David Ricardo and the “Natural” Level of the Quantity of Money

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“It has indeed been said that we may judge of its [currency] value by its relation, not to one, but to the mass of commodities. If it should be conceded, which it cannot be, that issuers of paper money would be willing to regulate the amount of their circulation by such a test, they would have no means of so doing.” (Ricardo Works IV, 64)

1.

By the time England officially adopted the Gold Standard in 1821, or rather returned to it after the Suspension of Cash Payments in effect since 1797, Ricardo’s views on the working of the system and his prescriptions for the conduct of monetary affairs had gained wide acceptance and recognition. The main propositions in monetary policy can be summarised as follows: a) the monetary authorities are accountable only for those changes in money prices which can be imputed to a monetary disturbance; b) a desirable monetary regime is one in which such an occurrence is least likely to occur; c) targeting the quantity of money, in order to prevent a monetary disturbance, is both undesirable and ineffectual. In this paper I try to show how Ricardo derived these propositions from his monetary

and value theory and discuss the role played by the concept of the “natural” level of the quantity of money.2

Ricardo firmly believed that it was possible to distinguish variations in money prices having a monetary origin from those originating in real causes. Changes in money prices that have a monetary cause could and (should) be prevented, while those due to a change in the conditions of production of commodities could (and should) not be avoided. The premise of the argument is a peculiar definition of value of money, which now sounds unfamiliar (but was common for most of the classical economists), as the purchasing power of a unit of currency over the standard.4 The standard is that particular commodity which—in virtue of its own particular characteristics—is chosen to measure the value of money. If, then, gold is chosen as the standard, variations in the money price of gold are the measure of changes in the value of money. An increase in the price of gold, i.e. a change in the purchasing power of the currency over the standard, means a decrease in the value of money, i.e. a depreciation of the currency. (Conversely, for a decrease in the price of gold).

From this premise Ricardo drew a distinction between a change in money prices and a change in the value of money: by the former he meant a change in the ratio of the currency (money) to commodities, by the latter a change in the ratio of the currency to the standard. Commodities prices are seen as made up of two components, as in the following expression:

$$\frac{\text{Money}}{\text{Commodities}} = \frac{\text{Money}}{\text{Standard}} \times \frac{\text{Standard}}{\text{Commodities}}$$

Thus, in a monetary regime in which the price of the standard in terms of the currency is fixed and kept within a given interval of variation, changes in the money prices of commodities can occur only if there is a change in the ratio between commodities and the standard. Furthermore, if the standard chosen has the desired characteristic of being stable in value—by

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2 Ricardo Works III, 105, 193; VI, 75.

3 See Rosselli 1999.

4 “Depreciation as applied to money must be understood to mean relative lowness as compared with the standard, and nothing else” (Ricardo Works IX, 276); “Commodities generally […] can never become a standard to regulate the quantity and value of money.” (Ricardo Works IV, 61).

which Ricardo meant “an invariable measure of value”, as we shall see—the only cause of variations in commodity prices is a change in their conditions of production (or taxation).

If the standard is gold, the price of gold measures the internal value of the currency, while the rate of exchange (the ratio between the official prices of gold at home and abroad, assuming that the other countries have also adopted a Gold Standard) measures the external value of the currency. Whenever the market price of gold shows no deviation from the official price and the market rate of exchange (the price of foreign bills of exchange) is close to the par of the exchange, the purchasing power of the currency over gold—therefore its value—is equalised at home and abroad.

This configuration of the system is attained when the quantity of money is at its “natural” level. This is not a quantity that can be given a numerical value—targeted by the monetary authority—but rather a benchmark signalled by the foreign and domestic value of money—on the evidence of which it can be seen when that level is not attained. When both the market price of gold at home and the market rate of exchange deviate from their official values, provided the internal and external convertibility of the currency is maintained, forces are at work that will restore that level.

Summing up, Ricardo’s belief that it was possible to separate “monetary” from “real” causes of variations in money prices rests on two presuppositions: (i) there is a market mechanism which ensures that the value of money, once the price of the standard is fixed in terms of the currency at home and abroad, remains constant; (ii) there is an actual commodity which is “invariable” in value.

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The mechanism, which ensures that the level of the quantity of money is self-adjusting—and therefore that the value of money is kept constant—relies on individuals’ responses to profitability conditions for arbitraging in gold in the domestic and in the foreign markets. Let us suppose that market rate of exchange falls relatively to par due to an increase in the quantity of money over its “natural” level, thereby to an increase in the
demand for foreign currency and assets. If the depreciation of the exchange reached the so called “gold points”, which bound the profitability conditions for shipping gold, gold is exported, the quantity of money is reduced to its “natural” level and the market rate of exchange is once again brought back level with par.

