

Hoover, Kevin D.

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THE COEVOLUTION OF CENTRAL BANKS  
AND THE  
CONCEPT OF MONETARY POLICY\*

KEVIN D. HOOVER

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**The Coevolution of Central Banks  
and the  
Concept of Monetary Policy\***

Kevin D. Hoover  
Department of Economics  
Department of Philosophy  
Duke University  
kd.hoover@duke.edu

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Abstract of  
**The Coevolution of Central Banks and the Concept of Monetary Policy**  
by  
Kevin D Hoover

The explicit concepts of a central bank and monetary policy were not fully articulated until the 20<sup>th</sup> century, although, with some degree of circumspection, they can be used retrospectively in regard to earlier times. The oldest central banks were hardly central banks in the modern sense at their foundings. Rather they coevolved with the financial system and money itself. This paper traces that coevolution and the related coevolution of monetary policy from commodity money and policies related to the maintenance of the quality of the coin or intentional debasement to support the fiscal aims of the state, through the support of the banking system in crises, to the fiat money of today and policies of macroeconomic control.

## The Coevolution of Central Banks and the Concept of Monetary Policy

Central banks are familiar players in the everyday discourse of economist, politicians, journalists, and the public. They are among the key centers of economic power in developed economies. The *Oxford English Dictionary* defines *central bank* as,

a financial institution that provides banking services to a country's government and commercial banking system, being responsible for delivering the government's monetary objectives, and often performing other functions such as issuing currency, managing the national debt, and acting as principal regulator for the commercial financial sector.

The definition reasonably picks out a group of institutions typically regarded as central banks, while recognizing the possibility of considerable diversity in their activities. Only two features are marked as essential: the first is that the central bank is the government's and the commercial banks' own bank; the second is that the central bank is the executor of *monetary policy*, if not its author. Other roles are optional.

Typical of many accounts of the history of central banks, *Wikipedia* (2023) provides venerable roots for central banking in early-17<sup>th</sup> century Bank of Amsterdam. The Sveriges Riksbank is identified as the world's oldest central bank, founded, it is reported, in 1668; while the second oldest, the Bank of England (1694) is taken to be the template for most modern central banks. At their founding, these banks fulfilled some of the *OED*'s optional functions of central banks; yet they were not called central banks and monetary policy was not among their functions. The Riksbank was the successor to the private Palmstruch Bank, which was essentially a *Notenbank* that issued transferable certificates of deposit in an effort to ease the shortage of copper coin (Wicksell 1906[1935], pp. 76-77). The Bank of England was a private joint-stock bank that was granted limited liability and a monopoly on note issue within the City of London in exchange for a large loan to the English government and for later taking over the

management of the government’s debt. In the modern senses of the terms, neither were “central” and neither were the makers nor executors of “monetary policy.”

Even if we can trace particular central banks back to an original, quite distinct type of institution and even if, over time, these institutions did begin to take on the outlines of the modern central bank, the concept of a central bank itself was not well established. In *Lombard Street* (1873[1904]), his classic study of the English money market at the height of Britain’s financial dominance, Walter Bagehot uses the term “central bank” only twice (pp. 59, 91). Although the Bank of England stands at the center of Bagehot’s account, his term “central bank” is, in the words of the *OED* used “not as a fixed collocation” – that is, it does not yet mark a distinct conceptual type. Rather it refers to any bank that stands at one of the multiple hubs of a network. Most of the earliest references to a “central bank” discoverable in the English corpus of Google Books are similar, although one reference from 1764 clearly refers to a “great Central Bank of Issue,” mooted for the Presidency of Calcutta (Ames Library 1764). It is striking that the earliest citations to the term in the *OED* come only from the debates in the 1840s that shaped the financial system that Bagehot so famously documented.

The relatively late arrival of the explicit concept of a central bank is reflected in the Google Ngram that counts the proportion of the Google Books corpus in which the term appears year by year (see Figure 1). Its use really takes off only after 1900 and ebbs and flows around an increasing trend, where the first local peak coincides with the run-up to the creation of the U.S. Federal Reserve System – the American central bank – and the last with the period of Federal Reserve dominance of American macroeconomic policy in the 1990s.

While not a recent coinage, “monetary policy” was similarly slow to take hold as a widely used concept. The earliest instance in Google Books comes from a British Parliamentary

debate in 1804 (Parliament 1804). And the Google Ngram shows that it enters widespread use only after World War I (Figure 2). The first local peak occurs in the midst of the Great Depression. After the end of World War II, the course is steadily upwards, increasing by an order of magnitude by the end of the century.

The title of Charles Goodhart’s valuable institutional history is *The Evolution of Central Banks* (1988). He stresses that the modern central bank is, in fact, a relatively slow adaptation to the changing demands of government and an increasingly pervasive financialization of the world. An intellectual history of monetary policy and its relation to central banks has a similarly evolutionary character, the main lines of which I hope to trace. The shifting character of monetary policy and the evolving role of the central bank will be seen to be a coevolution, not only with each other, but with money itself.

## **1. The Central Bank in Modern Monetary Policy**

When we think about the Federal Reserve, the European Central Bank, the Bank of England, or other central banks we likely think of the diversity of functions that they serve in the manner highlighted in the *OED*’s definition. These functions might include:

- fiscal agent for the government;
- issuer of banknotes;
- operator of clearing house for transactions;
- financial regulator;
- manager of financial crises – i.e., “lender of last resort”;
- bankers’ bank – i.e., holder of commercial bank reserves;
- monetary policymaker/agent.

No central bank necessarily fulfills all these functions, and central banks may well sometimes fulfill other functions. Despite being increasingly entangled and of increasingly systemic importance, the first five functions might be classified by economists as microeconomic, while the last two are characteristically macroeconomic. Many of the functions might be – indeed,

often are – assigned to other actors, the last two probably best define the minimum functions that an institution must have to be called a central bank. Above all, central banks are involved in monetary policy through their role as the supplier of the reserve base of the banking system. And monetary policy is largely seen through a macroeconomic lens.

The centrality of the central bank arises from the fact that it is either a government agency or a government sanctioned monopoly standing in a relationship to multiple commercial banks or other financial institutions. Even if the central bank is legally a private, profit making institution, as the Bank of England was until 1946 and as the individual regional Federal Reserve Banks still are within the complex American federal architecture, they characteristically do not act as profit maximizers, but carry an implicit or explicit mandate to act in the public interest.

