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**The Theory of the Gold Standard and  
Ricardo's Standard Commodity**

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## Introduction (+)

In a gold standard regime the monetary authority has an obligation to maintain the price of its liabilities in terms of gold. The monetary authority is thereby forced to provide only that quantity of money which is compatible with maintaining convertibility of its liabilities at a fixed gold price. In this respect a gold standard regime differs from a pure fiat money regime, where such an obligation does not exist and where the monetary authority's behaviour is not therefore disciplined by a single commodity.

It is the constraint imposed on the growth rate of the quantity of money which has always been used to account for the superiority of a commodity standard regime over a pure debt money regime. But the inference that the constraint on money prices can be better achieved in the former than in the latter monetary regime is conditional on the choice of the appropriate standard. The historical record of gold in terms of its superiority in maintaining stable commodity prices is very controversial. According to one view the gold standard seems "to provide for long-run nominal stability, but it did not provide for

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stability of nominal and real variables on a year to year basis" (1). According to another, "price stability was not attained, either in the short run or in the long run"(2). The evidence of fluctuation in the wholesale price level before 1914 challenges the expected performance of a metallic standard regime. Yet, it does not seem to undermine the theory of the determination of the price level behind it, which is based on the equilibrium condition between the supply of gold and the demand for money. Discrepancies in the growth rate of the world gold stock and the growth rate of the world real output permit to justify both short run and long run fluctuations in the price level(3).

On this ground it has been questioned whether gold is or ever was an appropriate standard to maintain constant the purchasing power of money. The issue of what would be the most suitable alternative to gold has given rise to an interesting discussion of possible candidates to become

1) Barro (1984), p. 665.

2) Cooper(1982), p. 7.

3) "A decline in the trend of the price level reflected a more rapid growth of world real output and hence in the demand for monetary gold than the growth in the world's monetary gold stock could accomodate. The movement in the price level induced a shift from non-monetary to monetary uses of gold and ultimately led to increased gold production. A rise in the trend of the price level reflected more rapid growth in the world's monetary gold stock than in the demand for monetary gold, inducing a shift from monetary to nonmonetary uses of gold and ultimately to decreased gold production." Schwartz (1984); p.11. See also Rhomberg(1985), p. 10.

the commodity standard:

Two questions are on the forefront of this debate: the explanation of fluctuations in money prices under the gold standard and the criterion by which to judge a good commodity standard. On both these issues the theory developed by Ricardo - the first advocate of the gold standard and perhaps the greatest defender of a one commodity standard - provides arguments in favour of the gold standard which were built on assumptions different from those of modern economic theory and which led to different expectations as to its actual performance.

In Section 1 we focus on the particular Ricardian notion that the value of the currency should be better measured by a single commodity, which is used as standard of the currency, rather than by some approximation to the price level. In Section 2 we review the reasons given by Ricardo to choose gold as the monetary standard in his early as well as in his later writings. We show that the purchasing power constancy in terms of commodities is unnecessary as a requirement for a commodity to be used as monetary standard. In Section 3 we make our case against the literature on this aspect of Ricardo's monetary theory and in Sections 4 and 5 we present our reconstruction of Ricardo's theory of the gold standard. The main point is that the equilibrium quantity of money is not crucial for the description of the mechanism of the gold standard. We then derive the main implications from our analysis,

namely that once the equilibrium quantity of money is dispensed with, there is scope for a theory of the gold standard which requires less restrictive assumptions and may produce more interesting results.

1. Ricardo's monetary theory was developed in the midst of the Bullion Controversy, during the inconvertibility years of high inflation and of low exchange rate. His argument, unlike that of the other Bullionists(4), relied heavily on the distinction between a change in the value of the currency and a change in money prices. Whatever the composition of the currency, he insisted that the value of the currency should be measured by the purchasing power of the pound over the commodity which was used as the standard, not by its purchasing power over the "mass of commodities"(5). Hence his definition of depreciation of the currency always implied an increase in the price of the standard and never an increase in money prices(6).

Since variations in the value of the currency were related to a change, at home and abroad, in the purchasing power of the currency over the standard commodity, a

4) "To Ricardo, moreover, it seemed an absurd notion that the trend of prices in general, or of the general purchasing power of money, could be measured." Viner(1937), pp. 126-7. See also, ibidem, pp. 125-6n.: "Ricardo [...] referred to the existence of a premium on bullion as not merely evidence, but as proof of the existence of depreciation and excess issue."

