When Ricardo saw profit, he called it rent: on the vice of parochial realism

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When Ricardo Saw Profit, He Called it Rent: On the Vice of Parochial Realism

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Abstract

According to Ricardo the principal problem in Political Economy is to determine the laws which regulate the distribution of profits, rents, and wages. Ricardo determined the respective shares in real terms and to this end invented an engine of analysis that became paradigmatic. The present paper applies a consistent real and monetary analysis, which is based on a set of objective structural axioms, and contrasts the results with Ricardo's approach. The general result is that real analysis misses economic reality. The specific result is that rent is a misnomer for the distributed profit of the land owning firm.

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> Then there are *axioms* (everyone maximizes his profits; resource allocation is the only economic problem): these are not known in other sciences. An axiom ... is only a premise one is not allowed to question, dressed up as something grand. But it is precisely the scientists duty to question everything! Our crime is not that we use *a priori* reasoning, for often we can use nothing else, but that we push the *a priori* all the way up to the axiom. "Axiom" is, of course, a polite but impressive-sounding word for a "sacred proposition." The concept gives us the impression that it is worthwhile to erect vast superstructures of deduction on virtually no fact, and this has now become a deep-rooted tradition. ... These, then (abstractions, parsimony, axioms, economic determinacy) surely are the "Ricardian Vices" to which we are all heirs; it is these that divert and corrupt our energies. (Wiles, 1979, pp. 163-164), original emphasis

Among plenty of wish-wash this is a definite answer to the question: What went wrong with economics? and, above all, to: Who is to blame? But rounding up the culprit does not put an end to all issues: How was it done and how could it happen that this evil spirit, Ricardo, 'conquered England as completely as the Holy Inquisition conquered Spain' (Keynes, quoted in Deane, 1978, p. 75)?

> On the other hand, if economics is essentially an engine of analysis, a method of thinking rather than a body of substantive results, Ricardo literally invented the technique of economics. ... His gift for heroic abstractions produced one of the most impressive models, judged by its scope and practical import, in the entire history of economic theory: seizing hold of a wide range of significant problems with a simple analytical model involving only a few strategic variables, he produced dramatic conclusions oriented to policy action. In short he was the first to master that art that brought success to Keynes in our own day. Not everyone will consider this praiseworthy. Even Schumpeter calls Ricardo's habit of applying severely simplified abstractions to the solution of practical problems 'the Ricardian Vice'. And to the Historical School and the American Institutionalists, Ricardo has always stood for everything they detest in orthodox economics. (Blaug, 1998, p. 132-133)

Neither the Historical School, nor the American Institutionalist, nor their modern heterodox incarnations, though, ever came up with a convincing alternative. Wedded to plane empiricism, the inductive method and *Verstehen*, they got lost in the ever changing tides of surface phenomena. Insisting on the stale polarity of realism vs. abstraction this could not be otherwise.

> Since, therefore, it is vain to hope that truth can be arrived at, either in Political Economy or in any other department of the social science,

> while we look at the facts in the concrete, clothed in all the complexity with which nature has surrounded them, and endeavour to elicit a general law by a process of induction from a comparison of details; there remains no other method than the *à priori* one, or that of "abstract speculation." (Mill, 2004, pp. 113-114)

With abstract speculation Mill meant the axiomatic method.

> In political economy, Ricardo and James Mill compared the certainty of the propositions they were advancing to the certainty of the propositions of Euclid. (Halévy, 1960, p. 494)

Touching the nerve of methodology this claim was vigorously contested from the very first moment on two essentially different counts:

> A remarkable discussion has been lately going on in the revues and journals concerning the logical method of the science, touching even the question whether there exists such a science at all. Attention was drawn to the matter by Mr. T. E. Cliffe Leslie's remarkable article "On the Philosophical Method of Political Economy," in which he endeavours to dissipate the deductive science of Ricardo. Mr. W. T. Thornton's writings have a somewhat similar tendency. ... Many would be glad if the supposed science collapsed altogether, and became a matter of history, like astrology, alchemy, and the occult sciences generally. ... But as regards the fate of the deductive method, I disagree altogether with my friend Mr. Leslie; he is in favor of simple deletion; I am for thorough reform and reconstruction. (Jevons, 1911, pp. xv-xvi)

