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Why Post Keynesianism is Not Yet a Science

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Abstract

In a programmatic article Alfred Eichner explained, from a Post Keynesian perspective, why neoclassical economics is not yet a science. This was some time ago and one would expect that Post Keynesianism, with a heightened awareness of scientific standards, has done much better than alternative approaches in the meantime. There is wide agreement that this is not the case. Explanations, though, differ widely. The present – strictly formal – inquiry identifies an elementary logical flaw. This strengthens the argument that the Post Keynesian motto ‘it is better to be roughly right than precisely wrong!’ is methodologically indefensible.

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Keywords new framework of concepts; structure-centric; axiom set; consistency; Post Keynesian hard core; logical rigor; loose verbal reasoning; hypothetico-deductive method; profit; retained profit; saving; general complementarity; IS-fallacy

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To anticipate the bottom line of Eichner's (1983) rephrased adumbration: Post Keynesianism is not yet a science because of a lack of logical rigor. This is not to say that Keynes's theory is 'false' in the naive factual or political sense. Post Keynesians rightly claim that Keynesianism is closer to the facts than general equilibrium theory and this is recognized by some Post Walrasians.

I consider that Keynes had no real grasp of formal economic theorizing (and also disliked it), and that he consequently left many gaping holes in his theory. I none the less hold that his insights were several orders more profound and realistic than those of his recent critics. (Hahn, 1982, pp. x-xi)

The Keynesian Revolution was intended as both, a radical change of economic policy and a groundbreaking paradigm shift. Keynes pursued *two* goals (Moggridge, 1976, pp. 29-36). That, of course, is perfectly legitimate, but it complicates things somewhat.

However much economists may evoke their purity, they want to change the world. They want to contribute to the solution of urgent *practical* problems. ... Of course, they also pursue the consistency of the theories they make, for he who contradicts himself proves nothing. (Klant, 1988, pp. 112-113), original emphasis

The crucial point is to set the priorities right. The consistency of theory comes first. An inconsistent theory is on equal footing with a pamphlet. Needless to emphasize that consistency, the 'hobgoblin of little minds' (Veblen), is rarely the chief criterion of theory choice. There is no difference on this score between Laissez-faire, Keynesianism, Marxism or Heterodox Economics in general. What is accepted in the political arena is 'the implied ethical message of the doctrine rather than the doctrine' (Gerschenkron, 1969, p. 13). In the following neither the ethical message nor the political usefulness of Post Keynesianism is at issue. The focus is on Keynes pivotal message.

Keynes ... believed that he could *logically* demonstrate why "Say's Law ... is not the true law relating the aggregate demand and supply

functions" when we model an economy possessing real world characteristics; and until we get our theory to accurately mirror and apply to the "facts of experience," there is little hope of getting our policies right. That message is just as relevant today. (Davidson, 1984, p. 561), original emphasis

Here we are on common ground – but then it takes little more than ten pages to backpedal from ‘accurately’ to ‘roughly’.

For Keynes as for Post Keynesians the guiding motto is "it is better to be roughly right than precisely wrong!" (Davidson, 1984, p. 574), see also (Colander, 1995, p. 283) for Marshall’s maxim

If we define the ambition of science as to get it *precisely right*, then the guiding motto of Post Keynesianism amounts to an invitation of ‘Babylonian incoherent babble’ (cf. Dow, 2005, p. 385) and leads, predictably, to a loss of theoretical coherence (King, 2002, pp. 203-208). The obvious logical crux of the motto is that there is no scientific criterion to decide between ‘roughly right’ and ‘roughly wrong’. Roughly right presupposes that one knows already what is right. In this case: why bother with the second best?

It is worth to recall how Keynes announced his scientific revolution and thereby set the task.

The classical theorists resemble Euclidean geometers in a non-Euclidean world who, discovering that in experience straight lines apparently parallel often meet, rebuke the lines for not keeping straight – as the only remedy for the unfortunate collisions which are occurring. Yet, in truth, there is no remedy except to throw over the axiom of parallels and to work out a non-Euclidean geometry. Something similar is required to-day in economics. (Keynes, 1973, p. 16)

Davidson, for one, took up the task (e.g. 2011, 2010) but an agreed-upon set of non-Euclidean axioms that defines the Post Keynesian hard core is still lacking. Keynes’s formal groundwork consisted in the main of two equations ($Y = C + I$, $S = Y - C$; 1973, p. 63). That *provisional* (O’Donnell, 1997, p. 158) formal basis is too small and contains quite a number of tacit assumptions. Taking this

two equations as a point of departure, an alternative formal foundation is in the following worked out because to gain full transparency about the basics is a *sine qua non*.

