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Notes on Ricardo's Theory of Value and Taxation*

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ABSTRACT

The purpose of this paper is twofold: on the one hand is to discuss Ricardo's version of the labour theory of value; and on the other hand, is to analyse some crucial aspects of Ricardo's theory of taxation as an extension and further elaboration of his theory of value. This discussion is illustrated with the use of a formal model based on a generalisation of Ricardo's numerical examples. The claim that the paper raises is that Ricardo's analysis of taxation is a kind of a comparative statics exercise, where the real wage, the state of technology and the level of output are taken as givens. Furthermore, it is shown that Ricardo's claim that money's role in the presence of taxation of profits is not neutral becomes questionable, when various feedback effects are accounted for.

Key Words: Classical economists, Taxation, Theory of Value, Distribution

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1. Introduction

The purpose of this paper is twofold: on the one hand is to discuss Ricardo's version of the labour theory of value as an interpretation of relative prices through relative labour times expended in production; and on the other hand, is to analyse some crucial aspects of Ricardo's theory of taxation as an extension and further elaboration of his labour theory of value. The interest in these two questions stems from the view that Ricardo's theory of value is usually misrepresented in the literature for a variety of reasons (Stigler, 1958). From these reasons the most important is that most economists instead of studying Ricardo separately they tend to read in his writings their version of the theory of value. For example, Marshall (1820) or S. Hollander's (1985) reading of Ricardo is really a way to attribute to him the neoclassical partial or general equilibrium framework, respectively. Most of the neoricardians (the modern followers of Ricardo's approach) focus on those sections of the *Principles* that refer to the invariable measure of value and usually make the connection with Sraffa's standard commodity, and Ricardo's theory of value is treated as a cost of production theory (Steedman, 1982). Marxists, usually attribute to Ricardo a theory of value similar to Marx's and then they try to find inconsistencies. A careful reading of the *Principles*, however, reveals that the usage of word value in Ricardo has entirely different meaning from Marx's usage of the same word (Tsoulfidis, 1999). Turning to Ricardo's theory of taxation we observe that it has received much less attention than his theory of value. For example, most of Ricardo's commentators restrict their investigation in summarizing Ricardo's chapters without discussing either their connection to the theory of value or to their relevance today (*inter alia*, Shoup, 1960; Carr *et al.* 1982; Eagly, 1983).

The remainder of the paper is organized as follows: the next section refers to Ricardo's theory of value, where it is argued that this theory is general enough so as to take into account the inter-industry differences in capital-labour ratios, turnover times and changes in the distributive variables. The effects that these variables exert on relative prices are minor, when they are compared to the principle cause of variation in relative prices, that is, relative labour times. These results are shown with the use of a formal model based on a generalisation of Ricardo's numerical examples. In the third section we continue with the question of taxation as is presented in the *Principles*. The focus,

however, lays on some specific aspects of two types of taxation, on wages and on profits. The claim that the paper raises is that Ricardo's analysis of taxation is a kind of comparative statics exercise, where the data of the analysis, that is, the real wage, the state of technology as well as the level of output are taken as given. Furthermore, it is shown that Ricardo's principle that money's role in the economy in the presence of taxation of profits is no longer neutral becomes questionable, when various feedback effects are accounted for. In the final section we make some concluding comments.

2. Ricardo's Theory of Value

Ricardo argues that the principle according to which the exchange ratios of products are regulated by relative labour times expended in their production is correct not only in "the rude and early stage of society" but also in capitalism. The difference is that in capitalism the previously correctly stated labour theory of relative prices needs several qualifications and modifications. These modifications relate to the presence of factors such as capital-labour ratios, changes in income distribution, *etc.* Ricardo's fundamental thesis, however, is that the relative prices of products, subject to reproduction, are determined by the relative quantity of labour expended on their production. The quality of the expended labour is independent of the subjective evaluations of individual producers; this is an issue that is resolved through the market mechanism. Moreover, Ricardo argued that not only direct labour expended in production determines the value of the product but also the indirect labour. He notes: "Not only the labour applied immediately to commodities affect their value, but also the labour which is bestowed on the implements, tools, and buildings, with such labour is assisted" (Ricardo, 1951a, p. 23). In other words, the exchange ratios of commodities are determined by their respective labour times and that fixed capital only transfers its exchange value gradually through its depreciation.¹