Jevons's reconstruction was taken up and elaborated on by Walras – with scant success:

> Walras approached Poincaré for his approval. ... But Poincaré was devoutly committed to applied mathematics and did not fail to notice that utility is a nonmeasurable magnitude. ... He also wondered about the premises of Walras's mathematics: It might be reasonable, as a first approximation, to regard men as completely self-interested, but the assumption of perfect foreknowledge "perhaps requires a certain reserve." (Porter, 1994, p. 154)

There have always been two answers to the Ricardian challenge: (a) the whole method is mistaken, and (b), there is nothing wrong with the method, but the foundational assumptions concerning the working of the economy are beside the point, that is, axiomatization is right but the axioms are wrong.[1]

[1] To be sure, the emotional uproar is not solely about methodology. For the socio-political background of the 'Malthus-Ricardo embroilment' see (Kanth, 1992, pp. 108-113)

> We should also like to underline Debreu's effective reference to Bacon when he says that "citius emergit veritas ex errore quam ex confusione." It would be a mistake to lower the level of analysis and clarification. The only way possible is a *thorough* reexamination of the theory's basic hypotheses, i.e., a true paradigmatic revolution. (Ingrao and Israel, 1990, p. 362) original emphasis

Each theory, orthodox and heterodox in equal measure, starts from a small set of foundational 'hypotheses or axioms or postulates or assumptions or even principles' (Schumpeter, 1994, p. 15). Standard economics rests on a set of *behavioral* axioms (Arrow and Hahn, 1991, p. v). The main thesis of the present paper is that human behavior does not yield to the axiomatic method, yet the axiomatization of the money economy's fundamental structure is feasible. The crucial point is not axiomatization *per se* but the real world content of axioms. Our objective is to make the implications of the *structural* axiom set about profit and rent explicit and to contrast them with Ricardo's approach in order to settle a time-honored methodological question.

By choosing objective structural relationships as axioms behavioral hypotheses are not ruled out. On the contrary, the structural axiom set is open to *any* behavioral assumption and not restricted to the standard optimization calculus.

We proceed as follows. The minimalistic formal frame that constitutes the pure consumption economy is set up in section 1. In section 2 the Ricardian and the structural axiomatic concepts of profit are contrasted. The consistent interrelation of the real and the monetary sphere is formally established in section 3. The differentiation between the ownership of the firm and the ownership of land is carried out in section 4 and it is shown how it gives rise to a redistribution of profits within the business sector. In section 5 the lease price is determined under the condition of profit ratio equalization. Section 6 concludes.

1 Axioms

The first three structural axioms relate to income, production, and expenditures in a period of arbitrary length. For the remainder of this inquiry the period length is conveniently assumed to be the calendar year. Simplicity demands that we have at first one world economy, one firm, and one product.

Total income of the household sector Y is the sum of wage income, i.e. the product of wage rate W and working hours L, and distributed profit, i.e. the product of dividend D and the number of shares N.

$$Y = WL + DN \quad |\mathrm{t} \tag{1}$$

Output of the business sector O is the product of productivity R and working hours.

$$O = RL \quad |\mathrm{t} \tag{2}$$

Consumption expenditures C of the household sector is the product of price P and quantity bought X.

$$C = PX \quad |\mathrm{t} \tag{3}$$

The axioms represent the pure consumption economy,[2] that is, no investment expenditures, no foreign trade, and no taxes or any other government activity.

2 Profit

The task, as defined by Ricardo, is: 'To determine the laws which regulate this distribution [of profits, rents and wages], is the principal problem in Political Economy'.