This paper's general thesis says that human behavior does not yield to the axiomatic method (cf. Hudík, 2011; Rosenberg, 1980), yet the axiomatization of the monetary economy's fundamental structure is feasible. By choosing *objective* structural relationships as axioms behavioral hypotheses are not ruled out. The structural axiom set is likewise open to the optimization calculus and to Keynes's fundamental psychological laws (for details see 2011c).

The formal ground is prepared in Section 1. In Sections 2 and 3 profit, retained profit and saving is defined in terms of the axiomatic variables. Then, in Section 4, the business sector is differentiated. This yields the General Complementarity that defines the relation between total profit, investment expenditure, household sector saving and distributed profit. This relation is contrasted to Keynes's *limiting* case in Section 5. In the final part, Sections 6 to 8, it is demonstrated in detail how the redundant definition of total private saving led to elementary logical flaws and how the resulting inconsistencies have been papered over with loose verbal reasoning. Section 9 concludes.

1 Axioms and definitions

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. Axiomatization is about ascertaining the *minimum* number of premises. Three suffice for the beginning.

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 .

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

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

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

The productivity R depends on an underlying production function. The 2nd axiom should therefore not be misinterpreted as a linear production function.

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

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

The axioms represent the pure consumption economy, that is, no investment expenditures, no foreign trade, and no taxes or any other state activity. Albeit quite obvious, it is worth to emphasize that all axiomatic variables are measurable in principle. No nonempirical concepts like utility, equilibrium, decreasing returns or perfect competition are put into the premises.

A set of axioms cannot be assessed *ex ante* because the full range of implications is not immediately evident, yet:

The contents can be disclosed completely by deduction. It then brings nothing to light which had not already been contended in the composite of axioms. (Klant, 1984, p. 25)

Definitions are supplemented by connecting variables on the right-hand side of the identity sign that have already been introduced by the axioms (Boylan and O’Gorman, 2007, p. 431). With (4) wage income Y_W and distributed profit income Y_D is defined:

$$Y_W \equiv WL \quad Y_D \equiv DN \quad |t. \quad (4)$$

Definitions add no new content to the set of axioms but determine the logical context of concepts. New variables are introduced with new axioms.

The economic meaning is rather obvious for the set of structural axioms. 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 are quite different things that have to be thoroughly kept apart.

2 Profit

The business sector's financial profit in period t is defined with (5) 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 :¹

$$Q \equiv C - Y_W \quad |t. \quad (5)$$

In explicit form, after the substitution of (3) and (4), this definition is identical with that of the theory of the firm:

$$Q \equiv PX - WL \quad |t. \quad (6)$$

Using the first axiom (1) and the definitions (4) one gets:

$$Q \equiv C - Y + Y_D \quad |t. \quad (7)$$

The three definitions are formally equivalent. If distributed profit Y_D is set to zero in (1) then we have as the most elementary configuration $Y = Y_W$. For the business sector as a whole to make a profit consumption expenditures C have in the simplest possible 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 (for details see 2011a). A theory that does not include at least one bank that supports the concomitant credit expansion cannot capture the essential features of the market economy (Keynes, 1973, p. 85). Since there is no capital in the pure consumption economy profit cannot be attributed to it as factor income (for details see 2012, Sec. 1.6). Mention should be made that neither Neoclassicals nor Keynesians ever came to grips with profit (Desai, 2008, p. 10).

¹ Profits from changes in the value of nonfinancial assets are neglected here, i.e. the condition of market clearing $O = X$ holds throughout. For details about changes of inventory see (2011d, p. 5). Nonfinancial profit is treated at length in (2011b).

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 Q_{re} is defined for the business sector as a whole as the difference between profit and distributed profit in period t :

$$Q_{re} \equiv Q - Y_D \Rightarrow Q_{re} \equiv C - Y \quad |t. \quad (8)$$

Financial saving is given by (9) as the difference of income and consumption expenditures. This definition is identical with Keynes's (1973, p. 63).²

$$S \equiv Y - C \quad |t \quad (9)$$

Financial saving (9) and retained profit (8) always move in opposite directions, i.e. $Q_{re} \equiv -S$. Let us call this the Special Complementarity. It asserts that the complementary notion to saving is *not* investment but negative retained profit. Positive retained profit is the complementary of dissaving. There is neither capital nor inventory investment in the pure consumption economy. Therefore, there can be no relation between saving and investment.

