

# MONETARY ENDOGENEITY AND THE QUANTITY THEORY: THE CASE OF COMMODITY MONEY

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## I. INTRODUCTION

Roughly, the Quantity Theory says that in the long run the quantity of money and the general price level bear a proportional relationship, with money acting as the cause and the price level being the effect. To identify the essentials of the theory a bit less roughly, consider for a moment the quantity equation in its standard modern form,  $MV = PY$ , which can be re-written as  $M/P = Y/V$ . It is not essential to the Quantity Theory that the ratio  $Y/V$  remain constant, in either the short run or the long run. Quantity theorists can live quite happily with both secular trends and some degree of cyclical variation in both  $V$  and  $Y$ : a *ceteris paribus* clause can be written into the proposition regarding the proportionality of  $M$  and  $P$ . But two points are essential to the theory. First, if this *ceteris paribus* clause is to have any validity, significant variations in  $V$  and  $Y$  must stem from sources independent of the quantity of money; any dependence must be minor and transient. Second, significant variations in the quantity

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of money itself must stem from an independent source, or in other words money must be exogenous. That is, there must be two-way independence of the sources of variation in  $M$  on the one hand and  $V$  and  $Y$  on the other. Correspondingly, challenges to the Quantity Theory have taken the form of denying one sort of independence or the other. As is well known, Keynes, in *The General Theory*, denied the first sort (without denying the latter).<sup>1</sup> Keynes argued that (exogenous) changes in money tend systematically to induce changes in both  $V$  and  $Y$ . Outside of the liquidity trap an expansion of money supply can be expected to lower the rate of interest, hence tending to raise investment (and so, via the multiplier,  $Y$ ) and at the same time, by increasing the demand for money balances in proportion to income, tending to lower velocity. If the typical state of a capitalist economy is, as Keynes believed, one of under-employment, these effects will not be transient. In consequence the effect of a change in money stock on the price level will be less than proportional, and systematically so. The Quantity Theory then becomes a special case, applicable only in situations of full employment (Keynes, 1936, ch. 21).

In the modern post-Keynesian literature, however, the standard challenge to the Quantity Theory focuses on the second sort of independence rather than the first. The theory of endogenous money (Kaldor (1982), Moore (1988)) denies that the quantity of money plays any independent causal role. The endogenous money theory is generally seen as applying to a modern credit-money economy where the private-sector banks create money via their lending operations, in a process over which central banks have only indirect influence (by virtue of their ability to set the discount rate). This raises the question of whether the Quantity Theory may have been valid (modulo Keynes's sort of criticism) in an earlier age. Some post-Keynesians have suggested as much. Colin Rogers, for instance, has this to

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<sup>1</sup>For a discussion of Keynes's views on the endogeneity or exogeneity of money see Moore (1988, ch. 8); but cf. Cottrell (1994).

say:

In particular the role of money as cause or effect should be seen in terms of the distinction between commodity and bank money. Commodity money is clearly compatible with the classical quantity theory of money in which the quantity of money has a causal influence on the price level. (Rogers, 1989, p. 175)

Basil Moore is a bit more guarded, but seems to have a similar view, when he says of the Quantity theory that it “may once have been relevant to a commodity or fiat money world, but it is not applicable to the current world of credit money” (Moore, 1988, p. 3).

The question I wish to examine in this paper is whether it is right to cede the case of commodity money to a Quantity Theoretic analysis. There are two questions here: What is the “correct” analysis of the case of commodity money, and what did the classical monetary theorists have to say on the matter? I find both questions interesting, and indeed find that they are not really separable: in seeking an adequate analysis of commodity money one is obliged to engage with those writers who have had the most to say on the subject.

