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RESEARCH ARTICLE

The role of reputational incentives in an international currency union: Greek monetary institutions in the classical and Hellenistic periods

Zane Allen Mullins

George Mason University, Fairfax, VA, USA
Email: zmullins@gmu.edu

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Abstract

In the Hellenistic era, there was widespread convergence to the Attic standard and a similar narrowing of coin types in terms of aesthetics. The competition between issuers resulted in an equilibrium in which improvements to the consistency and quality of money were sought after. This institutional foundation resulted in the creation of an incentive structure that fortified adherence to international monetary standards and discouraged entropy due to debasement and the pursuit of short-sighted fiscal gains. This paper explores the role of reputational incentives faced by issuers when determining coinage standards and aesthetic types, as well as the benefits that the attainment of reputational value conferred to both the issuers and users of coinage. I argue that the economic openness and competitive nature of coin issuance in the period created a framework in which the imputation of fiduciary value to coinage stemmed from the generation of reputational quality.

Keywords: currency union; fiduciary value; Gresham's law; monetary aesthetics; reputational incentives; seigniorage

Introduction

While it was only one of many monetary standards used in Classical Greece (~500–323 BC), the Attic standard survived the death of Alexander the Great and prevailed as the primary international monetary standard for the duration of the Hellenistic period (323–31 BC). This paper investigates both the scale and longevity of the primary Greek monetary standard and necessarily elucidates institutions that facilitated cooperation among a vast number of individual polities and cultures over an extraordinary period of time, relative to other historical currency unions.

The Classical and Hellenistic Greek world provides an interesting time capsule in which the monies of hundreds of polities circulated freely and transcended national boundaries. However, they were not equal, with certain coinages enjoying wider circulation and use in international commerce. Many economic phenomena regarding the functionality of Greek monetary institutions remain unsatisfactorily explored. Among these are the economic openness that categorized the period, the choice of many polities to use foreign money, the hugely differential degrees of circulation between different coinages, the widespread occurrence of imitation coinage, and the international convergence on shared coin types and standards in the Hellenistic period. The literature on Greek monetary institutions leaves ample opportunity to apply economic theory in ways that would illuminate and properly explain these phenomena.

A prominent explanation for the homogeneity of Greek coinage under Alexander and throughout the Hellenistic period invokes the right or ability of an imperial power to suppress the coinage of its subjugated territories. Martin (1985, p. 220) has argued against these claims and questioned the notion that Greeks in antiquity viewed the right to coinage as an extension of their sovereignty.[1] There have been no other satisfactory explanations for the widespread convergence of coin types in the Hellenistic era, as well as the sustained prevalence of the Attic standard throughout this period. Many authors (Head, 1887, p. xliii; Jenkins, 1990, pp. 45–47; Ober, 2008, p. 227, 229) note the role of reputation in the success and widespread circulation of Athenian coinage which saw wide proliferation in both the Classical and Hellenistic periods.[2] This paper extends the popular explanation for the success of the Athenian coinage to that of Alexander and his successors and investigates the role of reputational quality in the coinage of both large kingdoms and city-states.

The paper begins by exploring the features of participation in the Attic standard, with a particular focus on the incentives facing producers, and the compatibility of theory with available evidence. I argue that the level of economic integration must have been sufficient to outweigh the short-run fiscal benefits of debasement, thus providing ample incentive to adhere to the Attic standard in the long-run. The second section of this paper analyses the imputation of fiduciary value to Greek coinage and the premium attached to notably high-quality coinages. The vast number of polities issuing Attic-weight coinage led to intense competition in quality, which manifested in excess fiduciary value for the most well-known and highly regarded Greek coinages. The third explores the economic and reputational aspects of currency, monetary standards, and the widespread occurrence of imitation coinage.

The economic properties of monetary standards

In his *Politics,* Aristotle (1.1257a) states that precious metal money arose from trade and naturally superseded the more primitive system of barter, was sustained by agreement, and served to free men from weighing precious metal in every transaction.[3] Under commodity standards, monetary policy at its most passive extent involves establishing a unit of account, or standard. The unit of account provides denominations which are inextricably linked to specific media of exchange (coins). For example, a drachma on the Attic standard is a coin that corresponds to a specific weight (4.3g in this case) of precious metal, thus linking the unit of account to a specific medium of exchange.

The straightforward benefit of participation in a shared commodity standard is the mitigation of trade barriers and transaction costs (von Reden, 2010, p. 67). For poleis in the Greek world, the potential gains from trade were immense, and therefore the benefits accrued from reducing transaction costs and increasing economic integration were significant.[4] In many cases, city-states relied on the economic integration achieved through shared trade networks. For example, the metropolitan lifestyle achieved by Athenians, where they mostly specialized in commerce and industry, was only sustained through the constant importation of agricultural goods.[5]

Monetary network effects pertain specifically to the number of users on a given monetary standard, where more transactors using a specific standard create benefits that are internalized to others using the

[1]Martin argues that the contemporary view in numismatics was derived from Jean Bodin in the 16th century, where coinage was explicitly viewed as the right of the sovereign. Martin (1985, pp. 15–21) claims that this view has been imposed onto the monetary system of Philip II and his son Alexander the Great, when no such prerogative existed.

[2]However, this list is not exhaustive.

[3]See Martin (1985, p. 216) for a brief discussion.

[4]Kron (2015, p. 357) uses data from harbour taxes in Athens and other Delian League city-states to calculate the total volume of trade in per capita terms. The result is that per capita trade volumes for these poleis were similar to those of Venice during the Renaissance. Kron also documents other notable evidence for increasing economic integration, such as the tendency for merchant ships to rapidly increase in size from the Classical to Hellenistic periods.

[5]Kron (2015, p. 359) estimates that annual per capita grain imports in Classical Athens were 168.5 kilograms in the mid-4th century BC. This figure is compared to 122 kilograms of per capita grain imports for the Netherlands at the peak of the Baltic grain trade in 1649.

same standard. In other words, it means that as more people use a monetary standard, the strength of its network effects increase, since the currency denominated in that standard is more widely accepted in trade. This benefit is internalized by those participating in the standard, creating some gravity around currency areas. As a time-invariant and fundamental property of monetary standards, network effects have been studied thoroughly. Menger (1892) made early contributions which display the network properties of money. For contemporary fiat or digital currencies, see Selgin (1994), Luther and White (2016), and Luther (2016).[6]

In the Hellenistic period, the Attic standard served as the international monetary standard, and its currency area stretched from Sicily in the west to the Greco-Bactrian Kingdom in modern day Afghanistan. Prior to his conquest of Achaemenid Persia, Alexander conformed all of Macedon's coinage to the Attic standard. After his death, the Attic standard remained in use by the successor kingdoms and innumerable city-states, down to the conquest of the Greek world by the Roman Republic in the first century BC.

