

The Rise and Fall of the Quantity Theory in Nineteenth Century Britain: Implications for Early Fed Thinking

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Since Friedman and Schwartz (1963), monetary historians have been critical of the performance of the pre-World War II Federal Reserve System (see also Hetzel 2014; Meltzer 2003). That poor performance raises the question addressed here. In the first half of the nineteenth century, there was a flowering of the quantity theory. The Bank of England was a solid institution in Great Britain with a rich tradition. Why then did not the founders of the Fed learn from British experience in the nineteenth century?

The objective of the Bank of England prior to World War I was to maintain the gold standard. Maintaining the convertibility of the paper pound into gold made London the center of the world market for financing international trade. That central position complemented Britain's position as the center of a world empire. The Bank's success in maintaining the gold standard required solving two related problems. First, it had to become a "central bank" in the sense that management of its discount rate moved predictably the complex of interest rates in money markets. Second, it had to figure out how to be a lender of last resort in bank panics while also maintaining a gold reserve sufficient to

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maintain convertibility. Solving this latter problem required limiting the moral hazard encouraged by access to the discount window through limiting the risk-taking of commercial banks and discount houses.

Solving these problems was an extraordinary achievement. Moreover, the Bank was successful in the sense of surviving independently of the British treasury [Exchequer]. What is relevant here, however, is that the Bank of England solved these problems pragmatically without the need for recourse to the analytical framework of the quantity theory. At the same time, the gold standard became monetary orthodoxy. The quantity theory would have been essential if the intellectual and policymaking environment had been receptive to consideration of the alternative monetary standard of fiat money. It was not, and the quantity theory withered away. Despite a revival in the 1920s, its ideas were still largely unknown in the Great Depression. Moreover, because of the association with paper money, in policymaking circles, it was considered subversive of the established social order (Hetzel 1985).

This paper starts with a review of quantity-theoretic thought in nineteenth century Britain. It continues with an overview of the development of Bank of England orthodoxy as the linchpin of the international gold standard. With this background, the paper then explains the reasons why quantity-theoretic thought had largely disappeared by the last part of the nineteenth century. The overview makes the point that the Bank's understanding of the world developed as a pragmatic response to the need to solve the problems mentioned above. By the time of the founding of the Fed in 1913, there was no analytical framework in current use that would have allowed the founders of the Fed to understand the ramifications for the control of prices of its creation.

Real bills filled the vacuum left by the absence of the quantity theory. Real bills was the school of thought that banks should only discount bills arising in the course of commercial transactions. (A real bill was an IOU promising to pay a given amount on a specified date typically in London. Discounting it, that is, paying an amount less than the face value by a discount house or by a bank, provided the financing for goods in transit between producers and consumers.) The over-issue of bank notes that could threaten the ability of a bank to maintain gold convertibility was possible if the bank lent for speculative purposes. The problem the Bank of England had to solve of how to manage the moral hazard from committing to meet the liquidity demands of banks during a bank panic made real bills into an obvious operating principle for its discount window. The principle in itself was a useful part of risk management for a bank and for management by the Bank of England of its discount window lending. Taken by itself as a principle for central banking, without the nominal anchor of the gold standard, it turned

into a disaster for the early Fed. This paper concludes with thoughts about why the early Federal Reserve learned very little in the way of useful knowledge from British monetary experience.

1. DEVELOPMENT OF THE EARLY QUANTITY THEORY

This section highlights through citations the major contributions of early nineteenth century economists to the quantity theory.¹ The British philosophers John Locke and David Hume formulated rudimentary versions of the quantity theory, which in brief is the hypothesis that the institutional arrangements of a country for determining money also determine the behavior of prices (Humphrey and Keleher 1982, Ch. 3). Their work also illustrates the importance of the way in which episodes of monetary disturbances occur for testing the usefulness of the quantity theory. Tests of the validity of the quantity theory require episodes that make evident the causal nature of changes in nominal money.

Locke formulated the key analytical distinction of the quantity theory—the distinction between nominal and real—in his criticism of the plan of the British government to make uniform the silver content of its coinage. Due to wear and clipping, old coins had lost silver content and were worth less in exchange than full-weight coins. The government proposed to equalize the exchange value of coins by increasing the nominal value of the full-weight coins and by reducing the silver content of newly minted coins. Locke (1695 [1968], 43 and 9) protested that the recoinage would impose losses on existing debt holders. “People who are to receive Money upon Contracts already made, will be defrauded of 20 per Cent. of their due. ... Men in their bargains contract not for denominations . . . , but for the intrinsick value.” (See Mazumder and Wood 2012; Eltis 1995). Locke could then theorize about “the value of money,” that is, the price level. “[T]he value of money in any one country, is the present quantity of the current money in that country, in proportion to the present trade. ...” (Locke 1823 [1963], 49, cited in Leigh [1974]).

Hume drew on the discovery of the silver mines in the Americas in order to test the hypothesis that the price level is a monetary phenomenon. Hume (1752 [1955]) gave the classic statement of the short-run nonneutrality of money and its long-run neutrality:

¹ An Appendix (“A Brief Overview of the Quantity Theory”) provides a framework for understanding the excerpts cited below.

Though the high price of commodities be a necessary consequence of the increase in gold and silver, yet it follows not immediately upon that increase. ... At first, no alteration is perceived; by degrees the price rises, first of one commodity, then of another; till the whole at last reaches a just proportion with the new quantity of specie. ... [I]t is only in this interval or intermediate situation, between the acquisition of money and rise of prices, that the increasing quantity of gold and silver is favourable to industry. ... From the whole of this reasoning we may conclude, that it is of no manner of consequence, with regard to the domestic happiness of a state, whether money be in a greater or less quantity.

Hume formulated the price-specie-flow mechanism. He did so in a challenge to the mercantilists, who believed that a country should increase its wealth through restrictions on imports that would increase its gold by producing a positive balance in its international trade. Using a counterfactual in which money declined exogenously, Hume (1752 [1987]) wrote:

Suppose four-fifths of all the money in Great Britain to be annihilated in one night, and the nation reduced to the same condition, with regard to specie, as in the reigns of the Harry's and Edwards, what would be the consequence? Must not the price of all labour and commodities sink in proportion, and every thing be sold as cheap as they were in those ages? What nation could then dispute with us in any foreign market, or pretend to navigate or to sell manufactures at the same price, which to us would afford sufficient profit? In how little time, therefore, must this bring back the money which we had lost, and raise us to the level of all the neighbouring nations? Where, after we have arrived, we immediately lose the advantage of the cheapness of labour and commodities; and the farther flowing in of money is stopped by our fulness and repletion.

However, a problem with empirical verification and acceptance of the quantity theory was lack of data. There were no time-series data on the price level. Also, the law forbade the melting of coin and the export of bullion. Because of its illegality, there were then no data on the export of bullion that could test a monetary theory of the equilibration of the balance of international payments. Critics could argue that the theory was irrelevant to real world practice. As a result, after the restriction in 1797 in which the Bank of England suspended convertibility, there was no general acceptance of a monetary theory that would have led to the conclusion that the depreciation of the paper pound on the exchanges served the role formerly played by external gold outflows in adjusting to an excess emission of money (banknotes).

The Napoleonic Wars and their fallout produced the monetary disturbances that spurred development of the quantity theory (Fetter 1965, 20-21). In 1797, Britain was the main adversary left of Napoleon. In that year, rumors of an invasion force landing on British shores caused bank runs. The gold reserve of the Bank of England had already been stressed. The abandonment of the paper currency (assignats) in France beginning in 1775 and France's subsequent return to the gold standard probably caused an external drain of gold from the Bank (Hawtrey 1950, 276-7). A drain of gold to Ireland had occurred in 1795 and 1796. In May 1797, Parliament passed the Bank Restriction Act, which suspended the legal requirement that the Bank of England make its bank notes convertible into gold (see Laidler 2000; History of Economic Thought).

