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**Destabilizing asymmetries in central
banking: With some enlightenment from
money in classical Athens**

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Abstract

Drawing on theory and empirical evidence this paper establishes that the U.S. Federal Reserve System, and for the same matter central banking in general, is associated with four classes of asymmetries. These emanate from *informational*, *structural*, *instrumental*, and *moral hazard* misalignments. The latter one is particularly destabilizing because the U.S. Federal Open Market Committee, i.e. the Fed, by assuming the risks of bad and good banks alike, cultivates among them incentives of moral hazard, which exacerbate the risk of the banking system. By implication, if anything is certain this is that another 2008-type financial crisis, if not bigger, will occur and at a time that will be least expected. That is why, acting prudently recommends replacing the Fed with a monetary system free of these asymmetries. To contribute in this direction, the paper presents and assesses the properties of the model of free banking that emerged in classical Athens, the merits of which can be hardly overstressed. In particular, the money market functioned as a fully decentralized monetary system. The state served the common good by providing the institutional setup for establishing the *Attic* drachma as a symbol of its ever-lasting reputation, whereas the quantities of silver currency and money, along with the interest rate and the reserve ratios of banks, were determined competitively in private markets. Moreover, monetary policies generated no asymmetries because the commodity nature of the currency, flexibility of relative prices, and the openness of the economy, assured price stability.

Keywords: Central banking, monetary policy, stabilization, asymmetries, free banking, money in classical Athens

JEL Codes: E31, E40, E52, E58

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1. Introduction

To the extent that public policies, conventional or not, draw on propositions emanating from general equilibrium theory, they depend squarely on the presumption that the institutions and the behavior of economic agents are such that through continuous adjustments the economy is led in the long run to a state of social peace and resource sustainability. From the contributions of [Arrow](#), [Debreu \(1954\)](#), [Debreu \(1959\)](#), [McKenzie \(1959, 1987\)](#), and several other pioneers, it follows that ingrained in this economic theory of free market economies is the notion of *symmetry*. Sellers and buyers have full information. All sellers and buyers are small relative to the markets in which they participate, and hence none is able to distort the competitive process. The technologies of production and distribution of goods and services are such that do not promote concentrations of economic power, which might introduce imperfections in the markets, etc. However, against the predictions that derive from this analytical framework, the actual course of economic activity as reflected in such aggregates as output, employment, consumption, investment and the likes, is anything but smooth and orderly over the business cycle. Consequently, it is not surprising that research economists have turned their attention in recent decades to the channels through which public authorities introduce various *asymmetries* and/or, on political or other grounds, they allow endogenously grown *asymmetries* to undermine the fundamental premise of *symmetry* on which the proper functioning of such economies is predicated.

To reinforce this assessment, consider the implications from the theory of asymmetric information, which was developed in the 1970s and 1980s by [Akerlof \(1970\)](#), [Rothschild, Stiglitz \(1976\)](#), [Jovanovic \(1982\)](#), and others. Having demonstrated, first, that there are markets in which sellers have more information than buyers, and secondly that such markets fail to deliver the expected results, these researchers made a plausible case to the effect that *informational asymmetries*, if widespread and persistent, may give rise to elevated volatility in the short-run and delay convergence of the economy in the long-run.¹ In this light, suppose that markets suffer neither from this nor from any other distortion and ask the question: Would long-lasting *informational asymmetries* emerge in the presence of a central bank? The answer is certainly in the positive.

¹ [Arrow, Hahn \(1971\)](#) have shown that errors of judgement and management due to market imperfections are offset in the long-run, particularly if the economy is growing. However, if a central bank is present, this is not the case because *informational asymmetries* are persistent. Looking forward, this argument will help us gain further insights later on when the presentation turns to the evidence found in the literature regarding the implications of unanticipated shocks induced by monetary policies.

For, if there is a clear-cut asymmetry that comes to mind, this is that what the central bank may possibly know about the state of the economy falls short of the information individual economic agents have at any given time. To differentiate these two types of *informational asymmetry*, it is convenient to call the former “Akerlof’s asymmetry” whereas the latter “Niskanen’s asymmetry”.²

Another asymmetry, the nature of which is *structural*, springs from the micro-prudential policies of central banks. To highlight it, consider the case of the United States (U.S.).³ Given that the Federal Open Market Committee (henceforth, “the Fed”) is in charge of the rules that apply in the regulation of the financial system, it follows that the Fed is responsible for the degree of competition that prevails in the banking industry. Has the Fed acted to promote competition by preventing concentration among banks, or perhaps it has encouraged it? [Fohlin, Jar- emski \(2020, 2\)](#) report that, while the value of assets managed by the top five banks as a percentage of total assets never exceeded 11% from 1820 to 1924, in the following years it trended upwards rising to around 27% in 1980. After decelerating somewhat in the 1980s, its trend turned again upwards in 1994, climbing to an all time high close to 50 % in 2012, and since then it has retreated towards the neighborhood of 45%. From the course of this index, one cannot help but surmise that, in the 80 years from the *great depression* in 1929 to the *great recession* in 2008, the Fed pursued systematically policies that encouraged concentration in the banking industry. If one were prepared to assume that the Fed behaved in this way because it found motivating support in the findings of empirical research, one would be disappointed for at least two reasons. First, because according to the recent assessment of the literature by [Barrell, Karim \(2020\)](#), the evidence is inconclusive, if not slightly in favor of the view expressed by [Schaeck, Cihak, Wolfe \(2009, 711\)](#) that “more competitive banking systems are less prone to experience a systemic crisis and exhibit increased time to crisis”. And second, because the rise in the concentration ratio predates all available empirical evidence about its harmful implications. Rather the more credible interpretation is that the Fed gave in to pressures that the “big-to-fail-banks” exercised via the political system.

² Researchers following [Akerlof \(1970\)](#) have investigated *asymmetries of information* that lead to market failures and their findings provide justification for government intervention. On the contrary, researchers following [Niskanen \(1971\)](#) focus on *asymmetries of information* that are generated by government interventions and their findings provide justification for state authorities to remain aloof. This paper follows Niskanen’s approach.

³ According to [van Alfen \(2011\)](#) and other economic historians, during classical times the Athenian currency held a position in the wider Mediterranean region comparable to the worldwide dominance of the U.S. dollar in recent decades. Drawing on this parallel, henceforth all references will relate to the monetary institutions and policies in the U.S.

Closely related to the preceding are various *systemic asymmetries*, the source of which are the multiple *moral hazards* that the Fed has propagated among the banks that participate in the Federal Reserve System. For example, by allowing a few banks to grow so large that, if any of them failed it might bring down the whole financial system, the Fed has transformed banking crises in the U.S. from a problem of isolated individual banks before its establishment in 1913, to a problem of large-scale systemic breakdowns in a centrally managed financial system. Now any of these large banks knows that its credit risks are ultimately insured by the money creating authority of the Fed, and hence instead of prudence it has an incentive to degrade the quality of its loans to maximize profits. How destabilizing this magnification by centralization of financial risks may turn out to be, we experienced recently, when suddenly financial markets closed down in 2008 and the authorities improvised with policies alien to free market economies. And certainly one does not have to study the analyses by [Stockman \(2013\)](#), [Jordan \(2015\)](#) and other experts to sense the potentially ominous developments looking forward.

