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## On some classical monetary controversies

David Glasner

## I. Introduction

Most standard accounts of classical monetary theory (e.g., Blaug 1968, O'Brien 1975) emphasize its grounding in the quantity theory of money. Elsewhere (Glasner 1985), I have disputed the identification of classical monetary theory with the quantity theory, arguing that much of classical monetary theory can best be understood as a theory of a competitively produced convertible money in which the nominal quantity of inside money produced by the banking system has no effect on the exogenously fixed price level. For many classical economists, the quantity theory was strictly applicable only to an inconvertible fiat currency. Construed broadly as an extension of supply-demand analysis, the quantity theory could also account for the effects of gold discoveries—but only at the level of the closed world economy, not at the level of an open national one. Moreover, by treating the quantity of money as the exogenous variable to which prices had to adjust, the quantity theory could not cope analytically with the existence of a competitive banking system.

In my 1985 article, I argued that numerous supposed inconsistencies or errors in classical monetary theory—dichotomizing the determination of relative prices and the price level, ignoring the real-balance effect, and belief in Say's Law<sup>1</sup> and the Law of Reflux—can be validly deduced from a model of a competitively produced convertible money. I also suggested that such a model could illuminate several classical monetary controversies that have puzzled later commentators who identified classical monetary theory with the quantity theory.

In this article, I want to examine those controversies in more detail to support my reinterpretation of classical monetary theory. To do so, I shall suggest some new readings of old texts. Obviously those who are used to reading those texts from a quantity-theoretic perspective may find my interpretations forced. Demonstrating the correct reading of a text is a difficult, if not hopeless, task as literary critics and legal scholars well know. But if they are willing to postpone judgment on the basic issue, readers

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1. Unless otherwise indicated, I use Say's Law in the strong sense of Say's Identity throughout the article.

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may find my interpretation of the texts no more forced than the more conventional ones.

The next section outlines a classical monetary model of a competitive convertible currency. In section three, I show how Adam Smith's adherence to something like this model accounts for his differences (including his omission of the price-specie-flow mechanism) with David Hume, a pure quantity theorist. Section four interprets the debate between the Banking and Currency Schools as an extension of the one between Smith and Hume and shows how the Banking School's Law of Reflux follows from the classical model. In the next section, I show that Say's Law also follows from the classical model and, indeed, is equivalent to the Law of Reflux. I explore the reasons for abandonment of the classical theory in section six. In particular, I consider how Cairnes's quantity-theoretic analysis of the effects of the Australian gold discoveries helped establish the quantity theory and the price-specie-flow mechanism as the orthodox explanation of international prices. Section seven contains some concluding observations about the relationship between the classical and the quantity theories of money.

## II. A Classical Monetary Model

I begin by sketching a model developed by Thompson (1974) which I described more fully in my 1985 article (48-55). Assume that banks can lend (estimate risk and collect repayment) costlessly, but that it is costly for non-banks to do so. As the least-cost provider of credit, banks issue IOUs that are instantly redeemable and, hence, more marketable than IOUs issued by others. Because bank IOUs are more readily accepted in payment than IOUs issued by other economic agents, non-banks exchange their own IOUs for those of the banks to use in making payments.

If banks compete with each other, they are obliged to pay interest on their IOUs,  $r_M$ , equal to the riskless rate of interest on loans,  $i$ . Otherwise, since banks operate costlessly, they would earn positive profits. To safeguard holders of its IOUs against its technical ability to issue liabilities without limit and render them worthless, a bank must commit itself to convert its IOUs at a stipulated rate into an asset whose value it cannot control.<sup>2</sup> Without offering some guarantee of convertibility into an "outside" asset, no bank could gain currency for its liabilities. Money holders would not necessarily insist on a promise of instant convertibility, but a commitment to convert eventually is essential.<sup>3</sup> Thus, a commodity (gold)

2. The asset into which convertibility is promised need not be a real commodity. An inconvertible fiat money issued by the government or a bank with monopolistic privileges like the Bank of England would also qualify.

3. The Scottish banks, for example, had an option clause that allowed them to postpone converting notes into gold for six months after presented for redemption. Smith (1937, 309) condemned the option clause and favored legislation prohibiting its use. But K. Dowd (1987, 1989) has recently reexamined the option clause and cast it in a much more favorable light than did Smith.

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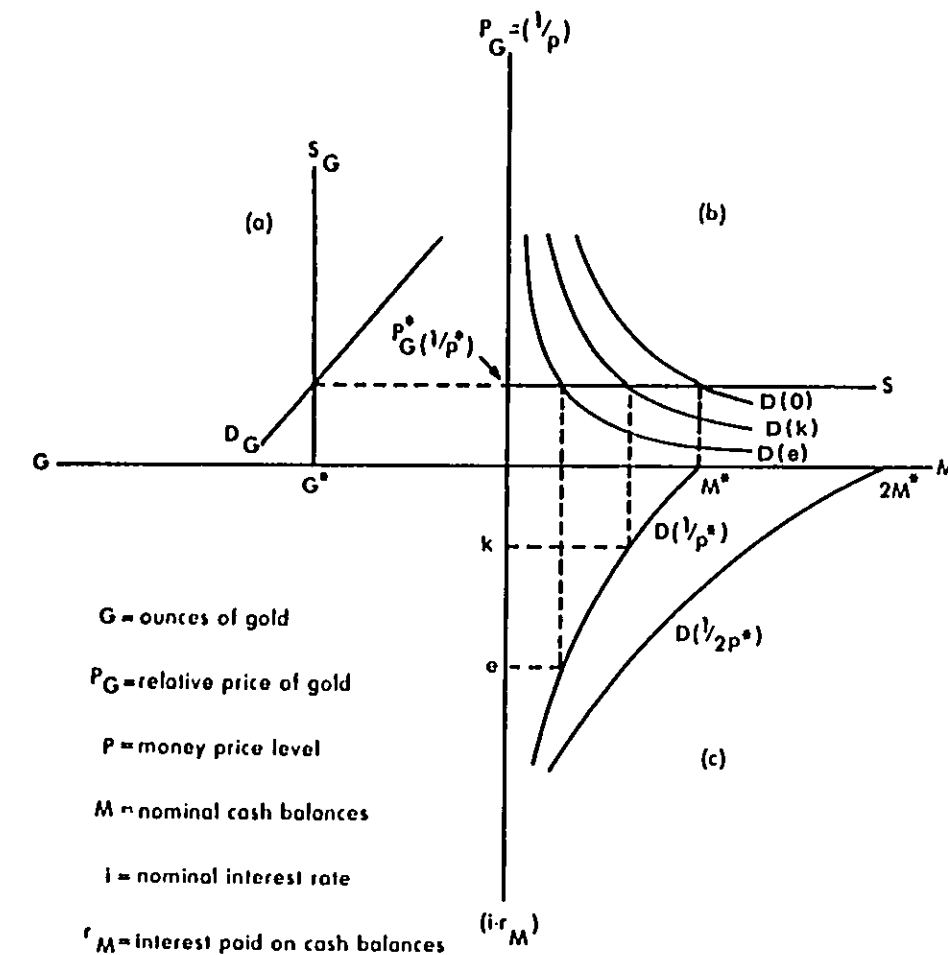


Figure 1.

standard is the outcome of a competitive process, not merely a legal requirement exogenously imposed on the banking system (Selgin and White 1987; White 1984b).

Except after unanticipated gold discoveries, prices measured in gold generally fell in the nineteenth century. Hence, holders of money convertible into gold usually did receive some implicit interest. Insofar as holding money required foregoing any interest, that implicit price reflected either real costs of producing money or monopoly power in the banking systems of most countries.