2.1 Structural axiomatic profit

The business sector's financial profit in period t is defined with (4) as the difference between the sales revenues – for the economy as a whole identical with consumption expenditures C – and costs – here identical with wage income Y_W:

$$Q_{fi} \equiv C - Y_W \quad |\mathrm{t} \tag{4}$$

In explicit form, after the substitution of (3), this definition is identical with that of the theory of the firm:

$$Q_{fi} \equiv PX - WL \quad \Leftarrow \quad Y_W \equiv WL \quad |\mathrm{t} \tag{5}$$

With (6) the expenditure ratio ρ_E, the sales ratio ρ_X, the distributed profit ratio ρ_D is added for formal convenience as:

$$\rho_E \equiv \frac{C}{Y} \qquad \rho_X \equiv \frac{X}{O} \qquad \rho_D \equiv \frac{Y_D}{Y_W} \quad \Leftarrow \quad Y_D \equiv DN \quad |\mathrm{t} \tag{6}$$

Definitions add no new content to the set of axioms but determine the logical context of concepts (Stigum, 1991, pp. 35-36). An expenditure ratio $\rho_E = 1$ indicates that total consumption expenditures are equal to total income, or, in other words, that the household sector's budget is balanced; a value of $\rho_X = 1$ of the sales ratio means that the quantities produced and sold are equal in period t or, in other words, that the product market is cleared.

[2] "Under the influence of recent mathematical fashion, some authors have developed axiomatic formulations of mechanics using set theory. But set theory is not the right mathematical tool because it is too general. Consequently, theorems and proofs in this approach are inordinately unwieldy." (Hestens, quoted in Schmiechen, 2009, p. 368)

"Thus not all axiomatic theories need to be phrased in terms of set theory but much more conveniently and intelligibly rather in terms of some advanced mathematical structures." (Schmiechen, 2009, p. 367)

Using the first axiom (1) in combination with (6) one gets from (4) the relation between financial profit and the key ratios:

$$Q_{fi} \equiv C - Y + Y_D \quad \Rightarrow \quad Q_{fi} \equiv \left(\rho_E - \frac{1}{1+\rho_D} \right) Y \quad \text{cond.} \quad \rho_X = 1 \quad |\text{t} \qquad (7)$$

In the pure consumption economy financial profit is greater than zero if the expenditure ratio ρ_E is >1 or the distributed profit ratio ρ_D is >0, or both. If distributed profit Y_D is set to zero, then profit or loss of the business sector is determined solely by the expenditure ratio. For the business sector as a whole to make a profit consumption expenditures C have in the simplest case to be greater than wage income Y_W. So that profit comes into existence in the pure consumption economy the household sector must run a deficit at least in one period. This in turn makes the inclusion of the financial sector mandatory (see 2011).

To get rid of all absolute magnitudes the profit ratio ρ_Q is defined with (8) and this gives a succinct summary of the structural interrelation of the profit ratio, the expenditure ratio, and the distributed profit ratio for the business sector as a whole:

$$\rho_Q \equiv \rho_E (1+\rho_D) - 1 \quad \Leftarrow \quad \rho_Q \equiv \frac{Q_{fi}}{Y_W} \quad |\text{t} \qquad (8)$$

The overall profit ratio is positive if the expenditure ratio ρ_E is >1 or the distributed profit ratio ρ_D is >0, or both.

The determinants of profit look essentially different depending on the perspective. For the firm price P, quantity X, wage rate W, and employment L in (5) seem to be all important; under the broader perspective of (7) these variables play no role at all. Both views are formally equivalent,

2.2 Ricardo's wheat profit

The first thing to note is that Ricardo left nominal values and money completely out of the picture. This abstraction together with the assumption of decreasing returns on the combined input of labor and capital without further ado delivers the distribution of the period output of wheat:

> The difference between the net wheat product per worker on the least fertile land and the constant wheat wage per worker goes to the tenant farmer as profit. Owing to the action of competition, the advantages of working superior land go entirely to the landowner in the form of ever increasing rents. As more land is is taken up, the net produce per worker falls whereas the real wage remains the same. Obviously, profits per worker decline. (Blaug, 1998, p. 88)

From this class-struggle follows quite naturally:

P=1	L	R	O	W	Y_W	C
A	10	3	30	3	30	30
B	10	2	20	2	20	20
C	10	1	10	1	10	10
Σ			60		60	60

(a) Real and nominal sphere of the initial economy

L	R	O	W	Y_W	C	Δ
10	3	30	2	20	30	10
10	2	20	2	20	20	0
10	1	10	2	20	10	-10
		60		60	60	0

(b) Applying a uniform wage rate

Table 1: The emergence of profit and loss

> Further, Ricardo discussed at considerable length the tension between the workers and the capitalists, in that he claimed consistently that the rate of wages and the rate of profit varied inversely. His proposition at the beginning of his chapter "On Profits" that "profits would be high or low in proportion as wages were low or high" ... came back repeatedly to prominence. (Vickers, 1995, p. 62), see also (Nadal, 2004, pp. 193-197)