¹ "Suppose [Ricardo notes] that the same quantity of labour was necessary to make both weapons, but they were of very unequal durability; of the durable implement only a small portion of its value would be transferred to the commodity" (Ricardo, 1951a, p. 23). However, in the numerical examples that follow Ricardo assumes, for simplicity purposes, that fixed capital does not depreciate.

2.1 Modifications due to unequal capital-labour ratio

Let us now focus on Ricardo's thesis when it is applied to fully-fledged capitalism where: "The principle that the quantity of labour bestowed on the production of commodities regulates their relative value, considerably modified by the employment of machinery and other fixed capital" (Ricardo, 1951a, p. 30). Ricardo argues that capital is transferred wholly or partly (through depreciation) into the final product, and the owner of capital gets a profit. Under these circumstances he notes that the presence of capital and of the rate of profit affect the exchange ratio of commodities only marginally. For this purpose he constructs a numerical example of two trades, the first producing cotton and the second corn; each of the trades employs the same quantity of labour, a hundred men at a wage rate of £50 per year. He further supposes that the cotton trade uses a machine worth of £5,500 while the corn trade uses only direct labour. The rate of profit (r) is assumed at 10%. Thus, we can construct the following Table:

Table 1. *Ricardo's numerical example*

	K	$W = wL$	K/W	$\Pi = r(K + wL)$	$P = W + \Pi$
Cotton industry:	£5,500	£5,000	1.1	£1,050	£6,050
Corn industry:	0	£5,000	0	£500	£5,500

Where K is the value of the machine (indirect labour), w the wage rate which multiplied by the employment L gives the wage bill $W=wL$, Π is the amount of profit, P_{ct} and P_{cn} are the prices of cotton and corn trades, respectively. From the above Table we get that the relative prices or exchange values of commodities $P_{ct}/P_{cn} = £6,050 / £5,500 = 1.10$ are close to relative direct labour times $L_{ct} / L_{cn} = 100/100 = 1$. The deviation stems from the differences in the K/W ratios.

The following price equations can be formed on the basis of the above numerical example: $P_{ct} = W + r(W + K)$ and $P_{cn} = W + rW$ and the relative prices will be:

$$\frac{P_{ct}}{P_{cn}} = \frac{wL_{ct} + r(wL_{ct} + K_{ct})}{wL_{cn} + rwL_{cn}} = \frac{L_{ct} \left[1 + r \left(1 + \frac{K_{ct}}{wL_{ct}} \right) \right]}{L_{cn} (1 + r)}$$

Thus, the relative prices of production are affected by the presence of capital and rate of profit, but only in a limited way. Ricardo's example is reasonable, since he demonstrates his thesis on unfavourable to his proposition grounds. For example, instead of taking the two trades having K/W ratios close to each other, he demonstrates that the difference between relative prices and labour times is still relatively small, when it is compared to the K/W differences. He examines a reasonable case, where the cotton trade uses accumulated labour yielding a positive capital-wage bill ratio ($K/W=1.1$ or $K/L=5.500/100=55$) and the corn trade with no accumulated labour yielding a zero capital-wage bill (or capital-labour) ratio, and he demonstrates that the effect on relative prices is not only limited but also predicted. More specifically, the effect on relative prices is proportional to the differences in capital-wage bill ratios of the two trades. It is important to point out that the rate of profit exerts an influence on relative prices but this diminishes with the passage of time because of the long-run falling tendency of the rate of profit.²