Standard macroeconomic textbook (e.g., my own), as well as expositions of monetary policy by central bank insiders (e.g., Alan Blinder’s Robbins Lectures (1998)), frame monetary policy in a stylized manner in which the “government” and the central bank are distinct players, even when the central bank is a government agency (Hoover 2012, sections 16.1.1, 17.2.1). The dance of these two players has continued unbroken ever since the ancestors of today’s central banks first appeared in the 17<sup>th</sup> century. The relationship can be clarified in the textbook “government budget constraint”:

$$\text{Government Expenditure} - \text{Government Revenue} = \Delta \text{Monetary Base} + \Delta \text{Government Debt}.$$

Here the *monetary base* is defined to be currency in circulation plus reserves owned by the banking system on deposit with the central bank.

Essentially, the government is the actor in control of *fiscal policy*, tax and expenditure policies that affect the left-hand side of the budget constraint; while the central bank is in control



of *monetary policy*, which affects the right-hand side. Pure fiscal policies are possible: governments can change the composition of spending and taxes and can increase or decrease them in unison without involving the central bank. Similarly, pure monetary policies are possible: the central bank can alter the ratio of the monetary base to outstanding debt through market transactions without altering their total. But more generally, the two policies are entangled. A budget deficit forces the central bank to either accommodate it through an expansion of the monetary base or to accept a new portfolio mix. A central bank action altering portfolio composition, which typically affects interest rates, alters both the price at which debt can be issued to cover the deficit and the level of government expenditure claimed by interest payments. Central banks may be independent of the government *qua* decision maker; they cannot be independent of the influence of the government on the constraints that they face – nor can the government be independent of the influence of the central bank.

The government budget constraint articulates the most basic elements of monetary and fiscal control. Macroeconomic policy analysis is essentially an investigation of how the government and the central bank use these elements interact with each other and with the wider economy and how they should them be manipulated: what should their managers aim for? and what are the desirable and undesirable consequences of trying to achieve their aims? The coevolution of monetary policy and of central banks is to a large extent a reflection of the coevolution of money itself with the fiscal role of the state.

## **2. A “Waggon-Way Through the Air”**

Money and debt originate before recorded history. Money is the subject of any number of “just-so” stories are told about its origins – that it is a creature of spontaneous evolution (Menger 1892) or of ancient states (Knapp 1924). Some authors contend that debt is even older than

money (Graeber 2011). Something like modern banks seems to have existed by the time of the Roman Empire, and no doubt have earlier precursors (Temin 2004). The identification of wealth with money was clearly already common in biblical times.

One of Adam Smith’s signal contributions to economics was to demystify the money-wealth relationship. “Every man is rich or poor,” says Smith, “according to the degree in which he can afford to enjoy the necessaries, conveniencies, and amusements of human life” (1776[1976], I.v.1). Wealth for Smith consists of the stocks of these goods, but also critically of the durable instruments necessary for their production. Too often, economists have used Smith’s view to treat money as a veil that simply hides the real action in the economy. In fact, for Smith money was among society’s productive instruments, a part of the social infrastructure of the economy. Without it, the complexity of barter would so limit desirable trading that the division of labor and, therefore, the productive potential of the economy could not advance. Money was a relatively small, but vastly important, element of the real wealth of the economy. It was, like the roads, canal, harbors, and similar infrastructure vital to making trade and production possible. And like them, it required maintenance.

Transactions in the pre-modern era were dominated by coined metals – mainly gold and silver. Coin naturally wears and loses weight in use. Within a distinct polity, this may not matter, as coin can be valued by tale. Internationally, however, coin was valued by weight. Because coin would often trade by tale domestically, it could be clipped, shaved, or sweated to extract hard-to-detect amounts of metal from individual coins, which when collected over many coins could be re-minted into new full valued coins. The matter was serious: the Christian

Bishop Fleetwood no doubt praised God’s mercy, but nonetheless felt that such frauds should be capital offenses.<sup>1</sup>

What was a fraud for the private citizen was often a policy for the monarch. By replacing heavier coins with lighter or by adulterating the precious metals with base metals while maintaining the same nominal value, the prince could augment his budget without explicit taxation. Monetary policy is here essentially indistinguishable from fiscal policy. While it raises revenue for the government, its unintended effect is to raise prices throughout the economy. The original *pound sterling* was literally a Troy pound of silver. By Smith’s time its value had been debased to roughly a third of that (Smith 1776[1976], I.xi.e.2). Smith devotes 180 pages of the *Wealth of Nations* to a “Digression on the Variations in the Value of Silver . . .,” documenting both the massive debasement of the coinage and its consequences for price inflation. The monetary policy of successive monarch’s was a policy of neglect – of deferred maintenance. More constructive monetary policies in the form of several recoinages and conversion to a gold standard, while not restoring the value of the pound sterling to value of its original weight in silver, paid greater attention to the maintenance of the monetary machinery. Smith does not hesitate to refer to “our present excellent gold coin” (Smith 1776[1976] I.v.38).

The reliance of trade on hand-to-hand exchange of coins posed other problems as well. The policy of debasement of the more valuable coins, which generated price inflation, repeatedly led to the silver content of the smallest coins – the coins most commonly used among the mass of working people in retail trade – exceeding their face value. These coins typically traded by tale,

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<sup>1</sup> "And if nothing less that Death will serve to these good Ends, then putting Men to Death for Clipping and Coining is neither cruel nor Unjust. And tho' more Pity usually attends these Criminals than others, yet the Laws have not therefore less of Reason and Equity, that condemns them ..." (William Fleetwood (1694) reprinted in White (2000, p. 148).

so that the rising value of their silver provided an arbitrage opportunity for those willing to collect and melt them for reminting into the less over-valued large coins. The resulting *Big Problem of Small Change* – the title of Sargent and Velde’s (2014) book – disrupted real economic activity. It also incentivized monetary innovation.<sup>2</sup>

The existence of many small states in Italy and central Europe – open economies with limited capacity to maintain their own domestic coinage or to compel its use in trade – posed additional transactions costs related to constantly establishing the value (by weight) of a variety of foreign coins (Bagehot 1873[1904], p. 82 ff.). Both the problem of small change and of small states were closely related to the physical qualities of commodity money, to the need for significant maintenance. One solution was for banks to receive gold and silver by weight and to issue banknotes promising payment in coin on presentation to the bank. Another solution was the creation of bookkeeping systems of exchange. The Amsterdam Bank, founded in 1609 is a classic example. Gold was deposited at the bank, which not only guaranteed repayment on demand, but also provided public sureties of one-to-one correspondence between bookkeeping credits and gold holdings, reducing any incentive to actually withdraw the funds unless gold was genuinely required. Then, transactions were executed simply through orders that shifted the credits from the account of one merchant to another (Smith 1776[1976], IV.iii.b).