## II. THE CLASSICS AND THEIR INTERPRETERS

It is commonly assumed that the classical writers, from Locke to Hume to Ricardo, espoused the Quantity Theory, and were right—in their historical context, if not more generally—to do so.<sup>2</sup> But on a moment’s reflection this seems quite paradoxical. If money takes the form of a real commodity, with a definite cost of production, then it seems that its exchange value or relative price should be determinate independently of the Quantity Theoretic framework (and furthermore its quantity should not be capable of arbitrary

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<sup>2</sup>See Glasner (1985, p. 46) for several citations along these lines, and Wood (1995) for a recent example.

exogenous variation). And indeed if one looks into the literature one sees that this point is recognized. A succinct modern statement of the case for the inapplicability of the Quantity Theory to commodity money is given by Niehans (1978, ch. 8), but the essential point was also made by at least some of the classical writers. I shall begin with Marx's argument on the topic. Of course, Marx is not exactly a representative or typical classical economist, but he offers a particularly clear and emphatic statement of certain propositions that are, as we shall see, also to be found elsewhere in the classical literature.

The case for the endogeneity of the stock of commodity money, and the inapplicability of the Quantity Theory, can be made most concisely on the basis of the Ricardo/Marx labor theory of value (though it does not depend on the latter, as shown by Niehans' version of the argument). According to the labor theory of value, the equilibrium relative price of each (reproducible) commodity depends on the amount of socially necessary labor time required, directly and indirectly, to produce that commodity;<sup>3</sup> gold (or silver) is no exception. Suppose for a moment that prices are expressed in ounces of gold. Given the labor value of an ounce of gold, and given the labor value of the mass of commodities to be circulated, the required stock of money then depends on the velocity of circulation:  $M = PY/V$ ,<sup>4</sup> with causality running from right to left. Marx puts it thus:

The total quantity of money functioning during a given period as the circulating medium is determined by on the one hand the sum of prices of the commodities in circulation, and on the other hand by the rapidity of alter-

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<sup>3</sup>This statement of the theory abstracts from the adjustment of equilibrium price ratios, relative to labor-contents, required to achieve an equalized rate of profit on activities having a different capital-to-labor ratio (or organic composition of capital, in Marx's terminology). But this effect—well understood by both Ricardo and Marx—was considered a second-order phenomenon by both authors, and will be ignored here.

<sup>4</sup>Since Marx, in common with other classical writers, operated with a a conception of transactions velocity rather than income velocity (see Laidler, 1991), “ $T$ ” rather than “ $Y$ ” would be less anachronistic in the last equation; but the distinction is not of much significance in this context.

nation of the antithetical processes of circulation. (Marx, 1976, pp. 217–8)

Marx then goes on to make the connection with the Quantity Theory:

The law that the quantity of the circulating medium is determined by the sum of the prices of the commodities in circulation, and the average velocity of the circulation of money, may also be stated as follows: given the sum of the values of commodities, and the average rapidity of their metamorphoses, the quantity of money or of the material of money in circulation depends on its own value. The illusion that it is, on the contrary, prices which are determined by the quantity of the circulating medium, and that the latter for its part depends on the amount of monetary material which happens to be present in a country, has its roots in the absurd hypothesis adopted by the original representatives of this view that commodities enter into the process of circulation without a price, and that money enters without a value, and that, once they have entered circulation, an aliquot part of the medley of commodities is exchanged for an aliquot part of the heap of precious metals. (*ibid.*, pp. 219–20)

As representatives of the view he is attacking, Marx cites Jacob Vanderlint, David Hume and Arthur Young; as allies he cites William Petty, James Steuart and Adam Smith. The last reference is to Book IV, Chapter 1 of *The Wealth of Nations*, where Smith states that

the quantity of coin in every country is regulated by the value of the commodities which are to be circulated by it. . . . The value of goods annually bought and sold in any country requires a certain quantity of money to circulate and distribute them to their proper consumers, and can give employment to no more. The channel of circulation necessarily draws to itself a sum sufficient to fill it, and never admits any more. (Smith, 1937, pp. 408–9)

As one would expect, Ricardo is also clear on the matter. In the *Principles* he writes:

Gold and silver, like other commodities, are valuable only in proportion to the quantity of labour necessary to produce them, and bring them to market. Gold is about fifteen times dearer than silver, not because there is a

greater demand for it, nor because the supply of silver is fifteen times greater than that of gold, but solely because fifteen times the quantity of labour is necessary to procure a given quantity of it. (Ricardo, 1951, p. 352)<sup>5</sup>

He then proceeds to draw the same moral regarding the endogeneity of the stock of money that Smith had drawn earlier, and that Marx would draw in *Capital*: “The quantity of money that can be employed in a country must depend on its value: if gold alone were employed for the circulation of commodities, a quantity would be required, one fifteenth only of what would be necessary, if silver were made use of for the same purpose” (*ibid.*). And he is able to cite Say to the same effect.