Producer incentives: instances of debasement and seigniorage capture

Monetary unions typically face a collective action problem similar to the prisoner's dilemma, where the incentive to 'cheat' is powerful and takes the form of currency debasement for fiscal gains. Individual members may succumb to this temptation and abandon the standard, weakening the monetary network, and lowering the benefits of economic integration attained by participation in it. In other cases, fiscal burdens compel virtually all members to leave the union, as was the case with the First World War and the classical gold standard.

There are a few notable examples of states in the Hellenistic period which ceased minting on the Attic standard and chose to debase through the issue of a new lightweight currency. The Ptolemies were a special case and chose to implement a closed monetary system which endured for the duration of the Hellenistic period. Under Ptolemy I, Egypt banned foreign coinage, and began minting series of increasingly light tetradrachms, finally settling on a weight of 14.25g (Lorber, 2012a, pp. 33–35).[7] Foreign coinage was banned entirely and forcibly exchanged for the light Ptolemaic coinage at par upon entering the state, which brought heavy Attic-weight coins into Ptolemaic mints for recoining and a tidy profit (Lorber, 2012a, p. 40). These reforms took place around 305 BC, with hoard evidence indicating that the circulation of Attic-weight coinage had ended by the early third century BC (Lorber, 2012a, pp. 41–42). The catalyst of the initial Ptolemaic debasement was likely the costly war with the Antigonids, and the destruction of the Ptolemaic fleet at Salamis (Lorber, 2012b, pp. 212–213).

The city-states of Byzantium and Calchedon both issued imitations of Lysimachus' Alexander-style coinage on the Attic standard for nearly a century before debasing. Debasement occurred from c. 235–220, with the production of Persian weight drachms of 5.5g and light tetradrachms of 13.9g. Hoard evidence indicates the closing of their respective economies through the disappearance of most Attic-weight currency, and the remainder unequivocally bear local countermarks (Mørkholm, 1982, p. 300). Conflict with the Galatians in northeastern Asia Minor likely constitutes the impetus for the monetary policies of these two cities, which was clearly aimed at generating seigniorage. However, the policy experiment was relatively short-lived, and by 220 BC both city-states had resumed minting on the Attic standard.[8]

[6]Specifically, Selgin (1994), Luther and White (2016), and Luther (2016) practically analyse, in various ways, the challenges faced by new monies resulting from competition with well-established incumbents, whose network effects create a great deal of inertia.

[7]An Attic-weight tetradrachm weighed 17.2g.

[8]Marinescu (1996) argues that the policy was longer-lived, especially at Byzantium, and included the continuous minting of full-weight Lysimachi alongside the lightweight local issues. If Marinescu is correct, Byzantium likely used full-weight Lysimachi for international payments, bringing its monetary policy closer to that of Attalid Pergamon.

Attalid Pergamon began its light cistophoric coinage around 167/6 BC by issuing tetradrachms with an average weight of 12.2g (Meadows, 2013, p. 178).[9] Following the introduction of the lightweight cistophoric coinage, the Attalids continued producing some royal Attic-weight coinage for export and tolerated the independent issue of Attic-weight coinage by subject city-states (Meadows, 2013, pp. 184–190). Attic-weight coinage was therefore clearly not banned, as it was in the Ptolemaic case, but it was often tariffed through countermarking. The numismatic evidence shows a relative lack of Attic-weight coins hoarded in the Attalid kingdom, with no evidence that the cistophori circulated outside of it (Meadows, 2013, pp. 191–194).

The open monetary system of the Seleucid Empire was also subject to a brief attempt at centralized control.[10] From 173 to roughly 170 BC, Antiochus IV implemented several monetary reforms with the intention of increasing fiscal revenue for the Seleucid state (Mørkholm, 1982, pp. 303–304). There was a brief issue of tetradrachms with an average weight of roughly 16.6g, lighter than the contemporary Attic standard of 17.2g. There is also a series of Seleucid countermarks appearing on foreign coins during this period. This policy was short-lived, with the normal open monetary policy resuming sometime after 171 BC (Mørkholm, 1982, pp. 304–305). The treaty of Apamea (188 BC) imposed a large indemnity on the Seleucids, and the heavy financial burden, still partially outstanding, likely influenced Antiochus IV's policy experiment.[11]

In all cases, the causes of debasement and restrictions on foreign currency in the period were categorically related to pressing fiscal concerns. While examining the adoption and use of coinage in the Greek world, it is important not to conflate the intent for issuing a specific series of coinage with the choice of standard. That is, while any sovereign may earn a monopoly profit from operating a state-owned mint through pricing above the cost of production (brassage), that profit incentive does not fully explain the choice to adhere to a regimented standard in coin production. In fact, a sovereign could earn even greater profits through lowering the weight or fineness of precious metal coinage and declaring through edict that the new coins with lower precious metal content are of equal nominal value to the old.

Selgin and White (1999, p. 156) use the following accounting identity to analyse different forms of revenue generation for mints operating on a commodity standard.

1) $M = PQ + C + S$
2) $S = M - PQ - C$

Where:
M = Nominal Value
P = Nominal price paid by mint for precious metal
Q = Amount of precious metal in a series of coins
C = Operating cost or brassage
S = Nominal seigniorage

This analysis differentiates the profit made from monopolistic minting as a phenomenon related to market structure and seigniorage captured through the forced acceptance of debased coinage. In a competitive minting environment, seigniorage would be zero in the limit (as the number of producers increases) and all economic profit would be dissipated, where $M = PQ + C$ (Selgin and White, 1999, p. 157). For positive seigniorage to exist, the nominal value of coins must exceed the sum of the price

[9]See Meadows (2013, pp. 153–175). The Attalids historically produced Attic-weight coinage in the style of Alexander and Philetairos, among other designs.

[10]See Houghton (2012, p. 240). The Seleucid Empire's standard monetary policy was to allow the circulation of all Attic-weight coinage, domestic or foreign, without interference, except in the brief case discussed in this section. Foreign Attic-weight coinage was used for payments of all kinds, including tax payments and expenditures made by the state.