In addition to the preceding three classes of asymmetries, central banks are associated with yet a fourth one, which for purposes of distinction may be called *instrumental*. This has to do with the differential size and sign effects that changes in the quantity of money and the interest rate on central bank funds may induce on key macroeconomic aggregates over the business cycle. As it can be ascertained from the survey article by [Florio \(2004\)](#) and the papers in the more recent special issue of the *Journal of Economic Asymmetries* that [Kouretas, Papadopoulos \(2016\)](#) edited, the study of these asymmetries in recent decades has attracted considerable attention. In particular, interest started back in the 1970s and early 1980s with the key contributions by Barro ([1977](#), [1978](#)) and [Mishkin \(1982\)](#), and since then the literature has grown voluminous. Its significance lies in the empirical nature of the evidence that it provides. For, if it turns out that in actuality monetary policy defies the objectives assigned to central banks by citizens in Western-type democracies, or if the instruments used in the conduct of monetary policy give rise to socially unacceptable asymmetries, central banking may be deemed superfluous.

The objective in this paper is to argue that in the latter event the alternative would be to adapt to modern circumstances a monetary system without a central bank by drawing enlightenment from the historical precedent of Athens in classical times. To this effect, Section 2 pursues two tasks. Namely, first, to present a brief account of the main issues that have been raised and discussed with regard to the conduct and effects of monetary policy, and second, to assess the sig-

nificance of the associated empirical evidence. Section 3 highlights the rudiments of the monetary system in classical Athens. Athens did not have a central bank but it had sound money. Hence, its case offers a good historical precedent for looking into monetary policies as a source of possible asymmetries. This task is undertaken in Section 4. Finally, Section 5 closes with a summary of the main findings and the conclusions.

2. Monetary policy in the U.S.: Issues, evidence and implications

Before the 1929 crisis, the normal for central banks was to employ the instruments of monetary policy at their disposal to stabilize prices. After the *great depression* that followed and until the 1960s, central banks were tasked in addition to achieve maximum employment, or inversely the lowest possible unemployment. With two instruments available, that is the supply of money and the interest rate on central bank funds, and two objectives to achieve, the problem on account of Tinbergen's (1952, 1956) contributions was considered tenable, and this justified their efforts to fine-tune inflation and unemployment in the context of the U.S. Phillips Curve. Then, in the 1970s, there emerged the phenomenon of stagflation, and monetary policy entered a period of uncertainty as to its efficacy. For an example, consider the U.S. Federal Reserve Reform Act of 1977. Fed's mandate was expanded to pursuing money supply growth commensurate with the economy's long run productive potential, maximum employment, stable prices, and moderate long-term interest rates. In that juncture, central banking became untenable, because the Fed does not have four independent instruments at its disposal.⁴ Nor has central banking gained effectiveness ever since. The reason being that, while the "Statement on Longer-Run Goals and Monetary Policy Strategy," which was adopted in January 24, 2012, and amended, in January 29, 2019,⁵ tasks the Board of Governors of the Federal Reserve System with three objectives, the Fed is known to rely only on the interest rate for over two decades now.

However, this argument has failed to shake the trust of advocates for central banking. Perhaps they remain unwavering in their views because they are encouraged from the empirical evidence, which has become available in the meantime. To find out, this section assesses the findings from a brief survey of the relevant literature.

⁴ Distinguishing between policy targets, on the one hand, and policy instruments, on the other, Tinbergen argued that to achieve n independent policy targets at least the same number of independent policy instruments are required. This has become known as the Tinbergen Rule.

⁵ See, http://www.federalreserve.gov/monetarypolicy/files/FOMC_LongerRunGoals.pdf.

2.1 Asymmetries due to the lack of instrument control

Beginning in 1970, every week the Fed declared the path of M1 and indicated their preferred behavior for M2.⁶ This approach to controlling money supply changed in 1975, and the Fed began to announce publicly targets for money supply growth. However, even though in the following years they experimented with various operating targets, experience was disappointing and particularly during the period 1979–1982. As a result, the Fed started to deemphasize the use of monetary aggregates, and in 1987, they declared that they would not even set targets for M1. Finally, upon testifying in Congress in 1993, Alan Greenspan, then chairperson of the Fed, submitted that they would no longer use any monetary targets, including M2, as a guide for the conduct of monetary policy. This was equivalent to witnessing that any measure of money supply is too volatile to be used as a policy instrument, and hence by implication, that the monetary policy in the preceding decades might have been responsible for generating destabilizing asymmetric shocks.

That the latter is the case may be glimpsed by drawing on more recent events. Let us assume that the base money is 100 dollars and that the reserve requirement is 10%, so that the official upper limit of “money supply” commercial banks can provide to the economy is 1,000 dollars. Under the prevailing economic circumstances, commercial banks may decide to lend less or more than this limit. Can this be possible? Certainly it can, and we observed the former event right after the outbreak of the crisis in 2007–2008, when the commercial banks stopped lending altogether and the financial markets imploded. As for lending in excess of the official limit, what happened in the period preceding this crisis is revealing. Commercial banks used fractional reserve controlled deposits to finance voluminous loans against risky asset-backed securities from outside the commercial banking system, and they did so without adequate capitalization to self-insure for the high risks they assumed. Again, but the hard way this time, it took a systemic breakdown to understand that the Fed could never control the money supply and that in its effort to do so in actuality destabilized the economy.

Nor can the Fed control the other instrument of monetary policy, that is, the interest rate on the funds it provides to commercial banks. For, if the rich evidence summarized in [Bitros \(2015\)](#) is not convincing enough, the empirical evidence reported by [Fama \(2013, 198\)](#) more than suffices. Clearly, being unable to control the instruments at its disposal, the Fed and for the same matter

⁶ Money supply measured by M1 includes cash, demand deposits, and traveler’s checks. M2 includes M1 plus savings and time deposits, certificates of deposits, and money market funds.

any central bank should be unable to manage effectively monetary policy. Even worse, in the context of moral hazard, no central bank can be certain that its operations do not introduce harmful unintended asymmetries. For, in the real world there is always Knightian uncertainty⁷ and, according to [Phelps \(2010, 137\)](#), central banks cannot know the level to which they should set a given “policy instrument”, and thus neither the direction nor the step by which to start moving it.

2.2 Asymmetries due to the unknowable structure of the economy

From the preceding it follows that, since the central bank is unable to control its policy instruments, it is hopeless to expect that it can fine-tune the economy. This inference may be reinforced strongly by borrowing schemes of thought and analytical tools from the theory of chaos, which is widely used in the natural sciences.⁸ According to this theory, short term policy effects, either positive or negative, are followed by feedback effects that the central bank is impossible to know in advance whether eventually they may push the economy towards equilibrium or not. For an example, consider how a policy can be implemented, either as a reaction to something negative (e.g., rising unemployment) or as an initiative to prevent some undesirable development (e.g., burst of inflation). The policies in these two cases will have different feedback effects. In particular, policies to reduce unemployment may have much better results than policies to prevent inflation. But even if unemployment is reduced and the economy reaches some sort of employment equilibrium, this will be temporary, because new disturbances stemming from shifts in the unknown plans of consumers and/or producers will start a new round of adjustments that will most likely pass undetected by the central bank to promptly revise its policies.⁹ Conversely, if the central bank stays put, the economy would absorb the new disturbances by moving along a path of continuous adaptation (as in the theory of chaos). This is exactly the difference that explains why central bank interventions may give rise to more negative than positive results. In other words, such interventions are “second best” because they cannot discount the reactions of economic agents, they destroy the flexibility of the economy, and hence the self-coordinating

⁷ This type of uncertainty refers to the inability to quantify the probability of occurrence of an event, as opposed to the presence of quantifiable risk in the form, say, of statistical noise or a parameter's confidence interval. The concept, named after [Knight \(1921\)](#) who suggested it, acknowledges the unpredictability of future events due to the fundamental limits of knowledge.