For Smith, such coinless transactions systems were technological advances not conceptually different from improvements to steam engines or pin-making machines. In his striking metaphor, “[t]he gold and silver money . . . may . . . be compared to a highway, which,

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<sup>2</sup> Stacy Schiff (2022, esp. pp. 40-46) argues that the shortage of coins in colonial Massachusetts was a distal cause of the American Revolution. Having found that trade was disrupted by a shortage of coin, the legislature of the colony chartered a private bank, the purpose of which was to issue circulating notes secured by mortgages against the land of wealthy colonists. The British government decided that such a financial innovation was an assault on its sovereignty and suppressed the bank, which in turn bankrupted some of its backers, including the father of Samuel Adams. The colonists regarded the action of the crown to be a signal grievance, and Samuel Adams became over the next three decades the most influential polemicist for American independence.

while it circulates and carries to market all the grass and corn of the country, produces itself not a single pile of either,” whereas the “judicious operations of banking” provide “a sort of waggon-road through the air,” freeing its monetary highways to be converted into “good pastures and cornfields” (Smith 1776[1976] II.ii.86). The monetary policy in this case, as it is a commitment to maintain the quality of the coinage, remains one of fostering and maintaining a superior kind of real capital and has nothing to do with the real-time management of the economy.

Banknotes and bookkeeping entries are not fully money in Smith’s view, but debt. Smith was well-aware of the complexity of the financial system – especially finance related to foreign trade. Credit – that is, the trust that a lender is able to place in the reliability and ability to repay of the borrower – was the essence of finance. “Show me the money,” at least at stipulated times, was the basis of building that trust. And the money to be shown remained coin. Unlike the Amsterdam Bank, which guaranteed deposits to be fully backed by gold holdings – so that they were essentially warehouse receipts, the productive advantage of banks issuing notes or making loans by creating deposits for borrowers depended on their not being fully backed. The bank typically held only enough coin to cover the day-to-day claims of note-holders or depositors, which were a relatively small fraction of the total. The coin freed-up in this way could be invested abroad or used to expand domestic profitable domestic lending.

The value of complex financial systems was that they allowed the savings of those who did not wish to engage directly in trade or production to be channeled to those who could employ it profitably. The danger of fractional reserve banking and of credit systems more generally is that it could be formed into chains of credit, each party relying on the trustworthiness of his counterpart, who in turn trusted others. To a large extent the chains of credit create a kind of decentralized insurance with the failure of one counterparty to repay shifting the obligation to

one further up the chain. However, especially when credit involves a short-term debtor (e.g., a bank that has received a deposit or issued a note) serving as a long-term creditor (a bank extending a loan to a producer), the demands for immediate payment might outrun cash on hand. A debtor might then be embarrassed by illiquidity, even when technically solvent. Then, the chain of debt might become subject to a cascade of illiquidity. Compared to older country roads, a modern highway may add considerably to the productive capacity of the economy, and, in day-to-day traffic, it may actually improve on safety; but the highway opens up the possibility of spectacular multicar crashes unheard of on the older roads. Smith understood both the promise and the risk of the financial wagon-way through the air:

The commerce and industry of the country . . . may be somewhat augmented, [but] cannot be altogether so secure, when they are thus . . . suspended upon the Dædalian wings of paper money, as when they travel about upon the solid ground of gold and silver. [Smith 1776[1976], II.ii.86]

Overextending credit or holding too few metallic reserves placed the bank and its notes at risk. And like Icarus crashing to earth, the collapse of the Ayr Bank provided Smith with a spectacular moral example (1776[1976], II.ii.73; see editors’ fn. 43).

Like metallic money banks were part of the productive machinery of the economy. As such, they required maintenance and also prudent operation. With respect to banks, sound monetary policy in Smith’s view, which belongs to a species of monetary analysis subsequently referred to as the *real-bills doctrine*, required the prudent operation: banks should lend only to people of good credit, only for short periods, and only against real collateral (Smith 1776[1976], II.ii, esp. paras. 59-64, 95). Thus, a bank might lend to a merchant to finance the purchase of goods to be repaid when the goods were sold. Such credit, Smith maintained, would be self-liquidating: the notes that the bank created on making the loan would be returned within the normal course of business. Smith conceived of banknotes under such a policy not as expanding

the amount of money in actual circulation in the neighborhood of the bank, but as merely replacing the gold that would have circulated anyway in their absence.

Economic growth for Smith was promoted by the division of labor; and the division of labor was promoted by the accumulation of productive capital. The fastest growing countries, Smith believed, would always be those with the highest ratio of productive to unproductive labor, which was in turn determined by the division of net revenues into productive and unproductive uses (Smith 1776[1976], II.iii). Smith supported moderate restrictions on usury (Smith 1776[1976], II.iv.15). . This appears to many commentators to be a violation of his own principle of natural liberty. One way to understand it, however, is as a monetary policy – one aimed not at the maintenance and operation of the productive monetary machine, but one that seeks to use that machine to direct the economy to a more desirable path.

Smith’s argument for usury limits starts with the observation that there are both prudent men of business and “projectors,” who may be engaged in fraud or who may simply have unreasonably high animal spirits, to use Keynes’s colorful description. Prudent men of business will borrow only to the degree that they can make a reasonable profit and repay the debt. At high rates of interest, prudent men cease to borrow, while projectors, who, by definition, have unreasonable expectations or fraudulent designs, are unlikely to be dissuaded. High interest rates thus shift capital away from productive uses and towards unproductive uses. Usury limits, then, increase the ratio of productive to unproductive uses of net revenue and, thereby, promote growth. Smith never makes it clear why the self-interest of the lender cannot be trusted, as Smith trusts self-interest in most other cases, to achieve this result. Whether or not Smith is correct in making this exception to his support of natural liberty, his analysis of usury amounts to

a macroeconomic policy – an effort to manage the economy – rather than a requirement of maintenance of the means of the production.

