Monetary Policy in the Roman Empire

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In writing about Roman money one faces many fundamental problems. Firstly, a monetary history of the Roman empire cannot yet be written. This might seem an extravagant generalisation given that there are many accounts of the development of Roman coinage, but careful study of these accounts often reveals the uncertainties that underlie their apparent confidence, particularly on basic matters of production, distribution and use.[1] Roman numismatists are no different from other scholars in wishing that they could be more certain of their material. Unfortunately the scarcity and ambiguity of hard evidence for Roman monetary history has sometimes led to a habit of treating as fact what is in reality quite insecure.

This is in part a consequence of the way in which scholarship on the subject has developed. At the risk of caricature, I will attempt to outline the key features of relevance here. At its heart is the matter of whether the Romans mismanaged their currency to the extent that it caused an economic crisis and whether they had any monetary policy beyond debasing their silver coinage to overcome fiscal difficulties.[2] That such fundamentals can still be debated shows how far we are from a proper understanding of the material.

Renaissance and Enlightenment scholars who studied Roman coinage were not much interested in its evolution, or in any evidence of monetary instability.[3] Instead they sought to define what they viewed as a relatively static system, which some held up as an ideal. Their identification of many of the denominations that made up the Roman currency was a major achievement of the sixteenth and seventeenth centuries. Working from obscure metrological texts and asides in classical sources, they managed to identify the aureus, denarius and sestertius, the three main denominations that had formed the core of the imperial monetary system until the third century AD. While it was recognised that the silver denarius had become debased in the third century, few felt it necessary to elaborate on the reasons for this. It seems to have been assumed that the causes were the same as many debasements in their own time: that Roman rulers had needed to cover the costs of their wars. The study of Roman coinage as money, however, remained very much subsidiary to its study as a source for history and art.

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[1] E.g. Harl 1996.
[2] Crawford !!!!!!!!!!!!
[3] Butcher and Ponting forthcoming.

A key figure in the history of scholarship on Roman monetary history is Theodor Mommsen (1817-1903). Mommsen was attuned to the possibility that the changes he could observe in the coinage could have been the consequence of monetary or fiscal problems, and his interpretations still deserve study to this day. Though most of his monumental *Münzwesen* concentrates on the coinage of the Roman Republic, he also provided a comprehensive account of the development of imperial coinage, backed up by data in the form of both ancient texts and archaeological finds.[4] He also argued from comparative historical cases in more recent times. His account was the first serious attempt to create monetary history from Roman coins. It charted the gradual decline of the Republican and early imperial monetary system and the 'crisis' of the third century, which in turn led to the monetary systems of late antiquity. These late antique systems that were much less well-understood than the earlier one, and to this day most of the denominations remain obscure in both name and their relationship to one another.

One mystery that Mommsen attempted to solve concerned the face value of a silver coin that was introduced by the emperor Caracalla in AD 215. This coin was important, because it became the main denomination to be issued for most of the third century. Previous scholars had viewed the coin as just another sort of denarius, heavier than the normal one. Some had suggested that because it weighed 1.5 times the weight of the normal denarius, this 'heavy denarius' had been worth 1.5 times more than the normal one. Mommsen dubbed the coin the 'antoninianus' and proposed that it had been created by Caracalla to serve as a double denarius. Effectively its introduction represented a debasement. Observing that his antoninianus became increasingly debased during the third century until it was little more than a copper coin, and noting that these heavily debased coins appeared in large numbers in hoards, Mommsen proposed that the new denomination had been responsible for high inflation that resulted in the 'collapse' of the old monetary system. He drew a parallel with modern paper currency, and in the French translation of the *Münzwesen* the parallel was made even more explicit: the antoniniani were like the French *assignats* that had caused extraordinary hyperinflation at the end of the eighteenth century.[5] The reader could scarcely doubt that the antoninianus was a hyperinflationary coin. As such, it occupied the liminal space between the monetary system of the Republic and early empire on the one hand and that of late antiquity on the other.

Though it provided an explanation for the apparent collapse of the early imperial monetary system, many students of Roman coinage in the nineteenth and early twentieth centuries remained unconvinced that the antoninianus was an overvalued double denarius.[6] Only Mommsen's name for the coin was preserved, though he was rarely acknowledged as the original authority. During the 1920s, however, the double denarius gained influential converts, none more so than Harold Mattingly, one of the authors of the standard catalogues of Roman coins,

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[4] Mommsen 1860.
[5] Mommsen 1860: 830; 1870: 147.
[6] On the history of thought about this denomination, see Butcher forthcoming.

The Roman Imperial Coinage and *A Catalogue of the Roman Coins in the British Museum*. His accounts of the ensuing hyperinflation were clearly coloured by the European hyperinflations of the 1920s, and those events may have been decisive in helping him to change his opinion – previously he had espoused the idea that the antoninianus was a 1.5 denarius coin.[7] Modern hyperinflation, particularly that experienced in the Weimar Republic in 1923, was seen as the model for what had happened in the third century by many scholars working in the 1930s and 40s.[8] By introducing the antoninianus, the Romans had destroyed their admirable currency in gold, silver, brass and copper.

