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Income Distribution, Profit, and Real Shares

Egmont Kakarot-Handtke*

Abstract

This paper clarifies first the nature and significance of financial profit by applying the structural axiom set as consistent point of departure. As a crucial result the fundamental theorem of income distribution emerges. It states: profit is no factor income. Since the individual firm is blind to this structural fact it subjectively interprets profit as some kind of reward. As a matter of fact, firms do not 'make' profit, they only redistribute it among themselves. With profit consistently defined it is possible to determine the nominal and real shares of the elementary income categories wage income and distributed profit.

JEL E20, E25

Keywords new framework of concepts, structure-centric, axiom set, financial profit, distributed profit, retained profit, key ratios, period core, invisible redistributor, nominal wage share, real wage share

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The Palgrave Dictionary concludes the section *Profit and Profit Theory* in a minor key: ‘A satisfactory theory of profits is still elusive’ (Desai, 2008, p. 10).

In retrospect this lack of a clear conception of profit, however, could not seriously impede the advancement of the theory of income distribution or, more precisely, of several quite distinct theories. Keynes’s approach is a case in point.

His [Keynes’s] *Collected Writings* show that he wrestled to solve the Profit Puzzle up till the semi-final versions of his *GT* but in the end he gave up and discarded the draft chapter dealing with it. (Tómasson and Bezemer, 2010, pp. 12-13, 16)

The *General Theory*, tough, is built upon a straightforward definition of total income.

Thus the factor cost and the entrepreneur’s profit make up, between them, what we shall define as the *total income* resulting from the employment given by the entrepreneur. (Keynes, 1973, p. 23), original emphasis; see also (Kaldor, 1956, p. 95), (Kalecki, 1942, p. 259)

This is essentially Ricardo’s distribution theory with rent omitted for simplicity. The marginalistic distribution theory is hardly a promising alternative because neoclassical authors seem not to realize that the very notion of profit is inapplicable to the real economy. A physical surplus or a real share of output is fundamentally different from profit.

The present paper starts from scratch by applying the axiomatic method. This, by itself, is not a novel idea. Actually, it can be traced back to J. S. Mill.

... Mill’s method of ‘inverse deduction’ is a fair (although scrappy) description of a procedure which is used not only in the social sciences but in all sciences, and to an extent far beyond Mill’s own estimate. (Popper, 1960, p. 121)

The general methodological thesis to start with is that human behavior does not yield to the axiomatic method (cf. Hudík, 2011), yet the axiomatization of the money economy’s fundamental structure is feasible. By choosing objective structural relationships as axioms behavioral assumptions are not ruled out. The structural axiom set is, as a matter of principle, open to *any* behavioral assumption (for details see 2011b). It is not a question of either–or but of analytical priorities.

The case for structural axiomatization has been made at length elsewhere (e.g. 2011a; 2011c). Here we proceed as follows. The analytical starting point is given in Section 1 with three structural axioms. In Sections 2 to 3 the financial profit of the business sector as a whole is determined and the relations with distributed profit, retained profit, and saving are made explicit. In Sections 4 to 7 the real shares of wage income and distributed profit income are determined first for the simple case of equal expenditure ratios and then for the general case with different expenditure ratios. The determinants of the real wage are established in Section 8. Finally, in Section 9, the relation between nominal and real shares is analyzed. This yields a comprehensive and consistent picture of the interrelation of the distributional key variables. Section 10 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 for the time being one world economy, one firm, and one product.

Total income of the household sector Y in period t 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 .

$$Y = WL + DN \quad |t \quad (1)$$

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

$$O = RL \quad |t \quad (2)$$

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

$$C = PX \quad |t \quad (3)$$

Axioms are the answer to the question: ‘What are the propositions which may reasonably be received without proof? (Mill, 2006, p. 746). The first three structural axioms represent the pure consumption economy, that is, no investment goods industry, no foreign trade, and no taxes or any other government activity. Thus, the structural axiom set is the transparent formal representation of the most elementary economic configuration. What deserves mention is that total income in (1) is the sum of wage income and *distributed profit* and not of wage income and profit. Profit and distributed profit have to be thoroughly kept apart.