### 3. “A Great Engine of State”

By Smith’s time, the Bank of England, which was legally a for-profit, private bank, had transformed into something quite different. It was much more than an ordinary bank: “It acts, not only as an ordinary bank, but as a great engine of state” (II.ii.85). It was a monopolist with respect to many government fiscal services; and the government in turn was monopsonist with respect to those aspects of the bank (Thornton 1802[1939], p. 105). Smith notes that “[t]he stability of the bank of England is equal to that of the British government.” Although its monopoly on banknotes did not extend outside London, its issue was so massive and considered so secure that a large number of smaller banks – in the countryside and in Scotland, as well as in London – established correspondent relations with it and treated its notes as essentially as good as gold (Smith 1776[1976], II.ii.95). Henry Thornton, who in *The Paper Credit of Great Britain* documented British finance at the turn of the 19th century, observed that Bank of England notes “constitute the coin in which the great mercantile payments in London, which are payments on account of the whole country, are effected” (Thornton 1802[1939], p. 97). While country bank notes dominated exchange outside of London, Bank of England notes served as bank reserves throughout the country. The Bank of England was well on its way to being a modern central bank. There were, Thornton observed government banks in Russia, Denmark, Sweden, Spain, Portugal, and other countries that issued notes and provided financial services to the government; but, in contrast to these, “The Bank of England is quite independent of the executive of the government” (Thornton 1802[1939], pp. 105-107).



Thornton criticized Smith’s banking policy based on the real-bills doctrine. Systems of exchange using notes or book transfers, he argued, would not merely displace coin one-for-one, as Smith had suggested, but would support much larger numbers of transactions. It was a question of quality not merely quantity, and Smith had failed to notice that paper money and paper credit actually circulated more quickly than coin – that is, in modern parlance, they had a higher velocity of circulation – and they could support a larger volume of transactions. Prices, therefore, depended not on the amount of monetary gold in the country but on the amount of paper notes as well (Thornton 1802[1939], p. 211). Gold remained important partly because it set the standard of value (i.e., the unit of account) and because it was required to settle international imbalances (Thornton 1802[1939], pp. 110-111).<sup>3</sup> It was an advantage, in Thornton’s view, that the Bank of England was a monopoly – if it could limit the issue of paper notes, then prices would remain stable. The fact that other banks also could issue paper was not worrying, as their dependence on Bank of England notes for their reserves, itself imposed limits of the kind already familiar to Smith under the gold standard (Thornton 1802[1939], pp. 260-261).

The question of what policy ought to govern paper money had become acute by 1802. In 1797, alarmed over a possible French invasion, the Bank of England faced a run that looked set to exhaust its gold reserves. The British government stepped in – so much for the independence of the bank – and suspended convertibility of Bank of England notes into gold guineas. For nearly a quarter century, Britain was effectively on a fiat money standard.

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<sup>3</sup> See Hoover (1988a; 1988b, ch. 5), who argues similarly that, even if it is not usually exercised, the role of money as the “ultimate good of conversion” of financial assets whose value is denominated in monetary units – that is, the good that dissolves the indebtedness altogether – that accounts for its special role in systems of monetary exchange.

The suspension posed two new monetary-policy questions. The suspension was meant to be temporary, but was nevertheless ended only in 1821, when the threat from Napoleon was well and truly over. The first question was how to get back onto gold. Inflation during the suspension period raised the price of gold bullion, as well as doubts about whether the old parity of 3*l*. 17*s*. 10½*d*. could be re-established. At issue was, in part, how much of the increase in the price of bullion could be attributed to the increase in banknotes. The Bullion Committee in 1810 estimated that 9½-13 percentage points of the rise of the price of bullion could be attributed to the monetary issue (see Hoover and Dowell 2001, pp. 145 ff., esp. p. 149). This policy problem was again of the same general family of problems addressed by Smith – how to maintain the monetary machine.

But there was a second question: money had been anchored in the adventitious fact that the stock of gold was limited by the slow production of the world’s mines. Thornton explicitly drew the analogy between the world’s gold mines and the creation of Bank of England notes under the suspension (1802[1939], p. 242). Unlike the mines of South America, the real cost of note issuance was trivial. Under the gold standard, prices had increased slowly, but substantially as the result of the influx of Spanish gold in the 16<sup>th</sup> century and afterwards. And prices rose and fell with the ebb and flow of trade. Fiat money opened up the possibility of an even faster secular inflation. The second question was how to manage the money to avoid secular inflation.

There was a well-known precedent. John Law, the Scottish financier and monetary economist, had argued in the early 18<sup>th</sup> century for the virtues of paper money, citing the same kind of advantages that Smith had noted for the Scottish system of paper money. The difference was that in Scotland banknotes remained convertible into gold, while Law proposed an inconvertible money – “coining paper” in his words (Law 1705[1760], p. 186). Law convinced

the French king to adopt his system. The system itself was not intrinsically vicious, but it required a limiting principle. Although his wings would reach a higher altitude than Smith’s wings of Dædalus, Law himself might well have managed the system sensibly. But France issued more and more of the currency, setting off the massive Mississippi Bubble and unchecked inflation, and the king in pursuit of fiscal heaven crashed more spectacularly than Icarus (Mackay 1841[1852], pp. 1-45).

The Bank of England and the British government managed its “paper mines” reasonably well and did not fall into John Law’s trap. Payments of gold were resumed at the old parity in 1821. The issue of how to manage paper money, nonetheless, did not go away.

#### **4. “Money Will Not Manage Itself”**

After the resumption of payments, Bank of England notes continued to serve as reserves for other banks. Earlier debates between bullionists, such as Ricardo, who argued for limitations on banknotes and anti-bullionists, such as Thomas Tooke, who, in the spirit of Adam Smith, thought that, so long as convertibility was prudently maintained, banknotes required no further regulation, morphed into a complicated debate over the underlying principles of the monetary economics. The successors to the bullionists were known as the Currency School, and the successors to the anti-bullionists as the Banking School. In practical terms, the debate was settled by the Peel Act of 1844. The Act divided the Bank of England into two departments. The Issue Department controlled the total quantity of notes. They were not fully backed, but new notes could be issued only one-to-one with new deposits of gold. The Banking Department continued to act more like an ordinary bank, though its customers were the government and the correspondent banks. In effect, the Issue Department implemented the position of the Currency School, so that Bank of England notes were, in fact, as good as gold (Smith 1776[1976], II.ii.95).