Schumpeter held that Ricardian analysis was a detour, yet credited him with the invention of a powerful engine of analysis: 'a systematic performance of the first order' (1994, p. 474). The main element of this engine was decreasing returns. Hence Ricardo cannot be accused of unrealistic abstraction. To the contrary, decreasing returns seem to be one of the plainest facts in economics. With this parochial realism – what could be more real than a wheat profit? – Ricardo was instrumental in the 'victory of real analysis over monetary analysis':

> By 'monetary analysis', we mean any analysis that introduces the element of money at the outset of the argument and denies that the essential features of economic life can be expresses by a barter model. By 'real analysis' we mean analysis that explains economic activity solely in terms of decisions about goods and services and the relation between them; ... (Blaug, 1998, pp. 22-23)

The structural axiomatic approach integrates real and monetary analysis.

3 From the initial state to the money economy

In order to elucidate the tacit assumptions of Ricardo's analysis we first go back to the initial state as the elementary and most transparent point of departure. Thereby we follow Ricardo in furthering the argument with a numerical example that, of course, is just a concretization of the structural axiom set. The starting point is given with Table 1a.

We have three agents, the farmers *A, B, C,* which cultivate three parcels of land of perfectly equal size but with different productivities *R* and correspondingly with

different outputs O per period t, given an equal labor input L of 10 units. The left part of Table 1a shows the real sphere. Since each agent consumes his own output real consumption differs markedly. 'The produce of the earth' (Ricardo, 1981, p. 5) is divided among three autarkic farmers. Workers, capitalists and landlords are absent. The unequal real distribution is due to the given productivity differentials.

Without any real change, the self-sufficient farmers become now economically literate, i.e. they start to calculate in nominal terms as shown in the right part of Table 1b. At first the wage rates W are set in exact proportion to productivities R. From this follows the distribution of wage incomes YW. The individual consumption expenditures are equal to the individual wage incomes. These consumption expenditures 'buy' the respective outputs at the price $P=1$. There are no market transactions and there is no money in the initial economy. Money is only present as a unit of account.

By comparing their calculations the farmers realize that they arrive at an equal price for their qualitatively identical outputs but that their wage rates are different. Since their labor input is qualitatively identical, different wage rates seem to be unjustified, and they decide to impute the same wage rate $W=2$ to their calculations. The result is shown in the right part of Table 1b.

Farmer A realizes that his wage income falls from 30 to 20 units when he regards himself as a household. Yet when he regards himself as a firm he now makes a profit of 10 units. Taking both components together, his situation is unchanged in nominal as well as in real terms. The same is true for farmer C who now gets a higher wage income but makes a loss when he regards himself as a firm. After equalizing the wage rates the different productivities reappear as the nominal magnitudes profit and loss. These new phenomena are a consequence of the application of the 'law of one price' and of the fact that wage incomes and consumption expenditures are no longer equal for each farmer. Farmer A dissaves and farmer C saves. It deserves mention that all these new phenomena emerge *uno actu* and have no counterpart whatsoever in the real part of the economy. From this follows that it cannot be taken for granted that the concepts of profit or saving are actually applicable to the real part of the economy. In fact, as Knight already recognized, this back projection is methodologically inadmissible:

> In an "exchange" economy, where individuals (families) secured their livelihood by the production and exchange of products ..., the categories of rent, wages, interest, and profits would have no existence. (Knight, 1935, p. 7)

Using the term profit in a real model is *the* Ricardian Vice as seen from the structural axiomatic position.[3]

[3] "The term "real" is used, as usual in economic discussions, to refer to physical quantities as opposed to values denoted in money terms, which are referred as "nominal" magnitudes" (Arrow, 1980, p. 146). "... rational individuals are interested in the commodities they can exchange and produce. Their motives are measured in "real" terms (in terms of goods), not in "nominal" terms (values expressed