2 Profit and the fundamental theorem of income distribution

The business sector’s financial profit ΔQ_{fi} 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 :

$$\Delta Q_{fi} \equiv C - Y_W \equiv PX - WL \quad \text{with} \quad Y_W \equiv WL \quad |t. \quad (4)$$

Definitions add no new content to the set of axioms but determine the logical context of concepts (Stigum, 1991, pp. 35-36).

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. An economic theory that does not include at least one bank that supports the concomitant credit expansion cannot capture the essential features of the market economy (for details see 2011a).

From (4) and (1) follows for the relation of profit and distributed profit:

$$\Delta Q_{fi} \equiv C - Y + Y_D \quad \text{with} \quad Y_D \equiv DN \quad |t. \quad (5)$$

The determinants of profit look essentially different depending on the perspective. From the firm's point of view, price P , quantity X , wage rate W , and employment L in (4) are all important; under the perspective of (5) these variables play no role at all. It has to be emphasized that both perspectives are not only equivalent but indeed *indispensable* for a comprehensive and consistent view of profit.

In the pure consumption economy one has labor input as the sole factor of production and wage income as the corresponding factor remuneration. Since the factor capital is nonexistent, profit cannot be assigned to it in functional terms. This has a far-reaching methodological consequence: to treat profit as factor income is a category mistake. Hence the fundamental theorem of income distribution states: profit is no factor income.

Profit is not on the same footing with wage income and from this in turn follows that approaches that start with the seemingly obvious definition 'total income \equiv wages + profits' can be ignored without any compunction about missing something of practical relevance.

The individual firm is blind to the structural relationship given by (5). On the firm's level profit is therefore subjectively interpreted as a reward for innovation or superior management skills or higher efficiency or toughness on wages or for risk taking or capitalizing on market imperfections or as the result of monopolistic practices. Seen under the broader perspective, though, business does not 'make' profit, it redistributes profit. The case is perfectly clear when there is only one firm. It is a matter of indifference whether the firm's management thinks that it needs profit to cover risks or to finance growth or whether it realizes the profit maximum or not. If the consumption expenditures C are equal to income Y and distributed profit Y_D is zero in (5), profit will invariably be zero, no matter what the agents think about profit. The existence and magnitude of total profit is not explicable by the subjectivist marginal principle and is beyond the common sense of myopic agents.

Under the condition $C = Y$ profit ΔQ_{fi} must, as a corollary of (5), be equal to distributed profit Y_D . The fundamental difference between the two variables is not an issue in this *limiting* case. The equality of profit and distributed profit is an implicit feature of equilibrium models. These have no counterpart in reality. Neither is the neoclassical equilibrium condition, profit rate = marginal productivity of capital, applicable in the pure consumption economy because we have profit but no capital. The question of whether in equilibrium profit is zero or not – Walras's 'ni bénéfice ni perte' – is of no concern within the structural axiomatic framework because the notion of simultaneous equilibrium is no constituent part of it.

3 Retained profit and saving

Profits can either be distributed or retained. If nothing is distributed, then profit adds entirely to the financial wealth of the firm. Retained profit ΔQ_{re} is defined, for the business sector as a whole, as the difference between profit and distributed profit in period t :

$$\Delta Q_{re} \equiv \Delta Q_{fi} - Y_D \quad |t. \quad (6)$$

In combination with (5) follows:

$$\Delta Q_{re} \equiv C - Y \quad |t. \quad (7)$$

Financial saving is given as the difference of income and consumption expenditures:

$$\Delta S_{fi} \equiv Y - C \quad |t. \quad (8)$$

Financial saving (8) and retained profit (7) always move in opposite directions, i.e. $\Delta Q_{re} \equiv -\Delta S_{fi}$. Let us call this the complementarity corollary because it follows directly from the definitions themselves. The corollary asserts that the complementary notion to saving is *not* investment but negative retained profit. Positive retained profit is the complementary of dissaving. Since there is no investment in the pure consumption economy the IS-equality-identity-equilibrium cannot hold. It does not hold in the investment economy either (for details see 2011a, pp. 18-23).