The mechanism which ensures that the quantity of money adjusts to its “natural” level, rests on two conditions: a) the currency is freely convertible into the standard at a fixed price (and at a small cost) at home; b) the standard can be freely exported and imported into the country.

Let us suppose that the standard is gold, and the currency is convertible into gold, at an official price; then the market price of gold is bounded and can vary only within a narrow range:

\[ p_m - \varepsilon \leq p \leq p_m \]  

(1)

where:

- \( p_m \) = domestic official (Mint) price of gold
- \( p \) = domestic market price of gold (bullion)
- \( \varepsilon \) = “convertibility” expenses (Bank commission, seignorage)

When gold can be bought and sold at its official price, the par of exchange represents the cost (net of transport costs) of making international payments by remitting gold. Assuming the “other” country be also on gold, the “official” parity (par of exchange) – defined in terms of foreign currency for one unit of domestic currency – \( E \), can be expressed as:

\[ E = \frac{p'_m}{p_m} \]  

(2)

where:

- \( p'_m \) = foreign official (Mint) price of gold

When there are “convertibility” expenses, as in (1), the market price of gold diverges from the official parity; in the calculation of the cost of remitting gold it is then necessary to take into consideration the market gold prices at home and abroad. This is known as the “real” parity, \( R \), defined as:

\[ R = \frac{p^*}{p} \]  

(3)

where:

- \( p^* \) = foreign market price of gold (bullion)

Bills of exchange were the alternative to shipping gold in making international payments. The price of bills of exchange denominated in foreign currency, i.e. the market rate of exchange, was determined by the supply and demand of those bills in the domestic \( (E_a) \) and in the foreign \( (E'_a) \) exchange market.

Let us consider the percentage deviations of the market price of gold bullion from the official price at home \( (\hat{p}) \) and abroad \( (\hat{p}^*) \), and of the market rate of exchange from the official gold parity \( (\hat{e}) \) and from the real parity \( (\hat{i}) \). Then we have the following expressions (" denotes percentage):

\[ \hat{p} = p - p_m \]

\[ \hat{p}^* = p^* - p_m \]

\[ \hat{e} = E - \frac{p}{p_m} \]

\[ \hat{i} = E - \frac{p^*}{p_m} \]

\[ \hat{e} = E - \frac{p^*}{p_m} \]

6 Ricardo gave us a precise description of how this market worked: “Bills are bought and sold on the exchange by brokers, who make themselves acquainted with the state of demand and supply. There is a difference in the price of bills, accordingly as they are drawn on persons, and by persons, of undoubted credit. There are also middlemen, who speculate largely on the rise or fall of the exchange and either buy or sell bills without being entitled to do so from any previous transaction, on the expectation of the future supply and demand of bills. The practice I believe this. The brokers go round to the different merchants, and ascertain whether they are buyers or sellers of bills. The man of most influence amongst them judging of the relation between the buyers and the sellers suggests a price at which all the transactions of the day are settled, with such deviations as particular bills, on account of their being very high, or very low credit, may be subject to.” (Ricardo Works VIII, 39).
\[
\hat{p} = \frac{\hat{P} - P_M}{P_M} \\
\hat{p}^* = \frac{\hat{P}^* - P_M^*}{P_M^*} \\
\hat{e} = \frac{E_n - X}{X} \\
\hat{t} = \frac{E_n - R}{R}
\]

It follows that \( \hat{e} \), the percentage deviation of the market rate of exchange from the official parity, \( X \), rearranging (6) and (7), is given by:

\[
\hat{e} = \hat{t} + \hat{p}^* - \hat{p}
\]

As long as there are market forces at work to enforce the equality of the market to the official price of gold at home and abroad, \( \hat{p} \) and \( \hat{p}^* \) are close to zero. There is no difference in the deviation of the market rate of exchange from "official" par and from real par. Its value is bounded only by the costs of using gold as means of international payments, i.e. by transaction and transportation costs.\(^4\) When domestic convertibility is suspended, the market price of bullion can be significantly higher than the official price, because it is not possible to obtain gold at the official price by converting banknotes; consequently this element enters in the computation of the profitability conditions of shipping gold rather than using bills of exchange.

3.