The determination of the price level,  $P$ , of the spread between the nominal interest rate on loans<sup>4</sup> and the interest banks pay on money,  $i - r_M$  and of the nominal quantity of money,  $M$ , is shown in Figure 1. Panel a)

4. In this model, the nominal rate on loans corresponds to Wicksell's "natural rate." The competitive model assumes that banks will charge the natural rate on loans. For a deviation between the natural rate and the market rate for loans to occur, some sort of market imperfection must be introduced. In Thornton, the sources of the imperfection were the monopoly power of the Bank of England and the suspension of convertibility. See fn. 19.

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shows the determination of the relative price of gold,  $P_G$ , on the assumption that banks hold no gold reserves. Unless gold is appreciating at a rate equal to  $i$ , this assumption is implied by the prior assumption of costless production. Given the exogenously determined conversion rate of currency into gold,  $CR$ ,  $P_G$  uniquely determines  $P$  in accord with the equation  $(CR)(1/P) = P_G$ .

Without loss of generality, we can choose  $CR$  so that  $P_G$  equals  $1/P$ , allowing  $P_G$  and  $1/P$  to be measured simultaneously along the vertical axis. In panel b) a family of rectangular-hyperbolic demand curves depicts the inverse relationship between the amount of nominal cash balances demanded,  $M$ , and  $1/P$ . The demand for real cash balances along each demand curve is constant and depends on  $i - r_M$ . In panel c) the demand for real cash balances as a function of  $i - r_M$  is shown by a family of demand curves (each corresponding to a given price level). Competition requires that  $i - r_M$  equal the marginal cost of maintaining cash balances held by the public. If that cost is zero, the supply curve of cash balances in panel c), indicating the output of money by banks as a function of  $i - r_M$ , coincides with the horizontal axis. Thus, the equilibrium amount of money balances is represented by the point where the demand curve in panel c) that corresponds to the price level determined in panel a) touches the horizontal axis.<sup>5</sup>

In standard quantity-theoretic analysis, the price level depends on an exogenously fixed nominal quantity of money. But in this model, the supply of money balances is perfectly elastic at a price level exogenously fixed by convertibility.

Even if banks cannot produce money costlessly, the same conclusions follow if the demand for gold by the banking system of the country whose price level is being determined is a small component of the international demand for gold (Glasner 1985, 52-54).<sup>6</sup>

I should also observe here that in the classical model an excess demand for inside money (in contrast to an excess demand for gold) does not

5. If there were some positive, but constant, marginal cost of maintaining the money balances held by the public, the supply curve would be perfectly elastic at  $k$ , where  $k$  is the annual cost of issuing one unit of money. If the marginal cost of producing money balances increases with the quantity of money balances, the supply curve rises. In other words,  $i - r_M = k(M)$  where  $K(M)$  is the marginal annual cost of maintaining the money balances held by the public as a function of the quantity of money balances. Note, however, that even if the supply curve in panel c) were upward sloping, the supply curve in panel b) would still be perfectly elastic with respect to  $1/P$ .

6. Classical theorists were of different minds about the "smallness" of Great Britain in the early nineteenth century. Ricardo, as we shall see in section V, did not believe Britain was small after the Napoleonic Wars. He blamed the Bank of England for causing gold to appreciate by rapidly accumulating gold in anticipation of the resumption of convertibility. However, Senior (1830), explicitly addressing the smallness issue, concluded that the whole British gold coinage was a small fraction of the world's outstanding gold stock. Certainly by the middle of the century, the smallness assumption was valid for Britain. That Britain was not small in relation to the markets for manufactured goods in the early nineteenth

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correspond to an excess supply of goods in the real sector. The excess demand for inside money is offset, instead, by an excess supply of IOUs offered to the banking system in exchange for money. Nor does an excess supply of inside money correspond to an excess demand for goods in the real sector. It is offset by an excess demand for IOUs from the banking system, i.e., a desire by the public to reduce its indebtedness to the banking system. The classical proposition that an excess demand for money does not impinge on the real sector is known as Say's Law. The corresponding proposition that an excess supply of money does not impinge on the real sector is the Law of Reflux.

A further observation may be helpful in avoiding confusion. Neither Say's Identity nor the Law of Reflux asserts that the money market is always in equilibrium. An excess demand for or excess supply of money can occur. What the two propositions assert is that any excess demand for or excess supply of money is offset, not by a corresponding excess supply or excess demand in the real sector, but by an excess supply of or excess demand for IOUs which the banking system stands ready to exchange for money. Two markets are juxtaposed: a market for inside money and a market for IOUs that back money. The two markets are equilibrated by adjustments in the spread between the interest paid on money and the interest rate charged loans (or paid on IOUs) or by adjustments in the quantity of money and IOUs. The equilibration occurs without impinging on the real sector of the economy, which is the fundamental proposition that both Say's Identity and the Law of Reflux seek to establish.

### III. *Hume and Smith on Banking and the Price-Specie-Flow Mechanism*

The classical theory of a convertible, competitive money was first coherently expounded by Adam Smith. Smith (1937, 189, 313, 404-05) recognized that the value of a metallic currency would be determined by the supply of, and demand for, the metal in international markets, so that the price level in any country was fixed by the internationally determined value of the metal.<sup>7</sup>

century is true, but not relevant to the properties of the model discussed in the text. Those properties depend on the relation between the demand for and supply of money and the relative price of gold. As I argue in the text, markets for real goods in this model are insulated from changes in the demand for or supply of money.

7. It is curious that in discussing the historical origins of the monetary approach to the balance of payments, neither Frenkel and Johnson (1976) nor Frenkel (1976) ever refer to Smith among the forerunners of the monetary approach who recognized the international determination of price levels under the gold standard. Yet they refer to Hume as a forerunner even though, as they recognize, his analysis of international adjustment assumed that national price levels could deviate from the internationally determined value of gold. On this point, see Frenkel (1976, 41-42).

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Smith worked out a rudimentary theory of a competitive banking system to explain the market mechanism that constrains the note issues of such a system.<sup>8</sup> He was specifically responding to David Hume who maintained that banks were inherently inflationary. In his essay, 'On money,' Hume had written (1955, 67-68):

I scarcely know any method of sinking money below its level, but those institutions of banks, funds, and paper credit which are so much practiced in this kingdom. These render paper equivalent to money, circulate it throughout the whole state, make it supply the place of gold and silver, raise proportionately the price of labour and commodities, and by that means either banish a great part of those precious metals, or prevent their farther encrease.

Smith responded by observing that banks could not cause prices to rise as long as their notes were unquestionably convertible into gold (1937, 308).

A paper money consisting in bank notes, issued by people of undoubted credit, payable upon demand without any condition, and in fact always readily paid as soon as presented is, in every respect, equal in value to gold and silver money; since gold and silver money can at any time be had for it. Whatever is either bought or sold for such paper, must necessarily be bought or sold as cheap as it could have been for gold and silver.

Understanding that instead of promoting overissue as Hume alleged, competitive banking prevented it, Smith directly addressed (1937, 308-9) Hume's argument:

The increase in paper money, it has been said, by augmenting the quantity, and consequently diminishing the value of the whole currency, necessarily augments the money price of commodities. But as the quantity of gold and silver, which is taken from the currency, is always equal to the quantity of paper which is added to it, paper money does not necessarily increase the quantity of the whole cur-

8. Unfortunately, the contribution by Smith to banking theory usually singled out for attention (Mints 1945, 9, 25-27) is the real bills doctrine (Smith 1937, 288-92). Since his discussion of the real bills doctrine presumed convertibility, one should not assume that he, like some of its later advocates, believed that adherence to it would prevent depreciation of bank notes even without convertibility. Smith (1937, 309-13) explicitly recognized that inconvertible banknotes could be depreciated. For Smith, the real bills doctrine was simply a rule of thumb for bankers to follow to maintain their liquidity and to permit their balance sheets to expand and contract in response to changes in the demand for money. See Smith (1937, 288-92), where he mentions the real bills doctrine among other expedients for a bank to gauge how much money it can safely issue.