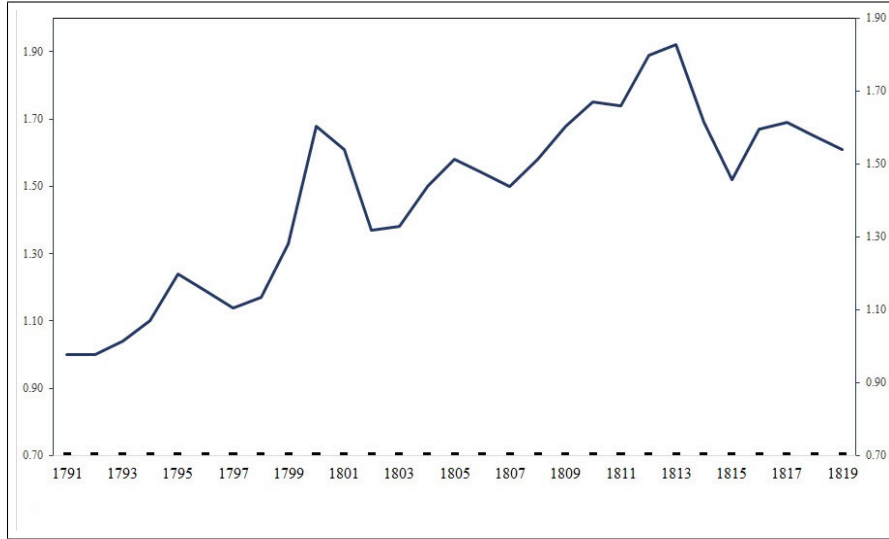
Starting in 1800, the pound price of gold bullion rose to a value 10 percent in excess of the old mint price under convertibility. The depreciation initiated a debate over the consequences of restriction.² In the absence of index numbers measuring inflation, debate centered on the value of the paper pound on the foreign exchanges where it traded for currencies on a commodity standard. (Using currently available numbers, Figures 1 and 2, respectively, show the level of the consumer price index from 1791 through 1819 and from 1820 through 1910.) The resulting debate led to the development of the quantity theory and at least for a brief period the modern concept of a central bank.³

After a revival of inflation toward the end of the first decade of the 1800s, Parliament commissioned the "Bullion Committee" to investigate the causes of the inflation and depreciation of the pound on the foreign exchanges. The committee included most notably Henry Thornton, who more than anyone articulated the idea of a central bank (Hetzel 1987). He did so in his book, *An Enquiry into the Nature and Effects of the Paper Credit of Great Britain* (1802) and in *Two Speeches* (1811). The members of the Bullion Committee (the bullionists) argued

² Later, two British economists, Joseph Lowe (1823 [1967]) and G. Poulett Scrope (1833 [1968]) advanced the idea of price indices and the indexation of contracts in order to protect against price changes. William Stanley Jevons (1876) revived their ideas. See Humphrey (1974). Joseph Schumpeter (1954, 701) wrote that almost all British economists "up to and including J. S. Mill, distrusted it [the method of index numbers] or even did not grasp its possibilities." Fetter (1965, 139) noted that in 1832 Charles Jones "advocated a policy of price stabilization by a national bank of issue through open market operation, buying public debt when a twenty-commodity price index fell, and selling public debt when the price index rose." One has to wait until Irving Fisher (1935, 97), cited in Humphrey (1990a), for a revival of this proposal.

³ For an overview of the bullionist/antibullionist debate, see Fetter (1965), Flandreau (2008), Hetzel (1987), Laidler (2000), Mints (1945), Viner (1937), and Wood (2002), as well as various publications by Humphrey (1982a, 1982b, 1983, 1986, 1990b, 1999).

**Figure 1 Consumer Price Index in the United Kingdom:
1791 to 1819**



Notes: Annual observations. Data from the Bank of England “Three Centuries of Data—version 2.3,” via the St. Louis Fed’s FRED database.

that the depreciation of the pound on the foreign exchanges and the rise in the price level resulted from the over-issue by the Bank of England of its banknotes. They recommended a return to convertibility. The directors of the Bank of England, who became known as antibullionists, responded with the logic of the real bills argument. That is, over-issue could not occur as long as they issued banknotes only by discounting real bills.

In a piecemeal way, the bullionists developed the analytical insights that would underpin the quantity theory of money. In a rudimentary way, they thought of the real rate of interest as a price with a well-defined (natural) value. Over-issue, that is, an increase in money that caused changes in prices, arose from a Bank of England discount rate held below the natural rate of interest. Bullionists developed the idea of the price level as a monetary phenomenon. Over-issue of the currency caused the price level to rise and the paper pound to depreciate on the foreign exchanges.

Although their opponents, the antibullionists, never developed an analytical framework, they had plausible explanations for the pound’s

depreciation and for inflation. The payments made by Britain to support its continental army and allies in the war against France produced the depreciation and the rise in the price of imported commodities. That is, the payments produced an adverse movement in the terms of trade. Wartime demands caused an increase in the price of commodities. That explanation also fit well with the deflation after 1812, the year of the defeat of Napoleon in his Russian campaign. As Fetter (1965, 16) pointed out, the absence of historical precedence for such large remittances rendered any resolution of the monetary versus nonmonetary depreciation of the paper pound on the exchanges problematic.

The directors who conducted the business of the Bank of England (the antibullionists) understood their responsibilities from the perspective of financial intermediation. According to their real bills view, the role of the central bank was to proportion credit to the needs of trade (short-term financing of production) by providing credit for productive purposes as opposed to speculative purposes. In hearings before the Bullion Committee of the British Parliament in 1810, the Bank of England, represented by Gov. Whitmore, defended the criterion of real bills as an adequate safeguard against over-issue of its banknotes.⁴ That is, the Bank of England would regulate the issue of banknotes associated with the discounting of bills of exchange by restricting discounting to productive as opposed to speculative purposes.

Asked to state “[W]hat is the criterion which enables the Bank . . . to guard the circulation of this country against the possibility of any excess,” Whitmore replied, “[T]he criterion by which I judge of the exact proportion to be maintained is by avoiding as much as possible to discount what does not appear to be legitimate mercantile paper. . . . We never discount without the circumstances being considered; namely . . . the appearance of its [the bill of exchange] being used for commercial purposes. . . .” Moreover, the Bank of England insisted that the real bills criterion was sufficient to guard against over-issue of banknotes regardless of the level at which it set the discount rate. Members of the Bullion Committee asked Whitmore, “Is it your opinion that the same security would exist against any excess in the issues of the Bank if the rate of discount were reduced from five to four percent?” Whitmore replied, “I conceive there would be no difference, if our practice remained the same as now, of not forcing a note into circulation.”

⁴ The quotations in the next paragraph come from Wood (2005, 14-18). See also Hetzel (1987) and Viner (1937).

Citing testimony of Whitmore before the Bullion Committee in 1810, W.T.C. King (1936, 73), who was an editor of the *Economist*, wrote:

The central theory which governed the Bank's credit policy was a conviction that it was impossible to over-issue notes so long as the issues were made by commercial discounts, and for legitimate business only. The working rule was, "let the public act upon the circulation": the public would apply for notes when they were required, and would always repay its loans when less notes were required, to the extent of the excess. The Bank never "forced" its circulation, said the Governor in 1810, with apparent pride. It thus professed to follow a purely passive policy, in the placid faith that it could safely comply with all the demands upon it, provided that it was satisfied that these came from "solid" merchants for bona-fide and not speculative transactions.

For the bullionists, the identification of shocks as monetary in origin started with an assumption that the price system works well in the sense that it produces well-defined values of real variables, in particular, a natural real interest rate. Money creation and destruction exert an independent influence when they emerge in response to a wedge between the market interest rate set by the central bank and the natural rate. Bullionists gave predictive content to this principle through the argument that central banks should operate constrained by a rule that provides for a nominal anchor (gives money a determinate value) and allows market forces to determine the real interest rate.

In this spirit, Henry Thornton (1802 [1939], 259) wrote:

To limit the total amount of paper issued, and to resort for this purpose, whenever the temptation to borrow is strong, to some effectual principle of restriction; in no case, however, materially to diminish the sum in circulation, but to let it vibrate only within certain limits; to afford a slow and cautious extension of it, as the general trade of the country enlarges itself; to allow of some special, though temporary, encrease in the event of any extraordinary alarm or difficulty ... this seems to be the true policy ... of the Bank of England.

In the *Bullion Report* (Great Britain 1810), Thornton distinguished between credit and money in criticizing the belief that real bills criteria are sufficient in order to limit the quantity of money: "The fallacy upon which it is founded lies in not distinguishing between the advance of

capital to Merchants and an additional supply of currency to the general mass of circulating medium.”⁵

As long as the Bank of England’s discount rate lay below the rate of interest obtainable in capital markets, the Bank would extend credit and create banknotes (Thornton 1802 [1939], 227 and 253-4):

Every additional loan obtained from the Bank ... implies an increased issue of paper. In order to ascertain how far the desire of obtaining loans at the Bank may be expected at any time to be carried, we must enquire into the subject of the quantum of profit likely to be derived from borrowing thereunder the existing circumstances. This is to be judged of by considering two points: the amount, first, of interest to be paid on the sum borrowed; and, secondly, of the mercantile or other gain to be obtained by the employment of the borrowed capital. ... Any supposition that it would be safe to permit the Bank paper to limit itself, because this would be to take the more natural course, is, therefore, altogether erroneous.

A key premise is the nonmonetary character of the interest rate determined in the market for real capital. A Bank rate arbitrarily set differently from the rate on real capital will lead to unlimited changes in the money supply (Thornton 1802 [1939], 255-6):

[C]apital ... cannot be suddenly and materially increased by any emission of paper. That the rate of mercantile profits depends on the quantity of this bona fide capital and not on the amount of the nominal value which an increased emission of paper may give to it, is a circumstance which it will now be easy to point out. ... It seems clear that when the augmented quantity of paper ... shall have produced its full effect in raising the price of goods, the temptation to borrow at five percent. will be exactly the same as before; for the existing paper will then bear only the same proportion to the existing quantity of goods, when sold at the existing prices, which the former paper bore to the former quantity of goods, when sold at the former prices; the power of purchasing will, therefore, be the same; the terms of lending and borrowing must be presumed to be the same; the amount of circulating medium alone will have altered, and it will have simply caused the same goods to pass for a larger quantity of paper. ... [T]here can be no reason to believe that even the most liberal extension of bank loans will have the smallest tendency to produce a permanent diminution of the applications to the Bank for discount.