[11]The enduring legacy of this experiment was the permanent reduction in weight of Seleucid tetradrachms from 17.2 to 16.8g. However, this change did not initiate Gresham's law, and foreign coinages continued to circulate in Syria until the end of the 2nd century. It is possible that the slightly lower nominal weight corresponded to the average weight of the stock of circulating Attic-weight coins, which diminished over time as a function of wear and tear.

paid for precious metal, the quantity of precious metal included in coins, and brassage. In a monopolistic minting setting, the currency monopolist can charge above the cost of production or offer discounted prices for precious metal brought to the mint (P), providing a positive economic profit. For example, the Ptolemies, as well as states using the Attic standard, such as the Seleucid Empire, would have been capable of making positive economic profits from monopolistic minting activity, assuming they could prevent domestic minting competition and create incentives that fostered an inelastic supply of precious metal to the mint, instead of it flowing elsewhere.[12]

What differentiates the policy choice of the countries with autarkic and open monetary systems is the ability to generate seigniorage through debasement. By lowering the quantity of precious metal contained in coins (Q) and declaring through edict that the nominal value of the new coins (M) be equal to the old, the autarkic states were able to generate positive seigniorage for some time. Differences in state capacity likely explain the longevity of departures from the Attic standard, where powerful bureaucratic and legal systems would be required to enforce legal tender laws and prevent arbitrage. Mørkholm (1982, p. 305) provides a complementary explanation for the short-lived Seleucid experiment, in contrast to the longer-lived monetary systems of the Attalids and Ptolemies:

> An explanation for the Syrian failure may be found in the fact that the administration of the Seleucid empire was far less centralized those of Egypt and Pergamum. Consequently the possibilities of exerting a narrow bureaucratic control over the economic life were smaller, and the plans for a monopolistic monetary policy had to be abandoned after a rather feeble attempt.

As previously discussed, there is ample evidence for the fiscal motives behind debasement and the departure from the Attic standard. This raises the question(s); What incentives did polities have to return to the standard sometime after debasement? That is, what is the underlying benefit of participating in the standard, in contrast to the magnitude and longevity of the revenue earned from debasement? Mørkholm (1982, p. 300) posits that the monetary policies enacted by Byzantium and Calchedon would have deterred foreign merchants and potentially led to a lower volume of trade, eventually reducing the attractiveness of the policies to local authorities. The restrictive monetary policy of Byzantium occurred concurrently with other policies designed to increase state revenue, such as imposing tolls on merchants passing through the Bosporus (Gabrielsen, 2011, pp. 223–224). There is evidence that these policies were upsetting to other states in the region. In 220 BC, Rhodes declared war on Byzantium and used its navy to open the Bosporus. A settlement between the two city-states was eventually reached to secure the freedom of Greek trade (Polybius *Hist.* 4.28–4.52).[13]

Interestingly, the generation of seigniorage required Attic-weight coinage to remain in circulation, and for a time it did. The first mechanism of seigniorage capture occurs through the arbitrary but equal valuation of Attic-weight coins and the new local lighter issues, where the state would ideally capture some quantity of full-bodied coins through taxation or melting at the mint (Table 1). The second came from the process of countermarking, which can best be viewed as a tax on foreign currency. In Byzantium, Calchedon, the Seleucid Empire, and Attalid Pergamon, Attic-weight coins were countermarked by a legal official, which allowed them to circulate and imposed a fee on the money holder (Mørkholm, 1982, pp. 299–304).

Numismatic evidence unequivocally displays the occurrence of Gresham's law, or the closing of the debasing states' monetary systems. Attic-weight coins left circulation, and those that weren't confiscated made their way into savings hoards or were carried elsewhere in trade.[14] Without any Attic-

[12]The latter assumption is dubious for small (open) polities participating in the Attic standard, as arbitrage would have been possible.

[13]Polybius documented a duty imposed by Byzantium on all trade flowing through the Bosporus, which led to Rhodes declaring war. Peace was reached in 220 BC, matching the timeframe of the numismatic evidence, but Polybius gave no account of the monetary policy practiced during this period.

[14]See Lorber (2012a, pp. 40–42) for an account of this process in Ptolemaic Egypt and Meadows (2013, pp. 191–194) for Attalid Pergamon.

	Attic standard	Ptolemaic Egypt (first departure)	Ptolemaic Egypt (final standard)	Byzantium and Calchedon	Seleucid Empire	Attalid Pergamon
Duration	323 BC –1st century BC	310 BC – 290 BC	290 BC – 1st century BC	235 BC – 220 BC	173 BC – 170 BC	167/66 BC – 133 BC
Weight (grams)	17.2	15.7	14.25	13.9	16.6	12.2
Difference (grams)	~	1.5	2.85	3.3	0.6	5.0
Seigniorage (%)	~	8.7	17.1	19.2	3.5	29.1

weight coins to harvest at the mint or tax through countermarking, the seigniorage generating capacity of these closed monetary systems was severely hindered.

White's (2022) study of private gold mints in the 19th-century United States provides some insights into the reputational aspects of coin production. Mints that produced substandard coins categorically failed. Once the news regarding their practices was disseminated, their coins traded below par or were generally refused in payments (White, 2022, pp. 13–14). Similarly, although mints in ancient Greece were publicly owned, those that debased their coinages faced Gresham's law, where Gresham's law can best be viewed as the unwillingness of money-holders to exchange full-bodied (Attic-weight) coins for debased ones at par.[15] The key difference between the two cases is that there was no legal support for the substandard coinage of private mints, and therefore no occurrence of Gresham's law.

The choice of monetary autarky over participation in the currency union only enabled significant seigniorage in the short run. After the operation of Gresham's law, there was little fiscal benefit to the choice of autarky over openness. The sovereign can declare the nominal value of its debased tokens to be whatever it wishes, but the Quantity Theory informs us that the price level will respond in kind. The result is the elimination of any real increase in purchasing power and therefore seigniorage in the long run, absent the secular and unexpected debasement of coinage over time.[16] The trade-offs come in the form of less economic integration and much higher transaction costs in international trade. Thus, the initial choice to debase and leave the Attic standard was a game-theoretic prisoner's dilemma. However, once Gresham's law occurred, the decision facing autarkic countries evolved into a coordination game. With the benefits of autarky and seigniorage exhausted, countries moved to the optimal payoff-maximizing equilibrium by rejoining the Attic standard and reaping the benefits associated with increased economic integration.