But the Banking Department ran more along the lines advocated by the Banking School (Wicksell 1906[1935], p. 175). By this point, “The Old Lady of Threadneedle Street” had become an essentially modern central bank.

London’s importance as a financial center continued to grow, so that by 1873, when Bagehot published *Lombard Street*, the Bank of England had become the principal depository of bank reserves, not only for Britain, but for much of the world. Credit and finance had become increasingly complex and interrelated. Where the old policy problem had been to maintain the gold value of money, the new problem was how to maintain the stability of the financial system. Bagehot saw the artificial, government-created monopoly position of the Bank of England as a danger. He regarded a system of decentralized reserves as ideal. But he was pragmatic enough to see that there was no chance of root-and-branch reform. Practically, the question was not, what would be a better system, but how could the system to hand be operated most safely. The intention of the Peel Act had been to stabilize the monetary and financial system on a more or less automatic basis, but a quarter century after its adoption, Bagehot concluded that “[m]oney will not manage itself, and Lombard Street [i.e., the British financial system as a whole] has a great deal of money to manage” (Bagehot (1873[1904], p. 20).

Between 1844 and 1873, the collapse of financial institutions had precipitated runs on the banks several times, which had required suspension of the restrictions of the Peel Act in order to guarantee adequate reserves to the system. This experience was the basis for Bagehot’s most famous piece of policy advice – advice still cited, even if not adopted, in every financial crisis. What I will call, *Bagehot’s First Monetary-Policy Rule* is aimed at managing a liquidity crisis:

*in time of panic [the central bank] must advance freely and vigorously to the public out of the reserve . . . at a very high rate of interest . . . [against] all good banking securities . . .*  
[Bagehot (1873[1904], pp. 198-199; cf. pp. 50 ff.,; emphasis added].

Lending freely aimed at restoring credit by demonstrating that reserves were adequate and that the panic had no actual basis. The high rate of interest aimed at husbanding those reserves and penalizing anyone who sought unnecessary safety through excess reserve acquisition. That loans be made only against good security aimed at realigning liquidity with solvency and avoiding subsidizing those who took unnecessary risks or managed their business badly. Overall, the point was to reinforce real credit where it truly rested in the system and to avoid the moral hazard of private parties believing that the Bank or the government stood behind what Smith thought of as failed “projectors.” Bagehot did not deny the possibility that his rule might prove to be inadequate to stanch a severe enough panic, bringing down the entire financial system, but he thought that there was no workable alternative (Bagehot 1873[1904], pp. 200-201).

Bagehot offered a less well-known rule, as well – one aimed not a crisis, but at the day-to-day operations of the Bank. A major source of fluctuations in the Bank’s reserves arose out of foreign trade. David Hume had famously analyzed the effect of trade on the economy with what was later called the *specie-flow* analysis (Hume 1752b[1985]). In Hume’s analysis, a trade surplus results in a flow of gold into a country as export receipts exceed import payments. In the short-run such inflows boost economic activity and cause prices to rise. The importing country experiences reduced economic activity and falling prices. Prices in the importing country thus became lower relative to those in the exporting country, encouraging trade and gold flows to shift back in the opposite direction. The process is self-equilibrating.

Hume’s analysis is highly stylized in much the same manner as modern economic models. His friend and contemporary Adam Smith was well aware of the simplifications. He observed that in reality most foreign trade is not settled through actual movements of gold, but through bills of exchange – short-term promissory notes issued against the purchase of trade

goods. The “exchange rate” in the 18<sup>th</sup> century was the rate at which a bill of exchange in one currency could be traded for one in another currency. Exchange rates could rise and fall, and it was only when the exchange rate departed far enough from the relative gold content of the currencies, when the arbitrage opportunity became large enough that the costs of transport and insurance could be covered and a profit still guaranteed, that gold actually shipped.

For Bagehot, a mechanism that relied on physical trade and changes in the relative price of goods to equilibrate was bound to involve large, unnecessary fluctuations around equilibrium, and he suggested smoothing the process. *Bagehot’s Second Monetary-Policy Rule* (here, paraphrasing extracts from his text) states:

*raise the Bank’s interest rate when reserves are flowing out of the country (i.e., when the exchange rate is overvalued) and lower them when they are flowing in (i.e., the exchange rate is undervalued).*

John Maynard Keynes later referred to this as “the rules of the game” for the gold standard (1930[1971], p. 124; 1982, p. 1). It is less recognized than Bagehot’s First Rule, because he states it less directly and because he is much more worried about reserve loss than reserve gain in practice (Bagehot 1873[1904], p. 325). But it is implicit *inter alia*, first, in his remark that the holder of a country’s banking reserve “ought at the very beginning of an unfavorable foreign exchange at once to raise the rate of interest, so as to prevent their reserve from being diminished further, and so to replenish it by imports of bullion” and, second, in his opinion that the duty of the Bank is reduce the volatility of interest rates owing to reserve fluctuations and to do so in a timely way (Bagehot 1873[1904], p. 48, pp. 122-123, 187-188).

Both of Bagehot’s rules are aimed at the protection and smooth operation of the financial system – the first focused on the crisis; the second, on routine operations. Neither is aimed at what today we would regard as a macroeconomic goal.

## 5. Wicksell and the Invention of Macroeconomic Policy

Practical men for many decades dominated monetary analysis. Thornton was a banker; Ricardo, a stockbroker; Bagehot a financial journalist. Knut Wicksell, in contrast, was a Swedish professor. His general understanding of the ordinary operation of the gold standard was essentially the same as Bagehot’s; yet with regard to central banks, they differed fundamentally. Bagehot saw the Bank of England as the creation of a misguided government that set it up as a monopoly. The ideal system was one in which reserves were dispersed among competitive banks. If he saw no possibility of moving Britain to an ideal system, he nonetheless lamented that something closer to it had not been set up in the first place. Given that the Bank was a monopoly and was vital to the national interest, owing to its role as the keeper of reserves for Britain and the world, he was sure that it should not be operated, despite its then legally private status, as a profit maximizer. On that, in fact, he and Wicksell agreed. Where they disagreed was in the thought that a fully competitive banking system was possible. The

essence of all banking activity is really concentration, and all the banks in a country do in virtue of their clearing house system constitute a much more unified system than exists in most other branches of business. [Wicksell 1906[1935], p. 119]

Had the British government not created the Bank of England, something like it would have emerged from the internal logic of the financial system. The American experience may bear out Wicksell’s point. The National Banking System created during the American Civil War featured a very large number of competitive, decentralized banks. But smaller banks soon grouped into correspondent relationships with larger, money-center banks; and, after a series of financial crises taxed the ability of the system to manage panics, Congress found it necessary to create the Federal Reserve System – America’s central bank.