⁸ See, for example, [Parker, Stacey \(1994\)](#).

⁹ Shifts in the plans of consumers and/or investors imply in essence that the parameters of any macroeconomic model would shift in response to monetary policy, and hence the central bank can never know the true structure of the economy. This proposition draws on the critique of public policies that was first articulated by [Lucas \(1975\)](#).

feedback mechanisms to bring about a timely adaptation to disturbances, and as shown by the empirical evidence surveyed below they lead to all sorts of shocks.

2.2.1 Asymmetries due to shocks in the growth of money supply

Beginning with Lucas ([1972](#), [1973](#)), it has been established in macroeconomic theory that, if people have rational expectations about future economic conditions and markets are self-coordinating, only sudden or unexpected monetary policies that take people by surprise may have some effects on the economy. Barro ([1977](#), [1978](#)) and [Barro, Rush \(1980\)](#) tested this hypothesis using post war U.S. data on money, unemployment, output (GNP), and the price level (GNP deflator) and found that the *unanticipated* component of money supply growth related negatively to unemployment, and positively to output and longer-term inflation. These research efforts were warmly welcome for the wide avenues they opened to testing for the effectiveness of monetary policies. But at the same time the results were found unsatisfactory because, in addition to various methodological shortcomings, first, they left unanswered the question of whether or not money supply growth influences the economy over the business cycle, and second, the neutrality of money that they implied in this setting was contradicted by the experiences of people during the upturns and downturns of economic activity.

As could be expected, with the credibility of the findings strongly in doubt, testing of the hypotheses, on the one hand of rational expectations at the macroeconomic level and of the neutrality of money that it implies on the other, did not take long to attract attention. Two years later, using roughly the same post war U.S. data in conjunction with an innovative econometric methodology, [Mishkin \(1982\)](#) was able to test both hypotheses by focusing on the effects of the *anticipated* component of money supply growth. Based on the results from the tests that he conducted, both hypotheses were rejected with high degrees of confidence, and moreover it was shown that the number of lags included in the estimating equations play a crucial role in delineating the length of the business cycle, and hence the rejection or acceptance of the hypotheses in question. Last, but not least, [Frydman, Rappoport \(1987\)](#), conducted tests using the same sample of data and found that output is influenced not by the *anticipated* or *unanticipated* components, but by the undifferentiated or *raw* money supply growth. Thus, by the end of the 1980s, and even though there remained significant uncertainties regarding the robustness of empirical findings, the evidence appears to have tilted in favour of the view that the Fed might

be able to fine-tune the economy and achieve its objectives through appropriate changes in the growth rate of money supply. Yet at the time it was unknown whether monetary policy might be equally effective in the contractionary and the expansionary phases of the business cycle. That is why since then this issue has remained high in the research agenda of empirically minded macroeconomists.

2.2.2 Asymmetries due to socks in the money supply

The first researcher to stress the importance of distinguishing between positive and negative shocks in the money supply is [Cover \(1992\)](#). To highlight the difference that it makes relative to the results reported by the above mentioned pioneers in this area, he focused solely on output, he stayed close to their data, sample period, and estimating approaches, and in order to check on the robustness of the parameter estimates that emerged, he tested for three processes of money supply. With regard to their implications for monetary policy, which are of main interest here, the results showed that, while unexpected increases in the money supply have no effect on output, unexpected decreases reduce it. This finding implied that monetary authorities might be able to stimulate output growth by reducing the variance of the unexpected shocks, and in the limit contribute even more significantly by eliminating all uncertainty about future changes by adopting a Friedmanesque policy rule of increasing money supply at a fix $k\%$ per annum. However, given that the Fed stands firm on applying policies at its own discretion, money supply socks are bound to remain uncertain, and hence destabilizing.

Since then several researchers have built on Cover's lead using different data, different sample periods, different target variables, different policy instruments and measurement thereof, different countries or groups of countries, and different models for identifying and estimating new categories of asymmetries. Yet, despite the wide variability in the testing circumstance found, for example, in [Morgan \(1993\)](#), [Rhee, Rich \(1995\)](#), [Karras \(1996\)](#), [Karras, Stokes \(1999\)](#), [Sensier, et al. \(2002\)](#), [Lo, Piger \(2005\)](#), [Hayford \(2006\)](#), [Karras \(2007, 2013\)](#), and [Gogas et al. \(2018\)](#), it is safe to surmise that the following list of results is well supported:

- Negative money supply shocks reduce output, whereas positive money supply shocks are unlikely to increase output because their effects tend to lack statistical significance.
- The positive and negative output effects are highly unstable. They vary markedly depending on the data environment within which the studies are carried out, the models and the estimating

methods employed, the state in which the economy is in (contraction-expansion), the presence in the output equation of the interest rate, the measurement of money supply, etc.

- Whether positive or negative, the output effects vary also with the scale of the shocks as well as their degree of persistence, namely whether they are temporary or permanent.
- The effects of shocks on output differ depending on whether they enter through the money supply or the interest rate on central bank funds. The evidence found is that, irrespective of the state of the economy, positive funds rate shocks (contractionary monetary policy) have a larger and statistically significant absolute value impact on real GDP growth than negative funds rate shocks (expansionary monetary policy).
- Positive and negative money supply shocks induce effects that are symmetric on consumption but with regard to investment they are similar to those on output.
- The effects of money supply shocks may affect output differently in the presence of inflation and supply side price disturbances such as oil price shocks.

In the light of the above, the question that comes naturally to mind is: Assuming that the Fed sought wisdom in the available empirical evidence to fine-tune the economy by adjusting appropriately monetary policies, would it find enlightenment solid enough on which to base its actions? The answer is that the empirical evidence is so uncertain¹⁰ that instead the Fed would be encouraged to abandon discretionary policies altogether and commit to a fixed money supply or interest rate rule. But since the latter is institutionally impossible, as [Chrysanthopoulou, Sidiropoulos \(2018\)](#) show, the case for the redundancy of the Fed and central banks in general becomes very compelling indeed, despite Gordon's comments to the contrary in [Barro, Rush \(1980, 55-63\)](#).

2.3 Implications

Both economic theory and empirical evidence cast strong doubts on the effectiveness of monetary policy. Since the Fed cannot control the instruments of monetary policy, and since monetary instruments turn into unintended channels of shocks that induce destabilizing asymmetrical output and other effects, there are two options. That is, either to subject the Fed, and any central bank for the same reasons, to a fundamental institutional overhaul, or to replace it by a market-

¹⁰ The empirical evidence is also uncertain because in the above-cited literature researchers do not allow for fundamental structural changes that took place in the post war period. In particular, recall that up to the early 1980s the U.S. economy was relatively closed, government deficits were moderate, the Bretton Woods monetary architecture ended in 1972, and the Fed switched to targeting the federal funds rate instead of the money supply in the early 1990s.

based monetary system, operating under the same government rules and administrative provisions as every other sector in the economy.