5) David Ricardo, Works and Correspondence, Vol.III, p.59 (Henceforth III,59). See also I,423.

depreciation or an appreciation could be prevented by the choice of a monetary regime in which the purchasing power of money over the standard was kept constantly within bounds. The monetary regime that Ricardo defended against his critics was precisely a regime in which this result was achieved via a market mechanism.

In order to clarify Ricardo's distinction between a change in the value of the currency(7) and a change in money prices, we express here the money price of any commodity as two ratios:

$$\begin{aligned} \text{money price} &= \text{quantity of currency/unit of commodity} = \\ &= \text{quantity of currency/unit of standard} \times \\ &\quad \times \text{quantity of standard/unit of commodity} \end{aligned}$$

By this method it is possible to visualize the two different sources of variation in money prices which are indicated by the first and the second ratio respectively.

6) "[...] where has it been disputed that there are not other causes besides the depreciation of money which may account for a rise in the prices of commodities? The point for which I contend is, that when such rise is accompanied by a permanent rise in the price of that bullion which is the standard of currency, then to the amount of that rise is the currency depreciated. During the American War the rise in the prices of commodities was not attended with any rise in the price of bullion, and was therefore not occasioned by a depreciation of the currency." (III,251). See also I,149; IV,62; V,166; IX,276.

7) We use the expression "change in the value of the currency" to indicate a change in the purchasing power of the currency over the standard. Ricardo referred to the same concept as depreciation or appreciation of the currency. By "change in the value of money" he usually meant a change in the value of the standard of the currency (gold). This is clear in I,105 where gold and money are used as synonyms.

According to Ricardo's argument, as long as gold was adopted as the monetary standard, a general rise in commodity prices which was not accompanied by a rise in the price of gold or by a fall of the exchange could be unequivocally attributed to a change in the ratio quantity of gold/unit of commodity and would have signalled "real" causes of inflation. Hence it could not be confused with a change in the ratio quantity of currency/unit of gold, which instead signalled a "monetary" cause of inflation. In the former case changes in commodity prices could be attributed to causes like taxation(8) or an increase in money wages(9), or a change in the value of the standard; in the latter case to an excess supply of money.

The endeavour to identify the causes behind movements both in absolute and in relative prices is a peculiarity of Ricardo's theory. Ricardo believed that a change in the relative value of two commodities could be unequivocally attributed to a change in the value of either commodity. Behind this belief there was an idea of "absolute" value, namely of value as an objective property of each individual commodity which, at least in principle, could be independently measured. Changes in money prices,

8) "It may be doubted whether any circumstances can rise prices generally but taxation, or a diminution in the real value of the precious metals in consequence of increased abundance" (III,328). See also III,243 and IV,321-2.

9) This holds true only until August 1814, when Ricardo abandoned the idea (derived from Adam Smith) that an increase in the price of corn could cause an increase in commodity prices.

deriving from a change in the ratio quantity of standard/unit of commodity, could therefore originate either from changes in the value of commodities or from changes in the value of the standard. This is the reason why the standard must be a commodity whose value is "invariable". Any commodity could be used as standard of the currency, but a good standard was only that commodity whose value varied the least. If corn were more invariable in value than gold - Ricardo said in Parliament(10) once - then banknotes should be made convertible into corn.

The "invariability" in the value of the standard was required because in Ricardo's theory the standard commodity was not a numeraire, but rather it served the purpose of clarifying the sources of variations both in money prices and in relative prices. By the use of a standard, monetary causes were distinguished from real causes of variations in money prices. By the use of a standard, if there was a change in the relative price of two commodities, it was possible to ascertain which commodity underwent a change in its absolute value. It is true that the expression "absolute" value appears for the first time in the Principles (I,21 and 63), where the

10) "But did the Hon.Member [i.e.T.Attwood] mean seriously to contend that corn was less variable in value than gold [Hear,hear!]? Let him propose, then, that the Bank Directors should pay their Bank-notes at a certain rate in quarters of corn instead of sovereigns; for that was the bearing of his assertion.[Hear!]." (V,167)



absolute value of any reproducible commodity is said to be determined by its conditions of production(11), but the idea of an "intrinsic" or "real" value of commodities is present - as a primitive concept - well before 1817(12).