4 The market clearing price

To the already introduced definitions four structural ratios are added now. With (9) the expenditure ratio ρ_E , the sales ratio ρ_X , the distributed profit ratio ρ_D , and the factor cost ratio ρ_F is defined:

$$\rho_E \equiv \frac{C}{Y} \quad \rho_X \equiv \frac{X}{O} \quad \rho_D \equiv \frac{DN}{WL} \equiv \frac{Y_D}{Y_W} \quad \rho_F \equiv \frac{W}{PR} \quad |t. \quad (9)$$

The axioms and definitions are consolidated to one single equation:

$$\frac{\rho_F \rho_E (1 + \rho_D)}{\rho_X} = 1 \quad |t. \quad (10)$$

The period core as the *absolute* formal minimum determines the interdependencies of the measurable *structural* key ratios for each period. The period core is free of any behavioral assumptions, unit-free because all real and nominal dimensions cancel out, and contingent. Contingency means that it is open until explicitly stated which of the variables are independent and which is dependent. The form of (10) precludes any notion of causality.

From the period core (10) the structural price equation is derived:

$$P = \frac{\rho_E}{\rho_X} \left(\frac{W}{R} + \frac{Y_D}{RL} \right) = \frac{\rho_E}{\rho_X} (1 + \rho_D) \frac{W}{R} \quad |t. \quad (11)$$

The price equation asserts that the price as dependent variable is determined by the expenditure ratio ρ_E , the sales ratio ρ_X , the distributed profit ratio ρ_D , and unit wage costs $\frac{W}{R}$.

Under the double condition of market clearing, i.e. $\rho_X = 1$, and budget balancing, i.e. $\rho_E = 1$, the market clearing price follows as:

$$P = (1 + \rho_D) \frac{W}{R} \quad \text{if} \quad \rho_X = 1, \rho_E = 1 \quad |t. \quad (12)$$

The market clearing price is determined by the distributed profit ratio and unit wage costs. Since this result follows without regress to behavioral assumptions in direct lineage from the axioms it would be conceptually inappropriate to refer to this configuration as product market equilibrium. Equilibrium would in addition require some economic mechanism which guarantees that ρ_X and ρ_E speedily approach unity. No such mechanism is known.

Price theory is concerned with the interrelations of more than one market and more than one product price. This presupposes the differentiation of the axiom set (for details see 2011c). For our present purposes this differentiation is not required.

5 The price as invisible redistributor

We have wage income, distributed profit, and profit on one side and period output on the other. This raises the question of how the interaction of nominal and real variables determines the real shares of the receivers of wage income and distributed profit income, respectively.

As starting point we take again the period core (10). For the initial period three conditions are applied: the quantity bought is equal to output, consumption expenditures are equal to income, and distributed profits are zero:

$$\rho_{X0} = 1 \quad \rho_{E0} = 1 \quad \rho_{D0} = 0. \quad (13)$$

This reduces the period core for the initial period to:

$$\rho_{F0} = \frac{W_0}{P_0 R_0} = 1. \quad (14)$$

A factor cost ratio ρ_F of unity means that the real wage $\frac{W}{P}$ is equal to productivity R which in turn means that profit per unit and, by consequence, total profit (5) is zero. The initial conditions are simple and clear: the households buy with their wage income the whole output. Profit as well as distributed profit is absent.