We can now lay down the profitability conditions for shipping gold which can bring about the stability of the purchasing power of the currency in terms of gold at home and abroad. Behind gold movements, according to Ricardo, there was the behaviour of a particular class of merchants, which made their profit by arbitraging between foreign currencies and gold prices in the international markets of the world, exploiting discrepancies in the price of bills, the price gold and the rate of discount.\(^5\) They could supply foreign bills of exchange, when the demand was high, by undertaking the risk of exporting gold, or they could buy bills of exchange to import gold as soon as the rate of exchange made this trade profitable.

The profitability of importing gold in the domestic market, say from the point of view of a merchant in London, can be found by comparing the cost and the revenue of investing one unit of domestic currency in the transaction. In the case of gold import, the London merchant's correspondent abroad sells a bill drawn upon the London merchant, then buys gold in the foreign market and ships it to London. Gold must be sold in London before the bill comes due. If either the delivery or the sale of gold is delayed, there is an additional interest cost. If cost (left hand side) is less than revenue (right hand side), it pays to import gold:

\[
1 + i_r < E_n^* \frac{1}{p^*(1 + \tau)} \rho
\]

where:

\[
T = \text{time interval between the payment of the bill and the sale of the gold imported} \\
\tau = \text{cost of shipping gold (brokerage, insurance, commission and freight) as percentage of the price} \\
i_r = \text{rate of interest for } T \text{ days in the domestic money market}
\]

The cost is given by the amount the London merchant has to pay (inclusive of interest) when the bill comes due. The revenue is given by the value of the sale at home at price \( p \) of the amount of gold bought at the official price abroad, \( p^* \) (plus expenses, \( \tau \)), i.e. \( 1/(p^*(1 + \tau)) \), by selling abroad a bill of exchange denominated in domestic currency (one pound) at the prevailing market rate of exchange, \( E_n^* \).

Let us now turn to the profitability condition of exporting gold, from the point of view of a merchant in London. This once again is found by comparing cost and revenue of investing one unit of the currency in the transaction. In case of gold export, the London merchant sells a bill of exchange denominated in foreign currency, drawn by him on his foreign

\(^7\) See Marcuzzo/Rosselli 1997, 103, 4n.
\(^4\) Ricardo calls them "natural limits" (Ricardo Works VII, 43).
correspondent and ships gold to the foreign market. If cost (left hand side) is less than revenue (right hand side), it pays to export gold:

\[ \frac{p(1 + r)(1 + \delta r)}{p'} < \frac{1}{E_a} \]

(10)

The revenue from the sale of a bill for one unit of foreign currency in the domestic market must be greater than the cost involved in selling the gold — bought in the domestic market at price \( p \) (plus shipping expenses, \( r \) and interest cost, \( \delta r \)) — in the foreign market at the official price \( p' \).

We can restate the two conditions as follows; for gold import:

\[ pE_a - p'(1 + \delta r)(1 + r) > 0 \]

(9a)

For gold export:

\[ p' - E_a p(1 + \delta r)(1 + r) > 0 \]

(10a)

The profitability conditions for exporting and importing gold are simply the arbitrage opportunities given by the differences in the prices of gold which individuals exploit. As a consequence, gold movements are generated which ensure the stability of the purchasing power of the currency in terms of gold.

4.

To enable the distinction between monetary and real cause of rising money prices, the commodity chosen as standard of money ought to be an “invariable” measure of value. Unlike A. Smith, who justified the use of precious metals as currency on the basis of their “utility, beauty and scarcity”\(^{10}\), from the outset, from his earliest to his latest writings, Ricardo emphasised the stability of their “intrinsic” value.\(^{11}\) As we know from Sraffa’s reconstruction,\(^{12}\) Ricardo’s elaboration of the theory of value went side by side with the search for an “invariable” measure of value. At each stage Ricardo considered three questions: (i) what laws regulate the absolute value and the relative values of commodities; (ii) what characteristics must a commodity have in order to serve as a measure of value; (iii) whether gold, more than any other commodity, has the characteristics of being an “invariable” measure of value. In the process which led to the first edition of the *Principles*, Ricardo arrived at a formulation of a theory of value based upon the quantity of labour embodied, and consequently, at an initial clarification of the requirements a commodity should satisfy in order to be invariable in value (i.e. to be produced always with the same quantity of labour). The supposition that equal quantity of labour are at all times necessary to produce equal quantities of gold, makes gold “an invariable measure of value”\(^{13}\). With the third edition of the *Principles*, the possibility of finding a commodity with an unchanged technology does not appear a sufficient condition for a commodity to be an “invariable” measure of value. Even a commodity which always required the same quantity of labour would seem to change in value, whenever there was a change in the rate of profit or in the rate of wage. But if gold were a commodity produced with the “average” proportions of capital and labour, then it would be the standard “so nearly approaching to an invariable one”\(^{14}\).