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rency. From the beginning of the last century to the present time, provisions were never cheaper in Scotland than in 1759, though, from the circulation of ten and five shilling bank notes, there was then more paper money in the country than at present. The proportion between the price of provisions in Scotland and that in England, is the same now as before the great multiplication of banking companies in Scotland. Corn is, upon most occasions, fully as cheap in England as in France; though there is a great deal of paper money in England, and scarce any in France. In 1751 and 1752, when Mr. Hume published his *Political Discourses*, and soon after the great multiplication of paper money in Scotland, there was a very sensible rise in the price of provisions, owing, probably, to the badness of the seasons, and not to the multiplication of paper money.

What introducing a convertible currency into a country did was not to raise prices, but to free for productive uses the capital formerly tied up in specie and coin (Smith 1937, 275). Substituting paper for metallic money reduced the demand for the metal, so that excess specie could be exported to pay for capital goods that would promote economic growth. If the amount of coin and specie replaced were small compared to the world stock, the export of precious metals would not greatly affect their international values. With the value of precious metals unchanged, the price level, under a metallic standard, would not change either. And even if their value did fall, prices in the country into which the convertible paper currency was introduced would not rise above prices in other countries on that standard.

Smith maintained (1937, 277, 405) that a competitive banking system would supply as much money as the public needed to facilitate its transactions. This vague, though essentially correct, statement is at least superficially at odds with the assertion quoted above that the amount of paper currency produced by the banking system would displace an equal amount of precious metals. That, as Henry Thornton (1939, 95-96) noted, would only happen if people wished to hold the same amount of money in notes that they had held in coin or specie. Thornton saw that if people wanted to hold more notes in real terms than the real value of coin and specie they had been holding, the quantity of notes would increase by more than the metallic circulation declined. But Thornton never denied Smith's basic assertion that the introduction of paper currency by competing banks would not raise prices. Since the public willingly held the newly issued paper money, there was no tendency for prices to rise in a small open economy.

Thus, Smith may have meant no more than to deny that convertible notes would be issued to excess and thereby raise prices. Since Smith

believed (1937, 405) that "a well-regulated paper money" could substitute for any shortage in the supply of gold and silver, he would not have denied that the reduction in the quantity of coin and specie did not have to match precisely the increase in the quantity of convertible paper.

A compelling reason for interpreting Smith's monetary theory as a theory of a competitive convertible currency is that doing so solves an apparent mystery in the history of economic thought (Viner 1937, 87): Smith's disregard in *The wealth of nations* of the Humean price-specie-flow mechanism (PSFM) of international monetary adjustment despite having reproduced Hume's analysis in his Glasgow lectures (1978, 507). Several solutions have been suggested to this puzzle.<sup>9</sup> Yet the simplest explanation is that Smith rejected PSFM because it incorrectly applied the quantity theory to determine the price level of a country with a metallic currency. A national price level depends on the international value of the metal used as money, not the quantity of money in the country.<sup>10</sup> Schumpeter (1954, 367) rated Hume's analysis of international monetary adjustment above Smith's. Yet precisely because Smith did not invoke differences in national price levels that do not arise under an international metallic currency, the ranking should have been reversed.<sup>11</sup>

Recall Hume's famous account (1955, 62-63) of PSFM:

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 HARRYs and EDWARDS, what would be the consequence? Must not the price of all labour and commodities sink in proportion, and everything be sold 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 we had lost, and raise us

9. For example by Low (1952), Petrella (1968), and Eagly (1970).

10. Girton and Roper (1978, 615-18, especially footnote 53) suggest a similar solution to Viner's mystery. They also show that Laughlin (1903) had developed a sophisticated version of the classical monetary position. Also see Humphrey (1981) and Laidler (1981) for similar solutions to the mystery. Although recognizing that PSFM is not applicable in Smith's model, these solutions to the mystery overlook the domestic mechanism that equilibrates the demand for and supply of money under a competitive banking system.

11. Schumpeter's words were (1954, 367): "In *The Wealth of Nations*, Adam Smith did not advance beyond Hume but rather stayed below him. In fact it is not far from the truth to say that Hume's theory, including his overemphasis on price movements as the vehicle of adjustments, remained substantially unchallenged until the twenties of this century." It is remarkable that Schumpeter could in one breath have dismissed Smith as not having reached Hume's level in analyzing international monetary adjustment and in the next one said that Hume's analysis remained unchallenged until the 1920s when his overemphasis on price movements was corrected. It is remarkable because it was on just this point that Smith rejected Hume's analysis.

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 fullness and repletion.

Referring to a metallic currency, Hume used the quantity theory to show that prices would change in proportion to the quantity of money. But no effect on the price level—certainly not a proportionate one—follows from a change in the quantity of money in a country on an international metallic standard. The country whose stock of currency declines would exhibit an excess demand for money. The excess demand would be eliminated and the original quantity of money restored by a balance-of-payments surplus with no change in the country's price level.

Girton and Roper (1978), Humphrey (1981), and Laidler (1981) have all suggested that in place of PSFM Smith substituted (1937, 277-78) a primitive, but not incorrect, version of the stock-flow adjustment model of the international payments mechanism under fixed exchange rates that has been rigorously developed within the monetary approach to the balance of payments. Samuelson's (1980) demonstration that international monetary equilibrium is restored more rapidly in a model relying solely on money flows for equilibration (because prices for all goods are perfectly arbitrated across markets) than in a PSFM model which permits price-level differences confirms the astuteness of that omission.<sup>12</sup>

After expounding his celebrated conceptual experiment, Hume (1955, 67-68) did note a tendency toward equality among national price levels: "Now, it is evident, that the same causes, which would correct these exorbitant inequalities, were they to happen miraculously, must prevent their happening in the common course of nature, and must forever, in all neighbouring nations, preserve money nearly proportionable to the art and industry of each nation."

So it is not exactly clear how much Hume thought national price levels could deviate in the short run from the common international level. Nor did Hume indicate what, aside from price-level differences, would propel the adjustment to monetary disturbances. Developing Hume's analysis, later exponents of PSFM such as Viner (1937) insisted that some international price differences, if only in the non-tradable goods sector, were needed for international monetary adjustment. It is this contention which has been challenged by the monetary approach to the balance of payments (McCloskey and Zecher 1976) and refuted by Samuelson (1980).

12. Samuelson's argument shows that, contrary to an objection voiced by an anonymous referee, a non-PSFM model of international adjustment such as the one presented here can provide a causal explanation of the adjustment process and does not simply assert accounting identities or long-run equilibrium conditions.

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In describing PSFM, Hume assumed that a change in the quantity of money would immediately alter the price level, thereby initiating a long-run adjustment to the internationally determined price level. But in his famous discussion of the relation of the money supply to income and employment, Hume (1955, 37–38), not quite consistently, assumed that an increase in the quantity of money would not affect prices much in the short run, but would be fully reflected in prices in the long run.

[W]e must consider that though the high price of commodities be a necessary consequence of the increase of gold and silver, yet it follows not immediately upon that increase; but some time is required before the money circulates through the whole state, and makes its effect be felt on all ranks of people. 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 in the kingdom.