To this effect, drawing on several stands of literature, [Bitros \(2015\)](#) proposed turning the Fed into a fourth state power, along with the other three in the established system of checks and balances, and at the same time imposing on the Fed the obligation to follow a monetary rule of its choosing. There is no doubt that a reform of such monumental proportions is highly unlikely to pass through the U.S. Congress or the parliament anywhere in Western-type democracies. Simply in these countries, *representative party democracy* has grown biased towards serving primarily organized minority interests and radical reforms of this nature are impossible to contemplate. At least not, short of an imminent domestic and worldwide financial crisis.

Thinking ahead of such a prospect it is prudent to be prepared and have in reserve feasible alternatives. One that has been tried with great success is the free banking system that evolved in classical Athens, and to which the presentation turns immediately below.

3. Money in classical Athens¹¹

With the exception of a short period after its defeat from Sparta in 404, from 508 to 322 BCE, when it succumbed to the Macedon forces in the Lamian War, Athens was governed by three entities: These were the *Ecclesia of Demos* (congregation of citizens) or *Assembly*; the *Council of 500* or *Boule*; and the *Dikastiria* or *Courts*. The *Assembly* exercised the legislative, supervisory, select ultimate-degree judicial, and auditing authority. The *Council* was the executive branch of the government with main duties: a) to prepare the so-called *probouleumata* (preliminary decrees) and submit those which were approved for final discussion and voting in the *Assembly*; b) to prepare the agenda for each meeting of the *Assembly*; c) to care for the arming and manning of warships as well as the cavalry; d) to supervise the execution of the budget, the management of the *treasuries of the gods*,¹² the operations of the *mint*, and a wide range of special purpose funds; and e) to be in constant contact and monitor the performance of the nine *archons*, the ten *strategoï* (generals), and several hundreds of public officials (magistrates), appointed to manage the affairs of the state on a

¹¹ This and the next section are based on [Bitros, Economou, Kyriazis \(2020\)](#).

¹² They were temples or shrines devoted to gods that served various religious and social purposes and managed particular sources of treasures. For example, the *treasury of Athena* managed the treasures of Parthenon. They functioned as *bankers* to the state during peacetimes and as *lenders of last resort* in periods of war. They were run by a group of magistrates called *tamiai* (treasurers). The latter were appointed for one year, operated under the supervision of the *Council*, and they were relieved of all responsibility only after strict audit.

daily basis in conjunction with the services of the *public administration*. As for the judicial powers, competent to adjudicate civil disputes were the Dikasteric Courts (Popular Courts or People's Courts), whereas the *Maritime Courts* and the *Areiopagos* handled maritime disputes and most homicides, respectively. The Supreme Court called *Heliaia* served as a *Court of Appeals*.

In this institutional setup, known as *direct democracy*, the interests of those who govern the state coincide with the interests of those who are governed, and thus it was to the benefit of all to manage the finances of the state and the currency as prudently as their own. Beyond this fundamental difference with the system of *representative party democracy* that has been adopted in recent centuries, it is worth noting that Athens:

- Did not run systematic budget deficits, nor did it borrow from private markets in cases of unexpected revenue shortfalls. Instead, in affluent years, they donated part of the budget surplus to the *treasuries of the gods* (henceforth to be referred to as *treasuries*) and these funds together with those from private donations to the shrines remained available for the state to borrow on interest in cases of extreme and unexpected circumstances.
- Maintained control over the standards and the organizational safeguards to protect the integrity of its silver currency.
- Pushed for the adoption of drachma among its allies but without ever forbidding explicitly the parallel circulation of currencies within its borders, and
- Operated a *mint* where the state as well as anybody who had silver bullion might convert it into drachmae at a relatively small fabrication and seigniorage cost.

The Athenian economy in those centuries comprised several sectors. In particular, it included production of goods and services by households for own-use and sale. Trade oriented production of goods and services, including mining, handicraft and manufacturing, housing and infrastructures, money and banking, *paideia*,¹³ and other public services like policing and street cleaning; distribution of goods and services, including labor, and import-export activities, with supporting facilities for shipping, warehousing, and shipbuilding and repairing. Contrary to the economies before the so-called Industrial Revolution, with very few exceptions like Venice and the Dutch

¹³ In ancient Greece, over and above education, *paideia* comprised *agoge*, which consisted of a parallel process of building into the character of youth the required *ethos* that would enable them to become worthy of themselves and of their fellow citizens. This distinction is very important, because democracy at the time functioned as a collective of individuals who were taught throughout their lives to balance their obligations for the well being of the state with their personal interests as free and sovereign citizens.

Republic in the 17th century, in which agriculture was the dominant sector, the structure of the economy was comparable to that of contemporary developed economies. Although we do not have national income statistics to document this assessment, the case that can be made by drawing on the available qualitative evidence in support of the claim that services (retail and wholesale trade, shipping and banking) and industrial value-added activities were more important than agriculture is very strong. To corroborate this claim, it suffices to note the following with regard to the banking.

[Cohen \(1990, 2008\)](#) has established beyond any doubt that the banks in classical Athens created credit by a multiple of the deposits they received. However, apart from this common feature, those banks differed from the ones of more recent decades in the following notable respects. The currency they dealt with was silver coins and bullion convertible into coins on demand at the state *mint*. Their so-called base money consisted of coins and bullion they themselves owned and/or derived from primary deposits by wealthy citizens, *metics*,¹⁴ and *treasuries*. Secondary or derivative deposits, equal to primary deposits times the inverse of the reserve ratio, emanated from advances of bank loans for consumption and production purposes. Lastly, since there was no central bank to offer them base money and to require that they apply a specific reserve ratio, the banks determined it along with all other variables in the monetary system. Does the absence of an exogenously imposed reserve ratio imply that the Athenian banks were very prudent and abstained from creating excessive amounts of credit? Not necessarily, since some banks did issue excess credit and from [Cohen \(1992, 215-224\)](#) we know that a number of them failed. However, given that depositors had all the incentives to guard against banks that overextended in the quantity and the quality of loans that they advanced, banks should have practiced restraint from the fear of having to face a run by their depositors.

The objective in this section is to explain how the Athenian banks mediated in determining the quantity and the composition of money, along with other key variables like the quantity of primary bank deposits, the bank reserve ratio, and the interest rate.

3.1 The Athenian model of free banking

In the monetary sector of Athens in classical times operated four markets of particular interest. These were the markets for silver bullion, currency in the form of silver coins called drachmae, bank deposits, and bank credit or loans. The markets for bullion and currency were closely inter-

¹⁴ This term refers to citizens from other city-states who were residing in Athens for work.

connected because, for some relatively small cost, bullion could be converted on demand into coins at the state *mint*. Hence, the supply of currency in every period was equal to the quantity of bullion that was worth holding in the form of coins on the grounds of its purchasing power in terms of goods and services. Or, more accurately, it was equal to the quantity of bullion that was worth holding in the form of coins for its purchasing power of goods and services all over the then known world, because the economy was completely open and local silver markets for currency and bullion coincided with the international ones. Figure 1 brings all four markets together in order to explain how the relative prices of currency, bullion, bank deposits, and bank loans, guided the self-centered decisions of economic agents who participated in them towards the equilibrium quantities of the respective assets along with the reserve ratio.