Sraffa has taught us what difficulties were involved in Ricardo’s quest for an “invariable” measure of value: there is no solution to the problem of distinguishing between variations in the relative price of commodities due to changes in the conditions of production and those due to a change in distribution.

Also for the standard of money Ricardo again looked for a commodity which was invariable in “absolute” rather than in “relative” value. His justification for the choice of gold as a measure of the value of money was never that gold had a stable purchasing power in terms of commodities, as which fits them better than any other commodity for their uses of money.” (Ricardo *Works III*, 65).

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\(^{10}\) Smith 1976, 191.

\(^{11}\) “Experience has indeed taught 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 property, among other excellencies,\(^{12}\) See Sraffa 1951.

\(^{13}\) Ricardo *Works I*, 87n.

\(^{14}\) Ricardo *Works I*, 46.
is often argued in the literature. There is indeed little evidence that Ricardo thought the relative value of gold in terms of commodities was constant over time, or that there was any merit in the idea of measuring the value of one commodity in terms of all other commodities.

Secondly, Ricardo’s “natural” quantity of money does not require the value of gold to be constant in terms of commodities. The working of the system can be presented without assuming that gold to be a commodity with constant purchasing power in terms of commodities at home and abroad. The equalisation of the purchasing power of the currency in terms of gold (or the law of one price of gold in the international markets) is all that is needed for gold movements to come to a halt.

Thirdly, since Ricardo’s theory is not based on the constancy of the relative value of gold in terms of commodities, price fluctuations are admitted. Unlike most of the contemporary Gold Standard models, which make this assumption, leading to the false conclusion that Gold Standard ensures price stability, Ricardo’s monetary theory makes no such prediction. By anchoring the money price of the standard, variations in money prices due to a change in the conditions of production of commodities or in the standard cannot be excluded, and therefore the possibility of variations in money prices is envisaged, as is the possibility that the purchasing power of gold in terms of commodities may differ across countries.

However, since there is no solution to the problem of finding a standard of money which is “invariable” in absolute value and which would make it possible to distinguish between variations in money prices due to a change in the value of commodities or in the standard, there can be no ground for Ricardo’s belief in the possibilities of distinguishing between “monetary” and “real” causes of rising money prices.

15 Viner 1937, 201; Hollander 1979, 40.

16 "By many Political Economists it is said that we have an absolute measure of value, not indeed in any one single commodity, but in the mass of commodities [...] If it be admitted that one commodity may alter in absolute value, it must be admitted that 2, 3, 100, a million may do so, and how shall I be able with certainty to say whether the one or the million had varied?" (Ricardo Works IV, 400-1).

17 According to Cooper (1982, 7; 1997, 53), large swings in prices were the norm during the 19th century Gold Standard.


5.

The level of the quantity of money at which its value is constant need not be calculated either by relating the cost of production of gold to the cost of production of commodities, nor is it determined as the equilibrium condition given by the equality of supply and demand of money. Ricardo explicitly denied that one could know precisely what the quantity of money ought to be at a given moment of time and his policy recommendations were always consistent with this premise.

By analogy with the definition of natural prices and natural wages, namely the value assumed by those variables when a permanent as opposed “to any temporary or accidental cause” prevails, we can offer a rational reconstruction of what Ricardo meant by the “natural” level of the quantity of money.

The distinction between “market” and “natural” values in Ricardo and in the classical authors does not have the same meaning as the distinction between the equilibrium values in the short and in the long run. The distinction relates not to the length of the period over which the process is supposed to occur, but to the nature of the forces involved.

In the case of money, once the price of the standard is fixed in terms of the currency, its quantity will adjust so as to keep the value of money (in terms of the standard) constant. If the price of the standard is not fixed (i.e. the external and/or internal convertibility of the currency into gold is suspended), the quantity of money is no longer self-adjusting and the concept of a “natural” level becomes meaningless. In those cases where the quantity of money did not adjust to its “natural” level, the “uniform-

19 "... the demand for circulating medium is subject to continual fluctuations, proceeding from an increase or decrease in the amount of capital and commerce; from a greater or less facility which at one period may be afforded to payments by a varying degree of confidence and credit; and [...] the same commerce and payments may require very different amounts of circulating medium." (Ricardo Works III, 247) "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." (Ricardo Works IV, 64).