Both the Attalids and Ptolemies faced a shortage of silver bullion in their holdings and may have deliberately chosen to institute a coinage on a light weight standard to ensure its local use and mitigate the potential of external monetary drain (Meadows, 2013, pp. 204–205; Lorber, 2012b, p. 214). Perversely, the theoretical implications of the price–specie flow mechanism address such monetary shortages, and there is no evidence that adherents to the Attic standard faced similar challenges.[17]

[15]Most precious metal Greek coins were struck at public mints. However, see van Alfen (2011) on the potential for private imitation coinage and Economou (2024, pp. 200–202) for privately minted token bronze coinage.

[16]In the cases described above, debasement occurred in one or two discrete steps.

[17]For countries adhering to the Attic standard with open monetary systems, it is possible to view the international flow of coinage as equating the balance of payments and therefore rectifying monetary imbalances.

Fiduciary valuation and precious metal coinage

There is another way to increase the nominal value of coins while still adhering to a monetary standard. It involves increasing the demand for a given coinage through non-price competition, which explains the exceptional proliferation of well-known and high-quality Greek coinages. All good precious metal Greek coinage inevitably entails some degree of fiduciary value, in the sense that coins command slightly greater value than the bullion they are comprised of (Seaford, 2004, pp. 144–145). Many scholars attribute this excess value to minting costs, or the deliberate invocation of state authority. While discussing the emergence of coinage in Lydia, Francois de Callataÿ (2012, p. 7) champions the latter argument when he states, 'It was indeed a revolution if the current view holds: an issuing authority was powerful enough to impose a forced currency of standardized stamped lumps of metal priced well above their intrinsic value'. Later, he says, 'People were convinced to accept a means of exchange whose intrinsic value was determined legally, not by the market, and archaic white gold coins are likely to have been priced considerably above their intrinsic value'.

The claim that the stamp of the sovereign is what imputes (fiduciary) value to a coin is incapable of serving as a holistic explanation of the phenomenon. In part, this is because the explanation is woefully inadequate in international settings. A sovereign's edict does not carry any weight in foreign markets and is completely incapable of explaining market-based fiduciary value in internationally circulating coinages. State edict is also not unequivocally sufficient to tokenize domestic money, as it requires a legal system powerful enough to punish arbitrageurs and prevent the use of monetary substitutes and foreign coinages.[18] While state support could feasibly help a given money achieve critical mass, its role in determining international circulation or valuation is limited to the state's ability to increase demand for its money (Salter and Luther, 2014).[19] That is, in sharp contrast to the position of chartalists, through methods other than coercion. This was done in Athens and other places through quality control in production, culling debased coins from circulation, and maintaining consistent aesthetics.

The common view of minting costs serving as the genesis of fiduciary value is also inherently flawed. Positive minting costs explain why prices charged by mints would exceed the strict bullion value of coins, but it does not imply that the brassage cost is arbitrarily attached to a given coin in the form of its fiduciary value. In economic terms, this is an appeal to the labour theory of value, given the deterministic nature of fiduciary value stemming from production costs.

De Callataÿ is correct in noting the importance of the stamp or seal that a Greek coin bore, but for the wrong reasons. Coin aesthetics mitigate informational asymmetries between transacting parties. The fiduciary value attached to coinage did not stem from edict, but from the coin's superior ability to facilitate exchange in comparison to unmarked bullion. Extra fiduciary value would have conveyed benefits to the money holder in exchanges within an economic area where the coin's type or standard is known and accepted. In foreign lands, the coin's type or standard may not be recognized, eliminating the excess fiduciary value, but the coin is still not worth any less than the value of its bullion content, making it unequivocally more desirable for exchange than bullion (Seaford, 2004, pp. 145–146).

Aristotle's (*Nicomachean Ethics*, 1119b) concept of money is embodied in the term 'nomisma', and he further defines 'chremata' as all things of which the value is measured by nomisma. By Aristotle's time, nomisma was widely synonymous with currency, although an interesting etymology can be traced further back into Greek history. The earliest surviving accounts of nomisma pertain to Greek battle cries used to inspire troops, and to cries uttered in sacrificial settings with potentially some divine or religious significance (Seaford, 2004, pp. 142–143). Seaford (2004, p. 153) defines this early interpretation; 'Customary collective practice (nomisma), *whether coinage or in battle*, depends on and objectifies the collective confidence of the community, for whom it introduces order into potential

[18]The only such case in Classical or Hellenistic antiquity is Ptolemaic Egypt.

[19]In this sentence, a 'given' money refers to one of a few goods with high saleability being used for indirect exchange, and 'critical mass' refers to the point at which network effects are powerful enough for the money to become a commonly accepted medium of exchange.

chaos'. The political connotation of nomisma may have remained, bringing it closer to the modern term currency, instead of money and the infinite fungibility generally associated with it.[20]

Seaford (2004, p. 145) describes fiduciary value in Greek coinage as 'A regularised small excess of the coin's value over the bullion value, such as we have seen at Athens, which would be accepted as the price paid for the general convenience, for the profit made by the state (perhaps), and most importantly – from the perspective of the recipient's individual interest – for the greater *ease of disposal* which a coin would have over unmarked bullion'. For Seaford (2004, p. 7), the ease of disposal that coins facilitate, and the fiduciary value they accordingly possess, are intrinsically linked to the collective trust in their future acceptability in exchange.

In Xenophon's *Ways and Means* (3.2, trans. Marchant), he argues to the Athenian Council of 500 that Athens can attain prosperity absent imperialism and conquest. He focuses on the revenue generated from Athens' position as a premier commercial centre, and to the unique benefits the city offers foreign merchants. Likewise, he describes how the renown of Athenian currency, and the corresponding fiduciary value it possessed, constituted one of these key benefits.

> Moreover, at most other ports merchants are compelled to ship a return cargo, because the local currency has no circulation in other states; but at Athens they have the opportunity of exchanging their cargo and exporting very many classes of goods that are in demand, or, if they do not want to ship a return cargo of goods, it is sound business to export silver; for, wherever they sell it, they are sure to make a profit on the sum paid.

This excess fiduciary value derived from the efficiency of undertaking exchange is not an unknown concept in economic theory and is closely linked to Carl Menger's (1892, p. 25) notion of the 'saleableness' of money.[21] Menger (1892, pp. 33–38) envisions a competitive economic process where media of exchange in use are slowly narrowed until the eventual convergence on a single commonly accepted medium of exchange occurs. This process is entirely dependent on the preferences of buyers and sellers in a market. In an economic setting with multiple media of exchange, there will be preferences for specific media according to their use or exchange value to a specific party, with buyers and sellers pricing discounts or premia into exchanges according to their monetary preferences to account for varying transaction costs. That is, in a market with multiple media of exchange, the exchange values of each medium are far from universal, and the use value of any specific money will also be heterogenous between participants.