In all of these instances, the money commodity is conceived as having a real value prior to exchange, as are the non-money commodities. This gives rise to a reverse Quantity Theory (i.e. instead of a Quantity of Money theory of the price level, we have a price level theory of the Quantity of Money). Marx points out that it is possible to take a consistent Quantity Theory view of the case of commodity money only if one (wrongly, in his view) denies that the precious metals have any intrinsic value. Thus he credits Locke with consistency, at least, in saying that “Mankind having consented to put an imaginary value upon gold and silver . . . the intrinsic value, regarded in these metals, is nothing but the quantity.” (Locke, *Works*, ed. 1777, vol. 2, p. 15, cited in Marx, 1976, p. 221).

In setting out the argument above, I started out by assuming that prices are expressed in ounces of gold. If prices are in fact expressed in a unit of account such as the Guinea or the Crown, this merely adds a layer of accounting on top of the system just described. Prices in gold being given,

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<sup>5</sup>In passing, we might note the toughening of Ricardo’s adherence to the labor theory of value as it applied to the money commodity. The first edition of the *Principles* was published in 1817; in 1810, in “The High Price of Bullion,” he had given a similar but more qualified statement: “Gold and silver, like other commodities, have an intrinsic value, which is not arbitrary, but is dependent on their scarcity, the quantity of labour bestowed in procuring them, and the value of the capital employed in the mines which produce them” (Ricardo, 1962, p. 52).

prices in, say, gold Crowns are found simply by dividing by the number of ounces of gold in a Crown. If the definition of a Crown is changed such that it now becomes the accounting-name for half the amount of gold that it previously represented, the natural effect is (a) a doubling of the nominal money supply measured in Crowns, and (b) a doubling of the general price level, again expressed in Crowns. This proportional change in nominal money supply and price level may look superficially like a Quantity Theoretic effect, but it is really nothing of the kind: it is not that a change in money stock drives the price level, but rather that the changes in money stock and price level are both driven by the alteration in the relation between the unit of account and the money commodity.

This last observation raises a question concerning both Locke's consistency, and the interpretation of Locke offered by Eltis (1995). Eltis, as is fairly standard, interprets Locke as a pioneer of the Quantity Theory, and one piece of evidence he cites is Locke's analysis of the effect of the debasement of the silver coin of England. Eltis subscribes to the proposition that forms one of the basic premises of this paper, namely that monetary exogeneity is essential to the Quantity Theory: "a larger money supply must produce a higher price level: causation must run from money to prices, and not the other way round" (p. 23). Locke, he says, "passes that test. He reiterates that increasing the number of shillings the UK's silver coins represent will raise prices accordingly. More shillings to a pound of silver and therefore more shillings in UK circulation will raise prices proportionately." Locke's own statement of the argument, however, seems to depend on the idea that silver has an intrinsic value, that monetary exchange is *essentially* a matter of exchanging the precious metals for other commodities in non-arbitrary proportions, and that the debasement is in the nature of a currency reform or simple re-scaling (as outlined above), rather than the sort of change in money stock envisaged by the Quantity Theory. Thus he says he thinks "no body can be so senseless, as to imagine, that 19 grains or Ounces of Silver

can be raised to the Value of 20; or that 19 Grains or Ounces of Silver shall at the same time exchange for, or buy as much Corn, Oyl, or Wine, as 20; which is to raise it to the *Value* of 20.”<sup>6</sup> Ironically, as we shall see below, Ricardo argued (in his case on the basis of a sound understanding of the Quantity Theory) that a debased currency is *not* necessarily depreciated to the full extent of its debasement—that depends on the degree of restriction of the quantity of the debased currency, and not simply on the relationship between the original and the new metallic content of the coinage.