The period from the 1950s to the 1980s saw the consolidation of what might be termed the 'substantivist' or 'primitivist' view of Roman coinage, which dominated thoughts about Roman currency up to the beginning of the present century.[9] While the antoninianus had already gained widespread acceptance as an inflationary double denarius and a leading cause of an economic crisis in the third century, it was noted that debasement of the silver coinage had occurred much earlier, beginning in the reign of Nero (AD 54-68). If such earlier debasements were not monetary adjustments (now deemed too subtle for the ancient mind to conceive), what had caused them? It was argued that the Romans had no notion that an increase in the money supply or a debasement of the coinage might cause inflation. Indeed, anything that seemed like an economic or monetary explanation for changes to the coinage was dismissed as incredible.[10] Some allowances were made for Rome's first emperor, Augustus, who was considered to be the architect of the imperial coinage and was credited with some financial acumen. But proof that Rome was otherwise ruled by the 'economically illiterate' seemed to come in the person of the emperor Diocletian (AD 284-305), who had tried to regulate prices to prevent inflation.[11] The manifest truth of market forces was considered beyond the reasoning of such characters, and any policy that granted emperors or their administration the slightest economic wisdom was deemed false.

All change in Roman coinage tended to be treated as the result of fiscal difficulties. Monetary explanations, such as an increase in the supply of coinage in one metal affecting its value relative to coins in other metals, were normally dismissed, although the possibility of such monetary adjustments was admitted for the Republican period (in times sufficiently remote from the age of imperial decadence). The financial difficulties of the empire, however, were of a different order: change, and particularly change to the silver coinage, was regarded solely as a consequence of fiscal shortcomings. If one follows this reasoning, the antoninianus *had* to be a double denarius rather than a 1.5 denarius piece,

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[7] For Mattingly's view prior to the Weimar inflation, see Sydenham 1919: 134, and Mattingly and Sydenham 1923: 29; for his later position, see Mattingly 1927: 126.

[8] E.g. Giesecke 1938: 161; Hammond 1946: 78-9.

[9] Jones 1974, especially 189-227; Crawford 1970.

[10] Jones 1974: 74.

[11] The quote is from Silver 2011: 19. Diocletian's lack of economic knowledge is commonly stressed, e.g. Jones 1970: 308.

because its introduction had to represent an attempt to save money.[12] Otherwise the denomination would not have existed.

In this model, the price of metals had no influence on the quality of the coinage. It was argued that metal prices did not change significantly (though there was little to support this assertion). The only real pressures on the coinage of the Roman state were fiscal: the tax system was inefficient, and there was resistance to increased taxation, so the only alternative was to debauch the currency to cover increasing shortfalls as the costs of maintaining an empire mounted (there was, and still is, no evidence for state borrowing).[13] All money was coined money, and therefore the supply of currency was restricted by the supply of metals used to make it.[14] The only way to stretch the supply of money was to stretch the existing metal across an increased number of coins – hence the debasements. Evidence for occasional improvements in fineness (such as that under Domitian; see below) made no sense, and were dismissed as impractical, doomed experiments.

Most importantly, it was argued that Roman coinage was not really money as we understand it. The state made coins only in order to cover its debts, usually in the form of salaries to its employees (notably the military). It had no interest in coinage as a medium of exchange (despite the fact that ancient sources explicitly said that coinage was designed for that purpose); instead exchange emerged naturally and incidentally when the population found it useful for the purpose.[15] Coinage was merely a means of payment for the state. However, it was questionable whether this sort of credit relationship between the state and its employees could really be considered a full monetary one,[16] and proponents of the model needed to find a way of ensuring that the state payments could be transferable to a third party. Taxation provided a solution. The state could kick-start the system of exchange by insisting on precious metal coins as taxes, requiring the population to acquire coins at the very least for this purpose. Base metal coin could be exchanged for tax coins, which helped explain the existence of an array of low value denominations (their existence being one of the chief objections to the model of coins as state payment).[17]

The model was thus relatively coherent, and overcame a big problem in the study of Roman money: how did the state distribute its coinage without a banking system? The answer was that it gave the coinage to those to whom it owed money, and no one else. Taxation would enable a certain degree of coin circulation; otherwise circulation was incidental. Thus there had to be an intimate link between state finances and the production of coinage; and even low value bronzes produced in limited quantities by small Mediterranean cities were regarded as evidence of the state's financial requirements. The distribution of

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[12] Jones 1974: 194n; Crawford 1975: 565.
[13] Jones 1974: 189-90.
[14] Jones 1974: 188: 'The currency was strictly cash.'
[15] Crawford 1970.
[16] De Cecco 1985.
[17] Reece 1987: 125.

coinage was also a political rather than an economic activity. Coins went to pay soldiers and state employees, and to finance wars and other state projects. Free minting was absolutely out of the question, and all coinage was produced on government account.[18] This meant that the state's ability to access metals influenced the coinage and its ability to finance its expenditure. It was argued that Rome relied heavily on gold and silver mined in Spain, and when this supply was interrupted and went into decline in the later second century AD, the Roman monetary system and state finances ran into trouble.[19]

The purpose of this rather long description of scholarly perspectives is to explain why the account of Roman coinage has assumed the shape that it has today: a rather moralising tale of financial incompetence and monetary mismanagement leading to currency collapse and economic crisis. While Renaissance and Enlightenment scholars might have seen in Roman coinage something worthy of emulation, the prevailing modern narrative would appear to treat the Romans as less than a model of financial probity. There also seems to be a contrast between the comparative stability of coinage under the Republic and Augustus and its instability under the empire.