⁵ The authors of the *Report* were Henry Thornton, Francis Horner, and William Huskisson. Thornton and Horner very likely wrote this sentence. The excerpt is cited in Wood (2005, 19).

In an explanation of why inflation had increased the incentive for banks to discount at the Bank of England's fixed discount rate, Thornton (1811 [1939], 335) distinguished between the real and nominal rate of interest. Thornton argued that if one borrowed £1000 at 5 percent in 1800 and repaid it in 1810, he

would have paid an interest of £50 per annum for the use of the money; but, if from this interest were deducted the £25 or £30 per annum which he had gained by the fall in the value of the money, he would find that he had borrowed at 2 or 3 per cent., and not at the 5 per cent. as he had appeared to do.

Because Bank of England banknotes circulated as money along with gold coin, Thornton (1802 [1939], 288; Bordo 1990; Capie and Wood 2007) argued, the Bank was unique among banks in its lender of last resort responsibility. Similarly, it was unique among banks in that its note issue controlled the note circulation of the entire banking system not only among London banks, but also the country banks. The antibullionists argued in opposition that Bank of England banknotes and country bank notes were substitutes in the banking system's production of money balances. A change in Bank of England notes would be counteracted, they argued, by an offsetting change in country bank notes. Thornton (1802 [1939], 225) countered "that the restriction of the paper of the Bank of England is the means both of maintaining its own value, and of maintaining the value, as well as of limiting the quantity, of all the paper in the country."

Thornton's argument made use of Hume's price-specie flow adjustment mechanism in an internal context. The note circulation of the Bank of England determined the price level in the area of London. Given the real terms of trade between London and the country, the price level was then determined for the country. This price level, in turn, determined the quantity of notes that the country banks could circulate. Any attempt by the country banks to issue an amount of notes beyond this given quantity would produce a trade deficit with London, which would produce a reserve outflow to the London banks and counter the initial excess note issue (Thornton 1802 [1939], 208):

[L]et it be admitted, for a moment, that a country bank has issued a very extraordinary quantity of notes. We must assume these to be employed by the holders of them in making purchases in the place in which alone the country bank paper passes, namely, in the surrounding district. The effect of such purchases, according to the principles established in this Chapter, must be a great local rise in the price of articles. But to suppose a great and merely local rise, is

to suppose that which can never happen or which, at least, cannot long continue to exist; for every purchaser will discover that he can buy commodities elsewhere at a cheaper rate. ... [H]e will, therefore, require to have his country bank note turned into a Bank of England note.

Thornton also used the price-specie flow mechanism in order to explain how the operation of the international gold standard would cause excess money creation to lead to reserve outflows. With the suspension of note convertibility into gold, money creation instead produced depreciation in the value of the pound on the foreign exchanges. He argued that a concern for this depreciation, in practice, had led the directors of the Bank of England to limit their note issue, despite their professed adherence to the real bills principle (Thornton 1802 [1939], 225 and 249):

Let the manner in which an extravagant issue of notes operates ... be recollected. It raises ... the cost of British goods. It thus obstructs the export of them, unless a compensation for the high price is afforded to the foreign buyer in the rate of exchange; and the variation in our exchange produces a low valuation of our coin, compared with that of bullion. The variations in the value of bullion, as compared with that of the circulating medium, serve, therefore, to detect and restrain that too great emission of notes to which all countries would otherwise be prone.

Along with Thornton, David Ricardo articulated the quantity theory.⁶ Ricardo (1824 [1951], 276) wrote on the distinction between money creation and financial intermediation:

⁶ It is interesting that Wicksell (1935 [1978], 178), who independently formulated a bank-rate/natural-rate model, initially criticized Ricardo for not explaining how “the banks could succeed in putting a larger amount of their stocks of money or notes into circulation” in a way that made money into the causal factor to which prices had to adjust. However, Ricardo (1821, 364) had written:

The applications to the Bank for money, then, depend on the comparison between the rate of profits that may be made by the employment of it, and the rate at which they [the Bank of England directors] are willing to lend it. If they charge less than the market rate of interest, there is no amount of money which they might not lend—if they charge more than that rate, none but spendthrifts and prodigals would be found to borrow of them.

When this passage was pointed out to him, Wicksell (1935 [1978], 200) commented that Ricardo’s model “is very much on the same lines as the theory I have developed.”

The Bank of England performs two operations of banking, which are quite distinct, and have no necessary connection with each other; it issues a paper currency as a substitute for a metallic one; and it advances money in the way of loan, to merchants and others. That these two operations of banking have no necessary connection, will appear obvious from this,—that they might be carried on by two separate bodies, without the slightest loss of advantage, either to the country, or to the merchants who receive accommodation from such loans.

Although the bullionist/antibullionist controversy dealt with the inflation that followed the suspension of convertibility by Britain in 1797, the bullionists were concerned with both inflation and deflation. Ricardo (1810 [1951], 94, cited in Laidler [2000, 21]) argued for a gradual reduction in paper money in order to lessen the economic disruption of resumption (return to the gold standard at the original parity by making the purchasing power of a paper banknote equal to that of a nominally equivalent gold coin):⁷

The remedy which I propose for all the evils in our currency is that the Bank should gradually decrease the amount of their notes in circulation until they have rendered the remainder of equal value with the coins which they represent . . . or, in other words, until the [pound] prices of gold and silver bullion shall be brought down to their money [parity] price. I am well aware . . . that even its sudden limitation would occasion so much ruin and distress that it would be highly inexpedient to have recourse to it as the means of restoring our currency to its just and equitable value. . . . If gradually done, little inconvenience would be felt.

In work beginning in the early 1820s, Thomas Joplin expanded upon how a divergence between the natural rate of interest and the market rate of interest (in this case determined by banks allowing their reserves to vary) would make money creation causal with respect to prices. (On Joplin, see Humphrey [1986] and Link [1959].) Joplin considered markets for the quantity of money, goods, and loans. He used the loanable funds framework in which the supply of debt derives from the demand for investment and the demand for debt derives from the supply of saving. Joplin termed the interest rate that equates the supply of saving and the demand for investment the “natural” or “true” rate. Banks can cause the loan rate to diverge from the natural rate. The money supply then changes to the extent that this

⁷ Parliament voted for resumption in 1819, and actual resumption of gold convertibility occurred in 1821.

divergence produces a difference in the saving and investment planned by the public.

When the supply of capital is greater than the demand, it has the effect of compressing it [money supply]; when the demand is greater than the supply, it has the effect of expanding it [Joplin (1832), 101]. Money comes into the market ... from the banks ... in consequence not of a demand for currency, but of a demand for capital, determined by the interest which the banks charge proportioned to the market [natural] rate. And in all cases the influx of money into the market ... is not the effect, but the cause of high prices [Joplin (1823) [1970], 258-9].

This quantity-theoretic way of identifying the causality of money with respect to prices survived in John Stuart Mill's *Principles* (1848 [1909], Book III, Ch. XXIII, 2-3, 15-16, and 22):

The rate of interest will be such as to equalize the demand for loans with the supply of them. Nevertheless, there must be, as in other cases of value, some rate which (in the language of Adam Smith and Ricardo) may be called the natural rate; some rate about which the market rate oscillates, and to which it always tends to return. ... The rate of interest bears no necessary relation to the quantity or value of money in circulation. The permanent amount of the circulating medium, whether great or small, affects only prices; not the rate of interest. ... But though the greater or less quantity of money makes in itself no difference in the rate of interest, a change from a less quantity to a greater, or from a greater to a less, may and does make a difference in it.

The rate of interest, then, depends essentially and permanently on the comparative amount of real capital offered and demanded in the way of loan; but is subject to temporary disturbances of various sorts from increase and diminution of the circulating medium. ... All these distinctions are veiled over and confounded by the unfortunate misapplication of language which designates the rate of interest by a phrase ("the value of money") which properly expresses the purchasing power of the circulating medium. The public, even mercantile, habitually fancies that ease in the money market, that is, facility of borrowing at low interest, is proportional to the quantity of money in circulation.

At the same time, Mill's unwillingness to apply his framework to alternative monetary standards rendered the quantity theory an irrelevancy. Schumpeter (1954, 715) noted Mill's dismissal of a paper money standard because its "power 'to depreciate the currency without limit' is an 'intolerable evil.'" He commented that through "Mill's refusal to

consider the theory of managed money ... he impoverished monetary analysis.”⁸

2. HOW THE BANK OF ENGLAND BECAME THE CENTER OF THE INTERNATIONAL GOLD STANDARD

The Bank of England developed pragmatically the procedures required in order to assure without any doubt gold convertibility and thus to make London the center of the world gold market and the center for the financing of international trade. It was just as important what problem the Bank of England was not trying to solve. It was not trying to stabilize the economy and unemployment.