20 Ricardo Works I, 92.

From the equilibrium condition, $M^s = M^p$, a unique relation is established between the prices of commodities, $P$, the stock of gold held for monetary purposes (and hence with the quantity of money) $G_m$, and the purchasing power of gold in terms of commodities, $p_m/P$:

$$G_m = \frac{kPY}{\delta p_m}$$

When gold can be freely exported and imported, the equilibrium quantity of gold is determined by the further condition that equal purchasing power in terms of commodities is attained by gold at home and abroad:

$$\frac{p_m}{P} = \frac{p_m^*}{P^*}$$

The equilibrium quantity of gold (and hence of money) is made self-adjusting by response to either a change in the relative price levels (pricespecie-flow mechanism) or in the demand for money (monetary approach)\(^{24}\).

In the price-specie-flow, gold outflows are the effect of a negative balance of trade, when exports decrease and imports increase in response to a rise in the domestic relative to the foreign prices. The outflow of gold, by reducing the quantity of money at home and increasing it abroad, provides the adjusting mechanism. Gold movements come to a halt when the purchasing power parity of gold in terms of commodities is attained at home and abroad\(^{27}\).

The monetary approach denies that prices of international traded commodities may diverge, since they are determined in a world market where the law of one price prevails. Gold movements respond not to a disequilibrium in the balance of trade, but to a disequilibrium in the money market. If there is an excess of demand for money (relatively to the domestic supply), individual will turn directly to the foreign markets

\(^{22}\) Ricardo Works IV, 69.

\(^{23}\) Ricardo Works III, 139.

\(^{24}\) "In the present state of the law [Bank of England's notes were no longer convertible into gold at an official price] they [Banks directors] have the power, without any control whatsoever, of increasing or reducing the circulation in any degree they may think proper: a power which should neither be entrusted to the State itself, nor to any body in it; as there can be no security for the uniformity in the value of the currency, when its augmentation or diminution depends solely on the will of the issuers." (Ricardo Works I, 359). A currency without a standard, according to Ricardo, "it would be exposed to all the fluctuations to which the ignorance or the interests of the issuers might subject it." (Ricardo Works IV, 59).

\(^{25}\) As in most Gold Standard models, see Marcuzzo/Rosselli 1991.

\(^{26}\) There is no agreement in the literature as to what the actual mechanism was behind gold movements. See Bordo/Schwartz 1984.

\(^{27}\) McKinnon's claims (1988 and 1993, 11), that during the pre-First World war period (1879-1913) the prices of tradable commodities were "aligned internationally" and that purchasing power parity across national currencies (measured by wholesale price indexes) "generally prevailed", seem a bit far fetched.
to sell goods and assets until the equality of demand and supply of money is established. In the monetary approach the equality of the purchasing power of gold in terms of commodities is the presupposition rather than the outcome of the adjustment process. Both theories rely on an equilibrium quantity of money (hence gold) to study the self-adjusting property of the system.

On the contrary, the "natural" level associates the quantity of money not to an equilibrium quantity of gold and a constant relative value of gold in terms of commodities, but to the equality of the purchasing power of gold relative to the currency at home and abroad. This means that relative value of gold in terms of commodities may differ across countries. Furthermore the enforcement of the law of one (international) price is required only for gold, not for all tradable commodities as is implied by the purchasing power parity condition.

By comparison, Ricardo’s theory appears more reasonable as a description of the working of actual markets, and perhaps more in accordance with facts.


29 This was clearly stated by Ricardo in a letter to James Mill in 1811: “You say [...] 'the value of the precious metals throughout the globe is uniform', or rather 'the only difference which can exist is the difference constituted by the expense of carriage'. I should have agreed with you if you had said 'price' instead of 'value'. If a bill on London for £ 100 will sell in Hamburg for £ 98 [...] then I should say that the price of bullion differed 2 pc in the two countries. But when we speak of the value of bullion we mean a very different thing - we mean, I apprehend, to measure it by some other commodity - corn, coffee, hardware or any amongst the thousands of commodities which may be exported. Estimated in either of these commodities money or bullion may differ in value in any two countries, not only all the expenses attending its exportation, but also all the expenses attending the importation of the commodity to be given in exchange for it.” (Ricardo Works VI, 54-55).

30 Ricardo was convinced that the international price of gold - translated into domestic moneys through the exchange rate - could be equalised across countries because the gold market, unlike most commodity markets, was highly organised, official prices were quoted and well known and therefore arbitrage could be enforced (Ricardo Works III, 81, VI, 54-5).

David Ricardo and the “Natural” Level of the Quantity of Money

Literature