The case for a currency regulated by a standard was strongly advocated by Ricardo from the very beginning. The attempt to define the requirements of a good standard - the search for an invariable measure of value - followed step by step the development of his value theory . When Ricardo decided in favour of gold as monetary standard, it was always because he was convinced that gold was more invariable in value than any other commodity, silver included, although the invariability of gold was justified by him differently before and during the elaboration of his value theory.

2. In his early writings Ricardo took for granted that the commodities which had historically been chosen as standard of the currency - the precious metals - were the least variable in value(13), but he made this assumption without any support from his theory of value which was developed much later.

11) See Sraffa (1951), p.xlvi.

12) "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."(III,52). See also III,65; IV,59-62; III,328. The same point was made by Meek (1976), pp.87-8.

As is well known, before 1814 Ricardo held Adam Smith's view that an increase in the price of corn would cause an increase in commodity prices, even if in 1813 he had already abandoned Smith's theory of profits. The "invariability of the value of the precious metals" (VI, 348) is indeed a key assumption in Ricardo's effort to disprove Smith's incorrect theory of the effects on other prices of an increase in the price of corn (14). As Ricardo wrote to James Mill in the famous letter of December 30, 1815:

"Before my readers can understand the proof I mean to offer, they must understand the theory of currency and of price. They must know that the prices of commodities are affected two ways - one by the alteration in the relative value of money, which affects all commodities nearly at the same time, - the other by an alteration in the value of the particular commodity, and which affects the value of no other thing, excepting it enter into its composition. - This invariability of the value of the precious metals, but from particular causes related to themselves only, such as supply and demand, is the sheet anchor on which all my propositions are built; for those who maintain that an alteration in the value of corn will alter the value of all other things, independently of its effects on the value of the raw material of which they are made, do in fact deny this doctrine of the cause of the variation in the value of gold and silver." (VI, 348-9).

13) "Strictly speaking, there can be no permanent measure of value. A measure of value should itself be invariable but this is not the case with either gold or silver, they being subject to fluctuations as well as other commodities. Experience has indeed told us that though the variations in the value of gold and silver may be considerable on a comparison of distant periods, yet for short spaces of time their value is tolerably fixed. It is this property, among their other excellencies, which fits them better than any other commodity for the use of money." (III, 65n.). See also IV, 62-3.

14) This view should not be identified with the "adding up" theory of prices, as in Peach (1984), p. 740n.

In this letter Ricardo constructed his proof on an assumption which is weaker than the one he made later in the Principles. The assumption is that the value of gold and silver can never change as a consequence of variations in the value of corn, but it can vary "from particular causes relating to themselves only". In the first edition of the Principles the latter assumption is abandoned and the value of gold is always assumed to be invariable, in order that:

"In speaking [...] of varying price, the variation will be always considered as being in the commodity, and never in the medium in which it is estimated" (I,87).

Moreover, in the first edition of the Principles, the labor theory of value is employed to substantiate the assumption of the invariability of the value of gold. If gold is a domestically produced commodity, its value, like that of any other commodity, is given by the quantity of labor necessary to its production(I,352). The invariable measure of value is identified with that commodity which is always produced with the same quantity of labor. Ricardo claims that gold is the commodity which more than any other is invariable in value, in the belief that the assumption that the conditions of production of gold do not change (15). is not entirely unrealistic(16). Yet Ricardo was aware that gold was not a perfect standard. Besides the variability in the conditions of production of gold there was another drawback. When gold is imported, as is the case for most countries, its value is given by

the quantity of labor necessary to produce those commodities which are traded against gold(17). Consequently, its value will tend to vary according to the variations in the terms of trade between gold producing and gold importing countries. Whenever the terms of trade improve for the country which imports gold, the value of gold diminishes and vice versa(18).