However, in recent years there has been something of a move away from the substantivist model, at least for the period up to AD 200. This is no doubt partly due to the waning influence of substantivism on other aspects of the study of the economy in antiquity. The substantivist image of a Roman Mediterranean dominated by cellular, self-sufficient micro-economies simply does not tally with the growing body of evidence for long-distance movement of commodities and large-scale specialist production geared specifically for export, or with the evidence for a degree of economic growth in the Roman empire. In tandem with this, our understanding of Roman money has also experienced something of a mutation. It has been pointed out that the modern insistence that coinage was produced solely to enable state payments contradicts just about every statement from antiquity about its function, which was to enable exchange.[20] The importance of credit money has been recognised, and some allowances for reforms as monetary adjustments have also been considered.[21] Yet it remains challenging to make a case that the Romans were thinking seriously about monetary issues.

The few statements we have from the Roman perspective suggests that their understanding of money was far from 'primitive'. A judicial view of coinage is provided by the jurist Paulus in Justinian's *Digest*.[22] Like most of the few

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[18] The general acceptance of this model of the Roman monetary system meant that there was a major difference between the rationale for ancient coinage and many medieval coinages, with the result that there has been very little dialogue between medievalists and students of the ancient monetary economy.
[19] See Jones 1980 on the proposed link between Spanish mines and imperial coinage.
[20] Howgego 1990.
[21] Harris 2008.
[22] *Digest* 18.1.1.

statements about Roman coinage that survive from antiquity, it has received extensive study. It presumably supplies the state's view of its own coinage, and it is interesting to us because it claims that coinage was a *pretium* (a price) and not a *merx* (a commodity). The feature that enabled this transformation of commodity metal was the fact that a coin was *forma publica percussa* ('struck with the state's design'). This seems to suggest that the state recognised that the value of coinage was symbolic and not based on 'intrinsic' value. A statement by the jurist Gaius makes it clear that coinage was valued by tale and not by weight.[23] Such statements would appear to throw into question the focus of many studies on presumed relationship between the fineness and weight of the coinage, and in particular the silver coinage.[24] Proponents of the notion of a coinage of 'intrinsic' value have sometimes suggested that the third century was the period in which the Romans moved from an intrinsic to a fully fiduciary currency, but this seems an unnecessary qualification. Coins were always intended to be more valuable than bullion, even in periods when they were made of carefully-refined, unalloyed bullion.[25]

However, it is important not to lose sight of what the archaeological evidence tells us. Hoards of the period show us that people valued gold and silver coinage as a store of wealth and were prepared to withdraw it from circulation to act as savings. Presumably they favoured these metals because it was believed that their high commodity value would help sustain their face value over longer periods; or, if they failed to maintain their face value, the commodity would ensure they did not become worthless. The rarity of gold and silver coins as single finds on archaeological sites contrasts with the ubiquity of base metal coin in the finds record. Base metal would appear to have been valued for use in small-scale transactions but not for savings, since it is less commonly encountered in hoards. The hoards also show us that people were aware of differences in fineness and weight, and were capable of preferentially selecting heavier or finer coins when assembling hoards.[26] Thus the quality of coin mattered, and public opinion about it could have an impact, potentially constraining the state's ability or willingness to implement drastic changes. The

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[23] Gaius, *Institutes*, 1.123.

[24] Walker 1976, 1977, 1978.

[25] On the transition, see Strobel 2004. The observation that the maximum price for gold in Diocletian's Prices Edict is the same whether in bars or in coin (Graser 1940: 413, 30.1a; Hendy 1985: 450), seems to me to be irrelevant here. If the maximum price for bullion exceeded that of coin, gold coinage would be rendered unprofitable to produce.

[26] A good example of this kind of discrimination is demonstrated by the Beau Street hoard, discovered in the city of Bath in 2007 (Ghey 2014). It consisted of over 17,000 coins separated into eight leather bags. One bag contained almost exclusively silver denarii; four more contained almost exclusively finer radiates down to the joint reigns of Valerian and Gallienus (AD 253-260), and three bags contained mainly base radiates of the period of the sole reign of Gallienus (AD 260-268) onwards. The latest coins in the hoard (and in many of the bags) were of Tetricus (AD 270-274).

state's awareness of public interest in coin quality may explain a number of the strategies that we observe.