### III. RICARDO AS QUANTITY THEORIST?

I started the above exposition with Marx, and remarked on the writers he cited as holding views consistent with his own. In that context an intriguing question arises—I think it holds theoretical as well as historical interest. Namely, why does Marx, who is in general full of admiration for Ricardo, not cite the latter’s clear statement of the determination of the value of a commodity money by its labor-content, and of the corollary that the stock of commodity money is an endogenous variable? One suspects that he regards Ricardo as tainted on the issue, in view of the other passages in Ricardo’s writings that will bear a Quantity Theoretic interpretation. Indeed, in the course of a long bibliographical footnote (Marx, 1976, p. 221) he brands “Ricardo and his disciples” as advocates of the “absurd hypothesis” that is, in his view, the foundation of the Quantity Theory. And at greater length in *A Contribution to the Critique of Political Economy* (Marx, 1970, p. 169 ff) he diagnoses what he sees as Ricardo’s invalid mixture of an analysis based on the labor theory of value with elements of the Quantity Theory. More modern writers, too, have worried about whether Ricardo was consistent on this point—for various views, see Hegeland (1951), Girton and Roper (1978), and Blaug (1985, 1995).

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<sup>6</sup>Locke, *Some Considerations of the Consequences of the Lowering of Interest and Raising the Value of Money* (London, 1692), p. 137, quoted in Eltis (1995, p. 14).



Various accounts may be given of the relationship, within Ricardo's writings and more generally, between a cost-of-production theory of the value of a commodity money, on the one hand, and the Quantity Theory. On one view, it is simply a matter of keeping proper track of the monetary system under consideration. For a commodity money the Quantity Theory is inapplicable, but for an inconvertible currency the theory is correct. Ricardo understood this, say (among others) Girton and Roper, although perhaps he was not always sufficiently explicit on the matter. On that interpretation, Marx's negative assessment of Ricardo on money was simply based on a misunderstanding on Marx's part. Blaug, on the other hand, continues to maintain that Ricardo "left the two doctrines standing in an unresolved relationship" (1995, p. 31). Blaug agrees that the above dichotomy is correct—the Quantity theory applies only to an inconvertible currency—but thinks that Ricardo did not fully understand this. There is another possibility however, namely that the neat dichotomy does not hold, that something like the Quantity Theory does find some application even when we are not dealing with inconvertible paper—and that Ricardo understood this quite well.

There are two main instances in the *Principles* where Ricardo uses what look like Quantity Theoretic arguments, yet he is not dealing with inconvertible paper. One is his discussion of currency debasement (alluded to above), and the other is his discussion of the price-specie flow mechanism. Let us consider these in turn.

#### *Debasement of the currency*

As mentioned above, Ricardo held—and he was very emphatic on this—that when a nation's currency is debased (i.e. when the standard metallic content of a coin of a given denomination is reduced), the currency does not necessarily (or even usually) depreciate in its general purchasing power to the full extent of the debasement (Ricardo, 1951, p. 353). It would do so,

if there were free minting and melting. It would be profitable to carry out a round trip, bringing the old heavy coin for melting then presenting the precious metal for coining under the new standard. This would re-establish the original exchange ratios between the money commodity and the non-money commodities, with the nominal price level ending up higher by the full amount of the debasement. But if the State does not open the mint to all comers, the full depreciation need not occur. There occurs a disequilibrium state (but one that can persist, if the restriction on coinage persists) in which the exchange value of the money commodity *qua* coin is greater than its exchange value *qua* commodity. There is an open incentive to turn the money commodity into coin, but this is blocked by the State's monopoly. And of course (as both Ricardo and Marx emphasized) the labor theory of value applies only to freely reproducible commodities. For non-reproducible commodities, exchange value depends on the interaction of demand and the available stock: the price must be such as to equate the quantity demanded with the stock to be held. Given the demand schedule, one might say that the price of any non-reproducible commodity is determined by the stock of that commodity (and if the demand curve slopes downward the relationship between the stock and the price will be inverse). The only special feature of money in this regard is that the demand curve is likely to be approximately hyperbolic (if a transactions demand predominates), so that the relationship between stock and price will be not only inverse, but approximately proportional.