From the first edition of the Principles till the very end of his life when he drafted Absolute Value and Exchangeable Value, Ricardo refined his value theory and specified and modified the requirements for an invariable measure of value. The major change, however, occurred in the third edition of the Principles. There Ricardo pointed out that an invariable measure of value required a further condition besides that of being a commodity such that "the quantity of labor necessary to produce [it] and

15) "Having acknowledged the imperfections to which money made of gold and silver is liable as a measure of value, from the greater or less quantity of labour which may, under varying circumstances, be necessary for the production of those metals, we may be permitted to make the supposition that these imperfections were removed, and equal quantities of labour could at all time obtain, from that mine which paid no rent, equal quantities of gold. Gold would then be an invariable measure of value."(I,87n). See also I,63.

16) "Gold and silver are no doubt subject to fluctuations, from the discovery of new and more abundant mines; but such discoveries are rare and their effects, though powerful, are limited to periods of comparatively short duration". (I,14)

17) See I,169.

18) See I,63.

bring [it] to market"(I,352) did not change. The exchangeable value of commodities varies whenever the rate of profit or the wage rate varied, because each commodity was differently affected by the change in distribution according to the different proportion of fixed and circulating capital, to the different durability of fixed capital, and according to the different length of time of the production process(19). Ricardo noted that the exchangeable value of two commodities may change even if the quantity of labor necessary to produce them - their real or "absolute" value - was unchanged. It followed, according to the same argument, that a commodity produced under an unvarying technology was invariable in value, but it was a good measure of value only for those commodities which were produced with the same technology. For all other cases it was not a good measure of value, since variations in the value of any commodity relatively to the standard could not be unambiguously traced back to variations in the "absolute" value of that individual commodity.

Ricardo indeed acknowledged that the latter problem made the search for a perfect measure of value more difficult and that a perfect measure of value may not exist in nature(20). Nevertheless he did not give up the search for a good proxy. If a commodity was produced

19) See Sraffa (1951), p.xlii.

20) See I,149; IV,404.

under an "average" technology, i.e. under conditions of production which are not far from those of most commodities, and if this commodity was chosen as the standard commodity, prices would not change on average with any change in distribution, as long as the technology of the system remained unchanged, because the increase in some prices would be offset by the decrease in others(21). Once again Ricardo made the appropriate assumption to justify the choice of gold as the standard commodity - i.e. that gold was precisely the average commodity(22) - an assumption which once again seemed to him not too far from reality(23).

3. Our interpretation of the rationale of the choice of gold by Ricardo as measure of the appreciation or depreciation of the currency is different from those which can be found in the literature. A popular view is that

21) Ong (1983), p. 11 distinguishes between the property of the standard commodity - it leaves the average level of prices and the value of the aggregate output unchanged - and the other property - to identify the sources of variations in the relative values of any two commodities. Even if Ricardo debated the latter issue, Ong fails to notice that only the first property is required for the standard of the currency.

22) "May not gold be considered as a commodity produced with such proportions of the two kind of capital as approach nearest to the average quantity employed in the production of most commodities? May not these proportions be so nearly equally distant from the two extremes, the one where little fixed capital is used, the other where little labour is employed, as to form a just mean between them?"(I,45-6). See also I,87.

23) See IV,389-90.

because Ricardo could not avail himself of index numbers, which were still in their infancy at the beginning of the 19th Century, he had to be content with a proxy - the price of gold - to measure variations in the price level(24).

These interpreters assume that Ricardo must have thought on empirical grounds that the price of gold approximately followed the general movement of prices. S. Hollander has tried to justify this interpretation by postulating that what Ricardo in fact meant was that gold showed a "relative stability of [its] purchasing power"(25). However, there is very little evidence to show that Ricardo thought that the relative value of gold in terms of commodities was constant over time and that the latter was a meaningful concept for him. More crucially, there is not a single argument in Ricardo's theory to support the view that the value of gold in terms of commodities must not change.

In contrast to Hollander we maintain that Ricardo generally referred to the absolute and never to the relative value of gold(26). Variability in the purchasing

24) See Blaug (1968), pp. 102-136; Humphrey (1974), p.7; Keheler (1978), pp.21-2; Officer (1982), p.65.

25) See Hollander (1979), p. 417.

26) The distinction between absolute and relative value is a common feature of classical theory. The quotations from Boyd, King and Horner that Hollander uses to support his interpretation (*ibidem*, pp.417-8) can also be interpreted as related to the invariability of the absolute value.

power of gold in terms of commodities whose conditions of production have changed was never considered by Ricardo a reason for abandoning the choice of gold as standard of the currency. On the contrary, variations in the relative purchasing power of gold would have correctly signalled "real" as opposed to "monetary" causes of inflation.