Horsley Palmer was a director of the Bank of England from 1811 until 1857 and governor from 1830 to 1833. He admitted that the gold standard, which transmitted shocks from around the world to the domestic British financial system, periodically destabilized the economy. In 1848, he testified to the Commons Committee. In reply to Thomas Baring, he said, “[T]he raising of the rate of interest ... stopped very largely the mercantile transactions of the country—exports as well as imports.” An exchange with James Spooner, a Birmingham banker, followed on the consequences of raising the discount rate in response to gold outflows (citations from Hawtrey 1938, 28):

Palmer: It destroys the labour of the country; at the present moment in the neighbourhood of London and in the manufacturing districts you can hardly move in any direction without hearing universal complaints of the want of employment of the labourers of the country.

Spooner: That you ascribe to the measures which it was necessary to adopt in order to preserve the convertibility of the note?

Palmer: I think that the present depressed state of labour is entirely owing to that circumstance.

Thomas Attwood (1832, cited in Fetter [1965, 115]), a banker from Birmingham, argued for a paper currency under the control of the government in order to avoid the periodic contractionary episodes required in order to maintain the gold standard (also see Humphrey 1977). If the Bank of England had wanted to reinvent the monetary standard in order to stabilize the domestic economy and unemployment, it would

⁸ Hawtrey (1950, 335) wrote, “Experience of the continental currency and the assignments engendered a deep-seated suspicion of all paper money not directly convertible into metallic currency.”

have found these ideas useful. However, it did not need them in order to achieve its objective of maintaining the gold standard.

During the restriction period, there was widespread resentment against “the inequity of the Bank of England monopoly” (Fetter 1965, 111). In May 1819, Lord Livermore expressed these views when he addressed Parliament (cited in Kynaston [1995, 20]):

No body of men was ever entrusted with so much power as the Bank of England. ... [W]ould Parliament consent to commit to their hands what they certainly would refuse to the sovereign on the throne, controlled by Parliament itself—the power of making money, without any other check or influence to direct them, than their own notions of profit and interest?

As reflected in the disparaging reference to the Bank as “a company of merchants” by Ricardo (1822, 9 and 8), the Bullionists advocated a return to the gold standard as a rule that would curtail the Bank’s discretion:⁹

Whoever . . . possessed the power of regulating the quantity of money could always govern its value. ... [T]he currency ... was left entirely under the management and control of a company of merchants—individuals, he [Ricardo] was most ready to admit, of the best character, and actuated by the best intentions; but who, nevertheless ... did not acknowledge the true principles of the currency, and who, in fact, in his [Ricardo’s] opinion, did not know anything about it.

It was ironic that the bullionists got the gold standard they desired but that that standard created an environment that caused the quantity theory to become an apparently irrelevant historical artifact. Moreover, for policymakers to understand the applicability of the quantity theory, they must solve the “identification” problem in a particular way. That is, they must understand that the way in which money is created and destroyed (the arrangements of a country for controlling money) is the primal force that drives inflation and significant cyclical fluctuations. However, during the gold standard, nonmonetary explanations explained these phenomena equally well, and they did not require the sophisticated analytical apparatus of the quantity theory. Only the outside “exogenous” event of a change in the monetary standard (clearly evident to all) could offer convincing information about causation. However, even such an event was not “*ceteris paribus*” in that other factors were always at play. As already noted, the course

⁹ On the early history of monetary rules, see Flandreau (2008).

of the Napoleonic Wars could explain the internal and external value of the pound. The British orthodoxy that maintained the gold standard from 1821 until 1914 prevented the kinds of experiments required in order to demonstrate the superior predictive power of the quantity theory, say, in explaining both the behavior of the internal (price level) and the external (exchange rate) value of the currency.

As a way of elucidating how the Bank of England solved the two related problems required in order to maintain the gold standard (the control of market interest rates and the moral hazard arising from lending in a bank panic), the remainder of this section reviews British monetary experience over the time period 1825 through 1907. Much of the focus is on recessions and panics because they were the times when the gold standard was tested. (The definition of recession used is a decline in annual real GDP. See Figure 3).

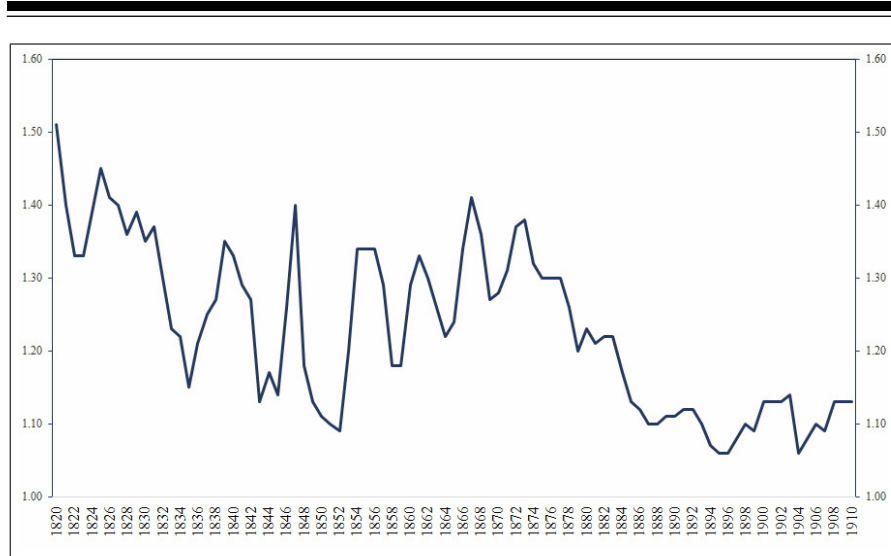
The Bank of England had accumulated large reserves associated with resumption in 1821. In an effort to “employ” those reserves, it lowered the discount rate and lengthened the maturity of bills eligible for discount. The foreign exchanges then turned against the pound, and an outflow of gold, which began in late 1824, continued through the fall of 1825. Bank depositors, fearful of another restriction, initiated an internal drain in the fall of 1825 (King 1936, 35-8). The Bank of England continued discounting but limited its discounting even for high-grade paper. In December 1825, a bank with many country correspondent banks failed and a full-scale panic commenced. Real output declined in 1826 (Figure 3).

The crisis of 1825 marked the first time the Bank of England accepted a lender of last resort responsibility. That is, not until after resumption did the Bank respond to a panic that highlighted the special role of its banknotes as money.¹⁰ In December 1825, the Bank began to discount freely and raised the discount rate from 4 percent to the legally allowed ceiling of 5 percent. In the words of one of its directors, “We lent . . . by every possible means, and in modes that we never had adopted before. . . . And we were not on some occasions over-nice; seeing the dreadful state in which the public were, we rendered every assistance in our power” (Fetter 1965, 1112-4).

Deflation lasted from 1825 through 1835 (Figure 2). The cause of the 1832 recession is unclear. The Bank rate stayed at 4 percent from 1828 until July 1836. As evidenced by an increase in the market rate

¹⁰ In 1793, following the outbreak of war with France, a severe panic and commercial crisis erupted. However, the government dealt with it through the loan of Exchequer (Treasury) bills to meet the demand for currency while the Bank of England played no special role (see introduction by Hayek in Thornton [1802 (1939)] and Fetter [1965, 12-14].)

**Figure 2 Consumer Price Index in the United Kingdom:
1820 to 1910**



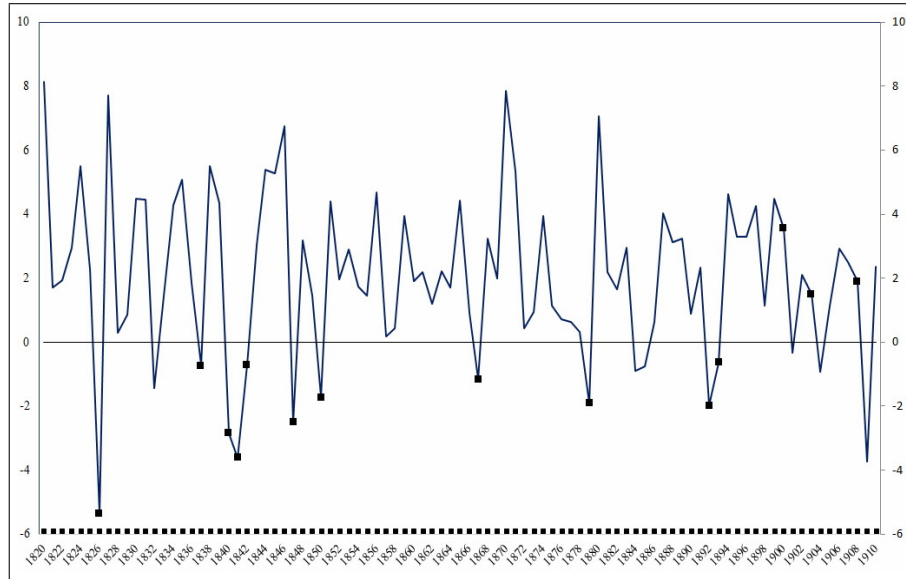
Notes: Annual observations. Data from Bank of England “Three Centuries of Data—version 2.3,” via the St. Louis Fed’s FRED database.

from 2.8 percent in 1831 to 3.7 percent in 1832, there was financial market stringency (King 1936, 80). An increase in the Bank rate in July 1836 to 4.5 percent and in September 1836 to 5 percent preceded the 1837 recession.¹¹ According to Temin (1969, 174-5), the Bank of England engineered the 1836 Bank rate increases and refused to discount bills of exchange financing the United States trade in order to offset gold flows to the United States.