Henry Thornton (1939, 238 note) saw the inconsistency Hume had fallen into and made the following comment:

Mr. Hume, in observing that, when money encreases, "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 which is in the kingdom," appears to me not sufficiently to advert to the tendency of money to go abroad as soon as it shall have raised the gold price of articles above their level in other countries, allowing for the charges of transportation.

In another passage, Thornton (1939, 269–70) dismissed Hume's argument that paper money would increase the domestic price level with an argument that is scarcely different from that which Adam Smith would have given.

[Hume] appears to forget, that, when the total circulating medium of a country, whether consisting of gold, or of paper, or of both, is rendered excessive; when it has thus lifted up the gold price of articles above the point at which they stand in adjacent countries, the gold is obliged, by the operation of the exchange, to transport itself to these other parts;<sup>13</sup> and that paper credit, therefore, enhances the prices not of that single spot in which it passes, but of the adjoining places, and of the whole world. The state which issues paper only in

13. An anonymous reader suggests that this passage shows that Thornton acknowledged that price-level differences were necessary to international adjustment and that an over-issue of a mixed currency would depreciate the whole currency. However, this effect only arises because of the costs of transporting gold. If there were no such costs, the adjustment process would operate without the minor price-level deviations possible within the gold points.

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such quantity as to maintain its general exchanges, may be considered as substituting paper in the place of gold, and as gaining additional stock in return for whatever coin it may cause to be exported. It derives, therefore, from its own issue, the whole advantage of this augmentation of capital. It participates with other countries in that inconvenience of generally increased price of commodities which its paper has contributed to produce.

The differences between Hume and Smith were to reemerge in several important monetary controversies of the nineteenth century. These controversies—the Banking-Currency Schools dispute, the argument about Say's Law, and the question of how the mid-century gold discoveries in California and Australia affected the general level of prices—will occupy us in the next three sections. Although not all classical theorists accepted the classical model—the debates were largely disputes between adherents of the competitive model and adherents of the quantity theory—subsequent misunderstanding of the competitive model has fostered the belief that the quantity theory was the only (or, at least, the only respectable) monetary theory maintained by classical theorists. And it has made it seem as if those taking issue with the quantity theory lacked a coherent theory of money and prices.

IV. *The Currency School and the Banking School*

In the first half of the nineteenth century, monetary questions were debated almost continually in Britain. The debates began shortly after the Bank of England suspended the convertibility of its notes into gold in 1797 when rumors of a French invasion triggered a run on its notes. Convertibility was not restored until 1819. During the suspension, the main issues were the policy of the Bank of England and its responsibility for the depreciation of the inconvertible pound in relation to gold. The debates of the suspension era are now known as the Bullionist Controversies. I shall not discuss them here except to note that, although there was disagreement over the responsibility of the Bank of England for the depreciation of sterling, only John Wheatley (1807, 1822),<sup>14</sup> following Hume not Smith, assigned the country banks, whose notes remained convertible into Bank of England notes, any share of the blame for the depreciation.

For two decades after the Bank of England restored convertibility, the bank faced repeated crises in which convertibility was jeopardized. Because they seemed to initiate business-cycle depressions, these crises provoked further debate of the causes of the bank's difficulties and their relation to the business cycle.

14. I am indebted to two anonymous referees for noting that Wheatley had held the country banks responsible for the depreciation.

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The continuing monetary difficulties after the resumption raised the question whether the country banks and not just the Bank of England were disturbing the British monetary system. A group of writers, notably Joplin, McCulloch, Overstone, Pennington, and Torrens, maintained that business fluctuations and the threat to convertibility were caused by the failure of a convertible fractional-reserve currency to vary as a purely metallic currency would have under the same circumstances. In their view, a loss of gold was conclusive proof of an excess supply of currency. Under a pure metallic currency, the efflux of gold would reduce the domestic stock of currency until the excess supply had been exported. But with a mixed currency, the Bank of England and the country banks could offset the export of gold by increasing their own issues. By maintaining an excess supply of money in the domestic market when a modest restriction could eliminate it, the banking system made a more severe restriction later inevitable.

Guided by this analysis, the Bank of England adopted the Palmer rule in 1827. The rule dictated that, at the lower gold point, the bank hold a bullion reserve equal to one-third of its outstanding notes and deposits. As gold was exported, the bank was to retire notes or extinguish deposits by as much as the amount of gold exported. Thus, in contrast to the subsequent Bank Charter Act, the Palmer rule allowed a drain of metal to be met by a contraction of deposits instead of notes. But the bank was either unable or unwilling to follow the rule, while periodic crises, in which convertibility was endangered, continued to occur during the 1830s (Viner 1937, 224-34; Fetter 1965, 32-33).

Nor did the Palmer rule restrain the country banks, whose activities were a concern to many. Longfield (1840) and McCulloch (1831), for example, contended that the country banks, driven by competition, had expanded too rapidly, forcing the Bank of England to expand to protect its market share. Reflecting this critical attitude toward competition in banking, the Currency School began calling for legislation to force the quantity of banknotes to fluctuate with the import and export of gold.

Under the Currency School's influence, Sir Robert Peel proposed and Parliament enacted the Bank Charter Act of 1844. The Bank Charter Act divided the Bank of England into two separate branches: a banking department and an issue department. Unlike the Palmer rule, the act did not limit the bank's creation of deposits: the banking department was expected to operate on strictly commercial criteria. Instead, the issue department was to be bound by a 100 percent marginal gold reserve requirement on notes issued beyond the fiduciary limit of £14,000,000. To prevent the country banks from causing disturbances, the act imposed an absolute quantitative limit on their note issues and authorized the government to bring about their eventual withdrawal from circulation.

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Opposition to the act was led by the Banking School. Both schools supported a convertible currency. But the Currency School held that convertibility alone was an inadequate safeguard against overissue and that a 100 percent marginal gold reserve requirement was needed to prevent overissue, to avoid cyclical fluctuations, and to ensure that convertibility itself would be maintained. The Banking School insisted that convertibility alone was an adequate safeguard against overissue and that the requirements of the Bank Charter Act were either unnecessary, futile, or harmful.

Perhaps misled by the Ricardian doctrine of a redundant inconvertible currency, the Currency School assumed that just as an excess issue of inconvertible banknotes would cause the currency to depreciate on the foreign exchanges, so an overissue of convertible banknotes would cause an outflow of gold.<sup>15</sup> And just as the depreciation of the inconvertible currency could be corrected only by its contraction, so an efflux of gold under convertibility could be corrected only by retiring convertible banknotes. In making this argument, the Currency School, guided by the quantity theory and PSFM, assumed that the outflow of gold always responded to a disparity between domestic and foreign price levels.

The Currency-School argument betrayed an inadequate understanding of the domestic and the international adjustment processes for a competitive convertible currency. As I showed in section two, the price level, under a gold standard with a competitive supply of money, is fixed by the value of gold in relation to other commodities and the conversion rate of money into gold. Given the conversion rate, the nominal stock of money is determined by the cost of producing nominal balances and the demand for nominal balances of the public. The profit-maximizing behavior of the banks ensures that the quantity of money supplied equals the amount demanded. If either the public's demand for money or the banks' cost of supplying it changed, an automatic adjustment process would restore a stable equilibrium.

The Banking School had two explanations of this adjustment process.<sup>16</sup> One was that competition among banks would, through clearing their mutual obligations, force any bank that created an excess supply of notes or

15. This argument should not be confused with the Smithian one concerning the export of gold that follows the introduction of banknotes into an economy without any notes. That efflux is part of an equilibrating adjustment by the banking system to what may be viewed as a parameter change: a reduction in the cost of creating notes by banks. The new equilibrium entails a larger quantity of bank notes and a smaller quantity of coin. The efflux the Currency School had in mind is an equilibrating international adjustment to disequilibrating behavior by the banking system. According to the Currency School, the banking system was, except when undergoing a serious loss of reserves, always inclined to create a domestic excess supply of money. In Smith's case, no contraction by the banking system was required in response to the efflux. According to the Currency School, an efflux always required a contraction of the note issue.