P=2	L	R	O	W	Y_W	C	Q	Y_D	Y
A	10	3	30	2	20	60	40	40	60
B	10	2	20	2	20	40	20	20	40
C	10	1	10	2	20	20	0	0	20
Σ			60		60	120	60	60	120

Table 2: Real and nominal spheres of the structural axiomatic economy

Up to this point profit and loss exist only in the minds of the calculating agents. Their real situation is the same as in the initial state. To make profit and loss real we have to split the initial economy into the household and the business sector. The households receive income and divide it between consumption expenditures and saving. They do nothing else. All economic activities take place in the business sector. As with Walras 'The economic system is made up of households and firms.' (Arrow and Hahn, 1991, p. 3). Analytical clarity demands that the multiple roles of the autarkic farmers are differentiated. Accordingly the farmers become at first owners of their firms and hire themselves as workers. In this role they receive wage income. The profit accrues to the firm (Ellerman, 1986). The owner of the firm in the last instance decides whether profit goes in the form of distributed profit to the household sector or else remains as retained profit in the business sector. In Table 1b firm *A* distributes 10 units to the household sector. Distributed profit is here equal to profit. This is obviously a limiting case. In the real world profit and distributed profit are never equal. A loss first hits the firm, but in the last instance the owner has to balance it (with details depending on the legal definition of ownership). This is the case of firm *C*. Profit and loss sum up to zero for the business sector as a whole. Dissaving and saving sum up to zero for the household sector as a whole.

Full differentiation requires that the firm hires the workers. *Uno actu* with the analytical splitting of the economy into the household and the business sector both the labor and the product market come into being and this entails money as a transaction medium. It is assumed that transaction money is provided by the central bank (see 2011).

Since firm *C* makes a loss the situation is not stable in the longer run. To establish structural stability it is necessary that the profit is at least zero in the marginal firm. This can be achieved by raising the price from *P=1* to *P=2* as shown in Table 2.

To buy the unchanged quantities each agent now has to double consumption expenditures as shown in the C-column. The result is that firms *A* and *B* make a profit *Q* while the marginal firm breaks even. These profits are fully distributed. The household sector's income *Y* consists of wage income *YW* and distributed profit

in money)" (1980, p. 139). Profit maximization is impossible in a real model because profit is a nonentity. With substantial inner logic it is also a nonentity in Walras's zero-profit economy. The existence of positive profit therefore amounts to the refutation of standard economics. "The scientific vacuousness of neowalrasian theory appears not to be recognized by some of its leading practitioners." (Clower, 1994, p. 809)

P=1	L	R	O	W	Y_W	C	Q	Y_D	Y
A	10	2	20	2	20	20	0	0	20
B	10	2	20	2	20	20	0	0	20
C	10	2	20	2	20	20	0	0	20
Σ			60		60	60	0	0	60

Table 3: Real and nominal spheres with equal productivities

income Y_D according to the 1st axiom (1). Total income is equal to consumption expenditures, that is, the expenditure ratio ρ_E is unity. The distributed profit ratio ρ_D is >0. Profit is equal to distributed profit. The real part of the economy has not changed a iota. We have formally transformed the initial state into a stable money economy without any change in labor input, productivity, and real consumption. In both the product and the labor market the 'law of one price' holds.

Securing the existence of the marginal firm entails a change of the distribution of output. Wage earners absorb at the new price 30 units, the other 30 units go to the receivers of distributed profits under the condition that both groups spend their whole income. Seen from our new vantage point the erstwhile autarkic farmers's real income was not plainly 30, 20, 10 but consisted of the real wage incomes 10, 10, 10 and the real distributed profits 20, 10, 0. The latter are the nominal images of the real productivity differentials. Without knowing it the farmers made profits in the initial economy and distributed them to themselves. This becomes perfectly clear when we change the initial conditions and assume that the productivities are equal on all parcels of land. The result is shown in Table 3.

In the new structure the price is $P=1$ and all profits and distributed profits vanish. The real wage incomes are now 20, 20, 20, that is, they double in comparison to Table 2. The real wage does not depend on the effort of the workers, which is the same in all cases, but on the productivity differentials among firms. The same is true for profit and distributed profit. Their raison d'être is in the last instance to keep the marginal firm in the market and to maintain the given structure. This structural fact has, of course, some repercussions for the notion of a factor of production.