4 Precisely right

Having clarified the structural properties of the pure consumption economy we are now ready to include investment expenditure. Based on the differentiated formalism it is assumed that the investment goods industry, which consists of one firm, produces $O_I = X_I$ units of an investment good, which is bought by the consumption goods industry to be used for the production of consumption goods in future periods. The households buy but the output of the consumption goods industry (for details see 2011e). From (6) then follows for the financial profit of

² For the treatment of nonfinancial saving see (2011b, Sec. 2.1).

the consumption and investment goods industry, respectively:

$$\begin{aligned} Q_C &\equiv C - Y_{WC} \\ Q_I &\equiv I - Y_{WI} \end{aligned} \quad |t. \quad (10)$$

Total financial profit, defined as the sum of both industries, is then given by the sum of consumption expenditure and investment expenditure minus wage income which is here expressed, using (1), as the difference of total income minus distributed profit:

$$Q \equiv C + I - (Y - Y_D) \quad \text{with} \quad Y_W \equiv Y_{WC} + Y_{WI} \quad |t. \quad (11)$$

From this and the definition of financial saving (9) follows:

$$Q \equiv I - S + Y_D \quad |t. \quad (12)$$

Higher total financial profits on the one side demand as a corollary, i.e. as a logical implication of the definition itself, higher investment expenditure and distributed profits and lower saving on the other side. By finally applying the definition of retained profit (8) the General Complementarity follows:³

$$Q_{re} \equiv I - S \quad |t. \quad (13)$$

If retained profit Q_{re} is zero, that is, if profit and distributed profit happen to be equal in (8), then, as a corollary, investment expenditure and household saving in (13) must be equal too. Vice versa, if it happens that household saving is equal to investment expenditure then, as a corollary, profit and distributed profit must be equal too. In reality, though, profit and distributed profit are *never* equal and correspondingly household saving and investment are not equal either. The fact that retained profit is different from zero in the real world can be taken as an

³ This equation is not entirely new, see (Robinson, 1956, p. 402), (Lavoie, 1992, p. 159 eq. (4.3)), (Allais, 1993, p. 69), (Godley and Lavoie, 2007, p. 37 fn. 9). But only Allais clearly stated the implications: “Autrement dit l’investissement n’est pas égal à l’épargne spontanée, mais à l’épargne spontanée augmenté du revenue non distribué des entreprises ...” Roughly: “In other words, investment expenditure is not equal to spontaneous saving but to spontaneous saving augmented by the business sector’s retained profit ...” This, though, made not much impact on the other side of the language barrier.

empirical proof of the logically equivalent inequality of household saving and business investment. Allais has definitively settled the IS-debate of the 1930s in 1993. Since then, all models (including *IS – LM*) that have been built and are still being built on the arguments of (Hicks, 1939, pp. 181-184), (Ohlin, 1937), (Lutz, 1938), (Lerner, 1938), (Keynes, 1973, p. 63), (Kalecki, 1987, p. 138), (Minsky, 2008, pp. 162-164) and others have to be regarded either as limiting cases or as formally deficient.

5 Roughly right

When the profit definition for the pure consumption economy (i) in (14) and the investment economy (ii) is compared

$$\begin{array}{ll} \text{(i)} & Q \equiv Y_D - S \\ \text{(ii)} & Q \equiv I + Y_D - S \end{array} \quad |t \quad (14)$$

the first point to emphasize is that definition (i) is consistently replaced by the broader definition (ii). The inclusion of the investment process significantly changes the scope of profit generation.

For definition (ii) the corollary (15) holds: if it happens that distributed profit is zero then financial profit must be equal to the difference of investment expenditures and household sector's saving:

$$Y_D = 0 \Leftrightarrow Q = I - S \quad |t. \quad (15)$$

This implication of (ii) is well known as one of Keynes's 'fundamental equations for the value of money' (Keynes, 1971, pp. 124, 136). This means that, although Keynes was closer to the structural axioms in his *Treatise* than in his *General Theory*, he nonetheless was not general there either. The reason is that he did not accurately discriminate between profit and distributed profit and by consequence failed to formally take into account the process of profit distribution that is crucial for the functioning of the market system.

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)

6 Precisely wrong

The formalism up to the General Complementarity (13) is composed of axioms and definitions. In a strictly formal sense the definitions are dispensable. Any new symbol (definiendum) that is introduced with a definition is an abbreviation for a longer expression (definiens) that is composed of the variables of the axiom set and the familiar mathematical operators. So, when the word processor is instructed to replace one definiendum after another by its definiens then the equations become longer yet nothing else changes.