Bagehot’s Second Rule implies, as he was fully aware, that at any time there is a sweet spot for the bank’s discount rate that would exactly balance reserve holdings and hold the

exchange rate at parity. That we never know precisely where this sweet spot is results from it shifting with the vicissitudes of the economy. The practical central banker pursues it improvisationally. Wicksell, the academic, abstracted from the practical problem and named the sweet spot the *natural rate of interest* (Wicksell 1906[1935], p. 193). . Like Bagehot, Wicksell acknowledges the efficacy of Hume’s specie-flow mechanism, while, at the same time, lamenting slowness of adjustment that depends on changes in relative commodity prices (Wicksell 1906[1935], pp. 109-110). Better to prevent the volatility implied by the specie-flow mechanism by adopting essentially Bagehot’s Second Rule, raising or lowering the Bank’s discount rate “at the first indication of gold shipments . . . to prevent it and reverse the movement” (Wicksell 1906[1935], p. 110).

With his focus on commodity prices as the marker of the trade imbalance, Wicksell’s version of Bagehot’s Second Rule could be stated:

*raise the Bank’s interest rate above the natural rate when prices are rising (i.e., reserves begin to flow out of the country) and lower them when prices are falling (i.e., reserves begin to flow into the country).*

The practical upshot of Wicksell’s Rule is the same as Bagehot’s. But whereas Bagehot focused directly on the central bank’s balance sheet and ordinary banking foreign-exchange transactions, Wicksell focused on the general price level – an essentially macroeconomic concept – and the goal is not just to protect the Bank’s reserves, but to stabilize the price level, an economy-wide target. While even Smith realized that monetary policy influences more than the financial sector, Wicksell is, perhaps, the first to explicitly treat its macroeconomic effects as its primary goal.

In the short-run, either Wicksell’s or Bagehot’s (Second) Rule are simply methods for smoothing the self-regulating features of the gold standard, implicitly assuming that the world stock of gold was more or less fixed. But the 19<sup>th</sup> century saw a series of gold and silver discoveries in California, in Nevada, in South Africa, in the Klondike, and elsewhere that



erratically, but significantly, increased the stocks of monetary metals and the price level.<sup>4</sup> At the same time, “a more or less accidental nature and . . . combination” of factors such as growth in population, the increasing monetization of, and increase in, trade, not entirely matched by development of supporting financial markets, implied undesirable changes in prices (Wicksell 1906[1935], p. 125). Anticipating Keynes’ (1923, p. 172) view of gold as a “barbarous relic,” Wicksell laments that

[t]he excellence of our present monetary system is therefore largely an illusion, and the danger of basing the whole of our economic system on something so capricious as the occurrence of certain precious metals must sooner or later come to light. [Wicksell 1906[1935], p. 126]

He continues,

our modern monetary system is afflicted by an imperfection, an inherent contradiction. The development of credit aims at rendering the holding of cash reserves unnecessary, and yet these cash reserves are a necessary, though far from sufficient, guarantee of the stability of money values.

The cost of the gold standard is an unstable price level, accompanied fluctuations of credit and of good and bad times. For Wicksell, macroeconomics – the business cycle the problem of managing the economy – has moved to center stage.

If the gold standard is at the root of the problem, Wicksell asks, could we secure a more reasonable economy through eliminating gold? It is only by eliminating the free minting of precious metals and making the central-bank (or state) created fiat money itself (the minted coin or banknote) the unit of account could “a logically coherent credit system, combining both economy of monetary media and stability in the standard of value, become in any way

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<sup>4</sup> Jevons 1863 addresses the empirical problem of how to measure the effect on the general price level of the expansion of the gold stock and to distinguish it from relative price changes. See Hoover & Dowell 2002, pp. 155-159 for a discussion.

conceivable” (Wicksell 1906[1935], p. 126). In effect, Wicksell advocates John Law’s system of coining paper.

Taking a leaf out of Hume’s book, he considers a thought experiment: how would a pure credit economy operate? In a pure credit economy, banks would make loans simply by crediting borrowers with a deposit and, simultaneously, with a debt. With no reserve constraint, there would be no limit to the expansion of credit. Wicksell notices that relative prices have a tendency to equilibrium. They may fluctuate around an equilibrium; but, like a pendulum, the deviations would be self-reversing. The gold-standard renders the price of gold (the value of money) into a relative price that also displays pendulum-like oscillations about an equilibrium. In contrast, the general (or absolute) price level in the pure credit economy is like a ball on a flat plane: once it is moving, even if friction were to bring it to a stop, it has no tendency to return to its former position (Wicksell 1906[1935], pp. 196-197). (Essentially Wicksell characterizes such prices as random-walks or what econometricians call series integrated of degree one or  $I(1)$ .)

A stable price level in a pure credit system would require a coordinated interest-rate policy. Setting interest rates at the natural rate would set the demand for loans equal to the supply of savings and would leave the price-ball at rest. But setting them below the natural rate would set the ball rolling in the direction of higher prices; while setting them above would set it rolling in the opposite direction. In either case, prices continue to change so long as the interest rates deviate from the natural rate. The upshot of Wicksell’s thought experiment is, that the closer a monetary system approximates the pure credit system, the more essential active monetary policy must be to maintain macroeconomic stability.

## 6. Monetary Policy as Macroeconomic Policy

The explicit distinction between microeconomics and macroeconomics was first drawn by Ragner Frisch (1933) in an essay that draws in part on Wicksell to elaborate economic dynamics. Wicksell and his concept of the natural rate of interest informed many of the debates over business cycle theory and monetary economics in the 1920s and 1930s. Keynes’ in his *Treatise on Money* (1930[1971]) embraced the idea of active monetary management, while Hayek’s in his *Monetary Theory and the Trade Cycle* (1933) and *Prices and Production* (1931[1935]) rejected it; yet each framed his analysis around Wicksell’s natural rate of interest.