Another problem for the claim that there was a direct relationship between debasement and inflation comes from the evidence for prices. Price data for the Roman empire are very poor, and the only region for which we have any sets (if 'set' is not too grand a word to describe random survivals) is Egypt.[27] The problem with this evidence is that Egypt had its own coinage and seems to have operated a closed currency system. The changes to Egyptian coinage do not always coincide with changes to imperial coinage, so any effect that these changes had on Egyptian prices may not apply to the whole empire. There appears to have been a doubling of prices in Egypt during the 160s to 190s, which coincides with a halving of the silver content of the Egyptian tetradrachm in the 160s; but which was cause and which was effect?[28] There was another inflationary episode about a century later, in the 270s, when prices rose by about ten times. Finally, we have a set of price ceilings from outside Egypt in the form of Diocletian's Edict on Maximum Prices of AD 301, which indicate further price rises, though it is not certain whether this period of inflation had been prolonged or whether it was recent; as Rathbone has pointed out, the tone of the preamble to the Edict would seem to suggest the latter.[29] At any rate, it would be hard to find in the evidence anything that would qualify as sustained 'hyperinflation' – a monthly rate of 50% or above, equivalent to an annual rate of 600% or above – continuing through the third century, despite frequent use of this term to describe the third century price rises.[30] Compared to modern times, the Roman empire would appear to have experienced very low inflation, at least until the later third century AD. Is there any evidence to indicate that this low inflation was related to the fact that Rome had a currency made of gold and silver up to about AD 260, and that the period(s) of inflation were provoked by the advent of a largely fiat money?

Before proceeding with an account of the main changes to Roman coinage in the first three centuries AD it is necessary to outline the form of the coinage, which is more complicated than suggested by the term 'Roman coinage'. The main mint for most of the period was at Rome. Exactly how this mint operated, and how it was controlled, is unclear. Ultimate authority no doubt rested with the emperor. His financial secretary must have been charged with general decisions about production.[31] The senate continued to provide three junior members as overseers of gold, silver and base metal coinage, as it had done under the Republic, but it is unclear what role they had. The coinage itself reveals little. Gold and silver bear no marks of authority apart from the portraits, names and

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[27] Corbier 2005: 425; Rathbone 1996.
[28] Rathbone 1996: 334; on the tetradrachm's fineness, see Howgego, Butcher and Ponting forthcoming.
[29] Rathbone 1996: 321.
[30] Cagan 1956: 25 (making allowances for variations in the rate over successive months both below and above the 50% rate during a hyperinflationary period). Third century inflation characterised as hyperinflation: Silver 2011: 14.
[31] Statius, *Silvae* 3.3 85-105.

titles of the emperor or members of his family. Usually the names and titles are in the nominative case, giving no clear indication of ownership. However, under Trajan (AD 98-117) they are in the dative, with the formula 'The Senate and the People of Rome, to the Best Prince …'.[32] Whether this sort of dedicatory formula is relevant to the question of minting is uncertain. A group of epigraphic dedications on stone by mint personnel under Trajan shows them to have been imperial freedmen and slaves, suggesting that the mint was firmly under the emperor's control.[33] The brass and copper coinage of Rome almost invariably bears the abbreviation S(enatus) C(onsulto) 'by decree of the senate' but, given the close connection between the base metal coinages and their gold and silver counterparts, it is unclear what role (if any) the senate had in coin production, and the meaning of the abbreviation in the context of the coinage remains disputed.

Gold coinage was produced almost entirely – with hardly any exceptions – by the state mint(s). It seems to have circulated widely, and was also exported. Silver was produced in a variety of forms. The state mint mainly produced denarii but, in the eastern provinces, silver coinage of a local or regional type was produced. These eastern silver coinages were usually based on Hellenistic antecedents: cistophoric tetradrachms of the Attalids; Attic tetradrachms of the Seleucids; or Egyptian tetradrachms of the Ptolemies, to name some of the best-known examples. Who controlled their production is not clear, and it is possible that no single mode applied to the variety of provincial silver. It is fairly clear, however, the procurement of metal for these coinages was episodic, as was their production.[34] In this respect they differ from the silver coinages minted at Rome. However sometimes denarii and gold coins were issued at certain provincial mints, as if these centres had become branch mints of Rome. These arrangements were often temporary, but from the middle of the third century AD Antioch began to operate as a branch of the mint of Rome on a regular basis, while still continuing to issue provincial silver tetradrachms.[35]

The provincial silver coinages had relatively restricted circulation. The Egyptian tetradrachms are not found in any significant quantities outside Egypt; Syrian tetradrachms are confined to Syria; and cistophoric tetradrachms to western Asia Minor, and so on. Denarii, on the other hand, are found more widely, although there is little evidence for their circulation in Egypt, so it cannot be claimed that they were conceived of as an empire-wide coinage, although their distribution comes close. The pure silver denarii of the early imperial period were exported to India; later, baser silver denarii of the second century are found in northern Europe; but provincial silver does not generally seem to have been exported.