Since it is true that everybody is free to define whatever appears to be appropriate it seems that a definition could not pose any real problem. This, indeed, is *not* true because the full freedom of definition holds but for the *first* definition (cf. Boland, 2003, p. 87; Hahn, 1984, p. 40).

Let us suppose somebody looks at the General Complementarity (13), which states that retained profit for the economy as a whole is equal to the difference of the business sector's investment expenditure and the household sector's saving, and proposes to refer to the *sum* of saving and retained profit as *total private saving* Σ because retained profit may, commonsensically, be regarded as saving of the business sector (e.g. Lavoie, 1992, p. 159). Thereby a new definition, (i) in (16), would be added to the already existing formalism. Together with the General Complementarity (ii) this gives (iii) which states that *total private saving* Σ "equals" investment.

$$(i) \Sigma \equiv S + Q_{re} \quad (ii) Q_{re} \equiv I - S \quad \Rightarrow \quad (iii) I \equiv \Sigma \quad |t \quad (16)$$

We thus arrive at an implicit definition that is no proper definition at all (Stigum, 1991, pp. 35-36). Equation (iii) in (16) is not a dispensable abbreviation but simply permits the arbitrary *permutation* of the symbols Σ and I . It is clear from the derivation of (iii) that it is an elementary formal mistake to define total private

saving Σ and then to claim that $I \equiv S$ is an accounting truism. If anything, then $I \equiv \Sigma$ is the truism. The difference seems subtle but it is real.

The practical implication of (16) is: Let I be 100 and S be 100 in (13) then retained profit Q_{re} is zero. Alternatively, let S be zero then retained profit is 100. Economically, both configurations are as different as can be with regard to the financing requirements of the business sector; according to (16) they are the same. As a matter of fact, *all* feasible configurations are formally made to be the same by (16). $I \equiv \Sigma$ is like the broken clock that, however, is right twice a day.

Because, and this makes the refutation of (16) a bit circumstantial, if it happens that retained profit is zero in (i) then, as a corollary, it must hold that total private saving Σ and household saving S are equal, i.e. $\Sigma = S$. From (ii) then results as a corollary $I = S$ or in plain words: household sector's saving equals investment – *if retained profit is zero*, which *never* happens. In contrast, (iii) states that total private saving Σ is identical with investment I by definition (cf. Samuelson and Nordhaus, 1998, p. 204 and p. 194 for corporate saving).⁴

A *complete* resolution of this formally unacceptable state of affairs requires that the wrong turnoff (i) in (16) is *not* taken. This definition implicitly leads to (iii) which signals redundancy. Redundancy calls for Occam's razor.

Under the purely formal perspective the salient point is: in a system of equations $x = y$ signifies a condition that is satisfied by certain values of the unknowns; in a system of definitions $x \equiv y$ signifies a dead end or, in Keynes's words, a 'blind manipulation of symbols.' The expression $x \equiv y$ allows replacing the word apple wherever it appears by the word orange, and vice versa. From this, no profound insights are to be expected.

Under the conceptual perspective the salient point is: saving as the complement of consumption expenditure refers *exclusively* to the household sector.

It is true, of course, that neoclassical economists also consider *total private saving*, defined as the sum of personal and business saving, since the distinction between households and firms is often treated as a veil and individual agents are assumed to optimize total private

⁴ From the 1948 edition onwards, Samuelson never came to grips with profits (Tómasson and Bezemer, 2010, p. 16-17).

(rather than merely household) saving. (Gordon, 1995, p. 62), original emphasis

Yes indeed, neoclassicals are talking nonsense, but a paradigm shift is supposed to overcome the flaws of the obsolete paradigm and not to repeat them (Eichner and Kregel, 1975, p. 1301). There is *no* such thing as saving of the business sector. Ultimately, the saving-equals-investment formula results in superficial empirical studies (Gordon, 1995, pp. 60-62) and unacceptable conventions in national accounting (cf. Eisner, 1995, p. 109; Godley and Lavoie, 2007, pp. 260-263; Kakarot-Handtke 2012).

Conceptual consistency *prohibits* the application of the notion of saving to the business sector. The compelling reason for rejecting the definition of total private saving Σ in (16), and *everything* that follows from it, boils down to that it is conceptually inadmissible, implicitly leads to $I \equiv \Sigma$, which signifies redundancy, and for certain conditions to $I = S$, which is a *limiting* case of the General Complementarity with *no* real world correspondence.