To provide an example, suppose a man wants to pay for a transaction with a bundle of wheat, but the seller already has a storehouse full of wheat, and if he makes the transaction, he will have to go and find a buyer who desires wheat and exchange it for something he wants. To cover the transaction cost of having to liquidate the wheat into something he desires, the seller charges a premium on all transactions conducted in wheat. In anticipation of this, market participants make use of the media of exchange that their intended transaction partners prefer, leading to positive network effects and the eventual convergence on a single commonly accepted media of exchange with homogenous exchange value among all market participants. Given that the Greek monetary system was generally characterized by silver monometallism, the effects of Menger's concept of saleableness are not so much reflected by the competition among different commodities serving as media of exchange but instead represented by the competition among coin types with varying reputational values. Arthur Burns

[20]Seaford (2004, p. 8, 142) describes a passage from Aristophanes' *Clouds* (247–8) where; 'Socrates declares that "the gods are not *nomisma* with us", to which Strepsiades replies "What do you swear with?" Iron (coins), as if in Byzantium?' Aristophanes comedically conflates the newer interpretation of nomisma with the old, by comparing currency with the collective trust placed in the gods. It also displays that nomisma is an alterable human construction (hence the iron coins of Classical Byzantium that would have been viewed as worthless), which has profound implications where collective confidence is necessary, as it is in the cases of currency and religion.

[21]Seaford's argument is nearly identical to Menger's here regarding the role of acceptability, especially when considering the future.

(1927, p. 121) described this relationship between the proliferation, marketability, and reputation of certain high-quality Greek coinages:

> More remarkable was the issue by some minting authorities of copies of the coins of other cities. This policy was a by-product of the emergence in the Greek world of certain coins with a wide currency outside the frontiers of the cities that issued them. The types of these coins constituted a valuable trade-mark under which precious metals could be easily marketed.

Coinage types and the influence of aesthetics

The technological advance of coinage was the information that it provided money users, in contrast to unmarked precious metal bullion. A guarantee of weight and fineness was drawn from a coin's aesthetics or type, which certified its legitimacy from the issuing authority. If a coin's type was trustworthy and recognized, it served the important role of reducing transaction costs by enabling the coin to pass by tale (without scrutiny). If these conditions were not met, coinage could be subject to the same scrutiny applied to precious metal bullion.

The Athenians seem to have universally held a sanctimonious view of their own coinage. Due to Nicophon's Law of 375-4, we know that in Athens, coinage disputes in the agora were adjudicated by a public official called a 'dokimastes' or tester, who had the authority to confiscate debased coins (Mørkholm, 1982, p. 294).[22] Athenian-minted coins were regularly and randomly tested for fineness by public officials. Evidence suggests that this was not motivated by the suspicion of forgery, but instead to ensure the consistency of Athenian coin production (Davis, Sheedy, and Gore, 2020). Therefore, some test cuts fall into a category of quality control policies enacted at the mint. However, Athenian Owls were subject test cuts to detect possible forgeries, especially in cases where imitation coinages circulated frequently. The extensive methods taken by the Athenians to create quality control in their coin production, as well as detect the circulation of base metal imitations reveals that the Athenians viewed discrepancies in the quality of their coinage as a significant threat to its reputation.

Aristophanes (*Frogs*, 718–733. trans. Dillon), an Athenian playwright and patriot, lamented the Athenian government's debasement of its coinage during the Peloponnesian war. He argued that a virtuous citizenry deserved no less than a virtuous money, and that base metal currency should be reserved for men of more base natures. Athens promised to redeem the debased owls for good silver coin in the future, and it is likely that this process was completed roughly a decade after the conclusion of the war (Aristophanes *Eccl.* 821–22, trans. O'Neill.). The treatment of their own coinage suggests that the Athenians widely understood and recognized the reputational importance of their coinage, which may have been fundamental to the prosperity, if not the survival, of the Athenian state. The reliance on imports may have given the Athenians an extra impetus to develop and maintain money of the highest quality, with their Owl tetradrachms forming the first international currency in history (Jenkin, 1990, p. 46).[23]

Modern metallurgical analysis reveals the fineness of Classical Athenian Owl coinage to be over 98% for roughly 75% of the coins in a large sample of tetradrachms, with 95% of coins possessing a fineness of over 95% (Davis Sheedy and Gore, 2020). Well-done imitations would have presented the most thorough challenge to maintaining a reputable system of coinage in this period. Nearly 20% of the roughly 800 Classical Athenian-style coins in the collection of the American Numismatic Society are ancient imitations (van Alfen, 2005). Of the 20% that were imitations, almost half (9%) were silver-plated or otherwise debased.

Nicophon's Law of 375/4 states, 'If anyone brings forward [foreign silver currency] which has the same device as the Attic, [if it is good,] let the dokimastes give it back to the one who brought it

[22]For Nicophon's Law, see Supplementum Epigraphicum Graecum 26.72, first published by Stroud (1974) and much discussed since.

[23]In the Classical period, Athenian coinage circulated across the Achaemenid Empire, especially in Egypt and the Levant.

forward'.[24] Following inspection by the dokimastes, if a coin was found to be debased, it was culled from circulation via confiscation. However, this passage also indicates that high-quality foreign coinage circulated freely but was likely subject to a higher degree of scrutiny (Ober, 2008, p. 232).[25] Uncertainty regarding the composition of foreign coinage or the imposition of transaction costs associated with investigation and scrutiny could cause foreign coinage to circulate at a discount.

Athenian monetary institutions are yet another example of the inability to remove fiscal revenue from the time-invariant calculus of monetary policy decisions. Although these concerns are typically exemplified through analysing cases of debasement, Wood (1999, p. 58) explains how abnormally large revenues can also be attained through the sustainment of quality:

> Some reputable governments have contributed to efficiency in trade for long periods and over wide areas by supplying reliable coins at low costs, that is, by appropriating small and constant proportions of the metals brought to their mints for coinage. An efficient mint with a good reputation is valuable property, and its owners have an incentive to preserve it, especially in a competitive environment. The willingness of traders to accept the Athenian owl and Spanish and Mexican pesos brought long-term profits to the governments that produced them.