The interwar period recapitulated the problems of Britain in the Napoleonic era. Many countries, having suspended the gold standard during World War I, had to address the question of whether and at what price of gold they would re-establish it or whether it would be better to remain on a fiat-money system. Stability in the fiat-money system would, as Wicksell had argued, required active management. Wicksell had in this *Interest and Prices* (1898[1936], pp. 190) had already imagined that international coordination among central bank to fix their discount rates according to the balance of payments and the rates of exchange, accepting each others notes at par. Cross-holdings of each others’ notes would allow establish “a common ‘world clearing house’” (Wicksell 1906[1935], p. 121). Wicksell describes in outline the arrangements adopted in the gold-exchange standard under the Bretton Woods Agreement that determined the value of the United States dollar in terms of gold and the value of other currencies in terms of dollars. But Wicksell also foresaw the problem that ultimately led to the demise of the Bretton-Woods system: such a system of fixed exchange rates would remain subject to balance-of-payments crises and to pressure to abandon the coordinated policy (Wicksell 1906[1935], p. 121). It was only with the abandonment of the Bretton-Wood system

in 1973 that the world finally went off the gold standard and Law’s and Wicksell’s vision a fiat money standard was generally adopted as more than a temporary expedient.

Unlike his *Treatise on Money*, Keynes’ *General Theory of Money, Interest, and Prices* (1936, p. 121) rejected Wicksell’s natural rate of interest as key concept in macroeconomic analysis; but, like Wicksell, he saw the need for active macroeconomic policy. In post-World War II, “Keynesian” macroeconomic analysis, macroeconomic policy focused on monetary and fiscal policy framed in terms of aggregate quantities – the level of government expenditures and taxes and the stock of money – rather than the prices of financial assets (interest rates).

At the same time, Jan Tinbergen (1952, 1956) formalized the macroeconomic policy problem in terms of the choice of policy instruments used to achieve desired macroeconomic targets. If Tinbergen’s framework did not immediately influence central-bank behavior, it nonetheless became a standard basis for normative analysis among academic economists. It relied on the existence of relatively stable relationships between the instruments and the targets. In textbook macroeconomic models, stable supply and demand functions for money (i.e., stable LM curves) suggested that monetary policy could be framed either as a policy for the money stock or as a policy for interest rates; the fundamental question was then, in a world subject to exogenous fluctuations, which choice would produce the more stable outcome (Poole 1970).

Since the early 1970s, the influence of academic economics on central banks has risen steadily (see, e.g., Acosta et al., forthcoming). Milton Friedman’s advocacy of monetary-aggregate targeting briefly dominated American monetary policy in the late 1970s and early 1980s. His concept of the expectations-augmented Phillips curve and the natural rate of unemployment – a concept that he explicitly notes as derivative of Wicksell’s natural rate of interest – is even more deeply embedded in policy circles (Friedman 1968, pp. 7-9). Alan

Blinder, an academic economist turned central banker, draws on both Wicksell and Tinbergen, as well as on Friedman’s expectations-augmented Phillips curve, in his account of a framework that would both rationalize the actual behavior of the Federal Reserve and guide policymakers (1998, Lecture 1 and p. 31, fn. 6).

The instability of econometric estimates of the demand for money since the 1980s and of the central-bank reserve multiplier – especially since the 2007-09 financial crisis – have again placed interest-rate policy in the center of monetary policy analysis. Michael Woodford’s *Interest and Prices: Foundations of a Theory of Monetary Policy* (2003) is a self-conscious revival of Wicksellian analysis. Increasingly, monetary policy has been framed within central banks by the notion of a natural or neutral rate of interest, widely denoted in the economics literature as  $r^*$ .

## **7. Monetary Policy in the 21<sup>st</sup> Century**

In the long history of market economies, the problem of monetary policy, even before the concept was named, come down to three interrelated matters. The first is the value of money. It was for most of history expressed as a relative price of a monetary unit to a real good – mainly, but not exclusively, to gold or silver. In a world of fiat money it is mainly expressed as the general price level, and it is secured by restricting the quantity of some monetary unit in a sort of pseudo-gold standard. But just as the relative value of commodity money could change with the ebb of flow of gold supplies and the changing real conditions of the economy, the inflation and deflation are variable in a fiat-money economy and are stabilized only through explicit management – whether by rules or discretion.

The second matter is the stability of the credit system built on a monetary foundation. When credit was relatively simple, failures of credit were personal and limited. But when the

credit one person or institution comes to depend in complex ways on networks of individual credibility, then the monetary system, which can substantially mobilize the allocation of real resources, also comes to possess a fragility displayed most recently in the financial crisis of 2007-09.

The third matter is the real effects of a monetized economy. On the one hand, at least since Hume’s famous thought experiments, we have been perfectly aware that money naturally possesses a particular type of neutrality: it does not matter whether we define its unit to be large or small; it does not matter whether the price level is high or low measured in monetary units. A change or the rate of change of prices may matter, but their level is simply a normalization.

The correct neutrality proposition is too often confused with a different one – namely, that the real economy is indifferent to the monetary system. Hume (1752a[1985]) wrote that, “money is none of the wheels of trade: it is the oil that renders the motion more smooth an easy.” Smith embraced the very metaphor that Hume rejected: money is “the great wheel of circulation.”<sup>5</sup> Without money and credit, capital could not be mobilized and the division of labor – the source of the increasing wealth of nations – could not advance. For Smith, money is a small, but absolutely essential, part of social capital; and, even for Hume, the real economic machine would be paralyzed without it.

The first two matters are deeply implicated in the third. The existence of money provides an avenue for the real transfer of wealth from citizens to the state. If the oldest question about money is how to establish its value, the oldest monetary policy is debasement – using a

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<sup>5</sup> “Money, therefore, the great wheel of circulation, the great instrument of commerce, like all other instruments of trade, though it makes a part and a very valuable part of the capital, makes no part of the revenue of the society to which it belongs ; and though the metal pieces of which it is composed, in the course of their annual circulation, distribute to every man the revenue which properly belongs to him, they make themselves no part of that revenue” (Smith 1776[1976], II.ii. 23; cf. II.ii.14 and II.ii.39).

reevaluation of money to provide a fiscal resource to the king. And its oldest macroeconomic implication is the resulting inflation of prices. Equally, credit crises are not merely the failure of the monetary mechanism; rather, because the monetary system does real work for the economy, credit crises causes real losses as they disrupt the channels of production and consumption.