From the axioms (1) to (3) and definitions (6) follows the price as dependent variable:

$$P = \frac{\rho_E}{\rho_X}(1+\rho_D)\frac{W}{R} \quad |\mathrm{t} \tag{9}$$

Under the condition of market clearing $\rho_X=1$ and budget balancing $\rho_E=1$ the price is determined by the distributed profit ratio and unit wage costs:

$$P^* = (1+\rho_D)\frac{W}{R} \quad \text{if} \quad \rho_X = 1; \rho_E = 1 \quad |\mathrm{t} \tag{10}$$

For a wage rate $W=2$, an average productivity $R=2$, and a distributed profit ratio $\rho_D=1$ the market clearing price is $P^*=2$. From (10) follows the real wage:

$$\frac{W}{P^*} = \frac{R}{1+\rho_D} \quad \text{if} \quad \rho_X = 1; \rho_E = 1 \quad |\text{t} \tag{11}$$

The real wage is *W/P*=1* if the distributed profit ratio is unity as in Table 2. Since the labor input is 10 units the wage income recipients absorb in total 30 units of output. The other half is absorbed by the recipients of distributed profit income. The real wage is *W/P*=2* if the the distributed profit ratio is zero as in Table 3. The wage income recipients absorb the whole output. In the last instance the real wage depends on the productivity differentials among firms and the 'law of one price' in the labor market. The real wage is *not* determined in the labor market or in the sphere of production but by the structural interaction of real and nominal variables. The real wage is not fixed, as Ricardo maintained, by some physical or social minimum (Hollander, 1973, p. 260), or, for that matter, by the marginal product of a conveniently chosen production function. The real economy is not the *real* economy, the money economy is the *real* economy.

4 The redistribution of profit

For the initial economy we have left open the question of whether the farmers own their land parcels or not. We now have to carry the analytical differentiation one step further and to discriminate between the ownership of the firm and the ownership of land. Therefore an additional firm is introduced that owns the land.

A private person that offers land for commercial use is no longer a private person but a firm. Each economically relevant activity takes place in a separate firm and all firms together form the business sector. This analytical separation is essential. It makes it possible to abstract from historical peculiarities and to treat agrarian and industrial production alike. The household sector provides the labor input and absorbs the final output. As shareholders the households receive in addition to wage income the distributed profit income.

To begin with it is assumed that all available land is owned by firm *D*. The output of firm *D* consists of land services that are bought by firm *A, B, C*. Being not storable, there can be no difference between services produced *O* and services bought *X*, hence O_D=X_D. Firm *D* sells a quantity *X* of land services at a leasing price *P* to each firm. The profit of the land owning firm follows from (5) as:

$$Q_{fiD} \equiv P_{DA}X_{DA} + P_{DB}X_{DB} + P_{DC}X_{DC} - W_D L_D \tag{12}$$

Firm *A* pays for the land services, therefore its profit equation changes from (5) to:

$$Q_{fiA} = P_A X_A - P_{DA}X_{DA} - W_A L_A \tag{13}$$

Likewise for the other firms. It is assumed now at first that firm *D* as land owner fixes a lease price for each firm such that the profits of firms *A* and *B* vanish and are

P=2	L	R	O	W	Y_{AW}	$P_D X_D$	C	Q_A	$P_D X_D$	Y_{DW}	Q_D	Y_{DD}	Y
A	10	3	30	2	20	40	60	0	40	0	40	40	60
B	10	2	20	2	20	20	40	0	20	0	20	20	40
C	10	1	10	2	20	0	20	0	0	0	0	0	20
Σ			60		60	60	120	0	60		60	60	120

Table 4: Redistribution of profits between the consumption good producing firms and the land owning firm

completely transferred to firm D. This does not alter the profit of the business sector as a whole. When (12) and (13) are summed up the lease payments $P_{DA}X_{DA}$ always cancel out. Profit and full profit distribution now reappear in firm D as shown in Table 4. To forestall second round effects the wage costs of firm D, i.e. Y_{DW}, have been here set to zero. Hence total income Y and consumption expenditures C do not change compared to Table 2. The owners of firm A and B 'loose' the owners of firm D 'gain' but total profits remain unchanged and the wage income recipients are not affected.