Graph (i) depicts the market for currency. The supply curve has been drawn in an upward

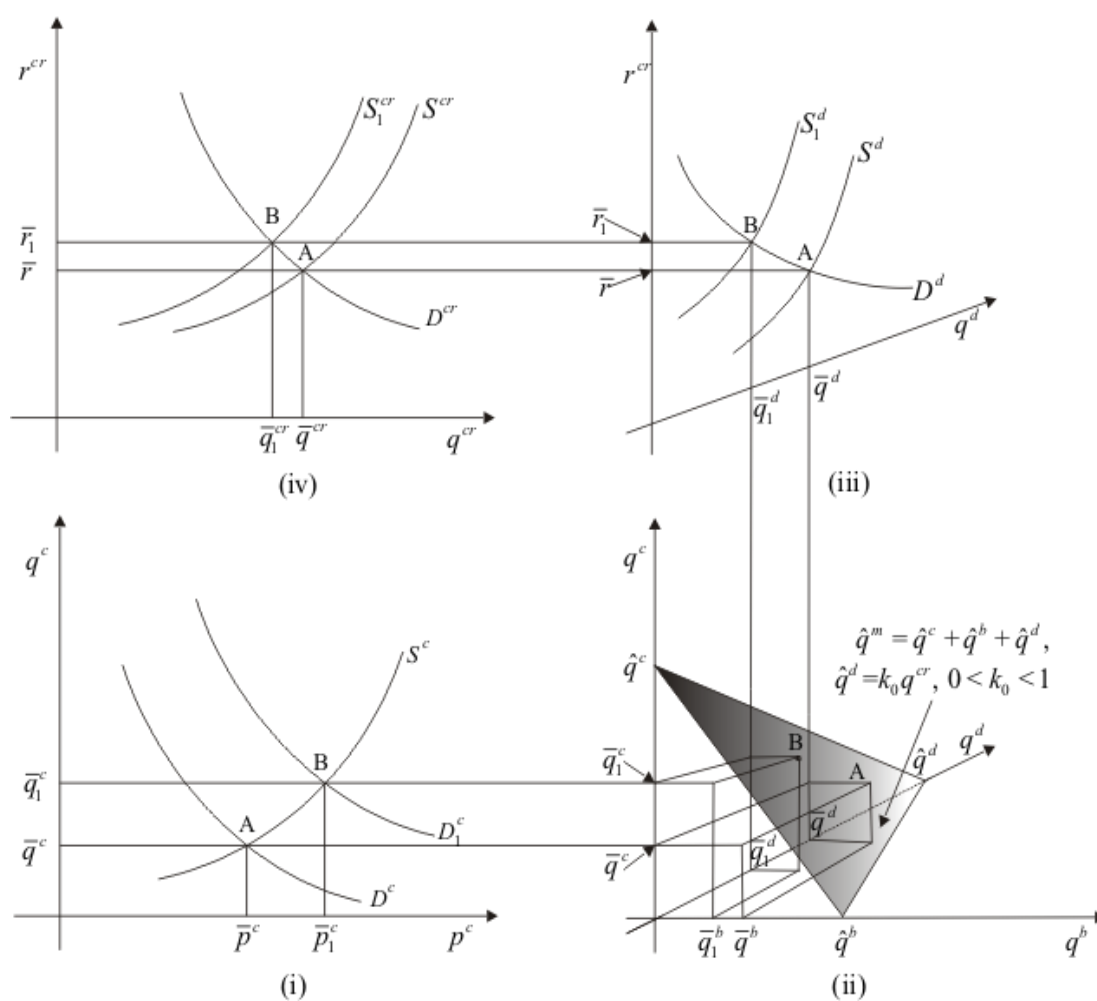


Figure 1: Equilibrium in the money market

sloping fashion because it is reasonable to assume that, as the price of the currency in terms of goods and services increases, bullion holders would be motivated to convert more and more of its quantity into currency. On the contrary, regarding those who demand currency by offering goods and services, it is reasonable to assume that, as its price rises they will reduce the quantities that they are willing to purchase. This explains why the curve of the demand for currency has been drawn as downward sloping. However, the interests of buyers and sellers of currency are opposite, because those who sell currency for goods and services wish to buy low, whereas those who sell goods and services for currency wish to sell high. Consequently, repeated exchanges among them would lead to a position where everybody is satisfied with the results. In the Graph (i) this situation is shown at point A where the quantity of currency and price that prevail are marked by the symbols (\bar{q}^c, \bar{p}^c) . At that price of the currency, Graph (ii) shows that from the total available quantity of bullion \hat{q} , quantity \bar{q}^c would be converted into currency and the remaining $\hat{q} - \bar{q}^c$ would be traded in the form of bullion and other wares from this precious metal.

Next, suppose that while the production of goods and services increases, the overall quantity of the available silver bullion remains fixed at \hat{q} . How would this change affect the allocation of bullion between currency and commodity uses? Since silver in the form of currency would become dearer in terms of goods and services, more of the silver in the form of bullion would be converted into currency and a new equilibrium would be established at point B in which the equilibrium values would be $(\bar{q}_1^c, \bar{p}_1^c, \bar{q}_1^b)$. Using the same analytical apparatus, the opposite case could be examined also in which the production of goods and services remains fixed and the overall quantity of bullion increases, as happened in the case of the discovery of the Laurion mines in 483 BCE. In that event, goods and services became dearer in terms of silver bullion and certainly some of its available quantity was converted into currency. But how much currency was necessary each time to carry out efficiently the transactions on the goods and services that were produced was determined in the two markets through the mechanism of relative prices and the competition between the opposing interests of currency buyers and sellers in terms of goods and services. So, in effect, one function of a modern central bank was performed by the stock of bullion that cushioned the shocks in the goods and services markets. Except that the stock was not held monopolistically by one organization, but by many individual and uncoordinated speculators who stood to make a profit or suffer a loss depending on the particular nature of the shocks.

The preceding analysis is partial in a very important respect. This has to do with the following considerations. The stocks of currency and bullion in the economy bore no interest. By implication, those who held purchasing power in the forms of liquid currency and slightly less liquid bullion lost the opportunity to make a deposit in a bank and earn interest. They absorbed an opportunity cost. This cost motivated the holders of wealth in these forms to try to allocate it among currency, bullion, and bank deposits to maximize their benefits.

Looking closer at Graph (ii), observe that the rise in the use of currency would come about partly from a reduction in the form of money held in bullion, the quantity of which would decline from \bar{q}^b to \bar{q}_1^b , and partly from a reduction in the deposits held by bankers. What would happen in the market for deposits is shown in Graph (iii). As deposits would decline with the shift from S^d to S_1^d , the interest rate and quantity of deposits would shift from point A to B. In particular, at the latter point the interest rate would increase from \bar{r} to \bar{r}_1 , whereas the quantity of deposits would decline from \bar{q}^d to \bar{q}_1^d . This analysis explains the chain of changes in response to an isolated increase in the production of goods and services. But it remains mute regarding the nature of the interest rate \bar{r} and it is in need of some further explanation.