The years 1840, 1841, and 1842 all experienced declines in real GDP (Figure 3). Britain again began to lose gold at the end of 1838 because of a financial crisis in France and Belgium and because of payments for imports of corn due to a poor domestic harvest (Hawtrey 1938, 19). In May 1839, the Bank of England raised the Bank rate from 4 percent to 5 percent, in June to 5.5 percent, and to 6 percent in August. In January 1840, the Bank of England lowered the Bank rate back to 5 percent, where it remained until being lowered to 4 percent in April

¹¹ Figures for the Bank rate are from the St. Louis Fed’s FRED database, “Bank of England Policy Rate in the United Kingdom,” which in turn are from the Bank of England, “Three Centuries of Data—version 2.3.”

Figure 3 Annual Growth Rates of Real GDP in the United Kingdom: 1820 to 1910



Notes: Annual rates of growth of real GDP at market prices. Squares indicate financial crises: 1825, 1839, 1847, 1857, and 1866. Recession years are 1826, 1837, 1840-42, 1847, 1850, 1867, 1879, 1892-93, 1900, 1903, 1908. Data from Bank of England, “Three Centuries of Data—version 2.3” via the St. Louis Fed’s FRED database.

1842. However, the Bank limited discounts in 1840 in an “exceptionally stringent” way “as an alternative to an increase in the rate” (King 1936, 82). The price level again declined from 1839 to 1843.

In the 1830s, under governor Horsley Palmer, the Bank moved toward its end-of-the-century practice of keeping the Bank rate above the market rate and serving as a source of discounts primarily at times of financial panic (King 1936, 78). However, that movement was interrupted by the Bank Charter Act of 1844 (Peel’s Act). The act divided the Bank into two departments: a banking department and an issue department. The banking department accepted deposits from the public (the London banks, discount houses, and some private individuals). It also discounted bills of exchange. The issue department issued and redeemed banknotes for gold one-to-one. Specifically, above a fixed fiduciary issue of £14,000,000, banknote issues had to be backed 100 percent by gold.

The Bank's directors believed that with the issue department protecting the gold reserve, the banking department could compete as a regular commercial bank, and it did so aggressively. After passage of the act, the directors lowered the Bank rate from 4 percent to 2.5 percent. With the Bank discounting paper at the market rate, it gave up control of the quantity of its discounts. As its discounts increased, its reserves declined (King 1936, 130).

Late in 1846, the Bank of England also began to lose gold due to a deficient wheat harvest and a failure of the potato crop and the resulting heavy imports of food. In response, the Bank raised the discount rate to 3.5 percent in January 1847, but gold outflows continued. The Bank's bullion reserve continued its decline, and in April the Bank raised the Bank rate to 5 percent. It placed a cap on the amount of bills it would discount and drained reserves by engaging in reverse repurchase agreements (RPs) using Consols. Panic then set in and "a virtual paralysis . . . of trade resulted." An internal drain of gold further depleted both the banking reserve and the bullion reserve (King 1936, 138-9).¹² Real output declined in 1847 (Figure 3).

On October 1, 1847, a further fall in the reserve caused the Bank also to refuse to make any advances on Exchequer bills. The first bank failed in mid-October. On October 25, the government wrote a letter to the Bank promising indemnity if it exceeded its legal note issue, but the Bank had to charge at least 8 percent on its discounts. Once reassured that the Bank would discount, the panic ended and the reserve recovered (King 1936, 144-7; Hawtrey 1938, 21-23). By allowing the Bank to discount bills and create banknotes above the £14,000,000 limit, temporary suspension of the act gave the Bank of England a war chest for supplying the currency demanded in a panic (Flandreau and Ugolini 2013).

Contemporary observers laid the blame for the 1847 panic on the collapse of speculative excess. Critics of the Bank blamed it for encouraging the speculative lending that had preceded the panic (King 1936, 149). Despite these real bills interpretations, it is clear that contractionary monetary policy preceded the crisis. The Bank did not realize that its deposits also served as money in that commercial banks used them as reserves. Also, it had no understanding of how it could create

¹² The banking reserve was the difference between the legally allowed maximum unbacked note issue of £14,000,000 and the actual note issue. The bullion reserve was the Bank's gold reserve.

destabilizing monetary emissions through driving a wedge between the market rate and a natural rate set in a world financial market.¹³

The next financial crisis, which occurred in 1857, shows how difficult it is to have “clean” experiments that separate monetary and credit disturbances. Hawtrey (1938, 32) characterized the period prior to 1857 as reflecting “the expansive tendency during the active phase of a trade cycle. ...” King (1936, 195-6) described how with the outbreak of the Crimean War in March 1854 raw materials prices and freight rates for shipping rose. Their collapse led to “a wave of failures.” According to King, the large number of startups of new cotton mills illustrated the existence of “sustained speculative activity.” King’s only explanation for why the presumed speculative bubble did not burst sooner was the “continuing Australian gold arrivals.” The discovery of gold deposits in California and Australia had produced an inflow of gold into Great Britain and by 1853 a rise in the price level, which was accompanied by labor unrest and strikes (Figure 2).

However, in the fall of 1857, gold flowed out in response to the Indian Mutiny in India and financial panic in the United States.¹⁴ The Bank lent until its reserve (additional legally allowable note issue) was nearly exhausted. When news of the American crisis reached Britain in August 1857, banks with American connections failed. The government again suspended the 1844 act. By the end of November, the crisis began to subside and gold flowed in from the interior and from abroad (King 1936, 193 and 197-9; Hawtrey 1938, 25-26.)

At the same time, the interval of an elevated Bank rate was quite short. It went from 5.5 percent in September 1857 to 10 percent in November 1857 and then declined sharply to 3 percent in February 1858. Growth slowed in 1857 and 1858 but did not turn negative. Given the short-lived incidence of monetary stringency, the absence of a recession despite a slowing of growth suggests that sustained contractionary monetary policy is required for a serious recession. That implication is counter to the conventional real bills view that periods of prosperity lead to “over-trading,” the inevitable collapse of which causes a period of purging in the form of recession.

A financial crisis arose again in 1866, and real output declined in 1867. In response to a drain of gold to Ireland that produced a decline

¹³ Figure 3 shows a recession in 1850. Over this year, the Bank kept the Bank rate at 2.5 percent and there was no financial panic. Presumably, the recession arose from nonmonetary factors.

¹⁴ Calomiris and Schweikart (1991) attributed the financial panic in the United States to a decline in western land values and the failures of railroads invested in the West. Eastern financial institutions with loans in the West and in railroads suffered runs prompted by fears for their solvency.

in the Bank of England's reserve between June and October 1865, the Bank of England raised its discount rate from 3 percent to 7 percent. In January 1866, the Bank raised the Bank rate to 8 percent "in consequence partly of a bullion drain to the East" (King 1936, 240-1; Hawtrey 1938, 82).

On May 10, 1866, Overend, Gurney & Co. suspended payments. King (1936, 243) cited the contemporaneous response as recorded in the *Bankers' Magazine*:

[A]s the shock of an earthquake. It is impossible to describe the terror and anxiety which took possession of men's minds for the remainder of that and the whole of the succeeding day. No man felt safe. A run immediately commenced upon all the banks, the magnitude of which can hardly be conceived.

Macleod (1866, 194-5) wrote:

[O]n the afternoon of Thursday, May 10, the terrible news spread through London that the great establishment of Overend, Gurney & Co. had stopped payment, with liabilities exceeding £10,000,000—the most stupendous failure that had ever taken place in the City.

The Bank of England raised its discount rate to 10 percent, discounted "legitimate" bills, and the government suspended the Bank Charter Act. Panic then began to subside and "mercantile failures were surprisingly few" (King 1936, 240 and 244).

Overend, Gurney occupied an unchallenged position at the top of Britain's credit structure. In the mid-nineteenth century, it expanded beyond bill broking and became a repository for the deposits of country and London banks (King 1936, 120). King (1936, 117) quoted the *Times* that Overend, Gurney could "rightly claim to be the greatest instrument of credit in the Kingdom." However, in 1865, Overend, Gurney became a limited-liability company. That act capped an expansion of its activities beyond bill broking to equity investments in railways and shipping. Failure of those enterprises brought it down. Given the essential position of Overend, Gurney in the credit markets of Britain, it is surprising that real GDP did not decline in 1866 and declined only modestly in 1867.