7 Never *ex ante*, never *ex post*

No matters were more discussed in the literature of the 1920s and early 1930s than the role of the market mechanisms in co-ordinating saving and investment decisions and the consequences of their failure to do so, ... (Laidler, 1999, p. 325)

It did not get lost in the discussion that in fact investment expenditure might not be equal to household saving and this was explained with the perfect reconcilability of an *ex ante* disequilibrium with the *ex post* accounting truism $I \equiv S$ (Myrdal, 1939, p. 47), which in turn is different from the equilibrium condition $I = S$. This rationalization is beside the point for the simple reason that a meticulous recording of all transactions during one period arrives at the General Complementarity (13) which is the logical terminus of the analysis. Only after applying the indefensible definition of total private saving Σ the national accountant will arrive at $I \equiv \Sigma$ (with Σ being *different* from S). These extra entries are formally redundant. The *ex ante*–*ex post* interpretation, or, for that matter, the designed–undesigned interpretation

(Heilbroner, 1942, p. 828) fits the prevailing mode of ‘loose verbal reasoning’ (Dennis, 1982, p. 698) that cares not much for conceptual consistency. All that is necessary for an empirical proof is to add up the available numbers and to abstain from redundant definitions.

8 Set and subset

Keynes’s characterization of the ‘nature of economic thinking’ (1973, p. 297) has been summed up to: better vaguely right (ordinary discourse) than precisely wrong (blind manipulation of symbols). This alternative does not exist, at least not in science. Keynes recognized that without formal principles of thought ‘we shall be lost in the wood’ and struggled in Book II with fundamental definitions and ideas (Coates, 2007, pp. 82-91). He finally came up with equation (i*) (Dimand, 2010, p. 292), which follows from (11) as limiting case:

Axioms	Definitions	
(i) $Y = WL + DN$	(iv) $Y_W \equiv WL$	
(ii) $O = RL$	(v) $Y_D \equiv DN$	
(iii) $C = PX$	(vi) $Q \equiv C - Y_W$	t. (17)
(i*) $Y = C + I$	(vii) $Q_{re} \equiv Q - Y_D$	
if $Q = Y_D$	(viii) $S \equiv Y - C$	

The structural axiomatic approach rests on the three axioms (i)-(iii) that capture the elementary facts of a monetary economy, and five definitions. It formally reduces to Keynes’s limiting case (i*) and (viii) if profit is equal to distributed profit (with $Q = Y_D = 0$ as the most limited case). This never happens in the real world (Godley and Lavoie, 2007, p. 35).

Keynes’s main concern in the *General Theory* was not market or policy failure but theory failure. By consequence he envisioned nothing less than a paradigm shift (Coddington, 1976) and called for a ‘complete theory of a monetary economy’ (Keynes, 1973, p. 293), see also (Dillard, 2010). While perfectly aware that this at the same time required a consistent set of some kind of non-Euclidean axioms, Keynes had no desire that the particular forms of his ‘comparatively

simple fundamental ideas . . . should be crystallized at the present state of the debate' (cited in Rotheim, 1981, p. 571). It is no undue rashness to make good for the missing non-Euclidean axioms now.

9 Conclusion

Behavioral assumptions, rational or otherwise, are not solid enough to be eligible as first principles of theoretical economics. Hence all endeavors to lay the formal foundation on a new site and at a deeper level actually need no further vindication. The present paper suggests three non-behavioral axioms as groundwork for the consistent reconstruction of Keynes's formal foundations. The main results of this endeavor are:

- The profit generating expenditure-income asymmetry is the indispensable prerequisite for favorable business conditions and prolonged growth. This holds for the elementary consumption economy and the complex investment economy in equal measure.
- Models that are based on the collapsed definition *total income* \equiv *wages* + *profits* are erroneous because profit and distributed profit is not the same thing.
- Keynes proposed to 'throw over' the axioms of the orthodox theorists which 'resemble Euclidean geometers in a non-Euclidean world', but failed to heed his own appeal. His own formal basis is too small, contains too many tacit assumptions, and is not general.
- The Keynesian formalism is a subset of the structural axiom set. The General Complementarity is confirmed. With regard to all $I = S$ or $I \equiv S$ models it asserts that household saving is never equal to investment expenditure, neither *ex ante* nor *ex post*. The standard *ex ante*–*ex post* explanation consists of multiple logical errors that support one another.

The structural axiomatic approach solves the Profit Puzzle and fits Post Keynesianism consistently into a general and open formal framework.

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