Based on the ownership of land firm D governs via the lease price to some extent the distribution of profits within the business sector. The crucial factor for the distribution of output is productivity differentials in combination with the 'law of one price', which, of course, is not a law in the proper sense.

There is no need to invent a new income category and to call the distributed profits of firm D rent. The two categories wage income and distributed profit suffice. By ignoring the monetary side of the economy Ricardo could not see that what appears as a factor remuneration is actually profit redistribution. On the theoretical level rent is not a separate income category but just another manifestation of distributed profit. By analytically separating the production of land services from the personal ownership of land the former landlord now becomes the owner of firm D and receives distributed profits as income.

5 The pricing of land services

From (12) and (13) follows that the distribution of profits between firms A and D depends on the lease price P_D if all input quantities and the wage rates are given for the period under consideration.

Firm A faces the following situation. The productivity R_A of the parcel of land which it has leased from firm D is given and known as a rough average. All other available sites have a lower productivity – again on the average. The productivity differential is expressed by a productivity factor $\tau<1$. Therefore, if firm A moves to another site its profit will be lower. Equation (5) changes to:

$$Q_{fiA} \equiv P_A \tau R_A L_A - W_A L_A \quad \Leftarrow \quad \tau < 1 \quad |\mathrm{t} \tag{14}$$

On the other hand, firm A has current leasing costs per period of $P_D X_D$ which lower its profit:

$$Q_{fiA} \equiv P_A R_A L_A - P_D X_D - W_A L_A \quad \text{if} \quad \rho_{XA} = 1 \quad |\text{t} \tag{15}$$

The lease price P_D can be rewritten as the product of the lease price factor ψ and the minimum lease price P_{D0}. At this price firm D's profit is zero.

$$Q_{fiA} \equiv P_A R_A L_A - \psi P_{D0} X_D - W_A L_A \quad \Leftarrow \quad P_{D0} = \frac{W_D}{R_D} \quad |\text{t} \tag{16}$$

The diverse qualities of land open the opportunity to raise the minimum lease price P_{D0} by a factor ψ for the site currently used by firm A. The relation between the productivity factor τ and the maximum lease price factor ψ can be derived from (14)=(16) and is given by:

$$\psi^{max} \equiv (1-\tau) \underbrace{\frac{P_A}{P_{D0}} \frac{R_A}{R_D} \frac{L_A}{L_D}}_{\text{structural ratios}} \quad |\text{t} \tag{17}$$

The lease price factor ψ is always positive and >1. The margin for negotiation is then given by P_{D0} as lower boundary and $\psi^{max} P_{D0}$ as upper boundary. At a higher lease price it is advantageous for firm A to move to another site. Within these objectively given boundaries firm D is in the position to influence the distribution of profits. It deserves mention that it is virtually impossible for firm D to know the actual parameter values of (17), notwithstanding the fact that they are measurable in principle. The exact margin for negotiation is shrouded in mist and no behavioral theory is capable of predicting the final outcome.

In order to eliminate all subjective elements and to determine the lease price objectively an additional assumption is required. We demand that the profit ratios of firms A and D shall be equal. The respective profit ratios follow from (8):

$$\rho_{QA} \equiv \frac{Q_{fiA}}{W_A L_A} \qquad \rho_{QD} \equiv \frac{Q_{fiD}}{W_A L_D} \quad |\text{t} \tag{18}$$

Substituting (15) gives for firm A:

$$\rho_{QA} \equiv \frac{P_A R_A}{W_A} - \frac{P_D R_D L_D}{W_A L_A} - 1 \quad \text{if} \quad \rho_{XA} = 1 \quad |\text{t} \tag{19}$$

Applying (5) to firm D gives:

$$\rho_{QD} \equiv \frac{P_D R_D}{W_D} - 1 \quad \text{if} \quad \rho_{XD} = 1 \quad |\text{t} \tag{20}$$

From the equalization of profit ratios (19)=(20) then follows the lease price:

$$P_D = P_A \underbrace{\frac{\frac{R_A}{R_D}}{\frac{W_A}{W_D} + \frac{L_D}{L_A}}}_{\text{structural ratios}} \quad |\text{t} \tag{21}$$