Ricardo's example can be straightforwardly generalised. Suppose two different industries i and j with different amounts of accumulated capital (K_i and K_j) and wages (wL_i and wL_j), we get:

$$\frac{P_i}{P_j} = \frac{wL_i + r(wL_i + K_i)}{wL_j + r(wL_j + K_j)} = \left[\frac{L_i}{L_j} \right] \left[\frac{1 + r \left(1 + \frac{K_i}{wL_i} \right)}{1 + r \left(1 + \frac{K_j}{wL_j} \right)} \right]$$

Clearly, if there are any differences between relative prices and relative labour times these differences depend on the capital-wage bill ratios as follows:

$$\text{sign} \left(\frac{P_i}{P_j} - \frac{L_i}{L_j} \right) = \text{sign} \left(\frac{K_i}{wL_i} - \frac{K_j}{wL_j} \right)$$

² Thus, the effect of different capital-labour ratios on relative prices is secondary, whereas the labour expended is the principal term exerting most of the influence.

2.2 Modifications due to changes in distribution

Ricardo continues his analysis by examining the effects of a change in the distributive variables on relative prices. In so doing, Ricardo shows first that his theory of value remains valid; and second he discredits Smith's cost of production theory of value. Let us suppose that wages rise across sectors and further suppose that the capital-wage bill ratio is the same it follows that profits fall proportionally across sectors in the economy and there is no reason for relative prices to change. However, in the usual case that the capital intensity differs between sectors an increase in wage diminishes profits disproportionately between industries. Labour-intensive industries will suffer (all else equal) a proportionally higher reduction in their rate of profit; the converse will be true for the capital-intensive industries. Ricardo argues that the existence of unequal rates of profit without the tendency for equalisation is a disequilibrium situation that cannot last for long. Thus, the reestablishment of a uniform (average) rate of profit across sectors can only come about through changes in relative prices. In the labour-intensive industries prices have to rise so as to raise the rate of profit to the point that it is equalized to the new lower uniform rate of profit. In the capital-intensive industries, prices have to fall to the point where their rate of profit becomes equal to the (lower) average one. Thus, individual prices fluctuate due to changes in distribution in a systematic way but for the average price level there is no reason to change. This is a remarkable result to support in a period where Smith's cost of production theory of value was dominant.

In terms of the numerical example of Table 1, Ricardo argues that a rising wage results in a fall in the “usual rate of profit”. Hence, P_{cn} will remain the same, since we only have redistribution between wages and profit and their sum must be the same. In the case of P_{ct} the manufacturer estimates a profit of his machine equal to 9% instead of 10%. The final price, therefore, will be $P_{ct}=\pounds 5,995$, and $P_{ct}/P_{cn}=1.09$. We observe, firstly that a fall in the rate of profit by only 1% made the relative prices of production to come even closer to their respective labour times. Secondly, a significant reduction in profits by $\pounds 155$ (10% of profits) leads to a change in relative prices by only 1%. Ricardo, after a kind of sensitivity analysis, concludes: “The greater effects which could be produced on the relative prices of these goods from a rise of wages, could not exceed 6 or 7 per cent.; for profits could not, probably, under any circumstances, admit of a greater general and

permanent depression than to that amount” (Ricardo, 1951a, p. 36). If we differentiate the relative prices with respect to the rate of profit and also take into account that $w=w(r)$ and $w' < 0$ and $dK/dr=0$, we get:

$$\begin{aligned} \frac{d}{dr} \left(\frac{P_i}{P_j} \right) &= \frac{d}{dr} \left[\frac{wL_i + r(wL_i + K_i)}{wL_j + r(wL_j + K_j)} \right] \\ &= \frac{\frac{dw}{dr} L_i r K_j + K_i w L_j + r^2 \frac{dw}{dr} L_i K_j - w L_i K_j - r K \frac{dw}{dr} L_j - r^2 K_i \frac{dw}{dr} L_j}{(wL_j + r w L_j + r K_j)^2} \\ &= \left(r \frac{dw}{dr} - w + r^2 \frac{dw}{dr} \right) \frac{L_i K_j - K_i L_j}{(wL_j + r w L_j + r K_j)^2} \end{aligned}$$