Period₁ In the next period the expenditure ratio ρ_E is greater than unity. Consumption expenditures rise while income remains unchanged. A subset of households increases consumption expenditures by drawing on overdrafts that are provided by the banking industry. The period core changes to:

$$\frac{W_0}{P_1 R_0} \rho_{E1} = 1. \quad (15)$$

When the expenditure ratio changes a second variable must change in order to satisfy the period core. It is assumed that the price rises and that the other variables remain unchanged. For the households that spend only their unaltered wage income this means that they can buy less than in the initial period. Their share of output diminishes. The complementary group of credit-spenders that has an unchanged wage income *plus* overdrafts at their disposal has also to pay the higher price, but since the increase of spending power is greater than the price increase their share of output increases. Thus a redistribution of the unvaried output takes place *within* the household sector. This redistribution is effected indirectly through the price increase. The price mechanism clears the market, signals an increased demand, and acts at the same time as anonymous redistributor.

Output does not change and is fully absorbed by the household sector as in the initial period. The real wage $\frac{W}{P}$ in (15) is now lower than productivity as a result of the altered spending behavior.

According to (4) profit is now greater than zero. But no share of output corresponds to profit which as a matter of fact increases the stock of money of the business sector (for details see 2011a, pp. 11-18). Hence in terms of real quantities nothing changes between the household and the business sector.

Period₂ For period₂ it is now assumed that consumption expenditures stay exactly at the higher level of period₁. But now total income increases through profit distribution. Hence the expenditure ratio returns to unity. The distributed profit ratio ρ_D is now greater than zero. The period core changes to:

$$\frac{W_0}{P_1 R_0} (1 + \rho_{D2}) = 1. \quad (16)$$

In order that everything else remains unchanged, particularly the price, it must hold that:

$$1 + \rho_{D2} = \rho_{E1}. \quad (17)$$

This follows from (16) and (15). Accordingly, the profit from the previous period is fully distributed in period₂ and profits are equal in both periods.

The part of consumptions expenditures that was equal to the deficit-spending in period₁ is now equal to the spending of the receivers of distributed profit. In contrast to period₁ total income is increased by distributed profits in period₂. The price in (16) and (15) is the same.

At this price wage income can buy only a part of the output. The rest goes to the households that spend their distributed profit income completely. The mechanism of

redistribution is exactly the same as in period₁. Only the personnel has changed. In the product market the credit-spenders have been replaced as buyers by the receivers of distributed profit. Profit has again no real counterpart.

6 Real shares

The share of the total quantity bought that wage earners absorb with a given expenditure ratio at a given price is defined as:

$$\delta_W \equiv \frac{\rho_E \frac{Y_W}{P}}{X} \equiv \frac{1}{1 + \rho_D} \quad \text{with} \quad \rho_X = 1 \quad |t. \quad (18)$$

Since the quantity bought X , which by assumption $\rho_X = 1$ is equal to output O , the share δ_W is identical with the share of output. This share depends solely on the distributed profit ratio ρ_D .

Analogously, the real share of the receivers of distributed profit is given by:

$$\delta_D \equiv \frac{\rho_E \frac{Y_D}{P}}{X} \equiv \frac{\rho_D}{1 + \rho_D} \quad |t. \quad (19)$$

Both shares add up to unity:

$$\delta_W + \delta_D = 1 \quad |t. \quad (20)$$

The division of output between the two categories of income depends solely on the distributed profit ratio ρ_D . Profits do not have any impact. An increase of profits without a simultaneous increase in distributed profits therefore has no effect on the real situation of the wage earners taken as a whole. If profits are always retained in full, i.e. $\rho_D = 0$, then total output goes to the wage income recipients.

The distributed profit ratio has already been defined as:

$$\rho_D \equiv \frac{DN}{WL} \equiv \frac{Y_D}{WL} \equiv \frac{Y_D}{Y_W} \quad (21)$$

If distributed profits Y_D stay the same and the wage rate or employment increases then the distributed profit ratio falls and the distribution of the output changes according to (18) in favor of the wage earners. The real shares of output correspond to the relation of the nominal magnitudes distributed profit income Y_D and wage income Y_W that is expressed by the ratio ρ_D if the expenditure ratio ρ_E for both income categories is identical. This, however, is normally not the case.