16. Both of these are traceable to Smith (1937, 284-86 and 313).

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deposits to contract.<sup>17</sup> The other explanation, the Law of Reflux, held that the public's demand for money limited the note issues of the banking system. Since banks only issue their moneys by making loans, any additional money supplied would be returned to the banks to extinguish previously incurred obligations. Unlike inconvertible fiat money issued by the government, money created by the banking system is not an exogenous variable—a "hot potato" which must be held by someone—to which the entire economy has to adjust, it is an endogenous variable which market forces drive toward its equilibrium level.

The usual reply is that these obstacles to overissue don't work if all banks are expanding together since none would suffer adverse clearings. But this argument implicitly assumes that, instead of competing against each other, banks act in concert. Obviously, like firms in any other industry, banks will behave differently if they collude with each other than if they compete with each other (Glasner 1985, 57–58).<sup>18</sup>

A second objection to the Law of Reflux is that if banks maintain a loan rate below the Wicksellian natural rate, they will face an increasing demand for loans to finance investment projects. Thornton (1802) elegantly stated this argument almost a century before Wicksell. Joplin (1832) and some members of the Currency School also stated it. However, the argument presupposes some kind of market imperfection or non-competitive behavior. Thornton found the imperfection in the monopoly privileges of the Bank of England, which suspension of convertibility enabled it to exploit, so he did not blame the country banks for the decline in sterling.

17. An early statement of this position dating back to the Bullionist period was given by Lord King (1804) quoted in Vincr (1937, 239). "An excessive issue of notes by any particular banker is soon detected, if not by the public, at least by the interested vigilance of his rivals; an alarm is excited; and he is immediately called upon to exchange a very large portion of his notes in circulation for that currency in which they are payable."

18. One could argue that if a single bank tried to increase its lending and were willing to tolerate diminished reserves, the rest of the banks would acquire excess reserves on which to base their own expansion. There are two points to note here. First, the bank in question would not in fact be expanding its asset portfolio by lending since, by assumption, there was no increased demand for its liabilities. It would simply be acquiring more loans at the expense of reserves. Second, if the bank wishes to maintain the new composition of its portfolio, and if other banks in the system do not want to add to their reserves, then the total demand for reserves by the banking system has diminished and the excess supply of reserves must somehow be extinguished. In a small open economy with fixed exchange rates this will imply an export of the reserves by way of a temporary balance-of-payments deficit. In a closed economy or small economy with flexible exchange rates, either the domestic price level will rise until the demand for reserves equals the supply or the authority controlling the stock of reserves must retire the excess supply of reserves. In the case of a small open economy with fixed exchange rates, about which the Banking and Currency Schools were arguing, the adjustment exactly corresponds to the Banking-School version of adjustment since the export of specie is self-limiting and is not evidence of an excess supply of money that requires a contraction of the banking system. I am indebted to an anonymous referee for bringing this issue to my attention.

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The Currency School writers, on the other hand, did blame the country banks for overissue.<sup>19</sup>

John Fullarton (1845) gave the most complete statement of the Law of Reflux. His explanation of why it was not possible for the banking system to issue too many banknotes went as follows (1845, 64–65):

However prone individuals may be to abuse at times the facility of borrowing, no merchant can ever desire to keep by him a larger sum in bank-notes than is indispensably necessary for his payments; and if any one were disposed to indulge so unprofitable a fancy, it would be a matter of not the slightest importance to any one other than himself, for in as far as the public are concerned, notes which are not in use are the same as if they are not in existence. These notes cannot be obtained from a banker, but by paying interest for the use of them, nor can they be obtained at all but for very short periods, at the expiration of which they must be replaced. Their circulation must always be strictly limited by the wants of those who have value or security to offer for them. And so limited, there can be no redundancy; no holder of them can ever be placed in the same predicament with the importer of a double supply of bullion, or the recipient of a forced issue of government-paper, who have no means of turning their acquisitions to use but by submitting to part with them at a reduced value.

What Fullarton ignored is that not everyone holding banknotes acquires them by borrowing from a bank; many people acquire them in exchange for goods or services. He also ignored that what the Currency School really wanted to avoid by limiting the quantity of bank notes was the spending, not the holding, of notes. Moreover, if competition among banks led them to increase lending by keeping the loan rate below the Wicksellian natural rate, as the Currency School insisted it would, the interest rate would not deter borrowing for and spending on investment projects.

Yet Fullarton did recognize a fundamental point which, had he developed it fully, would have enabled him to dispose of the objections his

19. The nature of the imperfection the Currency School had in mind is not entirely clear. Joplin (1832) believed that it stemmed from the dual role of banks as suppliers of loanable funds and suppliers of currency. The latter function somehow kept them from adjusting their lending rates to match changes in the profitability of investment. Presumably this was because banks did not have to raise the funds they lent in the market place by offering interest but could simply create the currency they lent out. This, of course, ignores that banks must induce the public to hold their moneys, which they do by, among other things, offering to pay competitive interest to holders of their moneys. So it is a misunderstanding to suppose that the power of producing money enables the producer to ignore changes in the market that dictate changes in the structure of interest rates. I elaborate on this point later in the text.



critics raised against the Law of Reflux. For he understood that competition obliges banks to pay interest on the money they issued. Though paying interest on banknotes may, owing to high transactions costs, be too costly to be worthwhile, paying interest on deposits is not. Since banknotes are convertible into deposits, holders of banknotes bear an opportunity cost of holding money in the form of banknotes not deposits. The apparent profit margin on non-interest-bearing banknotes cannot lead banks to overissue notes because excess notes are converted into interest-bearing deposits.

Moreover, since the size of a bank's asset portfolio depends on the willingness of the public to hold its liabilities, a bank cannot expand by reducing the interest rate it charges on loans; it can only alter the composition of its assets. When marginal revenue exceeds marginal cost, it cannot increase the size of its asset portfolio unless it can induce the public to hold more of its liabilities. To make its liabilities more attractive it will usually pay more interest on deposits. Thus, banks compete for market share primarily by increasing rates on deposits, not by reducing rates on loans. Reducing its lending rate below the Wicksellian natural rate undermines the bank's ability to support the interest it must pay on deposits. Since they bear competitive interest, all deposits created are held willingly and affect neither spending nor prices. As Fullarton wrote (1845, 92-93):

[T]he joint-stock banks have been far more successful in their efforts to promote and extend the use of banking accounts among all ranks throughout the kingdom, than in their attempts to engross or enlarge the circulation. This they have partly accomplished, by the facilities for that purpose which their numerous offices, dispersed over the country afford to every man, but chiefly the practice which they have borrowed from the Scotch bankers, of allowing interest to their depositors, and which, by the force of their example and competition, has become also, I believe, a very general practice among private bankers everywhere but in London. The inducement which such a system holds out to individuals to become depositors in banks, and to those who are already depositors to increase their deposits, are sufficiently obvious; and it is equally apparent that such circumstances must have a decided influence in reducing the circulation of bank-notes. The tradesman, instead of keeping by him an unproductive hoard of such notes for his daily disbursements, will prefer paying them into a bank which allows him interest for the amount, without any prejudice to his perfect command over the principal. He will make his payments thenceforth by cheque; and those cheques

will, in the vast majority of cases, be adjusted by transfer or exchange, without any resort to money.

The Scotch banks, among whom this practice of allowing interest to depositors has been coeval with their existence, are in themselves a standing refutation of the notion that bank-notes can be over-issued at the pleasure of the issuers.