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[32] SPQR OPTIMO PRINCIPI. This formula is presumably a continuation of the obverse inscription giving Trajan's names and titles in the dative: IMP CAES NERVAE TRAIANO AVG GER DAC P M TR P COS V P P.
[33] Woytek 2010: 46.
[34] Butcher and Ponting forthcoming.
[35] Butcher 2004: 118-27.

At Rome, Augustus introduced a set of base metal denominations in brass and copper, chief among which were the brass sestertius and the copper as. By the middle of the first century AD this coinage had replaced local and Republican coinages in the west, but in the eastern provinces, the Greek tradition of cities minting their own currencies continued and in many places the base metal coinage of Rome did not circulate to any appreciable degree. It is debatable what sort of supervision of this local minting existed. Some city coinages record imperial permission, but most do not. As a result, it is not certain whether there was any central control of the supply of these coinages. Since they generally circulated only within a restricted area around the issuing city, oversupply need not have caused more widespread inflation. Cities were not the only entities issuing coins: we also find coinages issued by *koina* (associations of cities organised around provincial imperial cults) and by the rulers of kingdoms allied to Rome.

Conventionally numismatists have distinguished the coinage of Rome (aureus, denarius, sestertius and as, etc.) as 'imperial', and other coinages as 'provincial'. Given the more restricted circulation of provincial coins, scholars have tended to focus more on the imperial coinages as evidence for the condition of state finances and for economic performance, and it is on this imperial coinage that we will concentrate.

Two features of Roman coinage during the first three centuries of the empire seem to stand out: the stability in the relationship between the denominations; and the stability of the weights of the denominations. This does not mean that the weights remained entirely stable over long periods, and there was a tendency in some periods for slight reductions to be made, perhaps to compensate for declining weight of the monetary stock in circulation and/or changes in the price of one of the metals, although after certain denominations like the silver denarius began to be alloyed with copper this weight decline seems to have slowed. Another feature of the coinage was that the purity of the gold coinage remained very high, while silver coinage began to be alloyed with copper to a greater or lesser degree.

To maintain this kind of stability in a coinage composed of various denominations in a variety of different metals is surely worthy of note. While modern narratives stress decline and instability, the fact that the system of denominations remained remarkably stable over a period of several centuries hints that the modern fixation on decline may be only a part of the story, particularly given that prices appear to have remained fairly stable over the same period. This apparent monetary stability is all the more remarkable given that the coinage of the early empire was very complex for a pre-modern society. As noted above, it made use of four different metals: gold; silver; brass; and copper. During the first two centuries AD coinage in all four metals was produced regularly and often on a large scale. This so-called 'Roman imperial' coinage contrasts with Republican coinage, which was composed mainly of silver denarii (and sometimes a half denomination, the *quinarius*) and copper alloy coins, mainly composed of *asses* (originally valued at a tenth of a denarius, but later revalued at a sixteenth). From the middle of the second century BC the

denarius had been produced on a massive scale. The copper alloy coinage had been produced in considerable quantities down to the mid second century BC (almost to the exclusion of silver coinage between about 170 and 150 BC[36]), but thereafter production was intermittent. Between 78 and 49 BC the state struck no base metal coinage at all. Older base metal coins continued to circulate, however, and may not have been completely eliminated from circulation until the first century AD.

The very simplicity of the Roman Republican coinage compared to the imperial coinage may be one of the reasons why it appears to have been stable. Under the Republic, the state did not have to manage a coinage composed of multiple denominations in four different metals. Even so, there were monetary and financial problems under the Republic. Something must have caused the revaluation of the as relative to the denarius in the 140s BC. One possibility that has gained widespread credibility is the proposal that oversupply of asses in the first half of the second century led to a rise in the value of silver relative to base metal – a clear monetary explanation of the sort that would be less well-favoured if it were applied to the imperial period.[37] In the 80s BC the denarius was slightly debased, which may be the reason why we find references to testing coins and fluctuating values in this period.[38] Two decades later, in 63 BC, there seems to have been a liquidity crisis with widespread hoarding following a contraction in denarius output.[39]

Towards the end of the Republic some major changes occurred.[40] Julius Caesar in 46 BC began striking gold coinage on a massive scale. Previously there had only been small issues of gold. We know from later sources that the main gold denomination, the denarius aureus, was worth 25 silver denarii, producing a gold to silver ratio of 1:12. Both the gold and silver in this period were made from carefully-refined metal of a high purity. If one takes the weight of Caesar's aureus and assumes it was worth 25 denarii, the ratio of his gold to silver is indeed 1:12, with a denarius struck at 84 to the pound an an aureus at 42. When we take into account later developments, the system looks like an attempt to establish a bimetallic standard.