It may be said that in this case we are really dealing with an inconvertible currency (and therefore not controverting the dichotomy mentioned above), but the case is not what people commonly think of as inconvertibility. The currency may retain a substantial real value; only there is no free traffic from unminted metal to coin.<sup>7</sup>

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<sup>7</sup>Presumably it is impossible to prevent free traffic in the opposite direction, so that the value of the money commodity *qua* commodity sets a floor to its value *qua* money, although it does not set a ceiling.

*The price–specie flow mechanism*

This topic is highly complex, and I do not intend to go far into it here. I will just point out that it constitutes another domain in which Ricardo’s analysis of the value of money—at root, an analysis founded on the labor theory of value—undergoes a certain torsion. The basic argument is that while the value of money at the *world* level is set by the cost of production of the money metal, measured in labor time, nonetheless it is in general impossible for the value of money to be equal across all countries. In general, the value of gold in different countries must diverge to just the extent needed to maintain a set of zero trade balances.<sup>8</sup>

The thought experiment Ricardo conducts (Ricardo, 1951, pp. 138–41) in order to make his point starts with balanced trade between England and Portugal (England exporting cloth and importing wine). Then we imagine that the productivity of wine production is raised in England, to the point where trade with Portugal is no longer profitable. At the original set of prices Portuguese importers will still wish to buy English cloth, but now their purchases will be unbalanced, resulting in an outflow of specie to England. England’s money stock expands, and her prices rise, up to the point where the increased price of English cloth makes its purchase by the Portuguese traders unprofitable. At this point the general price level in England will have risen relative to that in Portugal (the price of English cloth must have risen relative to prices in Portugal, but there is no force raising the relative price of cloth in England). Or in other words the exchange value of gold has been lowered in England relative to Portugal.

The Quantity Theoretic element in this story is the link whereby the flow of specie into England raises the general price level there. Whether this should be called a true case of the Quantity Theory is perhaps doubtful,

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<sup>8</sup>Ricardo is abstracting from persistent international capital movements. It would not be difficult to generalize his analysis to take these into account: in that case the differential gold values would play the role of holding trade balances not to zero, but to whatever figure is consistent with the desired pattern of long-term capital flows.

since the increase in money supply is not exogenous with respect to the system as a whole; rather it is an effect of the increased productivity in England. The monetary expansion is, however, at least the *proximate* cause of the price movement: it is not a case of monetary endogeneity in Marx's mode (i.e., a case of a change in the aggregate price of commodities, or in velocity, inducing a change in money stock).

But is Ricardo's argument valid? Two problems have been raised with his account of differences in the value of gold across nations. First, is he not somehow violating the Law of One Price? And second, even if this account makes good sense in its own terms, what at the end of the day has happened to the idea that the value of gold is determined by the labor-time required to procure it?

The first problem is raised by Glasner (1985, pp. 56–7, 59), who suggests that competition ought to establish a “uniform international value of gold,” and that the price–specie flow mechanism (PSFM) is incompatible with this requirement. Indeed, Glasner argues that it was an appreciation of this incompatibility that led Adam Smith to omit any account of the PSFM from the *Wealth of Nations*. Ricardo, in his account of the PSFM, “lapsed into some of Hume's errors,” confusing the analysis appropriate to an inconvertible paper currency with that appropriate to commodity money, while Smith avoided these errors.<sup>9</sup> On examination, this contention is without merit. Ricardo has the general price level in each nation adjusting to the point at which trade is balanced. The differences in the value of gold that emerge in this equilibrium state relate to the prices, relative to gold, of non-tradeable goods, i.e. those goods that are too bulky or perishable to trade with profit. There is no force acting to equalize *these* prices across nations; indeed their equalization is incompatible with balanced trade. This

