, p. 13. The weighing of large sums is unproblematic if the coins have a uniform fineness, which was the case in Germany until c. 1250; Hess, ‘Münzverruftungen’, p. 21.
122 Bisson, Conservation, p. 7; Grinder-Hansen, Kongamagten krise, p. 52. In Erfurt, a document from 1341 shows that the Archbishops of Mainz were not allowed to change the coinage without permission from the citizens. Instead, the Archbishops would receive a tax called monetagium; Mäkeler, Reichsmünzwesen, p. 35.
123 Cahn, Konstanz, p. 286; Steinhilber, Augsburgs, pp. 42–43.
124 Grinder-Hansen, Kongamagten krise, pp. 64–68.
(foreign coins are invalid), an exchange monopoly and control of marketplaces. In a short-lived coinage system, only one coin type should circulate in the currency area, and different types reflecting various issues need to be clearly distinguishable for the everyday users of the coins. Periodic re-coinage could particularly be accomplished with a high frequency in small currency areas. Furthermore, it turns out that periodic re-coinage works particularly well in relatively undeveloped economies. Such economies have a small volume of coins in circulation, which facilitates re-minting. There are also few places where coins are used for transactions in these areas, and few groups in society who use coins, i.e., low monetization. These conditions facilitate the monitoring and enforcement of periodic re-coinage. Furthermore, periodic re-coinage in large currency areas requires many mints.

Typically, periodic re-coinage was enforced only within a city’s borders (in Germany), and any coins could be used outside the city. The authorities had several methods to monitor and enforce periodic re-coinage. First, they used exchangers and other administrators at the city markets. Second, the re-coinage date was often designated as a date just prior to an important annual fair or the payment date of an annual tax. Third, the payment of any fees, taxes, rents, tithes or fines had to be made in new coins. Empirical evidence from hoards shows that people were more willing to exchange their old coins for new ones when the interval between re-coinage dates was longer. Thus, lower tax rates make periodic re-coinage work better.

The principal example of frequently renewed coins is the thin, uni-faced bracteates. Although the first bracteates had nothing to do with renewals, they had several favorable characteristics for periodic re-coinage: 1) low production costs—only one die was needed, and the bracteate dies lasted longer than those used for two-faced coins; 2) various pictures could be displayed given the relatively large diameter, thus making it easy to distinguish between valid and invalid types; and 3) old bracteates were easy to hammer out and overstrike. Consequently, fragility was not a significant problem inasmuch as the issues of the bracteates were short-lived. In fact, bracteates were struck only in relatively undeveloped areas where periodic re-coinage was undertaken. Bracteates were not the reason why periodic re-coinage occurred, but they facilitated frequent renewals. The characteristics of the bracteates explain why they could be the principal coin for such a long period (1140–1320) in central, eastern and northern Europe. When periodic re-coinage broke down and the bracteates lost their role as the principal coin in c. 1300–25, it was likely due to increased monetization and trade.
Periodic re-coinage had several consequences. First, it prevented *long-term* inflation because the number of coins (and the amount of silver) was the same after as before the re-coinage date. Short-lived coins are associated with a stable coinage with respect to fineness, as evidenced by the coins themselves. Second, *short-term* disturbances should have occurred in the velocity of money, the price level and the number of transactions as the re-coinage date approached because people did not want to pay the exchange fee. However, these effects were diminished if some people in society had to exchange their expired coins for new ones, which could be the case if an important monetary event, such as an annual tax payment or fair, was designated after the re-coinage date. Third, the coins’ function as a store of value deteriorated. Finally, periodic re-coinage as a monetary tax stymied economic activities such as trade and business, as evidenced by complaints in written documents.

In future research, it would be interesting to analyze the circumstances under which it is optimal for the minting authority to use periodic re-coinage vis-à-vis debasement to generate *seignorage*. Although debasement and periodic re-coinage are not mutually exclusive,\(^\text{125}\) Kluge has suggested that debasement primarily occurred in areas with long-lived rather than short-lived coins.\(^\text{126}\)

**APPENDIX: METHODS TO IDENTIFY PERIODIC RE-COINAGE**

There are several basic methods for identifying periodic re-coinage. In Table A1, these methods are ranked by level of confidence. Identifying periodic re-coinage through written documents that contain explicit information about dates of re-coinage and/or exchange fees (method A) provides the most confidence. However, there are no written sources about periodic re-coinage for some currency areas, and other methods must be used.