In 1871, Germany went on the gold standard. As other countries joined, the demand for monetary gold grew relative to the available gold stock. From 1872 until 1896, the British CPI declined by about 23 percent or about 1 percent a year (Figure 2). Over the period 1872 through 1879, annual real GDP growth averaged less than 0.8 percent.

(In the period 1820 through 1871, in contrast, annual real GDP growth averaged 2.4 percent.) As described by Hawtrey (1938, 65):

[T]he Bank was repeatedly led by a decline in its reserve to raise its rate to 5 per cent. or more, at times when, far from there being any danger of excessive expansion, the vicious circle of contraction was already at work. ... In the periods of depression ... when there were long spells of cheap money with no serious interruption, revival would begin at an early stage.

In response to exports of gold to the United States, the Bank began raising the Bank rate from 2 percent in February 1878 to 6 percent in October 1878. Output declined in 1879. “The depression had been greatly aggravated by the crisis and dear money of 1878. ... It was the stringency and crisis of 1878 that at last brought British industry to a sufficient state of prostration to free the Bank of England from anxiety in regard to the reserve” (Hawtrey 1938, 98-102). Output again declined in 1884 and 1885. Due both to an internal and external drain of gold, the reserve fell from June to November 1884. The Bank rate rose from 2 percent in September 1884 to 5 percent in November 1884 and then gradually declined back to 2 percent in May 1885. “Dear money had again been applied at a time of growing depression” (Hawtrey 1938, 103-4).

The causes of the 1892-93 recession are unclear. The height of the free-silver agitation in the United States occurred in the years 1890 through 1892, and the 1892 election appeared at first to be “an unequivocal victory for the cheaper-money free-silver forces” (Timberlake 1993, 170). As Sayers (1976, 9) noted, “[W]orld gold flows were distorted by the repercussion of American coinage controversies.” In 1891, the Bank rate fluctuated widely, varying between 2.5 percent and 5 percent, but those moves did not appear to translate into stringency in the money market.

The 1900 recession was accompanied by contractionary monetary policy. In October 1899, the Boer War broke out. When the reserve declined sharply, the Bank raised Bank rate to 6 percent. The mild 1903 recession appears to be nonmonetary in character. The 1908 recession followed on the gold outflows produced by the 1907 crisis in the United States. “In September, 1906 ... there arose an intense demand for gold for exportation to the United States. ... In four weeks the reserve fell from £24,762,000 to £18,290,000 (12th September to 10th October). ...” Knickerbocker Trust in New York failed on October 22, 1907. “Enormous exports of gold from England to the United States followed. ... Bank rate was put up to 7 ... on the 7th November” (Hawtrey 1938, 116).

After the 1847 financial crisis, the Bank of England began mainly to keep the Bank rate moderately above the market rate by following the market rate. Inflows of gold, for example, caused market rates to fall and the Bank followed them down. With these procedures, the Bank could claim to be “following” the market. However, they created confusion about the Bank’s intentions. By 1875, the Bank had developed the practice of maintaining the Bank rate well above the market rate and moving it based on its reserve position (King 1936, 163-66 and 286-7; Hawtrey 1938, 23).

As noted by Hawtrey (1938, 63), as the classical gold standard developed, in setting the Bank rate, “the Bank of England was guided not by evidence of the state of business but by the state of the reserve.” King (1936, 167-68 and 317) made the same point:

[A]t all costs it [the Bank] must preserve an adequate reserve. ... From these considerations there was evolved the practice of regulating Bank rate almost solely according to movements in the Bank’s reserve. ... [T]he authorities, once they had realized the dangers of attempting to resist the consequences of foreign-imposed influences, had no practicable alternative but to pursue a so-called automatic policy, regulating Bank rate almost mechanically by gold movements and the trend of the leading exchanges.

Paul Warburg (1910, 16) explained:

The government bank’s discount rate ... is, as a rule, so much higher than that of the general banks, and the restrictions as to the character of the paper which the government bank can take directly are so much more rigid than the requirements of the commercial banks, that in normal times the bulk of the business is done by the general banks and the bankers. Only when the demand for money increases does the rate of the general banks begin to approach that of the government bank, but when this happens the government bank, as a rule, raises its rate, so as to maintain its margin over that of the general banks.¹⁵

With the Bank rate above the market rate, the Bank of England had to enforce its Bank rate in financial markets. As the directors pointed out in their argument that they were not responsible for the

¹⁵ Warburg (1910, 17) continued to explain that in response to internal drains of currency understood as transitory, such as drains associated with the seasonal movement of crops, the Bank of England left its discount rate unchanged and encouraged discounts and an increase in circulating currency. In response to a persistent drain, however, the Bank of England would “raise the rate in order to protect the reserve and to force liquidation. ...”

speculation in financial markets prior to the 1847 crisis, the Bank had become a small player in the credit markets and could not influence interest rates in a direct way (King 1936, 150). The Bank did control money (bank reserves), however. If market rates failed to increase in response to a drain of gold, the Bank would drain reserves through sales of Consols combined with an agreement to repurchase them, “borrowing on Consols,” or reverse RPs in modern terminology. City banks followed the Bank rate knowing that if the market rate fell much below the Bank rate, the Bank of England would raise the market rate through draining reserves (Sayers 1976, 37-38). Also, Hawtrey 1938, 68) wrote:

When the Bank lost gold or the active circulation of notes increased, there was an equivalent decline in its [commercial bank] deposits. The money available for the commercial banks was diminished, and the gap was made good by the sale of bills to the Bank of England. Thus the loss of gold or the increase in the active circulation itself made Bank rate effective.

Banks acted in anticipation of movements in the Bank rate. King (1936, 320-21) wrote:

[T]he banks and discount houses began to watch closely the trend of official policy, anxiously scanning the Bank returns, the trend of money rates abroad, and, above all, the exchanges, for any clue as to what the action of Threadneedle Street would be. ... And at such times a helpful hint from the authorities that there might be breakers ahead came to be almost as effective in Lombard Street as even the most direct disciplinary actions had been in the past (King 1936, 320-21).

As the nineteenth century progressed, the Bank of England also developed its lender-of-last-resort responsibility (Capie and Wood 2007 and 2015; Humphrey 1975, 1989, 2010; and Humphrey and Keleher 1984). Bagehot (1873) formalized the concept of lender of last resort based on the bank panic of 1866. In order to prevent moral hazard, the Bank of England enforced a real bills policy on the discount houses. As described in King (1936, 215), by the end of the nineteenth century, the Bank imposed qualitative controls on discounts in a number of ways. It would exercise that control “by exercising a rigorous discrimination against speculative bills”; “rediscounts should be confined where possible to bills of shorter currency than the Bank itself held”; and “the total accommodation to be afforded . . . would always be considered strictly in relation to the capital and private resources of each applicant.”

3. WHY DID THE QUANTITY THEORY WITHER AS A USEFUL ANALYTICAL TOOL?

As the gold standard became orthodoxy, the quantity theory withered away. The readily “intuitive” demonstration of the quantity theory occurs in a monetary regime in which money creation, especially, to finance government deficits, precedes inflation. In the gold standard organized around the Bank of England’s manipulation of the discount rate, in contrast, the norm was for money not to be created but to be supplied on demand through the import of gold. The exceptions to the norm could only be inferred from a sophisticated analytical apparatus appealing to the construct of a natural rate of interest. Consider in this respect the operation of the gold standard.

With the gold standard, the price level for a country comprises a baseline of the average price level in countries on the gold standard. That baseline is determined in the long run by the marginal cost of producing gold, but it is influenced in the shorter run consisting perhaps of decades by the monetary and nonmonetary demand for gold. The price level of a country relative to other countries (relative to the baseline) then adjusts in order to produce the equilibrium real terms of trade that provides for balance of payments equilibrium. In the gold standard, a country’s price level is then determined through the working of the marketplace. With this given price level, gold flows are the equilibrating variable in that they adjust through the balance of payments in order to give the public its desired amount of money.

In contrast to the gold standard norm described above, money is “created” by the central bank rather than “supplied” by the market when the central bank creates a divergence between the natural rate of interest and its policy rate. However, the natural rate of interest is not observed. One must infer it from an understanding of the role of the interest rate in the price system *and* from an assumption that the price system works well to determine well-defined values of relative prices. Stated alternatively, the power of the central bank both for good and mischief derives from an ability to create a wedge between the market rate and the natural rate through money creation (destruction). The Achilles’ heel of the quantity theory as an intuitive analytical framework for bringing coherence to a monetary regime in which nominal money is demand-determined is the invisibility of the natural rate of interest.