Graph (iii) represents the segment of the money market that has to do with the demand and supply of primary deposits. Keeping with the preceding analysis, the equilibrium interest rate for deposits ought to have been symbolized by \bar{r}^d , because this would represent the interest rate that the banks offer to depositors in order to secure the quantity of deposits \bar{q}^d . Instead, the symbol \bar{r} was used to draw attention to the importance of this issue. Recall that when a certain amount of currency or bullion is deposited with the banks, they use it to extend interest-bearing loans by the multiple of the inverse of their reserve-ratio k . To attract the quantity of primary deposits \bar{q}^d (see Graph (iii)), assume that the Athenians banks offered to depositors the interest rate \bar{r}^d . In a competitive business environment, the interest rate on loans \bar{r} (see Graph (iv)), and hence on credit, has to be consistently aligned with the interest rate the banks pay to depositors, because in general $\bar{r} > \bar{r}^d$.¹⁵ How might this be achieved? The simplest conceptualization is to postulate that the demand curve

¹⁵ How larger is the average interest rate on loans in comparison to the average interest rate offered on deposits depends on factors like the operating costs of the banks, the pricing of default risks on their loans, the robustness of competition in the money market, etc.

D^d in Graph (iii) includes an interest rate for the attraction of primary deposits from households and enterprises. With this issue settled, let us address now the equilibrium in the credit market.

In Figure 1 relevant to the analysis of the market for credit or loans is Graph (iv). Let us concentrate first on the determinants of the curve labeled S^{cr} which stands for the supply of credit. Active on this side of the market were financial and non-financial intermediaries, including individual Athenians not necessarily rich. For example, aside from the *treasuries*, which acted like banks, [Harris \(2002, 81\)](#) reports several cases of small loans advanced by non-professional lenders. In addition, in order to facilitate the selling of their goods and services, enterprises offered credit to buyers. From a legal point of view, selling on credit was forbidden. But *de facto* in everyday commercial relations such transactions were quite widespread (see for example [Cohen \(1992, 14\)](#)) and affected the overall supply of credit by expanding or contracting the outstanding stock of “trade credit”. These written debt claims could be transferred to third parties ([Cohen *ibid.*, 14-18](#)). Yet as is the case today, advances of such credit as well as loans offered by isolated individuals should have been limited in scale relative to the total, so they are assumed not to have played a decisive role in the credit market. For this reason, let us concentrate on the role of financial intermediaries, i.e. banks.

Since they accepted deposits and extended loans, banks affected the supply of credit through three channels. The first and very likely the most important was the well-known multiplier mechanism. In particular, drawing on the realization that only a limited proportion of the deposits they kept was withdrawn each period, banks felt confident about their liquidity to lend out the rest in the form of business and consumer loans. Therefore, since some part of the latter returned to banks as new deposits, they continued lending up to a limit, which corresponded to so many times the initial deposit as it was warranted by the inverse of the reserve-ratio k that they applied at the time. The explanation of this process and its documentation by [Cohen \(2008, 76-83\)](#) leaves no doubt that the Athenian banks did create credit in the same way systemic banks do in present day fractional reserve monetary systems. More specifically, looking at the Graphs (iii)-(iv) in Figure 1, it is unlikely to miss that the money market determined not only the interest rate \bar{r} but the reserve-ratio $\bar{k} = k_0$ as well. For, the latter can be computed readily by dividing the volume of credit \bar{q}^{cr} (see Graph (iv)) by the volume of primary deposits \bar{q}^d (see Graph (iii)).

The second channel was the amount of base money, which consisted of the quantity of currency held by banks in the form of coins and coins-equivalent of bullion, i.e. $\hat{q}^c + (p-e)\hat{q}^b$. If the

price of the currency in terms of goods and services increased above the price of the bullion plus the charges for the latter's monetization, the banks would be motivated to convert into currency silver bullion they owned and possibly, even from the quantities they held for safekeeping purposes for their customers. Perhaps because they found no evidence of such episodes or they construed them to be insignificant relatively to the mass of coins in circulation, neither [Cohen \(1992, 2008\)](#) nor [Amemiya \(2007\)](#) make any reference to such conversions of bullion into coins, and vice versa. However, given that the *mint* was open to such business, the hypothesis that the banks were guided by the price mechanism to the optimal allocation between currency and silver bullion is credible.

Finally, regarding the third channel, it is helpful to note that, with the exception of state intervention in the determination of the prices of cereals, foodstuffs like oil and fish, and charcoal, markets were free and the same held true for the parallel circulation of domestic and foreign currencies. Hence, technically speaking, the position of the S^{cr} curve in Graph (iv) would be subject to the arbitrage that economic agents might be motivated to undertake depending on the differences in the relative prices. To see this, assume, for example, that the rise of productivity in the domestic economy shifted the curve S^{cr} to the position S_1^{cr} , thus raising the equilibrium interest rate from \bar{r} to \bar{r}_1 . If this rise was considered undue in the light of the financial conditions that prevailed abroad, other things remaining equal, importing of coins and bullion would shift the curve S_1^{cr} to the right and the amount of equilibrium credit would shift back from \bar{q}_i^{cr} to \bar{q}^{cr} .

Turning next to curve D^{cr} in Graph (iv), the demand for loans stemmed from domestic and foreign borrowers and aimed mostly for productive purposes. In general the loans were secured by property collaterals worth at least double the value of the loans and the interest rate they carried varied depending on the risk of the venture for which the loans were advanced and other considerations.¹⁶ Examples abound. [Amemiya \(2007, 86-87\)](#) for instance describes in detail the terms and the interest rates lenders charged for bottomry loans. They varied on account of the risks of the journey and the season that it took place, since ship losses during winter times were higher than similar journeys during summers. The view that emerges from the evidence is that much like today there prevailed a whole structure of interest rates which moved up or down de-

¹⁶ It should be clear that the volume of acceptable "bankable" collateral would be a strongly limiting factor restraining credit growth and enhancing stability in the economy. But at the same time, it would retard economic growth by curtailing the expansion of the money supply.

pending on the direction in which the conditions in the credit market moved the equilibrium interest rate. In other words, assuming that the credit market determined a basic relatively riskless interest rate, the structure of interest rates guided lenders on how to adjust it in order to reflect the circumstances that applied to the particular borrowers, the intended uses of the loans, the quality of the property offered for security, etc.

Drawing on the above, let us return to the question that was posed earlier regarding the equalization interest rates in the markets for deposits and loans. Consider an interest rate $\%$ in the credit market that is higher than \bar{r} . The margin of the former interest rate over the latter would signify that the bankers are able to make a pure profit rate¹⁷ on the deposits they manage to attract. However, in a competitive market with uninhibited circulation of information this situation cannot last for long. The reason is that the pure profit on the part of bankers will motivate enough depositors to withdraw deposits and instead become themselves direct lenders. As a result, while the curve S^d in Graph (iii) would start moving slowly rightwards, thus leading to a downward pressure on the equilibrium rate for deposits, the curve S^{cr} in Graph (iv) would move rightwards more violently as bankers lose deposits. Hence, eventually, as the interest rate $\%$ in the loans market declines faster than the interest rate in the market for deposits, the two interest rates would come to rest in the same lower equilibrium interest rate, which allows the bankers to earn only the normal net rate of profit, which by assumption is included in curve D^d of Graph (iii).