Since, the first term is always negative and the denominator of the second term is always positive, it follows that the sign of the above derivative depends exclusively on the term $L_i K_j - K_i L_j$. Specifically, we have:

$$\text{sign} \left[\frac{d}{dr} \left(\frac{P_i}{P_j} \right) \right] = \text{sign} (L_i K_j - L_j K_i) = \text{sign} \left(\frac{K_j}{L_j} - \frac{K_i}{L_i} \right) L_i L_j.$$

3. Ricardo's Theory of Taxation

The formulation of the theory of value was absolutely necessary for Ricardo to develop his theory of taxation. As it is customary for his approach, he always starts with Adam Smith’s views and after a short discussion he either approves or he modifies them. The modifications come mainly from the strict application of the theory of value. Ricardo devoted fourteen chapters (more than one-third) of his *Principles* to the question of taxation, nevertheless this part of the book was easy to complete in a relatively short period of time, precisely because the chapters on taxation were an exercise and further elaboration of the theory of value. It is interesting to note that Ricardo in his analysis performs what today is called a comparative statics exercise. That is, he examined one equilibrium situation with the one that the economy would gravitate towards, when some

of its elements changed. Such situations arise especially in the chapters of taxation, when the introduction of taxes leads to another equilibrium position with the technology, the real wage and the level of output remaining the same (Garegniani, 1984). So differences arise because of changes in the profit rate and the growth rate. Ricardo is explicit about that when he states, “there are no taxes that do not lessen the capacity to accumulate”. From his analysis of taxation we will focus on taxation of wages and profits.

3.1 Taxes on Wages

Ricardo's theory of the incidence of a tax on wages is based for the most part on his distinction between natural and money wages, which are related to each other in a shape analogous to the natural and market prices. His theory of natural wages led Ricardo to the proposition that a tax on wages is equivalent to a tax on the workers' socially given necessities. This view is in accordance—although for different reasons—with Smith's proposition that wages cannot be taxed, since workers always recoup the tax by increasing proportionally their money wages.³ Beyond this, however, their opinions are markedly different; since for Smith a tax on wages increases not only the money wage but also the price of the product, which in turn leads to another increment of money wages, and so on.

By way of contrast, Ricardo criticized Adam Smith's argument on its own grounds characterising it as “absurd”, since “this rise in the price of goods will again operate on wages, and the action and reaction first of wages on goods, and then of goods on wages, will be extended without assignable limits” (Ricardo, 1951a, p.225). More so, he rejected the possibility of such a spiral process in the first place since any increase in wages reduces profits, and thereby, changes relative prices without necessarily affecting the general price level. He notes that a “tax on wages will raise wages, and therefore will diminish the rate of the profits of stock [...] The ultimate effects which would result from such taxes then, are precisely the same as those which result from a direct tax on profits” (Ricardo, 1951a, p.215).

Ricardo's analysis of a wage tax relates to the principle of “equal profitability” among industries and to the manner in which this principle is modified to account for different

³ For a fuller discussion see Tsoulfidis (2010, chs. 3 and 4).

capital–labour ratios. If these ratios are the same across industries it follows that the post wage-tax average rate of profit will be the same (although lower) for all industries. Therefore, relative prices will remain the same. This is the case that Eagly addresses, when he states, “in the case of a tax on wages, relative prices remain unchanged. The general rate of profit declines, thereby occasioning all capitalists to share in the tax burden” (Eagly, 1983, p. 224).