Yet, for all his insight, Fullarton did overstate his case somewhat. He seemed to say that it was almost physically impossible for banks to over-issue notes—a proposition few have been willing to accept. He correctly observed that, while people could not reduce their holdings of precious metals or an inconvertible currency, they could reduce their holdings of banknotes and deposits. But he insisted this mechanism would immediately overpower banks no matter how hard they all simultaneously tried to expand their issues of notes and creation of deposits. The point that would have clinched his argument but that Fullarton did not quite grasp is that, by paying competitive interest on deposits, each bank reaches a profit-maximizing equilibrium at which the incentive, under given cost and demand conditions, to create additional notes and deposits is exhausted.<sup>20</sup>

The Currency-School argument that the banking system is under competitive pressure to overissue presumed that each bank could, at the margin, profit by lending additional banknotes. But if increased lending increases the quantity of interest-bearing deposits—as it must if the public can decide how much bank money to hold as notes and how much as deposits—the expansion of lending cannot be profitable.

Thus, the Law of Reflux can be understood as an explanation of the mechanism by which banks and the public jointly determine an equilibrium. Reflux enables banks to adjust the quantity of their outstanding liabilities to the amount that both they and the public wish to maintain. The equilibrium is such that banks have no incentive to create additional loans or issue more money and the public has no incentive to alter its indebtedness to the banking system or its holdings of bank money. Since the Banking School believed that this domestic mechanism equated the demand for with the supply of money, they denied that gold flows were caused by

20. Nor did Fullarton accept the validity of Thornton's argument that a bank, like the Bank of England, with monopolistic powers could keep the loan rate below the natural rate long enough to stimulate investment and raise prices. However, White (1984a) has shown that there was a Free Banking School which accepted the validity of Thornton's analysis for the Bank of England while denying that it applied to the country banks. Like the Banking School, they opposed the Bank Charter Act of 1844, but also suggested abolishing the monopolistic privileges of the Bank of England and allowing free banking in England on the Scottish model. However, since by 1833, there was free banking in England in the creation of deposits, it is not obvious that the monopoly power of the Bank of England was very substantial.

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monetary disturbances. A gold outflow was not evidence, as the Currency School contended, of an overissue of banknotes. Rather, it was symptomatic of a real disturbance, for example, a poor harvest. Such a disturbance would reduce the demand to hold gold reserves, so that gold could be exported to finance food imports. The efflux would be temporary and might eventually be reversed. A monetary contraction to stem the outflow would simply aggravate the initial disturbance. The oft-repeated charge that the Banking School did not understand the monetary nature of the balance of payments is therefore unfounded.

The Banking School thus inherited an important tradition in classical monetary thought. The tradition begins with Adam Smith and was continued in large part, in the work of Thornton, Ricardo, and their contemporaries. Yet the conviction that Ricardo was a forerunner of the Currency School is so strong that a Parliamentary speech Sir Robert Peel gave acknowledging that the Bank Charter Act departed from the teachings of Smith and Ricardo is worth quoting. Indeed Tooke quoted (1844, 155) the speech to show that it was the Banking School not the Currency School that was upholding the Smith-Ricardo tradition.

It has been contended by very eminent men that the only security you need against excessive issue of paper currency is immediate convertibility. This doctrine, indeed, appears to have the sanction of authorities no less eminent than Adam Smith and Ricardo. They assume that the paper engagement should always be liberally fulfilled—that there should be no postponement by means of paper; but they say also, that if you secure practical immediate convertibility, then there will be no immediate apprehension of conversion. If that opinion be not well-founded, it would be no reflection on those eminent men. We are in a constant state of transition, and we are constantly making new discoveries as to the rules which regulate our paper currency. At the same time the House would no doubt be disposed to abandon an opinion sanctioned even by such men as Adam Smith and Ricardo, if from subsequent lights that been thrown on the subject they should become convinced that they were in error. Now, I shall contend, both upon reason and upon admissions of advocates of free competition—and this will be a most difficult and important part of the subject—that convertibility into gold, together with unlimited competition as to issue, does not give sufficient security.

The Banking-School position was also endorsed by J. S. Mill (1865). Mill's theoretical pronouncements, however, were equivocal enough to be susceptible of citation by either side in monetary disputes, although he opposed the Bank Charter Act and was obviously more sympathetic to the Banking School than to the Currency School.

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V. *Say's Law*

In the previous section, I showed that the Law of Reflux was advanced by John Fullarton and other members of the Banking School to show that an automatic mechanism equates the amount of money the banking system creates with the amount the public wants to hold. That mechanism ensured that the banking system could not maintain an excess supply of money (an overissue) in circulation long enough to raise prices and cause an outflow of gold. But as I interpret it, what the mechanism really ensures is that the banking system has the appropriate incentives to allow the public to reduce its holdings of money to the desired level.

Although the connection between the two has almost never been made,<sup>21</sup> the Law of Reflux is virtually equivalent to Say's Law (Identity). The former denies that an excess supply of money implies an excess demand for goods in the real sector that would raise prices, while the latter denies that an excess demand for money implies an excess supply of goods in the real sector that would depress prices. Both propositions follow equally from the theory of a competitive money supply introduced by Adam Smith.

The difficulty with Say's Law, as is well known, is that it seems to be valid only for a barter economy because in a monetary economy an excess supply of all goods could be offset by an excess demand for money. Indeed, Say's Law is thought to be logically inconsistent with any mechanism for price-level adjustment since it seems to rule out either an excess demand for or excess supply of money. The modern solution (Baumol and Becker, 1952) has been to interpret Say's Law as an equilibrium condition (Say's Equality). The excess demand for money would tend to drive down the overall price level until the real value of nominal money balances increased to match the public's demand to hold money.

But this difficulty with Say's Law arises only when we interpret it within a quantity-theoretic framework. In that framework, an excess demand for, or excess supply of, money must be offset in real markets. But in the

21. Other than my 1985 article (pp. 47, 64) where I make the point explicitly, the only hint of a recognition of a connection occurs in F. Fetter (1965, 232). Fetter simply recognized that the real bills doctrine implied that the banking system would provide as much money as the public demanded, without seeing that this is also what was meant by Say's Law. "In the setting of the gold standard there were subliminal traces of the idea that if banks continued to loan on good assets the total means of payment would increase with the volume of business, and that hence, even though the gold supply did not increase as rapidly as production, there was no danger of price decline from an inadequate money supply."

Interestingly, J. B. Say (1880, 271) used the term "reflux" (at least that is the word used by Say's translator) to describe how the public retired an excess supply of bank money. "Should the paper-issues of a bank at any time exceed the demands of circulation, and the credit enjoyed by the establishment, there follows a perpetual reflux of its notes, and it is put to the expense of collecting specie, which is absorbed as fast as collected." However, Say did not explicitly link this proposition with the law of the markets.

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classical monetary model, in which it is the banking system, not the real economy, that adjusts to a difference between the amount of money the public holds and the amount it desires to hold, Say's Identity is perfectly valid.<sup>22</sup> Say (1880, 134) himself explicitly addressed the issue and denied that too little money could cause a general oversupply of goods:

Sales cannot be said to be dull because money is scarce but because other products are so. There is always money enough to conduct the circulation and mutual interchange of other values, when those values really exist. Should the increase of traffic require more money to facilitate it, the want is easily supplied and is a strong indication of prosperity. . . . In such cases, merchants know well enough how to find substitutes for the product serving as a medium of exchange or money [by bills at sight, or after date, bank notes, running credits, write-offs, etc. as at London and Amsterdam];<sup>23</sup> and money itself soon pours in for this reason, that all produce naturally gravitates to that place where it is in most demand.