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<sup>9</sup>Glasner offers three page-references to Smith on this matter. Only one of these seems to me to the point (Smith, 1937, p. 404), and even it is only obliquely relevant. The notion that Smith exhibited a greater theoretical consistency than Ricardo on the matter is hardly to be taken seriously.

explains “why the prices of home commodities, and those of great bulk, though of comparatively small value, are, independently of other causes, higher in those countries where manufactures flourish” (Ricardo, 1951, p. 142). “Where manufactures flourish,” because such flourishing endows the countries in question with a greater propensity to export, which must be offset by the price-level adjustment in question. Ricardo’s argument does not violate any “equalization” which is capable of being brought about by market forces.

The second problem is the old question of Ricardo’s consistency or inconsistency: Can he have PSFM *and* apply the labor theory of value to money? The answer is Yes. Returning to Ricardo’s thought experiment, let us suppose that prior to the improvement in the productivity of English wine-making, gold having a marginal labor content of 10 hours exchanges, in both countries, against other commodities also having a labor content of 10 hours. Now the adjustment of relative national price levels that Ricardo describes involves a fall in prices in Portugal and a rise in England, as specie flows from Portugal to England. By itself, this would give rise to a situation where gold having a labor content of 10 hours exchanges against goods with a labor content of *more* than 10 hours (in Portugal) and *less* than 10 hours (in England). Ricardo does not spell out the next step, but it is obvious enough. We have to ask: In which of the countries are the gold mines located? If the mines are in Portugal, there will be an incentive to mine more gold and the “world” money stock will increase. The “world” price level will then rise somewhat, but this process must nonetheless, at the end of the day, preserve the equilibrium difference of national price levels. If, on the other hand, the mines were in England, we would see the reverse. Gold production would cease temporarily, and the world money stock would gradually fall due to attrition. The world price level would fall to the point where the labor theory of value again correctly describes the relationship between the labor-content of money and the labor-content of

the goods against which it exchanges—in the gold-producing country where resources are actually transferable between the production of gold and the production of other goods. Again, this adjustment would have to preserve the difference between national price levels.

Thus—to return to the starting point for my discussion of Ricardo—my contention is that Marx was wrong to spurn Ricardo’s analysis of the value of money as inconsistent with the labor theory of value. The instances in which Ricardo talks in terms of the quantity of money having a causal influence over prices (outside of inconvertible paper) turn out to be compatible with the labor theory of value. In the case of currency debasement, this is because the “commodity” in question—namely coin—is not freely reproducible and therefore not governed by the labor theory; and in the case of the specie flow mechanism it is because the causal influence of money stock on prices is but one moment within a broader process that is entirely consistent with the labor theory.

It should be noted, however, that Marx’s objection to those elements in Ricardo that smack of the Quantity Theory is more deep-going than the modern charge of inconsistency leveled by Glasner, Blaug and the like. The point is that Marx is not at all comfortable with the Quantity Theory *even* as applied to an inconvertible paper currency. He found it impossible to imagine that a money severed from its connection to an intrinsically valuable commodity could retain the proper functions of money—see for instance his jab at Fullarton (Marx, 1976, p. 225n). Taking it for granted that Marx was wrong on this point, what was the source of his error? I don’t agree with Lavoie (1986) that the root of the trouble is Marx’s adherence to the labor theory of value. Ricardo’s monetary analysis is the disproof of that. And besides, Marx himself was quite clear that the exchange value of non-reproducible commodities is not governed by their labor content. The problem lies with Marx’s particular Hegelian slant on the labor theory of value, which partakes of what Althusser (1970) calls “expressive causal-

ity.” Money “represents” the value of other commodities only insofar as it possesses an intrinsic value of its own; only on this condition is it able to reciprocally “express” or measure the values of other goods. A paper currency that takes the form of tokens for the underlying money commodity can perform this function by proxy, but a pure paper currency cannot.<sup>10</sup>