7 Effects of varied spending behavior

In general, the expenditure ratio is not identical for spending out of wage income and spending out of distributed profit income. When the recipients of wage income and distributed profits belong to two separate groups with different spending behavior the general definition of the expenditure ratio is given as the weighted average of the groups' individual expenditure ratios:

$$\rho_E \equiv \rho_E^W \frac{Y_W}{Y} + \rho_E^D \frac{Y_D}{Y} \quad |t. \quad (22)$$

The definition of the real share of the wage income recipients changes accordingly when in (18) the average expenditure ratio ρ_E is replaced by the group-specific expenditure ratio:

$$\delta_W \equiv \frac{\rho_E^W \frac{Y_D}{P}}{X} \equiv \frac{\rho_E^W}{\rho_E^W + \rho_E^D \rho_D} \quad |t. \quad (23)$$

Analogously, the real share of the receivers of distributed profit is then given by:

$$\delta_D \equiv \frac{\rho_E^D \rho_D}{\rho_E^W + \rho_E^D \rho_D} \quad |t. \quad (24)$$

Both shares add up to unity:

$$\delta_W + \delta_D = 1 \quad |t. \quad (25)$$

Hence in general the real shares are determined by the distributed profit ratio ρ_D and the spending pattern of both income groups. With a higher distributed profit ratio and more spending out of distributed profits the real share of the wage earners shrinks. And vice versa, a higher ratio of retained profit and more saving out of distributed profit increases the real share of wage earners. If the spending out of distributed profit is zero the wage earners absorb the whole output independently of what the distribution of nominal incomes looks like. Therefore the income distribution alone cannot tell much about the real distribution. The real distribution is as a rule better – from the perspective of the wage income recipients – than the nominal appearances because it is the received wisdom that saving out of distributed profit income is relatively higher than saving out of wage income.

8 The real wage

Profit, therefore, is *not* the economic antagonist of the workers' real income share as in Ricardo's distribution theory (1981, pp. 110-127; for details see 2011d) and this real income in no way depends, as history testifies, on some society specific subsistence level, but on productivity, on profit distribution and on that part of distributed profit that goes to consumption.

Within the structural axiomatic framework the real wage is determined in the spheres of income and expenditures and not, as customary since the classics, in the sphere of production. This follows from (11):

$$\frac{W}{P} = \frac{R}{\rho_E (1 + \rho_D)} \quad \text{if } \rho_X = 1 \quad |t. \quad (26)$$

The real wage rises with productivity and falls with an increase of the expenditure ratio and/or the distributed profit ratio. Since there is no capital the real wage cannot have anything to do with the marginal productivity of capital. It has nothing to do with the marginal productivity of labor either. The real wage is a *structural* fact. Distribution is neither dependent on an imaginary production function with convenient properties nor on the behavioral assumption of profit maximization. Hence Euler's theorem cannot be applied to explain the real distribution of output (Shaik, 1980).

9 Nominal shares

From the 1st axiom (1) follows for the definition of nominal shares:

$$\begin{aligned} Y &= Y_W + Y_D \\ 1 &= \frac{Y_W}{Y} + \frac{Y_D}{Y} \\ 1 &= \delta_Y^W + \delta_Y^D. \end{aligned} \quad (27)$$

The share of wage income and distributed profit income, respectively, can, with the help of (9), be rewritten as:

$$\delta_Y^W \equiv \frac{1}{1 + \rho_D} \quad \delta_Y^D \equiv \frac{\rho_D}{1 + \rho_D} \quad |t. \quad (28)$$

The nominal shares are identical to the real shares (18) and (19) if the expenditure ratio for both income categories is equal. Otherwise, the real shares (22) and (23) differ from the nominal shares (28). In the general case, the income distribution and the distribution of the real product diverge. Therefore one cannot capture the real distribution by simply dividing the nominal shares by a price index. It is important to note that the distributed profit ratio is neither a nominal nor a real magnitude but a dimensionless *structural* indicator. In the very last instance the income shares are neither determined in the real nor in the nominal sphere.