3.2 Equilibrium in the money market

Money in classical Athens consisted of three components. Currency in the form of silver coins; silver bullion readily convertible into coins at a small fabrication and seigniorage charge; and loans advanced by banks to their customers for consumption and production purposes. The quantity of money at any given time was determined endogenously by economic agents interacting in the money markets, and the same is true with regard to its composition.

Presumably, some part of the coins and bullion was stashed away in response to the demand for hoarding. A second part, multiplied by the so-called “velocity of circulation” was used to carry out the volume of transactions that took place each year, and still a third part was deposited with the banks to earn interest income. How economic agents allocated their holdings in means

¹⁷ This profit rate is called “pure” to signify that it is over and above a “normal” profit rate required by banks to stay in the business of banking. By assumption, the latter is included in the curve D^d in Graph (iii).

of payment among currency, bullion, deposits and loans, was determined by the price mechanism in the framework of the markets exhibited in Figure 1. In particular, given for example a change in the demand for loans from q^{cr} to \bar{q}^{cr} , with the intermediation of banks, household and non-financial enterprises possessing portfolios of (currency = q^c , bullion = q^b , deposits = q^d , loans = q^{cr}), were brought into contact with households and enterprises which, under appropriate market conditions, stood ready to restructure into (currency = \bar{q}^c , bullion = \bar{q}^b , deposits = \bar{q}^d , loans = \bar{q}^{cr}). Depending on the direction of this change, the prevailing interest r would increase (decrease), say to \bar{r} , the deposits at the banks would rise (decline) to \bar{q}^d , and the latter would respond by expanding (shrinking) credit at the multiple of the inverse of their equilibrium reserve-ratio. These adjustments would bring about equilibrium in the markets for bank loans and deposits. However, in the process, the change in bank deposits would force the prices in the markets for currency and bullion to change in the directions $p^c \rightarrow \bar{p}^c$ and $p^b \rightarrow \bar{p}^b$. Finally, as these price changes would take effect, the quantities of currency and bullion would change in the directions $q^c \rightarrow \bar{q}^c$ and $q^b \rightarrow \bar{q}^b$. In short, all financial markets adjusted optimally to accommodate the change in the demand for loans. The same would happen given any other change like for instance an influx of specie into the economy, a shift in the seigniorage charge at the *mint*, or even changes in psychological factors that might influence the propensity of hoarding, and hence the velocity of circulation. Central to the aforementioned sequence of adjustments from the one equilibrium position to another was the determination in financial markets of the equilibrium reserve-ratio. What percentage of each deposit banks retained in order to safeguard their ability to cover withdrawals at any given time was then as paramount as it is today in the prevailing “fractional-reserve” monetary systems. Hence, banks were obliged to hedge against loan risks on their own by balancing their urge for profit against the trust and the loyalty of their depositors¹⁸

In addition to the above *first best* results for all participants, the results turned out to be also *first best* for the economy as a whole, because the money market allocated the available quantity of bullion into bullion, currency, deposits, and bank loans in the most efficient manner. To corroborate this proposition, it is convenient to raise the question: Could a central bank under any circumstances

¹⁸ Bankers knew that, if they failed and were found guilty of fraud or gross negligence, their personal freedoms were at stake, and presumably exercised prudence. Still, banking is a risky business and as [Cohen \(1992, 216-222\)](#) reports several banks failed at the time.

improve on the results of the money market in a monetary system like the one depicted in Figure 1? The answer is definitely not for two reasons. First, because the central bank ought to have better information about the actual conditions that prevail in the markets than the market participants themselves, which was established as impossible in Sub-section 2.2. And, secondly, because the central bank ought to be able to simulate the plans of market participants in advance, which is again an impossible problem to solve, given that the central bank cannot know the preferences of market participants before they are revealed by their choices.¹⁹

4. Asymmetries in the Athenian free banking system

In the absence of a central bank, the Athenian free banking system was free from the destabilizing asymmetries that were identified as inherent in money and banking systems like the one in the U.S. and analyzed in Section 2 . However, this realization does not preclude that some other different undesirable asymmetries might be present; or, perhaps, that the same asymmetries might apply in a different form or context. For this reason, to complete the presentation, this section focuses on the nature and effects of possible asymmetries in the monetary system that evolved in Athens during classical times.

4.1 Procedural counterbalancing of Niskanen informational asymmetries

All policy decisions were taken in the *Assembly*. To carry out their duties, participating citizens received advice from “initiators”, who were empowered to introduce proposals in their areas of expertise. The latter, speaking in the presence of at least 6,000 people, most of whom knew little on the issues under consideration, had to communicate their ideas in simple but not simplistic terms. In the process, the gap in knowledge between the initiators and the prospective voters was reduced. All citizens present shared the same information, which formed a basis for their vote; and the decision was carried out with a better understanding of the pros and cons by those who would be called upon to share the consequences, if the proposal was adopted. In other words, the *Assembly* functioned as a market for “ideas” or a setup for discovering what was best for the common good. Every initiator brought forward and tried to “sell” his own proposal, for which he had to offer specific

¹⁹ Even if the central bank were able to predict precisely the preferences of market participants, it would still need to have an automatic feedback mechanism to continuously adjust its policies to the changing circumstances in the markets, and indeed not alone in the money markets. But the design and implementation of such a mechanism lie in the domain of wishful thinking.

and convincing information (arguments) that would make it superior to those of other initiators on the same issue. This exchange of arguments counterbalanced *informational asymmetries* and established a common ground, which facilitated “informed” choices. Helpful in this regard was also that those who participated spoke the same language, shared the same code of ethics, and adopted the same practices in politics. Moreover, whoever wished to speak or to propose a different plan of action was free to do so, but in full knowledge that whatever he said could be used potentially against him, if his proposal was adopted, and eventually harmed the state’s interests.

Now recall from the introductory part in Section 2 the prerogatives that Athens reserved for itself in the currency domain. The state determined the standards of the coinage, operated the *mint*, and hence it was responsible for the quality of the coins and the purity of their content in silver, appointed the *dokimastai* in the market places of Athens and Piraeus, etc. All related decisions passed through the above deliberation process and took the form of decrees and laws. Therefore, interested economic agents learned instantly of the decisions and adjusted their plans knowing the objectives that the decisions aspired to accomplish and the means by which they would apply. Contrary to present day experiences, the state could not capture economic agents by surprise and presumably, the institutional setup led to better functioning markets.

4.2 Asymmetries from fiscally induced currency shocks

As noted in the introductory part of Section 2, Athens pursued balanced budgets. It applied this policy through war and peace with the assistance of the *treasures of the gods*. Aside of the indirect effects through household and enterprise incomes, fiscal policies exercised second-round currency effects on banking through the balance sheets of these institutions. Did shocks via this channel lead to protracted periods of inflation or deflation? Although there are no data gain some enlightenment in this regard, it is still possible to gauge what might have transpired.