## IV. LONG RUN AND SHORT RUN

David Laidler (1991) has offered a reading of the monetary economists of the later nineteenth century which also attempts to soften the dichotomy mentioned above (between a system of commodity money, under which the Quantity Theory is inapplicable, and a system of inconvertible fiat money where it may be applied). Since Laidler’s discussion expands on the issues mentioned above in connection with Ricardo it is worth considering here. Laidler’s basic point is that even under commodity money the Quantity Theory may offer a correct analysis of the short run, while the cost of production of the money commodity has a long-run role to play. He describes the sequence of events following the gold discoveries of 1849–51 as follows:

[The discoveries] led, beyond a doubt, to a sudden fall in the cost of producing gold. They were followed in Gold Standard countries by a steady increase in the prices of at least primary commodities, an increase which appeared to be proximately caused by the growing quantity of gold money coming into circulation as a result of mining activities. The price level in a country such as Britain, could, it appeared as a result of this experience, deviate from its long-run equilibrium time path for a considerable period of time. The factor which kept it away from this equilibrium was an initially ‘too low’ quantity of money. (Laidler, 1991, p. 12)

This experience therefore promoted the acceptance of the Quantity Theory, as a short run theory, even for the case of a convertible currency. Here,

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<sup>10</sup>Of course Marx was not the only classical writer to consider a pure inconvertible currency an impossibility—see, for instance, Eltis’s discussion of Locke (Eltis, 1995, p. 24).

for instance, is Cairnes:

The value of a circulating medium, convertible on demand into gold, of course, depends in the long run on the cost of obtaining gold; but its value at any given time and the fluctuation of its value, are determined by the quantity which happens to be in circulation, compared with the functions which it has to perform, and its efficiency in performing them.<sup>11</sup>

Let us pause for a moment to see what is going on here a little more formally. Commodity money has two special characteristics: it has a definite cost of production, and it has non-monetary uses. To start with, let us abstract from the second of these features and imagine that the only demand for the money commodity is *qua* money. (Let us also abstract from international considerations by assuming that gold is produced in the country that uses it.) Under this simplification, consider Figure 1. The equilibrium price of gold,  $P_G^*$  (the inverse of which is the general price level), is given by the intersection of the vertical schedule representing the stock supply and the demand schedule, which reflects a transactions demand. Now the stock of monetary gold is subject to a slow depreciation; let us say that this amounts to a fraction  $\delta$  of the stock per year. At the same time there is a flow supply of gold, represented by the schedule  $F_G$  (note that the horizontal axis is doing double duty, also representing gold flows per year). To maintain the existing stock equilibrium the flow supply of gold at the price  $P_G^*$  must just meet the depreciation,  $\delta S_G$ .

What happens if there is a reduction in the cost of production of gold, represented by a downward shift of the flow supply schedule? Then at the ruling price of gold, the flow supply will exceed the depreciation, and the stock will gradually expand. As the stock supply schedule shifts rightward (a) the depreciation  $\delta S_G$  increases and (b) a falling price of gold leads to a reduction in the rate of gold production. Eventually these factors lead

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<sup>11</sup>We are at this point three layers deep: I am quoting Laidler's citation of Bordo's citation of Cairnes. The passage appears on p. 13 of Laidler's book.