From (28) in combination with (21) follows that the share of wage income will remain unchanged if dividend D and wage rate W as well as the number of shares N and employment L move in perfect lockstep. This perfection is, of course, improbable, but it is quite commonsensical that the long term trends of dividend and wage rate do not extremely diverge. And a growth of employment is most probably

accompanied by a growing number of firms and shares. Hence it is quite probable that the longer term average of the nominal wage share is fairly stable.

However, things look different when profit instead of distributed profit is erroneously regarded as income. Although conceptually unwarranted, there is no syntactical hindrance to define the share of profits as follows:

$$\delta_Y^Q \equiv \frac{\Delta Q_{fi}}{Y} \Rightarrow \delta_Y^Q \equiv \rho_E - \frac{1}{1 + \rho_D} \quad |t. \quad (29)$$

This profit share compares to the distributed profit share (28), i.e.:

$$\delta_Y^D \equiv \frac{\rho_D}{1 + \rho_D} \quad |t. \quad (30)$$

Both measures yield exactly the same values in the limiting case $\rho_E = 1$. Otherwise, they diverge. From the structural axiomatic standpoint (30) is the correct measure. Then, in an expansionary phase with $\rho_E > 1$ the incorrect measure (29) is larger than the correct measure (30). In other words, the incorrect measure understates the nominal share of wage income. Vice versa, if $\rho_E < 1$, which indicates a contraction. Over a longer time span with the expenditure ratio ρ_E hovering around unity one gets the impression that the share of wage income swings around a stable equilibrium value. This, though, is an optical illusion. If there is a stable value it is given with (30) and it depends ultimately on the stability of the two ratios in (21), i.e. on $\frac{D}{W}$ and $\frac{N}{L}$, respectively.

When (26) is inserted into (28) one gets as an alternative expression for the nominal wage share:

$$\delta_Y^W \equiv \rho_F \rho_E \quad \text{if} \quad \rho_X = 1 \quad |t. \quad (31)$$

This translates with the help of (9) into the extended form:

$$\delta_Y^W \equiv \underbrace{\frac{W}{R}}_{\text{unit wage costs}} \underbrace{\frac{W}{P}}_{\text{real wage}} \underbrace{\frac{\rho_E}{W}}_{\text{complementary term}} \quad \text{if} \quad \rho_X = 1 \quad |t. \quad (32)$$

This equation tells us nothing new but shows the logical interconnection of the key terms: share of wage income, unit wage costs, and real wage. A productivity increase, for example, does not affect the nominal shares that are given with (28). According to (32) unit wage costs decline and the real wage increases according to (26) under the condition of market clearing. Both effects cancel out exactly. An increase of the expenditure ratio, too, leaves the nominal shares unaffected according to (28) but effects a fall of the real wage according to (26). Unit wage costs remain unchanged in this case. Since the market clearing price increases according to (11) the profit per unit increases and by consequence financial profit as given by (4). The changes of the real wage and the complementary term cancel out. In sum: all real and nominal distributional phenomena fall into their proper places.

10 Conclusion

The main results of the structural axiomatic recasting of the theory of profit are:

- From the first three structural axioms follow in direct lineage the determinants of profit, of the market clearing price, and of the distribution of the real product in the pure consumption economy.
- The expenditure ratio and the distributed profit ratio are the key variables for the determination of profit.
- The market clearing and budget balancing price is determined by the distributed profit ratio and unit wage costs. The market clearing price acts as invisible redistributor.
- The output share of wage income receivers is determined by the distributed profit ratio and the spending behavior of the receivers of wage income and distributed profits, respectively, that is, by their specific expenditure ratios.
- The real wage is determined in the income and consumption sphere and not in the production sphere.
- Models that are based on the collapsed definition total income \equiv wages + profits are flawed because profit and distributed profit is not the same thing.
- The existence and magnitude of profit and the distribution of the real product is not explicable by the marginal principle.
- The nominal and real shares of the two income categories wage income and distributed profit income are identical if the respective expenditure ratios are equal, otherwise they diverge.

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