To this end, consider a simple economy with two goods, say, silver drachma coins and a basket of consumer goods. Denote the possession cost of the drachma coin in terms of consumer goods as f_d^c , the unit price of consumer goods as p_c^d , say 2 drachmae per weight unit of consumer goods, and the price of drachma in terms of consumer goods as p_d^c , say half the weight unit of consumer goods per drachma. By implication, $p_d^c \equiv 1/p_c^d$. This defines the standard accounting identity according to which the purchasing power of money varies inversely with the price of

consumer goods. [Bitros \(2021\)](#) shows that in equilibrium $\bar{f}_d^c = \bar{p}_d^c = 1/\bar{p}_c^d$. Now assume that in some year the *treasures of the gods* took a deposit of x drachmae with the private banks, thus enabling them to advance new loans that raised the stock of money in the economy by the inverse of their equilibrium reserve-ratio times x . Would \bar{p}_c^d shift upwards causing inflation? Depending on the state of the economy, the rise in aggregate demand might or might not have increased the price of consumer goods. Suppose that prices increased, implying that $\bar{f}_d^c > p_d^c$. In this event, currency holders would experienced losses, which would have motivated the following adjustments: a) since the economy was open, the rise in the price of consumer goods would have increased imports; b) competition from imports would have pushed the price of consumer goods back to \bar{p}_d^c ; and c) paying for the cost of imports would have reduced the stock of primary deposits in the banks, and this in turn would have brought the supply of money back to its equilibrium. However, the latter would have occurred only if the demand for currency to finance the imports did not shift \bar{f}_d^c to a new equilibrium $\bar{\bar{f}}_d^c$ such that $\bar{f}_d^c < \bar{\bar{f}}_d^c$. From [Engen \(2005\)](#), [van Alfen \(2011\)](#) and other economic historians we know that beginning from 483 BCE Athens produced and amassed a huge stock of silver bullion, part of which was turned into drachma coins. In this light, the supply curve for international means of payments should have stayed practically horizontal, implying that \bar{f}_d^c did not shift. Therefore, given that the integrity of the drachma remained intact for 300 years,²⁰ most likely fiscally induced changes in the quantity of money via the *treasures of the gods* left the general level of prices unchanged.

4.3 Asymmetries from shocks in the supply of silver bullion

At one period or another, currency policies had to do with changes in the management of the silver bullion that the state earned from the Laurion mines. The handling of allied dues paid to Athens for spearheading the efforts of common defense against the Persians in the context of the First Athenian Alliance. The institutional arrangements regarding the operation of the *mint*, the

²⁰ The following quotation from [Rathbone, von Reden \(2014,153\)](#) leaves no doubt about the astonishing staying integrity of silver drachma over the centuries:

In classical Athens the principal coin was the silver *drachma* which numismatic studies have shown was minted at a target weight of 4.32g. ... In 170s BCE the Attic *drachma* was apparently reduced in weight to around 4.20g, and similar reductions happened to some other Greek coinages.

standards of coinage, and the means of payments in transacting with the state; and last, but not least, the regulatory framework for safeguarding the integrity of the currency. Were shocks in these fronts stabilizing or destabilizing? The discovery of the Laurion mines in 483 BCE acted as the single most powerful shock on the Athenian economy and society. Thinking of its effects, an economist might be tempted to surmise that the large volumes of currency that entered into the economy must have wreaked havoc on the general price level. However, even though [Figueira \(1998, 493\)](#) argues that the prices of necessities increased significantly in the 5th century BCE, on account of the following considerations the likelihood of general inflation is low, if not nil.

Before silver from the Laurion mines appeared in the form of currency, bullion and bank deposits, its mining and processing expanded employment and incomes, and hence of the Gross Domestic Product (GDP). The latter's composition would have changed and with it certainly the relative prices. However, the aggregate demand for goods and services should have increased pretty much in proportion with their aggregate supply. For, if the prices for foodstuffs and other household and enterprise implements increased in the short-run, due to supply of silver induced excess demand, profit margins would have increased and, by stimulating in the medium run imports, paid for by the plentiful supply of silver, prices would have returned to their previous long run equilibrium. Hence, if there was significant inflation, it could not have come from the supply of domestically produced commodity money. Nor could it be anything else but transient due to the large inflows of allied tributes. Let us see why. According to [Loomis \(1998, 243\)](#), drawing on the allied tributes, Athens raised the wages of public magistrates, soldiers and sailors across the board; it spent lavishly in the construction of luxurious public buildings and city beautifications; it established programs of social welfare, festivals and other cultural activities, etc. Rising wages in the public sector should have increased the wages and the cost of materials in the private sector. As the latter entered into a phase of cost-push inflation, exports would have decelerated and imports accelerated, giving rise to outflows of currency and silver bullion. These in turn would have reduced the primary deposits, shrunk money supply, and eventually returned the general price level back to its long run equilibrium level.

5. Summary of findings and conclusions

The macro- and micro-prudential policies of the Fed have been held responsible in the literature for introducing into the U.S. economy four classes of asymmetries. Depending on their source,

they are distinguished into *informational*, *structural*, *systemic*, and *instrumental*. The 2008 financial crisis showed that among them the *systemic* asymmetry is most destabilizing, because by its presence the Fed conglomerates the risks assumed by individual banks into a risk of the banking system. As a result, this risk is insured by the Fed's privilege of issuing base money. Yet this is only one worrisome aspect. Another, more problematic, is that this risk is not some linear combination of the risks that would be assumed by the individual banks, if they stood alone. The reason being that even those banks that would otherwise elect to become good quality banks in that setting, in the presence of the Fed acquire incentives to enter into a race to the bottom of the safety standards. Nothing can stop them, including the most sophisticated systems of regulation. The course to that end is inescapable because, by assuming the risks of bad and good banks alike, the Fed cultivates among them behaviors of moral hazard that exacerbate the risk of the banking system.

If one searched the record of U.S. financial crises in recent decades, one would find that ultimately the root cause has been always the same. That is, low bank capitalization and at the same time pricing of loans severely not commensurate with their risks, given the underlying quality of secured collaterals, and indeed despite the severe concentration in the banking industry that the Fed has promoted for better control. Anyway, in the post 2008 period, the Fed has assured the world community repeatedly that the U.S. banks are now well capitalized and that there is no risk of another crisis, which due to the world dominance of the U.S. dollar might develop into a financial Armageddon. Yet the *systemic asymmetry* is deeply embedded into the banking system and if anything is certain this is that another crisis will occur and at a time that will be least expected. Therefore, thinking prudently ahead of such a dreadful predicament recommends replacing the Fed with a monetary system free of the destabilizing asymmetries that are inherent to its institutional setup.

To contribute in this direction, this paper presented and assessed the properties of the model of free banking that emerged in classical Athens. Its merits may be hardly overstressed. The state imposed and maintained the standards of the currency in which it dealt. Money supply was determined competitively in markets where banks extended credit and offered services much like the present day ones. The national currency circulated in parallel and in competition with foreign currencies. In short, the money market functioned as a fully decentralized monetary system characterized by the following properties. The state served the common good, by providing the institutional structure to establish the *Attic* drachma as a symbol of its ever-lasting reputation. The

quantities of currency and money, along with the interest rate and the bank reserve-ratio, were determined in competitive private markets; and lastly, there were no destabilizing asymmetries, because the *commodity money*, the *flexibility of prices* and the *openness* of the economy helped absorb resiliently natural and man-made shocks.

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