The lease price depends on the price of the final product P_A and an array of structural ratios. By substituting the structural ratios from (17) one gets alternatively the lease price factor in dependence from the maximum lease price factor and the productivity factor:

$$\psi = \frac{\frac{\psi^{max}}{1-\tau}}{\frac{W_A L_A}{W_D L_D} + 1} \quad |\text{t} \tag{22}$$

Under the condition of equal profit ratios for both firm A and D the lease price factor is less than the maximum lease price factor. The factor is the higher the lower the productivity on the available other sites is. One is tempted to characterize this as a fair lease price factor.

What remains to be determined is the price for the final product. From the axiom set and (6) follows under the condition of market clearing and budget balancing analogous to (10) for two firms:

$$\begin{gathered} P_A^* = (1+\rho_D)\frac{W}{R_A}\frac{L}{L_A} \quad \text{if} \quad \rho_X = 1; \rho_E = 1 \quad |\text{t} \\ L \equiv L_A + L_D \qquad W \equiv \frac{1}{L}(W_A L_A + W_D L_D) \end{gathered} \tag{23}$$

The price of the consumption good depends in the main on the distributed profit ratio and unit wage costs. From this price the lease price is derived according to (21) under the condition of equal profit ratios. As a consequence the economic fate of the land owning firm ultimately hinges also on the conditions in the product market. The lease price, and with it the profit of firm D, moves with the product price.

A separate factor income rent does not exist. The land owning firm makes a profit (or loss, as the case may be) just like any other firm. Between the owners of the consumption good producing firm and the owners of the land services producing firm is not much difference. Capitalist and landlord are colorful figures; good for storytelling but without noticeable analytical value.

Standard economics is broadly, yet with great variations in detail, structured by the underlying classification of the factors of production labor, land, capital, and entrepreneurship on the one hand and the income categories wage, rent, interest, and profit on the other. Thus income can be treated as the reward for the productive contribution of each factor to the final output. This intuitively appealing classificatory scheme is not without problems, to say the least, but 'perhaps the main ground

for the reluctance of economists to discard it is æsthetic' (Fraser, 1937, p. 217). Whether the main ground is æsthecic or apologetic is a matter of indifference with regard to the crucial methodological point.

The compelling reason for the rejection of this misleading conceptual framework is that profit is not a factor income.[4] According to the 1st axiom income consists of wage income and distributed profit. The distinction between distributed profit as income and profit as factor independent residual is crucial. Models that are based on the collapsed definition income≡wages+profits are *a priori* false because profit and distributed profit is not the same thing. Rent, in any case, is neither a factor remuneration nor a separate income category. Ricardo failed to pierce through the historical surface. His theory of distribution is realistic but false. The marginalistic theory of distribution is not an improvement; it lacks even parochial realism. The "real" economy is a nonentity.

6 Conclusions

Ricardo literally invented the technique of economics. This, and not the concrete results of his analysis, makes him a key figure in the history of economic thought. Ricardo was instrumental in the 'victory of real analysis over monetary analysis' thereby dichotomizing the subject matter of economics. Standard economics has not recovered from this victory.

The structural axiomatic approach enables a consistent real and nominal analysis. The main results are:

- Profit is not a factor income. The distinction between distributed profit as income and profit as factor independent residual is crucial. Real profit is a nonentity.
- Rent is neither a factor remuneration nor a separate income category.
- By ignoring the nominal side of the economy Ricardo could not see that what appears as a factor remuneration is actually profit redistribution. Rent is just another manifestation of distributed profit.
- Models that are based on the collapsed definition income≡wages+profits are *a priori* false because profit and distributed profit is not the same thing.
- Under the condition of profit ratio equalization the lease price depends on the price of the final product and an array of objective structural ratios.

The often cited Ricardian Vice does not consist in heroic abstraction but rather in a herostratic abstraction from the indispensable nominal sphere.

[4] "[Profit] is a subject to which economists have addressed themselves for at least two hundred years, but without much success. For there is at the moment no general theory of profits which commands anything approaching universal acceptance either among academic economists or among men of affaires." (Wood, 1975, p. i)

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