By classifying different coin types as originating from a specific coin issuer and mint (method B), it is easy to establish whether periodic re-coinage occurred. If there is only one type per reign, the coinage system is long-lived. However, in the event that there are as many coin types as years of a specific reign and mint, the evidence indicates that annual renewals

---

\(^{125}\) Both debasement and periodic re-coinage occurred in Denmark from 1270–1330; Grinder-Hansen, *Kongamagten krise*, pp. 238–39.

\(^{126}\) Kluge, *Numismatik*, p. 64.
occurred. If the number of types exceeds (falls short of) the number of years, the renewals are more (less) frequent.127

A third method for identifying re-coinage involves carefully analyzing the concentration and distribution of coin types in hoards (method C). Coin hoards from the Middle Ages may contain few or many issues from each mint represented in the hoard. If re-coinage has occurred, one would expect a few types to strongly dominate the composition of the hoard. These types should be relatively young, whereas older types should have a more sparse representation. If there are several coin hoards from a specific coin issuer, one can expect the types existing in many hoards to be older and those in a few hoards to be younger.

Footnote references


Chilosi, D. and Volckart, O., ‘Good or bad money? Debasement, society and the state in the late Middle Ages’, (Working paper No. 140/10, Department of Economic History, London School of Economics, 2010).

Dobras, W., Münzen der Mainzer Erzbischöfe aus der Zeit der Staufer. Katalog der Brakteaten im Münzkabinett des Stadtarchivs Mainz (Mainz, 2005).


Olearius, M. J. C., Isagoge ad numophylacium bracteatorum: quâ, præstantia, usus & natura illorum succincte describitur, additâ centum & amplius eorundem litteris signatorum sylloge Ienae (Jena, 1694).


Table 1. *Similarities and differences between long-lived and short-lived coinage systems*

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Long-lived coins</th>
<th>Short-lived coins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geographic constraint (foreign coins should not be valid)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Exchange monopoly</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Sources of coin issuer profit</td>
<td>Minting of bullion (<em>gross seignorage</em>)</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Re-minting of foreign coins (<em>gross seignorage</em>)</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Periodic re-coinage and issues (exchange fee)</td>
<td>Only when shift of issuer</td>
</tr>
<tr>
<td>Number of coin types (same denomination) circulating simultaneously in a given currency area</td>
<td>One or few</td>
<td>One</td>
</tr>
<tr>
<td>Volume of coins circulating in the economy</td>
<td>Large</td>
<td>Small</td>
</tr>
<tr>
<td>Relative development of the economy</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Geographic area</td>
<td>Large or small</td>
<td>Preferably small</td>
</tr>
<tr>
<td>Number of mints in <em>large</em> currency areas</td>
<td>Few</td>
<td>Many</td>
</tr>
</tbody>
</table>

Table 2. *The composition of English coin hoards from 979–1125*

<table>
<thead>
<tr>
<th>Dating of coin hoards</th>
<th>979–1035</th>
<th>1035–1125</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of years between re-coinages</td>
<td>6 years</td>
<td>2–3 years</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hoards with</th>
<th>No. of hoards</th>
<th>Percent</th>
<th>No. of hoards</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 type</td>
<td>25</td>
<td>83.3 %</td>
<td>19</td>
<td>33.3 %</td>
</tr>
<tr>
<td>2 types</td>
<td>2</td>
<td>6.7 %</td>
<td>11</td>
<td>19.3 %</td>
</tr>
<tr>
<td>3 types</td>
<td>1</td>
<td>3.3 %</td>
<td>10</td>
<td>17.5 %</td>
</tr>
<tr>
<td>&gt;3 types</td>
<td>2</td>
<td>6.7 %</td>
<td>17</td>
<td>29.8 %</td>
</tr>
<tr>
<td>Total number of coin hoards</td>
<td>30</td>
<td>100.0 %</td>
<td>57</td>
<td>100.0 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coins from</th>
<th>No. of coins</th>
<th>Percent</th>
<th>No. of coins</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last issue</td>
<td>886</td>
<td>86.5 %</td>
<td>8,771</td>
<td>54.3 %</td>
</tr>
<tr>
<td>Second-to-last issue</td>
<td>137</td>
<td>13.4 %</td>
<td>1,724</td>
<td>10.7 %</td>
</tr>
<tr>
<td>Third-to-last issue</td>
<td>1</td>
<td>0.1 %</td>
<td>698</td>
<td>4.3 %</td>
</tr>
<tr>
<td>Earlier issues</td>
<td>0</td>
<td>0.0 %</td>
<td>4,964</td>
<td>30.7 %</td>
</tr>
<tr>
<td>Total number of coins</td>
<td>1,024</td>
<td>100.0 %</td>
<td>16,157</td>
<td>100.0 %</td>
</tr>
</tbody>
</table>

*Note:* Each coin hoard must contain at least three coins to be included in the table. Therefore, five hoards from 973–1035 and eleven hoards from 1035–1125 with only two coins are excluded. For some coin hoards, the exact number of coins is not available.