COMMODITY MONEY

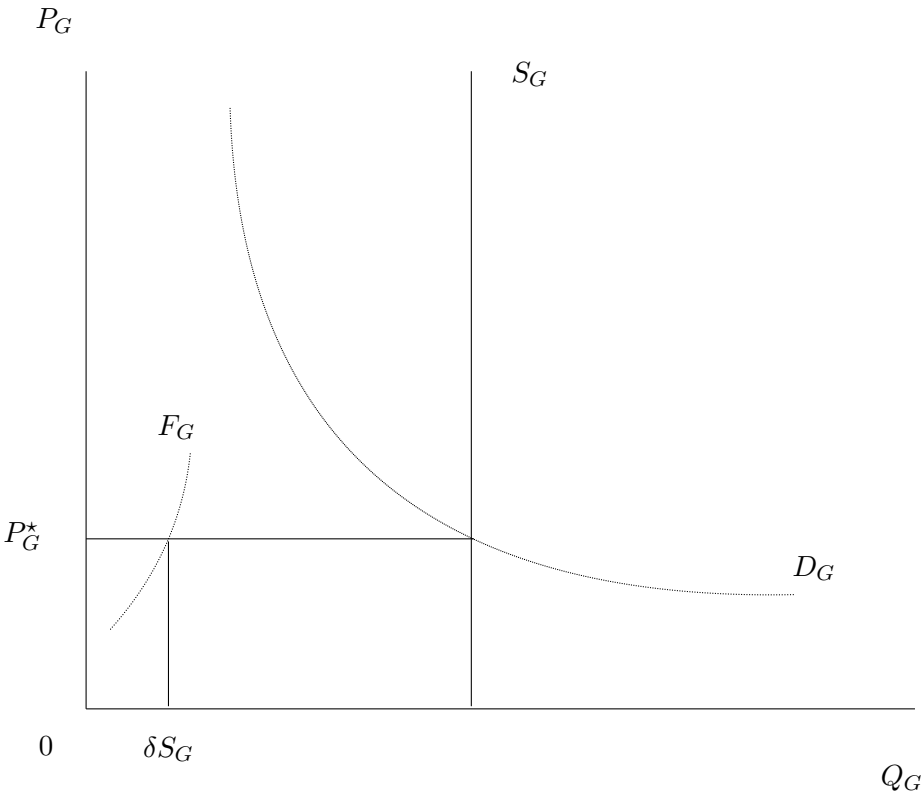


Figure 1: Gold stocks and flows

to a new stationary equilibrium in which gold production just matches the depreciation requirement.

Let us now relax the assumption that gold has no non-monetary uses. Then as  $P_G$  falls in the above thought experiment the non-monetary demand for gold will increase. The overall demand curve will not be a hyperbola, and proportionality will not obtain between the money stock and the general price level (Niehans, 1978, ch. 8). Also the new equilibrium will be achieved more quickly, since the stock of monetary gold has less adjusting to do (and the price level does not have to move so far). The more elastic is the demand for non-monetary gold, the stronger are these effects.

If this is what is going on, is it correctly described by saying that the Quantity Theory applies to the short run in a commodity money system? Well, the process as a whole is clearly very different from, say, the Quantity Theory à la Friedman. The money stock is not the prime mover, and money stock and price level do not, in general, move in the same proportion. Indeed, the very idea of a “Quantity Theory” confined to the short run is *prima facie* paradoxical from a modern point of view. It is not that money stock is an exogenous variable, to the movements of which the price level must adjust in the long run, but rather that the quantity of money is a *predetermined* variable, whose existing value can *impede* the full process of adjustment to a change in the conditions of production of the money commodity. Nonetheless, to reiterate the point made above in connection with Ricardo, it is true that there are, so to speak, Quantity Theoretic moments (phases in which changes in money stock serve as the proximate cause of movements of the price level) within the overall motion of a system of commodity money.

## V. CONCLUSION

I began with the point that post-Keynesians, adamant that the endogeneity of money in a modern credit-money system invalidates the Quantity The-

ory, were perhaps missing a trick insofar as they allow that the Quantity Theory may have applied in a system of commodity money. According to the classical cost-of-production theory of the value of money, very clearly expressed by both Ricardo and Marx, money stock is endogenous in the case of commodity money too. We have seen, however, by reference to Ricardo's arguments, that this does not mean that the Quantity Theory (or elements thereof) has no role to play in the theory of a commodity money.

I find myself making a point here that is rather similar to an earlier argument of mine (Cottrell, 1986). There I argued that the endogeneity of the money stock in a modern credit money system does not imply its causal passivity (in opposition to Basil Moore's claim that in this case there is no distinction to be made between the supply of money and the demand for it). It turns out that the same goes for commodity money. Even if the money stock is not an ultimate independent variable of the system (as in the famous "helicopter drops" of fiat money), nonetheless changes in money stock can, under certain conditions, play a causal role in driving the price level.

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