If, however, capital and labour are in different proportions, the increase in wages will result in unequal rates of profit. Labour-intensive industries will suffer a proportionally higher reduction in their rate of profit; whereas, the converse will be true for the capital-intensive industries. The unequal rates of profit cannot persist and sooner or later prices of the labour-intensive industries will rise to compensate for the higher reduction in their profits, whereas the opposite process takes place in capital-intensive industries. It is important to note that this process does not necessarily imply an increase in the price level or a Smithian wage-tax-price spiral process. Ricardo’s result can be derived formally, for this purpose we take into account that an increase in the money wage affects the rate of profit in the opposite direction, $r=r(w)$ and $r'<0$. In the two industries example above we have:

$$\begin{aligned} \frac{d}{dw} \left(\frac{P_i}{P_j} \right) &= \frac{d}{dw} \left[\frac{wL_i + r(wL_i + K_i)}{wL_j + r(wL_j + K_j)} \right] \\ &= \left[\frac{L_i + \frac{dr}{dw}(wL_i + K_i) + rL_i}{wL_j + r(wL_j + K_j)} \right] - \frac{[wL_i + r(wL_i + K_i)]}{[wL_j + r(wL_j + K_j)]^2} \left[L_j + \frac{dr}{dw}(wL_j + K_j + rL_j) \right] \\ &= \left(r + r^2 - \frac{dr}{dw} w \right) \left[\frac{L_i K_j - L_j K_i}{(wL_j + r w L_j + r K_j)^2} \right]. \end{aligned}$$

The sign of the derivative depends on the term:

$$\text{sign}(L_i K_j - L_j K_i) = \text{sign}\left(\frac{L_i K_j - L_j K_i}{L_i L_j}\right) = \text{sign}\left(\frac{K_j}{L_j} - \frac{K_i}{L_i}\right)$$

It goes without saying that if the capital-labour ratio is the same between the two sectors there is no change in the relative prices if money wage increase and the relative price of industry i decreases if its capital-labour ratio exceeds that of industry j and of course the relative price of i will increase if its capital-labour ratio is lower than that of industry j .

Ricardo supports his view for the rise in money wage by advancing a short-run argument based on the new conditions in the labour market. Specifically, he argued that if the tax revenues collected from direct taxation on wages are spent on public works, the demand for labour will increase, and with a given supply of labour money wages will also increase. The reason for this is that the private demand for labour does not change and “the owners of capital who would have nothing to pay towards such a tax, would have the same funds for employing labour...” (Ricardo, 1951a, p.220).

Within the framework of Ricardo's short-run argument, however, there is the possibility that higher money wages will reduce the rate of profit, and thereby diminish capitalists' “passion to accumulate”. Thus, in the next rounds, the demand for labour will decline depressing the money wage, and society as a whole, not only workers, will suffer from the tax on wages. Ricardo, nevertheless, referred to the theoretical possibility that real wages can indeed be taxed. For instance, if the supply of labour is not fixed, the additional employment might come from the unemployed, and therefore the above process might not work itself out. Moreover, if the government revenues derived from taxes on wages are not spent on public works within the country, but are paid “as a subsidy to a foreign state, and if therefore these funds were devoted to the maintenance of foreign, and not of English labourers, [...] then indeed, there would be a diminished demand for labour, and wages might not increase, although they were taxed” (Ricardo, 1951a, p.221).

The majority of modern economists are uncomfortable with Ricardo's idea for the flexibility of money wage that leads to a real wage fixed at the customary standard of living of workers. However, on closer examination, this idea becomes stronger than is usually thought. The following considerations can be used in favour of a theorization of a

constant real wage in Ricardo's sense.⁴ First, employers are willing to offer a real wage that enables workers to acquire the customary standard of living and also perform well in their jobs (the efficiency wage hypothesis). Second, unions in their collective bargaining with the employers demand wage increases that secure the customary standard of living. The increase in money wages more or less at the same rate with the price level indicates that the real wage is characterised by rigidity.