One must infer its existence indirectly. In order to maintain convertibility, the Bank had to enforce the internationally determined interest rate (the natural or market-determined world interest rate) on the British banking system and on the discount houses financing world trade. In a quantity-theoretic spirit, that power derived from its ability

to move the market rate in a way that produced a wedge between the market rate and the natural rate. A market rate above the natural rate led to the destruction of paper money, an increase in market rates, and ultimately a decrease in the price level. Conversely, a market rate below the natural rate led to the creation of paper money, a decrease in market rates, and ultimately an increase in the price level.

The Bank of England's power to enforce the international gold standard had to derive from its unique role as a creator of money. As the nineteenth century evolved, the Bank of England became a negligible player in credit markets. Moreover, it could not run a commodity-price stabilization scheme in order to peg the price of gold because its gold holdings amounted only to between a third and a sixth of the gold in circulation in the United Kingdom (Hawtrey 1938, 41, using figures of William Stanley Jevons). Despite these last two facts, the Bank became the linchpin of the world financial system as the guarantor of the convertibility of the pound sterling. The assurance of the ability and the ease of converting Exchequer bills into gold and vice versa made London into the world's money market. The continental central banks like the Reichsbank, Banque de France, and the Riksbank, which all originally maintained a significant presence in credit markets in the nineteenth century, eventually came to emulate the Bank of England (Sayers 1976, 2).

At the same time, however, a test of the quantity theory that would be readily observable would be a change in the monetary arrangements of a country that caused money to be the forcing variable and prices the equilibrating variable. That is, a test of the quantity theory would have required the unambiguous "experiment" provided by a change in the monetary regime to a paper money standard, especially, one driven by the requirement that the central bank finance government deficits. There were, however, no more departures from the gold standard and returns to it that forced economists and policymakers to adopt a conceptual framework for understanding the resulting behavior of inflation.

There was an additional problem in demonstrating the relevance of the quantity theory beyond the uniqueness of the suspension period. During the Napoleonic Wars, Britain had a usury ceiling of 5 percent. The stimulus to credit provided by wartime demands at times caused the ceiling to bind. There was then a natural counterpart to the Bank rate-natural rate construct used by the bullionists that did not require an understanding of the role of the interest rate in the operation of the price system. That construct disappeared with the end of exceptional wartime demands. It disappeared definitively after 1833 when the Bank Charter Act exempted bills up to three months from the ceiling with an extension to all maturities a few years later.

In the gold standard, the natural experiments relevant to the way in which the behavior of money explains the behavior of prices are the exogenously determined gold flows that originate abroad in the world gold market. For the bullionists, they separate purely monetary shocks from the impairment to credit flows.¹⁶ Thornton (1802 [1939], 271 and 307, cited in Humphrey [2010]) identified monetary excess and instability as the source of inflation and cyclical volatility:

[I]t is by the amount not of the loans of the Bank of England, but of its paper . . . that we are to estimate the influence on the cost of commodities. It is not the limitation of Discounts or Loans, but . . . the limitation of Bank Notes or the Means of Circulation that produces the Mischiefs [of lost output and employment].

However, absent the analytical framework of the quantity theory, for contemporary observers in the nineteenth century, the readily “intuitive” explanation of recession and deflation started with the cyclically low interest rates that existed in periods prior to economic expansions and continued with the association of expansions with the optimism about the future that encouraged investment. This “look-out-the-window” story (correlation implies causation) of the business cycle was then that “low” interest rates encouraged speculative excess, and the collapse of that excess caused recessions. For example, in his summary of the debate over the 1847 crisis, King (1936, 149) highlighted the different views on the responsibility assigned to the Bank of England for creating “low” interest rates. However, there was agreement in blaming “the commercial world, for its reckless overtrading, its foolish speculations and its irrational exuberance.” King (1936, 149) drew the following conclusion from his review of a century of British experience:

[T]he commercial world and the general public of all ages since capitalism began have been prone to overreach themselves by an irrational and cumulative optimism which must ultimately bring its own corrective in the shape of a more or less sharp recession, both of confidence and economic activity.

Although the last financial panic in Britain occurred in 1866, recessions continued. All the same, heightened uncertainty about the future and increased risk of default remained characteristic of reces-

¹⁶ Humphrey (2010, 342) expressed the distinction, “Money does what credit cannot do, namely serve as the economy’s unit of account and means of [achieving finality of] payment.”

sions. It was then difficult to identify natural experiments that would have allowed an unambiguous distinction between monetary disorder and financial disorder as sources of the disruption to trade. What participants observed directly was the cessation of the ready availability of credit. Henry Sidgwick (1883, 265) described how outflows and inflows of gold, a clearly monetary phenomenon, confounded the source of shocks by working through financial markets:

[I]t should be observed that those who confound the two meanings of “value of money” are not wrong in supposing that the value of the use of money tends to be lowered by an unusual influx of metallic money or bullion, and raised by an efflux: they are only wrong in overlooking the transitoriness of these effects. An increased supply of gold, not accompanied by a corresponding increase in the work that coin has to do ... tends ultimately to lower the purchasing power of money. ... [I]n the first stage of the process that leads to this result, the increment of coin ... must pass through the hands of bankers. ... Hence the price paid for the use of money will tend to fall, and this fall to cause increased borrowing, and consequent extended use of the medium of exchange; and then through the resulting rise in prices generally, the greater part of the new coin ... will gradually pass into ordinary circulation. ... In the same way, when gold has to leave a country ... it will generally be taken chiefly from the reserves of banks; and the need of filling up the gap thus created will make it expedient for bankers to restrict their loans, and so tend to raise the rate of discount. This effect will generally be greater, the smaller the reserve of metal kept by the aggregate of banks, compared with the amount of the medium of exchange that they supply.

Perhaps the most important reason for the fading of the quantity theory as a framework for analysis was that the intellectual environment became hostile because of the theory’s association with purposeful money creation by a central bank. Representatives of the agricultural sector and of the industrial interests of Birmingham, such as Thomas Attwood, cited above, criticized the gold standard and the deflation that lasted from 1815 until 1835 (Schumpeter 1954, 405 and 715; Fetter 1965, 99). In response to their arguments for paper money or bimetallism, conservatives rallied around the gold standard and around the Bank of England as the protector of the established order.

After the Bank Act of 1844, investigations into the behavior of money and prices practically disappeared. It was the adherents of the currency school who advocated the act and maintained the quantity theory tradition who should have possessed a natural interest in monetary phenomena. They believed, however, that the provisions of the 1844 act took discretionary control of money away from the Bank of

England. The behavior of the money supply was then believed to depend only upon gold flows in accordance with the discipline of the international gold standard. The automatic operation of the gold standard militated against any need for an analytical understanding of its working.

The commitment to the gold standard in the pre-World War I period came from identification of that standard with the British Empire. Just as London was the center of the empire, London was the center of the world market for gold (Bordo 1999). The absence of any kind of controls on the export and import of gold was the foundation for the central role of London in the finance of world trade.¹⁷ The conservatism of the established status quo with its belief that any alternative to the gold standard was synonymous with social disorder rendered disreputable the development of the quantity theory. King (1936, 317) noted, “The only available alternative [to the gold standard], the substitution of a pure managed currency for an international standard, was unthinkable before the War.”

Fetter (1965, 141) commented, “Among economists from the 1820’s on the gold standard was a matter of economic theology rather than economic analysis.” Fetter (1965, 141) quoted an 1822 speech of Charles Callis Western, member of Parliament and opponent of resumption:

A degree of something like superstitious veneration has been created for what they [the bullionists] called a SOUND METALLIC currency at the ANCIENT standard of value; a sort of priesthood is exercised by the learned on this subject, by which, as in the case of religious superstition, unassuming patient men are induced to believe that there are mysteries beyond the reach of common sense, and in like manner, give up the use of their own understanding, thus undergoing the fate of all honest dupes. [capitals in original]

The intellectual heirs to the bullionists in the nineteenth century also came to associate the gold standard with *laissez faire*. Schumpeter (1954, 405) expressed their view: “An ‘automatic’ gold standard is part and parcel of a *laissez-faire* and free-trade economy.”

¹⁷ Eichengreen (1987) discussed the leadership role of the Bank of England in the international monetary system of the nineteenth century. Roberds (2016) highlighted the difficulties other European countries experienced in their attempts to replicate the example of the Bank of England. The creation of a government bank holding interest-bearing government debt financed by currency (noninterest-bearing debt) provided seigniorage revenues to the government. The ability of government to use money creation to finance its spending too often ended in inflation and monetary instability. See also Tullock (1957) for the case of China. As a result, a fiat money standard and the quantity theory came to be associated with runaway inflation and instability.

4. WHAT COULD THE EARLY FED HAVE LEARNED FROM THE BANK OF ENGLAND?

The answer to the question of what could the early Fed have learned from the experience of the Bank of England is “very little.” The Bank of England learned pragmatically how to manage the gold standard without understanding or articulating the analytical basis for its operation. What transmitted then in Bank of England practice was not a quantity-theoretic understanding of maintenance of the gold standard but rather the real bills practices followed in its discounting of bills as a way of limiting moral hazard. As a result, when the gold standard broke down with World War I, knowledge of the quantity theory required reinvention.