The requirement of the invariability in the absolute value of the standard is weaker than the requirement of the constancy of the purchasing power of the standard in terms of commodities, which in modern models of the gold standard is necessary to produce stability in the price level(27). A constant relative value of the standard implies a constant absolute value(28), but the opposite does not hold. If the relative value of the standard is constant and the currency keeps its value in terms of the standard, money prices are stable. But, in a Ricardian theory of the gold standard, unlike from gold standard models, fluctuations in the level of prices are consistent with a standard which is invariable in value and a currency which is not depreciated.

The interpretation put forward by W.Mason is based on the correct recognition that the idea that commodities have an intrinsic value explains the classical and Ricardian search for a monetary standard (29). Mason

27) See Barro (1977), Niehans (1978), Bordo and Ellson (1985).

28) Excluding when the value of the standard and the value of any commodity undergo the same change.



argues that Ricardo chose gold as monetary standard as a proxy for the "real" measure of value, namely labor time. But his interpretation does not allow for the fact that Ricardo did not develop his labor theory of value before 1817. We differ from Mason insofar as we assign a different role to the labor theory of value in Ricardo's monetary theory(30). We claim that it is not the determination of the value of gold on the basis of the quantity of embodied labor which is relevant as far as Ricardo's theory of money is concerned. Gold is the standard of the currency and the standard of value, but in these functions it served two different purposes. Gold as standard of the currency measures depreciation:

"[...] if we adopted a currency without a standard, there is no degree of depreciation to which it might not be carried. The depreciation could not admit of proof, as it might always be affirmed that commodities had risen in value, and that money had not fallen". (IV,62).

If the standard of the currency is also the invariable standard of value, all changes in economic variables signal real changes, provided that the currency keeps its value in terms of the standard. This assumption holds for

29) See Mason (1963), p. 49: "Ricardo always insisted that changes in the value of money could be measured only against a standard of value [...] The general confusion of the "standard of value" and unit of account began in the post-classical period, when even the neoclassicists began to think of money primarily in terms of its own exchange value relative to goods, instead of as the standard for measuring the relative value of goods [...] The classical standard of value was turned upside down. Goods became the standard for the evaluation of money".

30) See Mason (1982), pp. 548ff.

most of Ricardo's analysis of income distribution. But this assumption, made by Ricardo for the sake of simplicity, must not make one forget the independent function of gold as standard of the currency, as if monetary theory were "merely a particular aspect or application of value theory"(31).

4. The pivot of our interpretation of the theory of the gold standard in Ricardo is that it is possible to separate the determination of the equilibrium quantity of money from the specification of the market mechanisms which make the value of the currency in terms of the standard equal to the same given quantity of gold at home and abroad. We then argue that the determination of the equilibrium quantity of money has no role to play in the Ricardian theory of the gold standard.

When the currency buys the same given quantity of gold at home and abroad, Ricardo defined the quantity of money as being at its "natural level" (III,125 and 193; VI,75). But we claim that the natural level of money does not have to be determined in order to analyze the dynamics of the system. The price of gold and the rate of exchange are the only signals of disequilibrium, i.e. of departures of the quantity of money from the natural level. Let's examine in more detail which are the effects, for instance, of an increase in the quantity of money beyond

31) See Mason (1963), p. 55.

its natural level. This has an immediate impact on the rate of exchange. The fall of the rate of exchange lowers the value of the currency in terms of gold in the foreign markets. The fall in the exchange rate is accounted for by import increases, by more active speculation, and by the rise in the prices of domestic commodities. When the rate of exchange is so low that the export of gold becomes profitable, the demand for gold increases. If the price of gold is fixed, or rather bounded above and below its official price by seignorage and melting expenses, as it was during the convertibility years, any quantity of gold is supplied at that price. This is the case of a circulation made of: i) coins of legal weight; or ii) paper money convertible into gold bullion; or iii) inconvertible paper money and coins of legal weight. It follows that the increase in the demand for gold, both when it is met by a run on the Bank, or by the melting of coins, will reduce the overall quantity of money in circulation. In turn, the decrease in the quantity of money will lead to an increase in the exchange rate which is then restored to its previous level, i.e. in the range delimited by the so called "gold points". This means that the quantity of money is back to its natural level. If gold cannot be obtained at the Mint price, the price of gold rises. This is the case when convertibility is suspended as it was during the Napoleonic Wars, or when the circulation is made of debased coins. The rise in the

price of gold is a consequence of the fall in the exchange rate (III,397), and it is the change in the price of gold which measures the depreciation of the currency. The case of a decrease in the quantity of money is perfectly symmetrical.