An even clearer statement of Say's Law was made by Ricardo when he testified in 1817 before the Parliamentary Commission investigating the resumption of the gold standard (1952a, 384–85).

Q. When merchants have a want of confidence in each other, which disinclines them to deal on credit, is there not a greater demand for money?

A. Undoubtedly.

Q. Then, if this is a period when there is a greater demand for money on account of a want of confidence, does it not follow that it would be an inconvenient period for reducing the means of accommodation?

A. It appears to me that that very circumstance would make a smaller reduction efficacious for that purpose; a demand for currency in consequence of a want of confidence, I should think a legitimate demand; it would enable the bank to keep their circulation at a higher level than they would be able to do, if there had not been a demand from such a cause.

22. As an anonymous referee points out, Mill's famous discussion (1844) of Say's Law interprets it in the weaker equality sense. However, Mill makes no reference to the operation of banks in that essay. That is legitimate if the excess demand is for outside money not inside money. In the classical model, an excess demand for outside money does impinge on the real sector, which is not surprising since the typical outside moneys—gold and silver—were also real commodities. But if the public does not lose confidence in banks, an excess demand for money is ordinarily an excess demand for inside money. And Mill does ascribe the excess demand for money to a "want of commercial confidence." So it should not be assumed that Mill, a supporter of the Banking School, would have rejected Say's Law as I interpret it.

23. The passage in brackets is a footnote in the original text.

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Six years earlier Ricardo observed in a letter to Tierney (1952b, 67–68) that a quantitative limit on the note issue of the banking system would prevent it from responding to an excess demand for money and that this failure could cause commercial distress.

Depreciation cannot be effectually checked by any other means than by depriving the Bank [of England] of the power which they at present possess of adding indefinitely to the amount of their notes. This might be done in a direct manner by limiting the amount beyond which their paper should be issued; but it has been plausibly urged against such a measure that occasions may arise in which sound policy may require a temporary augmentation of bank paper, and to deprive the Bank of the power of increasing their notes at such periods might be the cause of considerable distress and difficulty to the mercantile class.

Later in the same letter he observed that "if a greater circulation were required from the operation either of increased commerce, or of embarrassed credit, the bank might augment their issues without producing any effect whatever on the price of bullion, and consequently without exposing the Bank to any inconvenience, or depriving the merchants of that increased accommodation, which be essential for their operations."

While recognizing the significance of these and similar quotations for understanding Ricardo's views about monetary policy in general, Samuel Hollander concludes from a detailed discussion of Ricardo's position on Say's Law (1979, 474–539) that Ricardo held it only in the equality version. Hollander bases his conclusion on other passages in which Ricardo acknowledged that an increase in the quantity of money or in the stock of gold would raise prices. But these passages referred either to increases in the quantity of inconvertible paper money or to increases in the quantity of gold, so that no mechanism existed for retiring the excess supply of money. Only in such cases did Ricardo concede that a price-level adjustment was necessary to eliminate the excess supply of money.

Hollander admits that Ricardo did not use an excess demand for money to explain the post-Napoleonic war economic difficulties in Britain, which is problematic if he only believed in Say's Equality. Ricardo did blame the Bank of England for accumulating too large a gold reserve, driving up the value of gold and, thereby, causing deflation. But that was as far as he went in a monetary explanation of those difficulties. It is thus quite possible that Ricardo believed that the banking system would, on its own, adjust the quantity of money to whatever amount the public demanded at the prevailing price level; that is, he believed in Say's Identity for inside money. And that is why, except for the appreciation of gold, he did not rely on a monetary explanation for the post-war difficulties.

### VI. Cairnes on the Effects of the Australian Gold Discoveries

My discussion of the strengths of the classical theory leads to a further question: Why was such a good theory abandoned after the middle of the nineteenth century? Part of the answer lies in the doubts about competitive banking that the monetary difficulties in England created in the three decades after the resumption of convertibility. Whereas Adam Smith<sup>24</sup> and J. B. Say<sup>25</sup> praised competition in banking, William Stanley Jevons insisted (1875, 64) that "there is nothing less fit to be left to the action of competition than money."

Another reason the quantity theory displaced the classical theory was the apparent ability of the quantity theory and the price-specie-flow mechanism to account for the international response of prices to the gold discoveries in California and Australia in the late 1840s and early 1850s. According to the classical theory, prices should have risen after the gold discoveries because gold became cheaper. But there was no obvious reason for some prices to rise more than others if the value of gold fell. Nor, since gold is an internationally traded commodity, was there any reason for prices to rise more rapidly in some parts of the world than in others.

Quantity theorists attributed rising prices to the increase in the quantity of money triggered by the gold discoveries. The pattern of price increases would be determined by PSFM, so that the sequence of price increases would follow the movement of gold from the mines to the gold-importing countries.

In 1859, J. E. Cairnes (1873) published the first of a series of articles on the effects of the gold discoveries. He argued that the geographical pattern of increases in raw materials prices after the gold discoveries in

24. Smith wrote (1937, 313): "The late multiplication of banking companies in both parts of the United Kingdom, an event by which many people have been much alarmed, instead of diminishing, increases the security of the public. It obliges all of them to be more circumspect in their conduct, and, by not extending their currency beyond its due proportion to their cash, to guard themselves against those malicious runs, which the rivalry of so many competitors is ready to bring upon them. . . . This free competition too obliges all bankers to more liberal in their dealings with their customers, lest their rivals should carry them away. In general, if any branch of trade, or any division of labour, be advantageous to the public, the freer and more general the competition, it will always be the more so."

To be sure, in an earlier passage, Smith (1937, 308) advocated suppressing small-denomination banknotes and the option clause. The restrictions were calculated to protect presumably ill-informed holders of small notes from losses when banks failed and to avoid even the slightest impairment of convertibility. Smith did not want mismanaged banks to shift their losses onto the rest of the community which is why he regarded them as no greater violations of natural liberty than the "obligation of building party walls, in order to prevent the communication of fire."

25. Say's words (1880, 271) were: "The establishment of several banks, for the issue of convertible notes, is more beneficial than the investment of any single bank with the exclusive privilege; for the competition obliges each of them to court the public's favour by a rivalry of accommodation and security."

Australia conformed to the one implied by PSFM. Prices increased first in Australia where gold discoveries quickly increased the quantity of money. As Australia exported gold to Britain, America, and Europe, money stocks and price levels increased as well. Since the banking systems in Britain, America, and, to a lesser extent, in Europe allowed money supplies to increase without a corresponding increase in holdings of gold, much of the new gold was reexported to the Orient where it went into existing hoards. Because PSFM implied that increased prices caused gold to be exported, prices must have risen a bit more in the United States and Britain than in Europe, and in Europe more than in the Orient where much of the gold was finally held.

Besides tracing the effects of gold flows on prices, Cairnes also analyzed the likely relative-price effects of the gold discoveries, considering technological factors as well as changes in income distribution and in spending habits. His microeconomic analysis of these effects—a model of rigorous economic reasoning independent of the quantity theory or PSFM—was largely borne out by the quantitative evidence he provided.

So skillful was Cairnes's theoretical argument and his presentation of supporting evidence that he seemed to confirm the quantity theory and PSFM to the satisfaction of most of his contemporaries and many later economists (Bordo 1975). This impression was reinforced a few years later when, using more advanced statistical techniques than Cairnes had, W. S. Jevons (1884) arrived at broadly similar conclusions.

Only one adherent of the classical monetary theory, William Newmarch, systematically investigated (Tooke and Newmarch 1857) the effects of the gold discoveries. Newmarch, however, was a more skillful statistician than a theorist and simply denied that gold discoveries had affected prices at all—a conclusion not implied by the classical theory. Yet Cairnes's criticism of Newmarch was so effective that he seemed to refute both Newmarch's position and the classical theory.