* Based on 27 hoards. There are several thousand coins from the remaining three hoards that cannot be attributed to different issues, particularly two large hoards (the Kingsholm and Cnut hoards) that contain more than three types.

* Based on 53 hoards. There are c. 1,850 coins from the remaining four hoards that cannot be attributed to different issues.

Table 3. The composition of German coin hoards in Thuringia from 1156–1325 and in Upper Lusatia from 1200–1300

<table>
<thead>
<tr>
<th>Region</th>
<th>Thuringia</th>
<th>Upper Lusatia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dating of coin hoards</td>
<td>1156–1325</td>
<td>1200–1300</td>
</tr>
<tr>
<td>No. of years between re-coinages</td>
<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td>Hoards with</td>
<td>No. of hoards</td>
<td>Percent</td>
</tr>
<tr>
<td>1 type</td>
<td>2</td>
<td>2.4 %</td>
</tr>
<tr>
<td>2 types</td>
<td>3</td>
<td>3.6 %</td>
</tr>
<tr>
<td>3 types</td>
<td>9</td>
<td>10.8 %</td>
</tr>
<tr>
<td>&gt;3 types</td>
<td>69</td>
<td>83.2 %</td>
</tr>
<tr>
<td>Total number of coin hoards</td>
<td>83</td>
<td>100.0 %</td>
</tr>
</tbody>
</table>

*Note: Each coin hoard must contain at least three coins to be included in the table. Sources: Calculations are based on Hävernick, *Mittelalterliche Münzfunde*, pp. 26–79, and Haupt, ‘Oberlausitzer Brakteatenfunde’, pp. 516–81.*

Table 4. Characteristics of short-lived, two-faced coins and bracteates

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Short-lived coins</th>
<th>Two-faced coins</th>
<th>Bracteates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of re-coinage</td>
<td>Several years to annually</td>
<td>Annually or biannually</td>
<td></td>
</tr>
<tr>
<td>Imitations</td>
<td>Sometimes</td>
<td>Rare</td>
<td></td>
</tr>
<tr>
<td>Level of region’s economic development</td>
<td>Moderate</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Level of experience with own minting</td>
<td>Moderate/Long</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Number of coins in circulation</td>
<td>Moderate/Many</td>
<td>Few</td>
<td></td>
</tr>
</tbody>
</table>

Table A1. Methods to identify short- and long-lived coinage systems

<table>
<thead>
<tr>
<th>Method</th>
<th>Long-lived coins</th>
<th>Short-lived coins</th>
<th>Confidence in method</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Written documents</td>
<td>-----</td>
<td>-----</td>
<td>Very strong</td>
</tr>
<tr>
<td>B Coin types per reign and currency area</td>
<td>One</td>
<td>At least two</td>
<td>Strong</td>
</tr>
<tr>
<td>C Coin types in hoards</td>
<td>One or a few from each mint</td>
<td>Many from each mint, but a few late types dominate</td>
<td>Medium</td>
</tr>
</tbody>
</table>
Figure 1. *Short-lived and long-lived coinage systems in Europe, 1140–1300*

Note: Eastern Götaland, Sweden, changed from long-lived to short-lived coins c. 1250. England operated a system with periodic re-coinage from 973–1125.
Figure 2. Lifecycle for short-lived coins

- **Re-coinage date**
- **Tax payment or important fair (new coins)**

<table>
<thead>
<tr>
<th>Color</th>
<th>Description</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gray</td>
<td>Only new coins valid</td>
<td>1 lap clockwise</td>
</tr>
<tr>
<td>White</td>
<td>New and old coins valid</td>
<td>= 1 issue (e.g.,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 or ½ year)</td>
</tr>
</tbody>
</table>

German model

Danish model
Figure 3. German mints from 1140–1270 that primarily struck bracteates and two-faced coins

Note: The map shows only important mints. In Brandenburg and Stendal, only bracteates were minted from 1150–1200 and 1180–1200, respectively. Bracteates and two-faced coins were simultaneously minted from 1200–50; afterward, only two-faced coins were minted.