The adjustment mechanism following an increase in the quantity of money which Ricardo presented in his early monetary writings did not require the determination of the value of gold in terms of commodities. The theory introduced in the Principles, while allowing consideration of the relative value of commodities in terms of gold, was nonetheless never used by Ricardo to determine the natural level of money. The only proposition defended by Ricardo was that the natural quantity of money was a function of the value of the standard: the higher the value of the standard, the lower, ceteris paribus, the quantity of money necessary for the circulation(32).

Ricardo did not have a theory which could be used to determine the equilibrium quantity of money, based on well defined behavioral assumptions upon which supply and demand curves are derived. It can be proved that in Ricardo the link between the supply of monetary gold and the supply of money is unstable (III,322) and there is not a stable demand for money function either (III,247 and IV,58). Therefore according to our reconstruction Ricardo was not trying to determine the "equilibrium level of  
32) See I,352 and III,315.

prices" according to the quantity theory of money (33). It is undeniably true that he did say that an increase in the quantity of money could not have any permanent effect on output, employment and interest rate. There is evidence, though, which supports the view that Ricardo was aware of the dangerous effects of deflationary measures(34), suggesting at least an asymmetrical application of the neutrality principle(35). However, the main implication of the quantity theory - any change in the level of prices implies a change in the quantity of money - does not belong to Ricardo's framework of analysis. Changes in the quantity of money always affect both the rate of exchange and prices, even if there is not always proportionality between the increase in the quantity of money and the increase in prices. When he was explicitly asked:

"Do you think a diminution of the circulation produces a diminution in prices in exactly arithmetical proportion?",

he answered:

"I think it has a tendency so to do, but it does not act exactly so nicely as that". (V,385).

But prices can vary without any change in the quantity

33) The opposite view on this point is held by Gootzeit (1975), pp. 7ff.

34) "I am well aware that [...] even its [paper money] sudden limitation would occasion so much ruin and distress, that it would be highly inexpedient to have recourse to it as the means of restoring our currency to its just and equitable value". (III,94).

35) See Hollander(1979), pp. 488-500 and Ahiakpor (1984), pp. 18-22.

of money, because of changes in technology, in taxation or in the value of the standard.

In Ricardo's theory we are told, however, not only which market signals indicate that the quantity of money is not at the natural level, but also how to measure deviations in the quantity of money from its natural level. The signals are given by changes in the price of gold and by changes in the rate of exchange, while the measure is given by the difference (which can be positive or negative) between the market and the official price of gold and - approximately(36) - by the difference (which again can be negative or positive) between the market exchange rate and parity. Consequently, the policy prescription advocated by Ricardo was:

"The issuers of paper money should regulate their issues solely by the price of bullion, and never by the quantity of their paper in circulation. The quantity can never be too great or too little, while it preserves the same value as the standard."(IV,64).

5. The idea that in order to analyze a gold standard system we must have a model to determine the equilibrium quantity of money, is derived from modern monetary theory, but this idea obscures rather than clarifies Ricardo's argument in favour of the gold standard, and it is not

36) The rate of exchange was not a perfect measure of depreciation, as deviations of the market rate of exchange from parity, but within the gold points, can be accounted for by fluctuations in the market for foreign currencies connected with capital transfers and the state of trade. See III,75.

indispensable to understand how the gold standard really worked.

On the first issue it must be noted that an unnecessary difficulty has been raised as to the supposed contradiction between the theory of value and the theory of money in Ricardo. The determination of the equilibrium quantity of money requires that the demand for money and the supply of money functions be specified. The former is usually written as:

$$(1) \quad M = k P Y \quad k > 0$$

where  $M$  = demand for money;  $P$  = price level;  $Y$  = exogeneously given level of output.