3.2 Taxes on Profits

In chapter XV of the *Principles*, Ricardo addressed the question of a partial as well as of a general profit tax. He discussed two different circumstances that give rise to different outcomes regarding the rate of profit and the relative prices of commodities. The first refers to the case where gold—the commodity used as money—is produced inside the country. Here, Ricardo argued that a tax on profits of one industry will increase the price of the commodity, “for the trader will either quit his employment, or remunerate himself for the tax” (Ricardo, 1951a, p.206). Ricardo's reasoning is that the partial tax will drive the after-tax rate of profit of the industry to a level lower than the average; and by the virtue of a fixed rate of profit, would lead capitalists to charge a price higher by the amount of tax.⁵ Summarising his position, he notes: “Every new tax becomes a new charge on production and raises natural price. A portion of the labour of the country which was before at the disposal of the contributor to the tax, is placed at the disposal of the state, and cannot therefore be employed productively” (Ricardo, 1951a, p.185).

According to Ricardo a uniform tax on profits of all industries but gold will raise all prices disproportionately. This is equivalent to the proposition that if gold is produced domestically and the gold industry remains untaxed, then a tax on profits is not neutral with respect to relative prices. Although the mechanism leading to higher prices is not explicitly discussed in the *Principles*, some hints can be found in Ricardo's correspondence to his colleague Hutches Trower, where he argues that this process is based on the developments taking place in the gold industry: “The miners business would

⁴ The new Keynesian literature provides much more theoretical justification and empirical evidence lending support to the view of rigidity in real wages.

⁵ Ricardo assumes that the demand for the taxed product remains the same (‘unabated demand’), regardless of its higher price.

be more profitable than any other, and consequently would draw capital to that concern” (Ricardo, 1951b, p. 153). Consequently, the price of gold would be reduced to the level where the gold industry would make the average rate of profit. The general level of prices would tend to increase since gold in Ricardo’s theory of money serves as the numéraire commodity.⁶

By contrast, if the value of money alters in the same proportion as of all other commodities, that is to say, gold mines are also taxed by the same rate, the above process of price adjustments does not work itself out, since the otherwise higher price level is not supported by an additional supply of money. Ricardo summarises his views by noting “If a tax in proportion to profits were laid on all trades, every commodity will be raised in price. But if the mine which supplied us with the standard of our money, were in this country, and the profits of the miner were also taxed, the price of no commodity would rise, each man would give an equal proportion of his income and everything would be as before” (Ricardo, 1951a, pp.205-206).

Ricardo used the following numerical example to prove his proposition that when money is produced inside the country and remains untaxed, the rise in prices would be disproportionate in the different industries, that is to say, relative prices would change. Ricardo constructs a numerical example where he assumes two industries I and II that employ the same capital advanced equal to £10,000 but in different proportions of fixed K and circulating capital, which in Ricardo consists of wages W . Let Π be the total profits and let r be the given rate of profit equal to 20% in Ricardo’s example. Similarly, let T be the tax receipts and t the given tax rate on profits equal to 10%. Furthermore, let P be the price of a product before tax, P' the after tax price and finally, P^* the normalised post-tax price, that is, the ratio of each price to the sum of prices. In symbolic terms the pre-tax price for each trade can be written as: $P = W + r (K + W)$ and the post-profit tax price $P' = W + (1 + t) r (K + W)$. The above illustration can be summarised in terms of Table 2 below:

⁶ Gold production is treated as luxury production and therefore in a Sraffian sense non-basic. Thus, like any other tax on non-basic commodities, it does not affect the equilibrium variables of the system. Specifically, Ricardo notes: “Upon that portion which was used for money, through a large tax might be received, wholly would pay it. This is a quality peculiar to money.” (Ricardo, 1951a, p. 241)

Table 2. *Changes in Absolute and Relative Prices From a Uniform Tax on Profits*

	<i>K</i>	<i>W</i>	<i>II</i>	<i>P</i>	Tax	<i>P'</i>	<i>P*</i>
Before Tax							
I	8,000	2,000	2,000	4,000	0	4,000	0.2857
II	2,000	8,000	2,000	10,000	0	10,000	0.7142
After Tax							
I	8,000	2,000	2,000	4,000	200	4,200	0.2916
II	2,000	8,000	2,000	10,000	200	10,200	0.7083
First Round Effects							
I	8,228.6	2,057.2	1,942.8	4,000	194.3	4,194.3	0.2918
II	2,057.2	8,228.6	1,771.4	10,000	177.1	10,177.1	0.7082
Second Round Effects							
I	8,228.6	2,057.2	1,857.1	3,914.3	185.7	4,100	0.2852
II	2,057.2	8,228.6	1,857.1	10,085.7	185.7	10,271.4	0.7147
...							
Final Round Effects							
I	8,213.3	2,053.3	1,866.6	3,920.3	186.6	4,106.6	0.2857
II	2,053.3	8,213.3	1,866.6	10,079.9	186.6	10,266.7	0.7142