The focus of monetary policy has shifted over the past 300 years from maintaining the monetary machine to using it as instrument to guide the economy. The Dædalian wings of wings of gold have been replaced by the sleeker, lighter wings of fiat money, allowing the economy to fly ever higher. In part, because of economics itself, which increasingly abstracted from the concrete features of the economy to construct powerful stylizations in the form of theoretical and econometric models, monetary policy has focused on the operation of a well-functioning economy. But the earlier problems remain in the background – the monetary machine requires maintenance and, from time to time, repair. Both Bagehot’s *Lombard Street* and its updating for the world of ever more arcane financial derivatives, Perry Mehrling’s *New Lombard Street* (2011), are reminders of the dangers of neglecting the maintenance, as well as manuals of what to do in emergencies.

Just as the oldest monetary policy questions remain with us, the oldest abuses of monetary policy have never vanished altogether. The ghost of John Law is still with us. Wicksell does not lay the blame for the failure of Law’s bank on Law himself, but “on the immediate appetite of Governments for money and the contempt with which they placed themselves above ordinary business morals” (Wicksell 1906[1935], p. 78). Central banks around the world widely cited Bagehot’s First Rule to justify their massive interventions in the 2007-08 financial crisis, while conveniently forgetting one of its key clauses – that interest rates should rise for borrowers in need of more liquidity. They also appealed to Wicksell’s notion of the

natural rate of interest and to econometric estimates that it was, in fact, negative to justify their post-crisis policy of near-zero to negative interest rates. The “quantitative easing” by which they sought to implement the low interest rate policy amounted to a redirection of capital to favored businesses and to governments routinely and massively in deficit. Major central banks claim that monetary policy is independent, but in effect the policies surrounding the financial crisis and in the aftermath of the global pandemic amount to large-scale subordination of the goal of maintaining a stable value of money to the extraction of revenue for the ends of the government – perhaps the oldest monetary policy at all.

So-called Modern Monetary Theory, which remains an heterodox view, is at least candid on this last point (Wray 2015; Kelton 2020). For Modern Monetary Theory, the value of money means only that the state determines the unit. In the case of fiat money, the value entirely rests on the coercive power of the state to levy taxes and to require them to be paid in fiat money. As there is no limit to the amount of money that can be created, the government does not face a genuine budget constraint, but can in fact afford any expenditures it likes. Such subordination of monetary policy to fiscal policy explains why Modern Monetary Theory often treats “progressive” expenditure and redistribution policies, such as the Green New Deal and Universal Basic Income as fundamental parts of their theoretical account. Wicksell saw through this argument long ago:

Those who expect *monetary measures* to perform miracles might well remind themselves of the well-known fact that coins do not give birth to offspring, and that even if they did, precious metals and bank notes would constitute neither sustenance nor clothing. [Wicksell (1898[1936], p. 196).

There is no reason to imagine that the paper (or electronic) coins of 2023 are any more fecund than the gold coins of 1898.



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Figure 1. Ngram of *Central Bank*

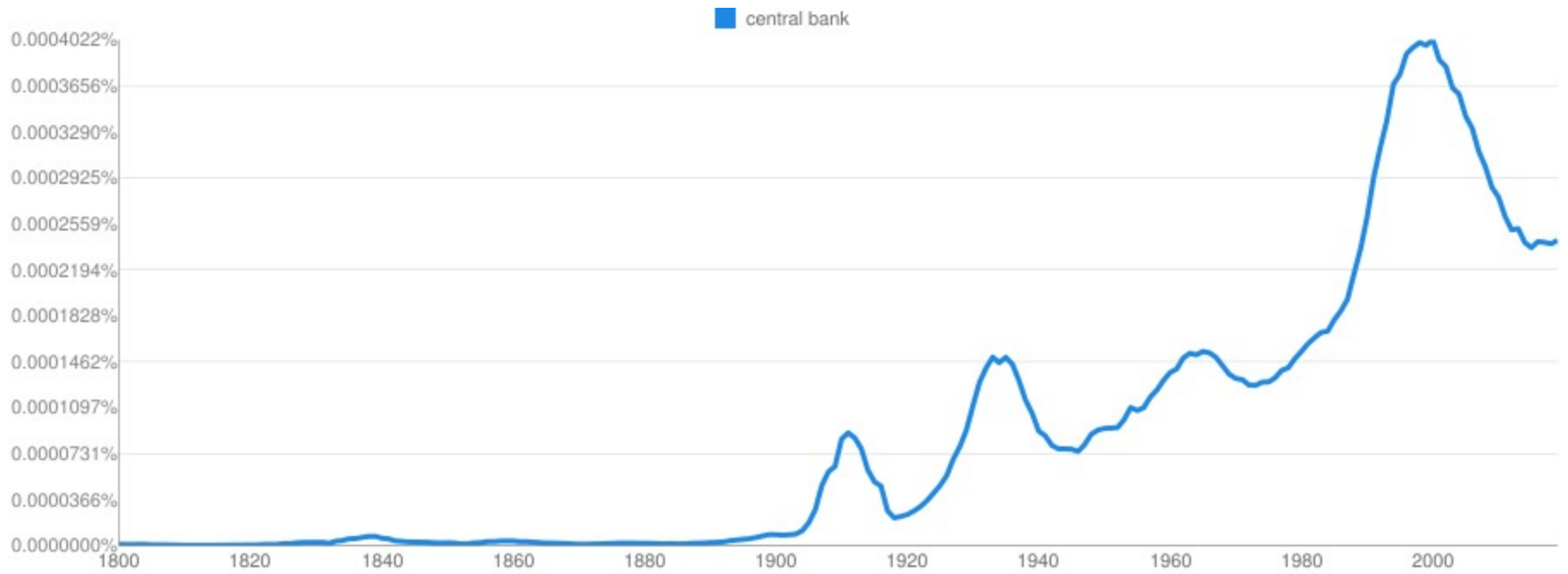


Figure 2. Ngram of *Monetary Policy*