Numismatists have tended to regard the coinage of the Roman empire as the creation of Augustus, and it is not uncommon to find it referred to as the 'Augustan' coinage. The coinage of Augustus is treated in modern scholarship as the original standard for imperial coinage, and later developments are regarded as adulterations of this standard. Yet the system of gold and silver appears to be an arrangement created by Julius Caesar, not Augustus. The significance of Augustus in Roman monetary history seems to me to have been exaggerated, to the extent that it has obscured or even trivialised the significance of changes

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[36] Woytek 2012: 330.
[37] Buttrey 1957.
[38] See the discussion in Crawford 1985: 187-93.
[39] Crawford 1985: 240-1.
[40] What follows is based on Butcher and Ponting forthcoming; Butcher and Ponting 2012.

under his successors. While there were developments under Augustus, who made some modifications to Caesar's system (which included reducing the weights of the aureus and denarius), more significant and far-reaching changes were introduced by later emperors.

That the gold and silver component of the Roman imperial monetary system was not the creation of Augustus is apparent from the fact that under Augustus the weight standards declined slightly from those of Julius Caesar. Further weight reductions took place under Augustus' successors, and production of silver coinage faltered. In contrast, production of gold seems to have remained high. This does raise the question of whether the changes we observe are the consequence of a gradual rise in the price of silver relative to gold, with the result that the silver denarius became increasingly unprofitable to produce at the existing standard. Such a change in price could explain what happened next.

In about AD 64 the emperor Nero reduced the standards of the gold and silver coinage. The importance of this reform can scarcely be exaggerated. Nero's standards remained in use for more than a century, and later emperors like Diocletian went back to them after the monetary changes of the third century. The coinage of the High Roman Empire was Neronian, not Augustan. It is this reform, or rather series of reforms, and their consequences, that I want to concentrate on, because I think they demonstrate that the Romans were thinking quite carefully about the management of their coinage.

That said, no ancient source mentions the reform. Consequently its purpose is disputed, with most scholars pointing to Nero's alleged financial difficulties as the reason for the change. Attention has focused on the silver coinage. For the first time, this was alloyed with a substantial portion of copper – 20%. This is normally seen as evidence that Nero was running out of money, but few have ventured to explain why the standards were chosen. In my view they were not arbitrary. The denarius was reduced in weight to about 3.45g (96 to the pound), which was a weight standard used in the Greek east for the drachm. It is possible, therefore, that one of the aims of the reform was to bring the denarius and drachm into equivalence. There is some evidence that the discrepancy between the local silver coinages of the provinces and the denarius had caused complications when assessing tax, and simplification may have been the main purpose of the harmonisation of the imperial and provincial silver coinages.[41]

The reforms were also accompanied by a change in the location of the mint for gold and silver. Under Augustus and his successors the aureus and denarius had been produced not at Rome, but at Lugdunum in Gaul; now Nero stopped production of gold and silver at Lugdunum and opened a mint for them at Rome.

The reduction in the fineness of the denarius may have proceeded in stages, since the earliest denarius issues after the reform seem to be comparatively fine – over 90% - but employ the new weight standard. Soon, however, the mint switched to a denarius at 80% fine. This was the first time the mint of Rome had

[41] Rathbone 2008: 266.

produced such a base denarius. Silver-copper alloys were common in the Greek east, and a standard of 80% was in use for some provincial coinages, suggesting yet another link between the new Neronian denarius and its provincial counterpart. The source of metal was also different. Lugdunum had relied on western sources: initially products of the mines in Spain, but, latterly, in Gaul; whereas Rome seems to have specialised in recycling old denarii. This recycling was to become a key component of monetary strategy as the first century progressed.

The gold coinage was also reduced in weight. It remained pure gold, but was now struck at 45 to the pound. The reason for this reduction seems to have been in order to maintain a notional 1:12 ratio – the ratio that would have existed had the denarius still been made of pure silver. In reality, the ratio was about 1:9.5. We cannot be certain how much the denarius was overvalued in relation to gold, but some degree of overvaluation is implied by the fact that in AD 68, at the end of his reign, Nero raised the fineness to 90%, and during the civil wars following his death, the various contenders for the throne issued pure or nearly pure denarii on the Neronian weight standard at mints in Spain and Gaul.

It would appear, then, that under Nero the denarius was understood to be a token coin, worth much more as a coin than as a piece of silver. If we are to consider the system bimetallic, it was merely a 'limping' bimetallism, with gold as the standard and silver as a token. This token denarius would seem to vindicate the jurists' conception of coinage as symbolic of value. However, public reaction to the changes reveals that other conceptions of the value of coinage existed.

First, the evidence of coin hoards. There are now a number of coin hoards containing denarii from Republican times through to the eve of Nero's reforms. In contrast, there are no known hoards closing with Nero's post-reform denarii. Clearly some people regarded the post-reform coins as different, and preferentially selected the pre-reform coins when hoarding. The Lugdunum issues were also exported to India, presumably for their bullion value. This process of export may well have begun under Nero's predecessors, when (as surmised above) the denarius was becoming increasingly undervalued at its old weight and fineness, but its continuation after Nero is assured because one coin from India bears a countermark of Nero's successor Vespasian (AD 69-79).