It is important to emphasise that the absolute and relative prices are not the final equilibrium post-tax prices. These are only transitory or first step prices, which Ricardo treated as if they were the final equilibrium prices. He notes that he was led “to the understanding of a very important principle, which, I [Ricardo] believe, has never been adverted to” (Ricardo, 1951a, p. 208). The principle is summarised as follows: “If a country were not taxed, and money should fall in value, its abundance in every market would produce similar effects in each [...] But this is no longer true when any of these commodities is taxed: if in that case they should all rise in proportion to the fall in the

value of money, profits would be raised above the general level, and capital would be removed from one employment to another, till an equilibrium of profits was restored, which could only be, after the relative prices were altered” (Ricardo, 1951a, pp. 209). We observe that in this particular case (tax on profits and money is produced domestically) Ricardo ruled out the possibility of the neutrality of money.

However, Ricardo’s analysis is restricted to the effects of a profit tax only for the first round effects and it is unclear whether the resulting higher prices will persist, or the whole numerical model leads to an endless profit–tax–price spiral process. There is no doubt that Ricardo was aware of the feedback effects; nevertheless he did not trace the final solution of his numerical illustration. It seems that he anticipated a favourable outcome for “his principle”, as this can be judged by his correspondence to his friend Trower. From the exchange of letters we see that Trower expressed scepticism about the validity of the “principle”, while Ricardo sought to clarify his position by offering the following final evaluation: “This is the opinion which I wished to express, whether it be a correct one is another question. On the hasty consideration which I can now give it I see no reason to doubt it.” (Ricardo, vol. VIII, 1951b, p.154)

If we take into account the feedback effects it can be shown that in the next rounds, the owners of capital in trades I and II—with given the stage of technology and the level of the real wage—would have the same funds to employ the same but appreciated capital advanced. With regard to this issue Shoup (1960, p. 103 and 127) refers also to the feedback effects, which are left out in Ricardo’s analysis. However, Shoup’s discussion is not in the spirit of Ricardo’s *Principles*, for he does not consider the mechanism of reduction in the profits and the concomitant price twisting effect. Other important commentators, such as Gonner (1925) in his edition of Ricardo’s *Principles* and St. Clair (1965, ch. 16) concentrate on the effects of taxation if money rose in value. In so doing, however, these authors do not confront Ricardo’s example that refers to a general profit tax imposed on all trades, except those producing the monetary metal. In this case Ricardo argued that not only the level but also the structure of prices changes.

In what follows we show that by taking feedback effects into account, the “very important principle, which, [...] has never been adverted to” (Ricardo, 1951a, p.208) does not necessarily hold. By referring to the above example, let us suppose that the tax