Beginning with the early coinages in Classical Greece, a notable aesthetic consistency over time occurs in the most prolific issues. The aesthetics of the Aeginetan Turtle, the Athenian Owl, and Corinthian Pegasus coinages did not change in the Classical period. Notably, all these coinages also corresponded to the most prominent standards of weight, which were widely used among other Greek city-states. Corinthian and Athenian coinage were also imitated aesthetically by Greeks and foreigners alike.[26] The artistic style of the Classical Athenian coinages remained for some time despite the design being viewed as increasingly antiquated as Greek art evolved from the Classical into the Hellenistic period (Jenkins, 1990, p. 46). Head (1887, p. xliii) identifies the mystery surrounding the success of Athenian coinage:

> To this almost international character of the Athenian tetradrachm is to be ascribed one of the strangest phenomena in the whole range of ancient numismatics. I mean the fact that the Athenian coins do not improve in point of style as time goes on. The Athenians, much as they loved art, were merchants first and artists afterwards. They probably deprecated any change in the familiar aspect of their coins lest the Barbarians with whom they traded should hesitate to accept them at the same favorable rate of exchange as of old.

In the Hellenistic period, the style of Athenian coinage evolved, but the types did not. Athens relied on the renown and prestige of its familiar Athena/Owl types well into the 1st century BC, despite the widespread gravitation towards Alexander-type coinage throughout the Greek world (Ashton, 2012, pp. 191–192; van Alfen, 2012, p. 88). Josiah Ober (2008, p. 227, 229) attests to the Athenian success in establishing a 'brand' attached to their coinage and that it possessed a 'fiduciary value added'. Colin Kraay describes the Athenian transition from its archaic coinage to the famous Classical Owl-style coinage and the impact of the mines at Laurion as follows:

[24]See Stroud, 1974, p. 159.

[25]Martin (1985, p. 207) notes that whether or not foreign coins were to be accepted is contentious. Ober interprets Nicophon's Law as establishing Athenian issues as legal tender, evidenced by imposition of sanctions on merchants who refused to accept them in payment. In terms of foreign coinage, Ober's view is that the decree allows their use and circulation given the coins are full-weight and pure, with acceptance in payment by individual merchants being optional. Economou (2024, pp. 215–216) notes that it is likely that the coins of other cities frequently circulated in Athens.

[26]See Psoma (2012, pp. 166–167), Fischer-Bossert (2012, p. 151.), and Talbert (1971) regarding the dominance of Corinthian-style coinage in Sicily during the 4th century BC, where it was issued in a decentralized fashion by a large number of Greek city-states in Sicily, Italy, and Greece.

> That there was some realization of the potentiality of these mines for foreign trade is suggested by the introduction of the owl coinage itself; for the replacement of the changing and inexplicit types of the 'Wappenmunzen' by the unchanging owls, which declare so very plainly their Athenian origin, seems to be directed at non-Athenian users.[27]

The role of the currency standard is to ensure the consistency of weight and fineness in coinages, and it seems plausible that corresponding consistency of aesthetic coin types may have mitigated informational asymmetries in exchange, where well-known monies would have been categorically more desirable.

Good examples of this phenomenon may be illustrated by briefly analysing the vast corpus of imitation coinage produced by non-Greek cultures and civilizations. A recurring theme is that newcomers to coinage in the Mediterranean rarely, if at all, begin with their own issues. This is likely due to the ease of circulation associated with copying a well-known coin type or standard, in comparison to creating a novel coinage. In the Classical period, the most widely imitated Greek coin was certainly the Athenian Owl. Persian satrapal imitations of Athenian coinage occurred briefly in Asia Minor, along with more extensive imitations produced in 4th-century Egypt (Alram, 2012, pp. 71–72, 74–75, 78–80). The latter occurred in conjunction with the issue of some Athenian imitations by the last native Egyptian pharaoh (Jenkins, 1990, p. 82).[28] Phoenician and Philistine imitations were also common in the Classical era, while Arabian, Babylonian, and Bactrian imitations of Athenian coinage also occurred after the conquests of Alexander the Great (Ober, 2008, p. 228; van Alfen, 2012, pp. 95–96).[29] The intensity of imitation Owl production greatly increased following the defeat of Athens in the Peloponnesian War, which led to a shortage of its coinage in international markets where it was common, and provided the impetus for imitations to meet the needs of commerce (Burns, 1927, p. 122).

Perhaps the largest category of imitation coinage comes from the Celts, who copied both Greek and Roman coinage before striking their own. Philip II of Macedon's gold coinage was exceedingly influential on Gallic coinage (Seltman, 1955, pp. 201–202; Allen, 1979, pp. 9–10, 69).[30] Philip's gold issues were aesthetically copied in northern Europe and the British Isles. The silver coinages of Macedon and other northern Greek states were imitated by the Thracians, Dacians, and Celts along the Danube, while the silver coinage of the Greek colonies of Massalia and Emporion in southern Gaul heavily influenced gallic coinage in Iberia and Southern Gaul (Allen, 1979, pp. 13–14). The level of economic integration and trade between the Celts and Greeks may possibly be inferred from the Celtic choice of weight standard in certain areas. The Celts north of Macedon along the Danube, in close proximity to the Greeks, used a combination of the local Thracian standard and the Attic standard for their silver coinages.

Despite a reputation as a thalassocratic and mercantile empire, Carthage minted no coins prior to 410 BC. The earliest Carthaginian coins were tetradrachms minted in Sicily on the Attic standard (Visona, 1998). Geographic proximity to the Greeks in Sicily and Magna Graecia who were already using the Attic standard explains Carthage's first venture into coinage and its choice of standard. Carthaginian issues bore the inscription 'in camp', which many numismatic scholars have interpreted to mean that these tetradrachms were exclusively for military use, including the payment of

[27]Wappenmunzen were the Archaic early coinage of Athens prior to the introduction of the Owl coinage. See also, van Alfen (2012, pp. 88–92) on Wappenmunzen and the relative marketability of the Owls. Van Alfen corroborates the point that it appears the Athenians deliberately tailored the Owl coinage to always be recognizable as distinctly Athenian in international contexts.

[28]Aside from imitations of Athenian Owls, the only true Egyptian coins were issued from 360–343 BC under Nektanebo the Second, which were gold staters of an Egyptian type on the Attic standard. Two hieroglyphic signs on these coins display 'nefer nub' and translate to 'good gold'.

[29]See Tal (2012, pp. 252–256) for the imitations and the influence of Athenian Owls on Philistine coinage.