However, not everyone chose to separate pre- and post-reform denarii, even after the emperor Otho (AD 69) and his successors reverted to the 80% standard of fineness. Evidently reactions to the reform varied. We assume that pre- and post-reform denarii were meant to circulate at par, but that is merely an assumption. The changes that took place in the later first century AD may have been attempts to combat the development of an unofficial discounting of the new denarius against the old. First, in AD 82, Domitian restored the denarius to a pure silver coin, but did not restore pre-Neronian weight standards (his coin may have been slightly heavier than a Neronian denarius, at about 3.55g). He also increased the weight of the gold coinage, this time to pre-Neronian standards. This produced a gold to silver ratio of 1:11.5, close to the pre-reform

ratio. But the reform does not appear to have been a success, to judge from the evidence of mint output.[42] As had happened in the period before Nero's reform, gold production was high and silver production declined precipitously. Three years after the reform, Domitian returned to Nero's weight for the denarius, using the revised standard of fineness of 90% that Nero had employed at the end of his reign. It looks as if Domitian was a convinced metallist who wanted to break with Nero's coinage, but was forced to concede that traditional ratio of 1:12 was no longer cost-effective. Even after he had reduced the fineness in AD 85, he still sought to maintain the denarius at the higher 90% standard of fineness, and he continued to mint aurei at a standard above Nero's, ensuring a ratio of about 1:10.

We have no useful price data from the period, and no way to evaluate what effect any of this had on prices – whether, for example, Domitian's improvements were deflationary. In any case a substantial proportion of the circulating medium continued to consist of Republican and pre-Neronian denarii, if hoards are any guide, so much of what was available for exchange was equivalent in silver content to Domitian's new coinage. However what happened next strongly suggests that the continued presence of pre-Neronian reform denarii in circulation was perceived to be a problem. Over the next few decades this older coinage was removed from circulation. What is remarkable is how comprehensive this removal was. Republican and pre-Neronian reform denarii disappear from hoards between the reigns of Trajan (AD 98-117) and Hadrian (AD 117-138) and never reappear. As mentioned above, the mint of Rome specialised in recycling old coin, and continued to do so until mid way through the reign of Trajan, when we can see a dramatic change in the trace element profile of its silver supply. The mint switched from recycled material to something that probably represents a freshly-mined source. This coincides with a remark by the third-century historian Cassius Dio that Trajan called in obsolete coinage.[43]

Trajan also returned the denarius to its Neronian standard of 80% fine, and the aureus to its Neronian weight (older aurei at heavier weight standards rapidly disappeared). His reign therefore witnessed the successful implementation of Nero's coinage standards, by doing away with the pre-Neronian reform coinage. Given that the volume of Republican coinage still in circulation in early imperial times was probably enormous, it is possible that Trajan was merely completing a long-term Neronian scheme to replace old with new, a scheme that had been interrupted by Domitian's attempt to restore a full-bodied coinage.

The switch from recycled silver to a new source in the reign of Trajan is striking. The traditional model has stressed that supplies of silver were running out and that the financial system was under strain. Yet if so, we might have expected to see signs of intensive recycling as the state attempted to acquire whatever silver was available. Instead we see the opposite: the denarius coinage of the entire Roman world was renewed through recycling between Nero and Trajan, after

[42] Carradice 1983: 160.
[43] Cassius Dio 68.15.

which the state seems to have moved to a single source of supply. What that source was we cannot yet say. However, another source comes on line during the course of the second century alongside the first, which may be Dacian in origin (Trajan having annexed Dacia in AD 106). Study of this material is still in progress.

The rest of the second century witnessed some minor fluctuations in fineness, and possibly a slight reduction in the weight of the denarius (and perhaps the aureus), but no major deviations from the Neronian standards.[44] However, in AD 194, Septimius Severus reduced the silver content of the denarius to just under 50% fine. No changes were made to the weights of either aureus or denarius. As with the Neronian reforms, we have no useful price data, but hoards once again show a certain amount of preferential hoarding of pre-194 denarii, and their export – not to India, but to northern Europe. As before, we assume that old and new denarii were meant to circulate at par. Pre- and post-194 denarii were hoarded together, just as pre- and post-64 denarii had been hoarded together down to the time of Trajan and Hadrian. The Neronian reforms thus supply a partial parallel for the one under Severus.

Whether this debasement tells us anything about the changing price of silver relative to gold is hard to determine. It may be simply the case that Severus decided to increase the rate of overvaluation of silver to gold. Even so, strange things happened to the gold coinage during the third century. While there is evidence for continued production at high levels, gold coinage was rarely hoarded either within or without the empire. What became of it is unclear. What is more, by the reign of Severus Alexander (AD 222-235) the aureus no longer appear to have been issued at a fixed weight standard, which suggests that it no longer bore a fixed relationship to the rest of the coinage. It looks as if gold had effectively become demonetised.