rate remains 10%, whereas the fixed capital and wages vary proportionally to the average price level because the owners of capital, in order to produce a unit of product, employ fixed and circulating capital evaluated at the new price level. It is worth noting that the mechanism for the increase in money wages might be the same as that in the chapter on the taxes on wages. Its operation is ascertained by the fact that the owners of capital —by initially charging a price that establishes a uniform rate of profit— have the same funds to compete with the government over the same pool of labourers. Consequently, in the next rounds, profits fall by the same amount that wages increase a result consistent with Ricardo’s views on income distribution. If, for example, profits and the rate of profit did not vary inversely with wages, the whole system would be trapped in a profit–tax–spiral process. We observe that the resulting rates of profit of the two “concerns” are unequal; the first makes a rate of profit of 18.89%; the second, a rate of profit 17.22%. Because this inequality in the inter-industry rates of profit without their tendential equalisation is inconsistent with the nature of capitalism. The necessary re-establishment of the new average rate of profit requires a change in the relative prices.⁷ The price of the first “concern” must fall, whereas the price of the second “concern” must increase, until both again secure the same average rate of profit. The new price level is lower, and when it is again fed back to the capital advanced we arrive at the results of the second round. By iterating the previously outlined procedure, *i.e.*, by re-evaluating the capital advanced in terms of the resulting lower or higher price level, and by taking into account the difference in the rates of profit, we arrive at the last rows in Table 2, which gives the final results. Hence, the price level does not change with respect to the previous price level and the rates of profit are equal, meaning that there cannot be additional feedback effects.

Therefore, we finish with the pre-tax relative prices, 0.2857 and 0.7142 for trades I, and II respectively. That absolute prices in the after tax situation are higher is totally immaterial to the owners of capital, who must lay out more money to set in motion the same productive forces and thereby to produce the same amount of output. Hence, Ricardo is correct when he writes to Trower “as a political economist I say that there is no tax which has not a tendency to diminish production” (Ricardo 1951b, p.154) because a lower rate of profit will eventually lead to a lower accumulation rate. His principle,

⁷ Hence, we assume that capital (fixed and circulating) is appreciating or depreciating in a uniform way.

however, that a uniform tax on profits will change the relative prices of commodities, when gold is produced inside the country and remains untaxed is untenable. In fact, in terms of Ricardo's numerical example, we showed that when the various feed-back effects are accounted for we derive the pre-tax relative prices. Our analysis is at variance with the usual interpretations of Ricardo's commentators. For example, Carr and Ahiakpor (1982) limit their analysis to the first round effects of profit taxation and accept Ricardo's principle of the non-neutrality of money in a world with taxes.

Thus far we considered taxes on profits, when the money commodity is produced within the country. However, when gold is imported Ricardo argued that any rise in prices could only be ephemeral, since it would lead to a trade deficit, and the outflow of money would reduce the price level to the pre-tax one. He notes: "a well regulated tax on profits, would ultimately restore commodities both of home and foreign manufacture, to the same money price which they bore before the tax was imposed" (Ricardo, 1951a, p. 214). Consequently, a tax on profits will not be borne by the consumers but by the producers. Hence, Ricardo shows that although a general tax on profits is not monetary neutral, money is neutral in the context of its effects on the structure of prices.

4. Concluding Remarks

So far we have shown that the unequal composition of capital and changes in the income distribution affect only marginally and in a predictable way the relative (natural) prices. In Ricardo the labour time is the primary regulator of natural prices, which in turn are the centre of gravity of market prices. For example, Ricardo notes: "all the great variations which take place in the relative value of commodities to be produced by the greater or less quantity of labour which may be required from time to time to produce them"(Ricardo, 1951a, pp. 36-37). Ricardo considers taxes on wages and basic commodities as a cause for the diminution of the rate of profit. Both increase the money wage directly or indirectly and, therefore, lower the rate of profit.

Ricardo's analysis is not confined to the microeconomic effects of the tax but also includes the macroeconomic consequences from the government's activities. This is an aspect that distinguishes Ricardo from other economists of his time such as McCulloch, Buchanan and Say, for neglecting the effects that arise from the government's demand for

labour. This negligence is still present in the modern theories of tax incidence, since the standard treatments of differential or balanced budget incidence both evade the difficulties associated with the question of demand emanating from state's expenditures.

It is now important to stress that Ricardo's principles of taxation are directly derived from his theory of value and distribution and in particular from the idea of a real wage is fixed at a level which allows for the normal reproduction of the labouring class; the given stage of technology and the output level. In addition competition assures the tendential equalisation of the rate of profit between industries. Ricardo's principles on taxation depend crucially on two other assumptions, that is, his theory of zero rent on marginal land and his version of the quantity theory of money.

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