[30]Philip's gold Philippi was plundered by the Romans in great quantities as they conquered the Hellenistic world. Due to their vast circulation, recognition, and reputational quality, they were allowed to circulate in Rome.

mercenaries (Visona, 1998; Lee, 2000; Seltman, 1955, p. 249). At the time of issue, Carthage was locked in a series of wars with Greek states in Sicily, so this is a reasonable explanation. However, the economic significance of the situation must not be minimized. By minting on the Attic standard, the Carthaginians were paying the Sicilian Greeks in the common currency used there for over a century (Fischer-Bossert, 2012, p. 145, pp. 148–150). This hypothesis is exceptionally reasonable, given that Carthaginian and Siculo-Punic coinage readily imitated the coinage types of its enemy, Syracuse, throughout the 4th century BC (Fischer-Bossert, 2012, p. 151).

The convergence on the attic standard and shared types in Hellenistic Greek coinage

Plato mentions precious metal coinage in both his *Republic* and *Laws*. Written around 350BC, Plato's *Laws* represents the philosopher's attempt to pragmatically outline the formation of an ideal but real-world state, in comparison to the utopian nature of the *Republic*. In chapter 5 of the *Laws*, Plato (741e–742b) outlines a dichotomy regarding the use of coinage in society. The first is a coinage to complement local exchange (*epichorion nomisma*). The second is a coinage of international character capable of facilitating exchange with other Greek polities (*Hellenikon nomisma*). Plato's local coinage has large civic importance and should reflect the culture and character of the people, while the international coinage must be respected and accepted by foreign states (Meadows, 2009, pp. 26–28).

Alexander undoubtedly gave the Attic standard a first-mover advantage in the newly conquered Greek lands, and likewise, the continuation of coinage types in his name and bearing his likeness. Following Alexander's death (323 BC), an unprecedented level of aesthetic convergence in Hellenistic Greek coinage seems evident. Many of these issues were autonomous, with a plethora of Greek polities producing 'Alexanders', or an Attic-weight silver tetradrachm with Heracles or Alexander on the obverse, and a seated Zeus (or sometimes Athena) with inscription on the reverse.

The titanic magnitude of coinage issued by Alexander and his successors constituted most of the money stock in the early Hellenistic period and led to a hiatus of Greek civic coinage. In Asia Minor, this abatement of coinage from city-states lasted until roughly the second century BC when the independent issue of precious metal coinages resumed. It is likely that Macedonia thoroughly monetized subjugated areas with its own royal issues, and localities found little reason to issue coinage.[31] Rapid Macedonian monetization may have caused a scarcity of gold and silver bullion due to royal monetary demand (Martin, 1985, p. 221). Moreover, perhaps much like the reputable coinages of famous Greek city-states, the Macedonian issues would have possessed an international appeal that no local coinage could match (Martin, 1985, p. 170).

The widespread imitation of the Macedonian royal coinage continued into the late 2nd century BC, if not well into the first century in Asia minor (Meadows, 2001, p. 56). The aesthetic convergence of coin types in the Hellenistic period occurred in stark contrast to the pattern established in the Classical period, with virtually every issuing city-state adopting its own coin type (Jenkins, 1990, p. 45). This is not to say that all Hellenistic Greek coinage conformed to the Alexander type, only that an increase in the relative homogeneity of Greek coinage did occur in stark contrast to the pure heterogeneity of coin types present in the Classical Period.[32] It is not only interesting that these coins circulated widely, with many ending up in the Seleucid Empire and the Hellenistic far east, but also that an unprecedented number of individual city-states minted coins of a common imagery and on a standard weight (Meadows, 2001, p. 56; Houghton, 2012, p. 240). There are roughly 4,000 known types of posthumous

[31]See Hansen and Nielsen (2005, p. 149). 'Sometimes two poleis shared a mint, and often a polis was satisfied with using the coins struck by its neighbors'.

[32]Posthumous Alexander coinages were complemented by many other types of coinage. These include royal and civic coinage of various designs. For more information, see Ashton (2012) and Economou (2020). Ashton documents the increase of uniform coin types in mainland Greece and Asia Minor throughout the Hellenistic Period. This includes the widespread issue of federation coinages in mainland Greece on a shared standard and of the same type, which is not explored in this paper. Economou (pp. 147–160) examines the use of a shared standard and coinage types found in the coinage of Achaean League member-states.

Alexander coins issued by a plethora of polities. Those issued by city-states often retained a deified Alexander on the obverse, with local civic symbols being prominent on the reverse (von Reden, 2010, p. 83).[33]

Aesthetic convergence among Greek coinages was not limited to Alexander types in the Hellenistic period. The 'wreathed' Attic-weight tetradrachms, or stephanephoroi, of the second century BC are similar in that they were widely produced in a decentralized fashion with a common type.[34] The pattern began with Athenian 'New Style' tetradrachms (164 BC), which hosted a wreath on the reverse surrounding the ever-present owl (Ashton, 2012, p. 199). The stephanephoroi of the independent cities in Asia Minor often travelled eastward towards the Seleucid Empire (Ashton, 2012, p. 200).[35] Meadows notes it is likely that there were economic reasons in play for such a drastic stylistic change in Greek coinage, with the appearance of these coins being tailored to facilitate broad acceptance (Meadows, 2001, p. 56). Le Rider (2001) suggested that the Alexander-type coinages of western Asia Minor down to approximately 160 BC, and the autonomous wreathed style afterwards, were employed to achieve a more favourable exchange rate against Seleucid coinage, relative to other foreign Attic-weight coinage circulating in Syria.

The large autonomous issues of Alexander-type coinage, as well as the later wreathed tetradrachms, represent the attempts of small Greek states to produce an export-worthy coinage. As previously discussed, the best and most renowned Greek coins possessed a strong and well-recognized reputation. From the perspective of an individual city-state, the cost of developing the reputational quality of its own money in a novel way could be quite extensive. Instead, adherence to international weight standards, and copying the aesthetics of the most prolific styles of Greek coinage likely imbued the issues of small states with a reputational quality that would be very costly or impossible to obtain otherwise. The resulting Hellenistic coins of similar weight and style increased the acceptance and circulation of monies from smaller and less reputable producers of Greek coinage. For example, Rhodes produced silver coinage on its local standard while concurrently issuing heavier denominations on the Attic standard (Seltman, 1955, pp. 253–254; Kroll, 1964).[36] Rhodian local issues were restricted in circulation to Aegean islands and territory in southwest Asia Minor under Rhodian control. In contrast, Rhodian Attic-weight coinages took the form of posthumous Alexanders and circulated widely, especially in the Hellenistic east (Ashton, 2001, p. 93, 95).[37]

Discussion

The key theme that unites Greek coinage from the Classical to the end of the Hellenistic period is the importance of reputational quality attached to coinage types and even particular standards. The capture of reputational quality associated with participating in the most prolific standard or copying well-known aesthetic types perhaps elevated coinage to the status of what Plato called '*Hellenikon Nomisma*'. The importance of acquiring an internationally accepted currency is reflected by the

[33]See Ashton (2012, pp. 191–192) for examples from the city-states of Asia Minor.