The irony here is that not only was Newmarch's argument inconsistent with the classical theory, but that Cairnes's evidence did not really support the quantity theory and PSFM against the classical theory. The key point to Cairnes was that increases in the quantity of money—made possible by, but not identical to, the increase in gold stocks—had caused prices to rise. Neither his theoretical explanation nor his empirical evidence entailed that conclusion. Nor did they imply that the prices had risen most in those parts of the world where money stocks had increased the most.

Cairnes supported his conclusions with evidence he found that local increases in prices and local increases in money stocks were correlated. For internationally traded goods, Cairnes conceded that price increases were uniform everywhere. Thus, the geographic differences he found were differences in the increases of prices of non-traded goods. But those dif-

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ferences could have been caused not only by differences in the changes in local money stocks; they could, instead, have reflected changes in international relationships between the prices of tradable and non-tradable goods that were directly caused by the gold discoveries. Changes in money stocks, in the alternative interpretation, were merely incidental to those relative-price changes.

To understand this point, consider that, as Cairnes observed, the gold discoveries had quadrupled Australian wage rates for unskilled labor. Since the prices of exports and imports, which were determined in international markets, did not change, Australian non-gold exporters and import-competing producers could not absorb those wage increases. Workers previously employed in export or import-competing industries either went into the gold fields or into the non-tradable-goods sector where prices could rise enough to allow employers profitably to pay the quadrupled wages.

The apparent inflation in Australia really reflected a drastic appreciation of non-tradable goods owing to the extraordinary increase in the marginal productivity of labor in gold mining. Monetary expansion following the gold discoveries did not cause that appreciation. The money stock grew passively in response to rising real income and to the increased internal price level implied by rising non-tradables prices with constant tradables prices. Precisely the same effect would have been observed had comparable deposits of an unquestionably non-monetary exportable resource such as diamonds been found.

Cairnes (1873, 24) sought to buttress his case for the quantity theory by noting that for several months after gold had been discovered in Australia, prices rose comparatively slowly owing to the absence of a local mint. Before the domestic money stock could increase, gold had to be shipped to England to be minted and then shipped back to Australia as gold coin. Prices in that interval rose much less than they did after new gold coins reached Australia. Cairnes concluded that only after the local money stock had increased was the full effect of the gold discoveries felt.

However, the facts recounted by Cairnes support a different interpretation of what happened. Even in the interval between discovery of gold and the arrival of gold coins from English mints, local prices rose somewhat. According to the quantity theory, an increase in the price level reflects an excess supply of money. Yet, during that interval, there was a shortage of money. The shortage of money was evidenced in the permission given to banks to issue token currency and in the fall in the price of gold from its mint price of 77.5 shillings to as little as 40 shillings. The nearly one hundred percent premium on coins shows that the demand for money, owing both to rising incomes and significant economic dislocation caused by the gold discoveries, was increasing, while the short-run supply was

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virtually fixed. Thus, the internal price level rose in the interval when gold could not be converted into coin even though there was an excess demand for money.

The subsequent importation of gold coins into Australia should therefore not be viewed as the cause of the increase in the Australian price level. With a fixed exchange rate, the discovery of gold in a small open economy such as Australia's required the internal price level to rise. At first, rising prices were moderated by an appreciation of the local currency against sterling.<sup>26</sup> But once exchange-rate parity was restored, the price level rose to the level consistent with parity. Monetary expansion was an automatic response to the demand at the original exchange rate, not the cause of the increase in prices.

Similarly, in countries that initially imported gold from Australia but which, given a limited internal demand for gold, reexported gold to other countries, the prices of non-tradables also rose compared to those of tradables. But in countries where the final demand for gold was strong, the prices of non-tradables fell in relation to tradables prices. Thus, the pattern of price increases that Cairnes ascribed to the effects of different rates of money growth really reflected changes in the price ratios of tradables to non-tradables caused by the gold discoveries and the international distribution of demand for gold.

The pattern was similar to what would be observed after any country began making large exports to the rest of the world. Countries with the greatest final demand for the products would have to finance their imports by increasing exports or reducing other imports. That would require a shift of resources from the production of non-tradables to tradables which would be reflected in a declining price ratio between non-tradables and tradables.

Indeed, at several points, Cairnes recognized that the pattern of price increases he observed had been determined by the requirements of international trade flows. But, seeking to confirm PSFM, he failed to distinguish between that effect and the supposed effect of increases in the quantity of money.<sup>27</sup>

26. An anonymous referee suggests that the rise in prices before gold coins reached Australia could be attributed to an expectation that the quantity of gold coins would soon increase. This is a different argument from Cairnes's and does not account for the effects gold discoveries had on relative prices. But the relative-price effects alone do explain the behavior of the price level, so the quantity theory adds nothing to the explanation and may, therefore, be ignored.

27. To avoid confusion, let me repeat that I do not deny that the gold discoveries raised prices. My difference with Cairnes is that in my interpretation the gold discoveries depressed the value of gold. Under a gold standard, that meant a more or less uniform increase in nominal prices. However, aside from the general price-level effect, there were also relative-price effects which Cairnes ascribed to PSFM, but which can also be derived from

## VII. Conclusion

My aim in this article has been to show that recognizing a classical theory of money distinct from the quantity theory helps us understand several classical monetary debates. It might be argued that I have exaggerated the differences between what I call the classical theory and the quantity theory. After all, just about everyone accepted the validity of the quantity theory for an inconvertible paper currency, and the one important classical figure who denied that the mid-century gold discoveries tended to raise prices, William Newmarch, seriously blundered in doing so.

Yet there was, I believe, a real disagreement among classical monetary theorists—one that has yet to be resolved. It was whether a competitive banking system is inherently disposed to overexpand and therefore must be subject to external constraint or whether its creation of money balances is effectively limited by market incentives. Smith, Thornton, Ricardo, Mill, and the Banking School, the premier classical monetary theorists, denied that competitive banks would produce an excess supply of money as long as they were obligated to convert their obligations into an outside asset at a fixed exchange rate.<sup>28</sup> Hume, Wheatley, and the Currency School believed that, even under convertibility, a competitive banking system would inevitably overissue.

Those I have called classical theorists excluded the convertible money created by the banking system from the quantity of money that could be said to have an independent effect on prices. From their point of view, the quantity of money produced by the banking system behaved passively. The quantity theorists, on the other hand, believed that the quantity of convertible money created by the banking system had no less impact on prices than did inconvertible fiat money or gold.

Thus, the significance of Cairnes's analysis in the history of monetary theory is his apparent demonstration that the quantity of money had been the active agent in transmitting price changes (Laidler 1988). By doing so, he ensured the dominance of the quantity-theoretic view according to which a change in the price level is the effect of an exogenous change in the quantity of money. Unfortunately, the classical view that the price level

an international barter trade model with both tradable and non-tradable goods. The increase in money supplies, as distinct from gold stocks, that Cairnes emphasized was, in my view, a passive response to the price and income effects of the gold discoveries.

28. Although they favored making convertibility a legal obligation of the banking system, they were not oblivious to the competitive pressures on banks to make their obligations convertible, even if not legally obligated to do so. But they felt so strongly about convertibility that they wanted to avoid even the slightest departures from instant convertibility on demand that might emerge in a fully competitive environment.

is determined independently of the behavior of the banking system, which automatically responds to the public's demand for money and, thus, can have no effect on the price level, was soon abandoned. Its abandonment, I would suggest, impoverished the subsequent development of monetary theory.

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