However, given the atrophied state of the quantity theory and the prejudice against “managed” money, the task proved impossible for the early Fed. Its founders were in no position to make the intellectual leap required for management of a monetary regime with a nominal anchor aimed at the domestic price level (Hetzel 1985). Ultimately, policymakers were overwhelmed by the Depression and the popular belief that it arose from the collapse of speculation. Real bills nostrums filled the intellectual vacuum (Hetzel 2012 and 2014).

Moreover, the early Fed operated in a different environment than the Bank of England. Without understanding its environment, the early Fed did in fact create a regime of “managed money.” The founders of the Fed were adamant that they were not creating a central bank, which was then understood as the Bank of England (Hetzel 2014; Lowenstein 2015). With the creation of the Federal Reserve, the United States went off the gold standard in that gold flows (external and internal inflows and outflows) no longer determined bank reserves and money in a systematic way. That situation persisted after the end of World War I and into the 1920s. However, because the United States maintained legal convertibility, there was little understanding of how the monetary regime had changed.

Early Fed policymakers assumed the United States was on a gold standard because it had maintained convertibility throughout World War I and the 1920s. However, this simulacrum of a gold standard in no way constrained money creation the way it did for the Bank of England. London was the center of the world gold market, and the Bank of England routinely set its Bank rate based on the way in which gold flows affected its reserve. In contrast, the individual Fed Regional Banks watched their gold cover (the required gold backing of

their note issue and deposits of member banks).¹⁸ Because the United States ended World War I with a large fraction of the world's monetary gold, only on three occasions did the gold cover bind.¹⁹ As a result, early Fed policymakers experimented with operating procedures for controlling the cost of funds to member banks but understood them in the context of their real bills views (Hetzel 2012 and 2014).

The critique that the bullionists applied to the Bank of England also applied to the early Fed. In the same way that the directors of the Bank of England failed to understand the need to replace their gold peg during restriction with a new nominal anchor, early Fed policymakers failed to realize that gold convertibility in itself in the absence of a discount rate tied to gold flows did not provide a nominal anchor that endowed money with a well-defined value in terms of goods.²⁰ In the absence of that understanding, what came through were real bills principles. In the *Report on the High Price of Bullion* (1810), quoted in Cannan (1919 [1969], 48-49), the bullionists argued:

So long as the paper of the Bank was convertible into specie at the will of the holder, it was enough, both for the safety of the Bank and for the public interest in what regarded its circulating medium, that the Directors attended only to the character and quality of the Bills discounted, as real ones payable at fixed and short periods. They could not much exceed the proper bounds in respect of the quantity and amount of Bills discounted, so as thereby to produce an excess of their paper in circulation, without quickly finding that the surplus returned upon themselves in demand for specie. ... It was hardly to be expected of the Directors of the Bank, that they

¹⁸ Morys (2010) documented that the peripheral countries of the gold standard made discount rate decisions based on their domestic gold cover rather than on the gold points, which are the ranges of tolerance of their paper currencies with their par gold value that set off exports or imports of gold.

¹⁹ In the fall of 1919, the fall of 1931, and early 1933, the Regional Banks raised their discount rates in response to gold outflows.

²⁰ Under the gold standard, the real (goods) price of a gold coin containing a specified amount of gold alloy was determined by the market value of gold. As long as the Bank of England guaranteed convertibility at a fixed par value between its bank notes marked one pound and gold coins marked one pound, arbitrage equated the goods value of the Bank of England paper pound and the equivalent of a one-pound gold coin. If, say, the gold coin was more valuable in exchange, individuals could take paper pounds to the Bank of England and demand gold coins. That would reduce Bank of England gold reserves. The Bank of England would then raise its discount rate. As businesses contracted lending in response, the money stock declined and the price level fell. The fall in the price level increased the real (goods) value of the paper pound by increasing its purchasing power. Deflation continued until the paper pound had the same value in exchange as the gold coin minted as one pound. In this way, the price level (the goods price of the paper pound) was determined. Britain then had a "nominal anchor" that gave the paper pound a well-defined value in terms of its purchasing power (a well-defined price level) although not a stable one because the market price of gold varied.

should be fully aware of the consequences that might result from their pursuing, after the suspension of cash payments, the same system which they had found safe before. ... [W]hile the convertibility into specie no longer exists as a check to the over issue of paper, the Bank Directors have not perceived that the removal of that check rendered it possible that such an excess might be issued by the discount of perfectly good bills.

In the United States, real bills views mixed with American populism. The unit banking system resulted in the pyramiding of reserves in which the reserves of country banks ended up held by correspondent banks in reserve and central reserve cities, especially New York City. The New York correspondent banks lent funds in the call money market, which financed the purchase of stocks on margin. The founders of the Fed believed that such lending financed speculation. In the last quarter of the nineteenth century in Britain, in contrast, branch banking replaced unit banking and, as a result, the need for a bill market to allocate funding from surplus to deficit regions disappeared. Bills of exchange became a primary instrument for financing world trade (King 1936, 268). There was then no association of the speculation assumed to produce boom-bust cycles with the concentration of bank reserves in London and with the presumed need to prevent them from spilling over into stock market speculation.

The reformers who created the Federal Reserve desired an “elastic” currency, that is, a currency that would expand *and* contract with the “needs of trade” so that excess credit would not spill over into speculation. In the United States, prior to the establishment of the Fed and under the National Banking Act of 1863, the issue of banknotes was inelastic because they had to be collateralized by government bonds. As a consequence, it was assumed that, when the demand for credit was cyclically low, an excess supply of credit would spill over into the speculative extension of credit. Extending credit based on real bills would proportion the supply of credit to the demand for productive uses and thus prevent the speculation, the collapse of which would lead to recession. (See Carter Glass, cited in Hetzel [2014, 175].)

Moreover, until March 1933, the Regional Fed Banks employed procedures in which member banks had to borrow from the discount window in order to obtain the marginal reserves they required and thus could be monitored for speculative lending (Hetzel 2012, Ch. 4). Because Fed policymakers interpreted the Great Depression as resulting from the collapse of a speculative bubble in land and equities, they maintained a contractionary monetary policy until forced to relinquish control of monetary policy to the Treasury in March 1933. Nothing in the early thinking of the Fed recognized its responsibility for the price

level or for setting an interest rate compatible with the required money creation (Hetzel 2012, Ch. 4).

In his commentary on the foreign exchanges, Hawtrey (1938, 34) commented that no one “would deny the fact of a great decline in manufacturing activity and consequent unemployment” following elevation of the Bank rate. However, he also noted that markets expected that the period of an elevated Bank rate would be short. In the case of Britain, a one-time deflation would depress the real terms of trade and restore balance of payments equilibria thereby arresting the external gold drain. Under the influence of real bills views, the Fed’s founders believed that once past the credit liquidation required in order to eliminate a speculative lending mania, the economy would recover and grow again. Nothing in their experience prepared them for the Great Depression.

Of course, one cannot undo the mistakes that led to the Great Depression. What one can do is to ask that central banks employ a systematic procedure for learning from past mistakes. For that to happen, they need to operate with an analytical framework like the quantity theory that yields counterfactuals of different monetary policies. Asking that central banks use their models to learn from the past in a way that disciplines the present is a natural extension of transparency and accountability.

APPENDIX: A BRIEF OVERVIEW OF THE QUANTITY THEORY

The foundation of the quantity theory is the distinction between real variables and nominal variables. Real variables are the relative prices of goods and services (rates of exchange between them) and physical quantities. Nominal variables are quantities denominated in money (dollars or pounds), especially the stock of money and the price level (the money price of goods). Real variables are determined within the price system by tastes, technologies, and endowments. In contrast, in a world of fiat money, which possesses no intrinsic value, some constraint imposed from outside the price system (a nominal anchor) is required in order to give nominal variables well-defined values. The quantity theory explains the fundamentally different behavior of real and nominal variables, especially, the difference in the determination of relative prices and the price level.

Giving empirical content to the quantity theory requires distinguishing between financial intermediation and money creation. It also requires the assumption that the price system “works” in the sense that, despite changes in the price level, over time markets will separate changes in the price level from the determination of relative prices. One consequence is that markets will determine a real rate of interest—the natural rate of interest—based on real determinants. If the central bank sets its policy rate differently from the natural rate, in a way analogous to price fixing in an individual market, the central bank will engender money creation (destruction) that will destabilize the price level. Although destabilizing to real variables, as long as central bank interference with the price system is temporary, market-clearing relative prices will reemerge.

Finally, giving empirical content to the quantity theory entails understanding how the nature of the nominal anchor determines the equilibrating role of money and the price level. In a gold standard with no changes in the world supply and demand for gold that force changes in the commodity price of gold and with no changes for a country in its terms of trade, money becomes the equilibrating variable. Through gold flows arising out of the balance of payments, the money supply (gold) varies in order to accommodate money demand (Humphrey and Keleher 1982). In a pure fiat money standard or in a gold standard, if the central bank creates a discrepancy between its policy rate and the natural rate of interest, changes in money force changes in the price level.

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