[34]Callataÿ (2013) and Psoma (2013) offer a competing explanation to the one explored in this paragraph. Both authors provide a fiscal explanation for the production and circulation of the wreathed tetradrachms, most of which were found in hoards located in the Hellenistic east. They argue that the wreathed tetradrachms constituted military payments and war indemnities accrued during a coup in the late Seleucid Empire.

[35]Stephanephoroi were produced at Attalid Pergamon, Macedon (both before and after Roman subjugation), and the city-states of Mytilene, Chalcis, Eretria, Cyzicus, Tenedos, Parium, Abydus, Alexandria Troas, and Ilium. Ashton argues there is no reason to assume this change in style is a reflection of a concerted policy effort by the states involved. He posits that the aesthetics became popular and helped with the acceptance of stephanephoroi. See Houghton (2012, p. 248) where he documents the circulation of these coins in the Seleucid Empire.

[36]See Seltman for Rhodian Attic-weight gold issues and Kroll for the Rhodian switch to Attic-weight tetradrachms at or before 166BC.

[37]As previously discussed, Attalid Pergamon is another good example of this phenomena. The Attalid's produced royal tetradrachms on the Attic standard in conjunction with its cistophoric coinage and tolerated the issue of decentralized civic coinages by its subject city-states on the Attic standard (Meadows, 2013, pp. 187–190).

requirement of Attic-weight coinage for many international payments, including the hiring of mercenaries and artists in both the Classical and Hellenistic periods.[38]

The reputation among specific issuers varied widely, with the most reputable gaining remarkable success in terms of the acceptance of their money and its circulation among the international community. The presence of reputational quality can manifest in the imputation of excess fiduciary value to money, or value that exceeds the strict value of the precious metal bullion embodied in the coin. In these cases, the achievement of wide circulation reflects an increase in acceptability and demand. It was likely the goal of Greek issuers and the many foreign states that imitated their coinage to obtain this excess fiduciary value attached to their money. That is, maximizing the fiduciary value of coinage would also maximize seigniorage for the issuer in the context of participation in a currency union. Given that fiduciary value was exclusively determined by the demand for a given money, it could only be attained through the generation of reputational quality.

This excess value does not stem from edict or any other political considerations, but instead from the competitive process of monetary production and the ability of coinage to facilitate exchange and mitigate transaction costs. That is, in a Mengerian context, the best Greek coinages bear the highest degree of "saleability" and are more widely desired for exchange amongst buyers and sellers.[39] Evidence from Nicophon's Law, such as the judicial role of the dokimastes, illustrates the omnipresent uncertainty and the limited information available to all Greeks regarding coinage. The ability of well-known coinages to pass by tale reflects their ability to mitigate the problems associated with imperfect and asymmetric information. In order to reduce transaction costs, it was crucial for coinage to transcend the limitations exhibited by transacting with precious metal bullion or other commodities.

The economic benefits associated with the convergence on coin types are displayed in the plethora of evidence provided by the autonomous imitations of Alexander-style coinage in the Hellenistic period and through the various cultures that inescapably copied Greek money before venturing to establish their own. Efforts to increase the reputational quality of money in the period are reflected by the relative homogenization of coin types, with large issues from small polities occurring in decentralized political contexts. Modern equivalents of these phenomena can be found in private counterfeiting, direct currency substitution, or the use of various types of fixed exchange rate regimes. It is unsurprising that the US dollar is the most counterfeited contemporary currency. Likewise, it would have been an unremarkable observation for the Greeks in antiquity to acknowledge that Athenian and later Macedonian currency were the most widely imitated, for very similar reasons. Modern countries that fix their domestic currencies to another that is viewed as strong or reliable through central bank or currency board arrangements are roughly equivalent to the use of imitation coinage in the Greek world. Perhaps the best reflection takes the form of direct currency substitution, such as dollarization, where a foreign unit of account and medium of exchange are adopted. In terms of shared monetary standards, the Greek system is quite similar to modern currency unions, such as the European Union. In both cases, countries voluntarily chose to use a shared unit of account to lower transaction costs and increase economic integration. The cost was the loss of independent monetary policy.

Conclusion

While we are accustomed to recognizing the power that states exert in their own territories and over their own affairs, it is critically important to acknowledge that international relations are inherently anarchic.

[38]See Psoma (2013) for the requirement of Attic weight coinage for the payment of mercenaries and artists in Hellenistic Asia Minor. Lee (2000) and Visonà (1998) offer evidence surrounding Carthaginian Attic-weight coinage, which indicates that it may have been required to pay large numbers of Greek mercenaries in Sicily. Alram (2012, p. 70) also notes that Greek mercenaries in the service of Achaemenid Persia may have refused to accept payment in Persian silver coinage, instead preferring payment in Greek silver coinage.

[39]See Menger (1892, pp. 25–28.) In this passage, Menger establishes that saleability is finite, even among monies. Although Menger envisioned differences in saleableness to be associated with distinctly different commodities, his logical framework is well applied in this instance of the differential saleability in currencies comprised of the same commodity.

In the context of the Greek world with heavily decentralized political structures, this anarchy created a great deal of accountability and competition in international relations. In the study of history, the most startling example of this competition is war, but in economics, competition need not be zero-sum. At its core, the competition between coin types prevailed because the incentives created by participation in the Attic standard monetary union were sustained over an extended period of time. That is, the shared institution of a currency union created incentives to adhere to the universal monetary standard and enjoy the benefits of market integration that came with it. The penalty for debasement was the natural closing of the domestic monetary system due to the operation of Gresham's law. In economic terms, the benefits of participation related to market integration exceeded the seigniorage gained from debasement over some long time horizon. This incentive must have been powerful enough to sustain cooperation over a vast geographic area, including hundreds of polities, with the Attic standard serving fully as the principal international monetary standard for approximately 250 years, beginning with the conquests of Alexander, and as one of a few prominent international monetary standards in the 200 years preceding it. Only from this institutional framework do we arrive at a historically unique monetary equilibrium where international competition upheld the quality and utility of money.

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