The general form of the supply of money function is:

$$(2) \quad m = h p G \quad h > 1$$

where  $m$  = supply of money;  $p$  = official price of gold;  $G$  = stock of gold for monetary purposes.

If the equilibrium quantity of money has to be determined, a contradiction becomes apparent in the closed economy model, as from (1) and (2) the following relationship between the stock of gold and the price level is implied:

$$(3) \quad G = k Y/h \cdot P/p$$

If  $P/p$  is determined according to the conditions of production in the commodity and in the gold sector according to classical value theory,  $G$  becomes the endogeneous variable, given  $k$ ,  $h$  and  $Y$ . It is therefore to be assumed that the world distribution of the stock of

gold among countries always tends to be consistent with the conditions of production of gold.

The stability of the equilibrium requires no less strong assumptions.

If the initial stock of gold is lower than the equilibrium stock, we must assume that there is a quantity adjustment mechanism provided by the new gold production, which is quick to operate. If it is higher, gold production stops altogether and the excess supply of gold is absorbed by the nonmonetary sector.

Otherwise, if  $G$  is initially at its equilibrium level, the new gold production must be ignored so as to leave the equilibrium stock of gold unaffected or it must be assumed that the rate of growth of output and the rate of growth of the gold stock are equal. Both alternatives do not seem viable: either gold is assumed to be a non-produced commodity or it is assumed that the industrial sector has a residual role and can always absorb or release exactly whatever quantity of gold is not necessary for monetary purposes.

On the other hand, once  $G$  is treated as given,  $P/p$  becomes the endogeneous variable. But in this case the value of gold ceases to be related to its conditions of production and becomes entirely dependent on the quantity of gold available, leaving classical value theory totally inapplicable to a monetary economy (37).

In an open economy, the exercise requires the



determination of the world distribution of a given stock of gold which is allocated to each country so as to enforce the purchasing power parity rule, i.e. the purchasing power of gold in terms of commodities is equalized across countries. Consequently, for a given world gold stock the equilibrium values of  $G$  and  $P$  are simultaneously determined for each country. Gold moves from one country to another until equilibrium is attained, under the assumption either of the price-specie-flow mechanism or of some other mechanism that does not require changes in international relative prices. The equilibrium position with no gold flows is however identified in both cases with the attainment of the purchasing power parity of gold in terms of commodities across countries. It is clear that in this case also the value of gold cannot be made dependent on its cost of production and, as in the closed economy model, any link with classical value theory is undermined. We have shown elsewhere(38) that in a Ricardian framework the equilibrium condition given by the purchasing power parity of gold in terms of commodities can be substituted by the stopping rule for gold movements given by the purchasing power of gold in terms of

37) The answer provided by invoking a distinction between a short run and a long run theory of money does not get us any further nor does the peculiar notion that Ricardo held two quite different, even incompatible theories, one for inconvertible paper money and the other for commodity money. See Hegeland (1969), pp. 59-60.

38) See Marcuzzo and Rosselli(1986)

currencies.

### Conclusions

Ricardo's assumption of an invariable measure of value may not provide an acceptable solution to the question of the properties of the commodity to be chosen as standard of the currency. His answer - variations in the value of money should be measured by a commodity whose conditions of production are "invariable", is not watertight, but an answer which relies only on empirical regularities is not entirely satisfactory either: "[...] an acceptable commodity standard could be based on a package of several commodities, chosen so that the historical association of the price of the package and the cost of living has been close"(39).

The purpose of a commodity standard regime is to insure stability in money prices, imposing a market constraint on the quantity of money. Ricardo held firmly that it was desirable to have stable money prices(40) and to put a constraint on the behaviour of the monetary authority(41). He, however, did not think that the aim of a constant general purchasing power of the standard was meaningful nor indeed feasible. A good standard was neither a necessary nor a sufficient condition to ensure stable

39) See Hall (1982), p. 4.

40) See III,137-8; V,126-7; IV,64.

41) See III,133.

money prices, as it provided only a means to prevent disturbances in the price signal mechanism. For Ricardo inflation was a signal: being able to provide the means to detect the underlying causes was more important for him than trying to cure the symptoms.

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