There is much else that is mysterious about the coinage of the third century, the period of supposed hyperinflation. Most serious of all these mysteries is the face value of the silver coin introduced by Caracalla in AD 215, conventionally called an 'antoninianus' or radiate' because its real name is unknown. We have seen how Mommsen proposed that it was an overvalued double denarius, and perhaps this is correct, but numismatists and historians have been remarkably cavalier in pronouncing it so. Caution is necessary when one's understanding of an entire currency system depends on it. The substantivist historian A H M Jones stated that there would have been no point in issuing the antoninianus unless it had represented a debasement, and many Romanists concur (see above). Yet there remains another possibility: that history was effectively repeating itself, and the public were discounting post-194 denarii compared to pre-194 ones, and hoarding or exporting pre-194 denarii, forcing the state to take action. Caracalla's solution was the same as Domitian's: to restore the pre-reform denarius; but he chose to restore it alongside the post-reform one by introducing a new coin. Rather than being innovative, the introduction of the new coin was conservative: it restored the Neronian denarius or drachm, but in a new form.

[44] Butcher and Ponting 2012.

Making sense of the coinage in the decades to followed is not currently possible. Too little is known about either the weight or fineness of the silver coinage, and the erratic weights of the gold coins do little to convince one that any consistent standard lay behind it. It would appear that by about AD 270 the former complexity of Roman imperial coinage had been reduced to a single denomination: the antoninianus, which by now had a nominal silver content of about 2% and was otherwise made of copper (and perhaps some tin). Most provincial coinages, whether of silver or base metal, had ceased (except for Egypt); gold is strangely absent, although apparently still produced in some quantity; the denarius was no longer produced in any substantial numbers but continued to function as a unit of account (assuming that the accounting term 'denarius' refers to the smaller coin and not to the larger, radiate antoninianus); and imperial base metal denominations had likewise all but ceased. It looks as if a proper fiduciary currency had been established. Freed from the constraints imposed by a coinage made from valuable commodities, and with a gold coinage of floating value against a notional denarius of account, emperors could revalue this billon coinage by fiat. In AD 301 Diocletian was able to double the value of a denomination (or maybe several denominations).[45] Twenty years later, in about 321, the emperor Licinius halved the value of his main base metal unit, the *nummus*, from 25 to 12.5 denarii.[46] Such options had not been available to rulers of the first and second centuries.

The change from a regime of low inflation to one characterised by periods (perhaps short and intermittent) of high inflation seems to be accompanied by a change from a complex coinage with denominations standing in fixed relationships to one another and made of valuable commodities to a simpler coinage consisting of billon coins with a largely nominal value and gold coins with a floating value. This would seem to argue in favour of a currency backed by metallic value as the more stable model, but we cannot be certain whether the lack of flexibility posed by the earlier system was not a hindrance that the changes of the third century were intended to solve. The changing prices of metals could have placed a strain on the earlier, more rigid system, resulting in falling production levels of certain denominations and threats to the level of liquidity, and the need to remove large populations of older coins. Corrections or restorations of fineness and weight could have had unintended deflationary consequences. After a debasement the hoarding of coins deemed more valuable could also have impacted on liquidity. Without good data on wages and prices it is difficult to say what were the wider consequences on society of the changes we observe. Some studies have argued for increasing demand for coin and increasing monetisation as the coinage became more debased, suggesting that, if coinage was intended to serve as a medium of exchange, the late antique system was a successful one, and that increased supply and debasement did not necessarily result in persistent inflation.[47]

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[45] Opinions vary: Harl 1996: 153 (all denominations); Estiot 2012: 548-9 (some denominations); Abdy 2012: 585 (one denomination).
[46] Hendy 1985: 463-5.
[47] Rathbone 1996.

Without clearer information about output, fineness and even the face values of the coins after the beginning of the third century it is often very hard to be decisive about either the rationale for changes or the outcomes of those changes. Recovering the monetary history of the Roman empire is essentially an exercise in prehistoric archaeology, in that there is plenty of material evidence, but almost no helpful documentary data. Modelling and the use of comparative material seems the most fruitful way forward. A current research project aims to outline the fineness of Roman silver coinage, and at the same time characterise the metal supplied to the mints, whether freshly-mined or recycled. This has revealed some of the complexities alluded to above. Even so, there remains some resistance on the part of many Roman numismatists to thinking about coinage in economic terms, which is no doubt the legacy of substantivism. Despite mounting evidence to the contrary, the preferred interpretation of hoarding patterns such as those terminating with Nero or Septimius Severus' reform are that they are evidence for wars or barbarian invasions and payments or transfers of money to soldiers or barbarians, not evidence for public reactions to coinage reforms or flows of undervalued coins to places where their bullion value would be realised. The movement of coinage is almost always treated as evidence for state payments or troop movements rather than exchange. While there is a tendency nowadays to rebrand the third century 'crisis' as a 'transformation', the currency is still said to have suffered a 'collapse'. Here too, however, 'transition' might be a better description, since it could be argued that the coinage presents us with a continuum.

I fear that much of the above will seem unduly pessimistic. However, there are reasons for optimism. Happily, we are living in an age where the monetary history of the Roman world is becoming a major research area. There are important projects under way that seek to understand the composition of the coinage and the supply of metals, and the patterns of hoarding both within and without the empire. In a few years we may be able to revisit the topic with more confidence in our certainties.

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