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The Post-Wicksellian approach to
The Theory of Employment and
Price Determination*

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1.   Introduction

Much has been written on the differences and similarities between the Stockholm School and Keynes's General Theory[1]. Leaving aside the policy issues associated with the debate, it seems reasonable to say that whereas Keynes focused on a theory of endemic unemployment, the Stockholm School's major concern was with the cumulative analysis in time of a process of expansion or recession. Recent contributions to the debate focus on theoretical elements of the 'macroeconomic' dimension of the works being discussed. How does investment get out of gear m relation to saving and, when it does, what is the mechanism and variables of adjustment? These are recurrent questions. We shall not neglect these here but rather treat them as features of a post-Wicksellian stylized model in which questions about method and decisions made at the level of the firm are addressed.

Method was an issue discussed in the 1920s and 1930s. Lindhal (1939, p. 11) was quite conscious of his method, which was to study "a *dynamic process* as a *series* of *temporary equilibria*, between which there occur unforeseen events with consequent gains and losses". According to Keynes in the Treatise (JMK, V, p. 120) the "problem of monetary theory" is to be treated "*dynamically*, …, in such a manner as to exhibit the causal *process* by which the price level is determined, and the method of *transition* from one position of equilibrium to another". However, interested as he was in the dynamics of the process which, in the Treatise, lay behind the study of the credit cycle, it seems to be that the prolonged state of unemployment in the 1920s affected Keynes's position on method. In 1931 he argued that "it is a possibility that the duration of the slump be much more prolonged than most people are expecting and that much will be changed, both in our ideas and in our *methods*" (JMK, XIII, p. 344; emphasis were added in all the above passages). Indeed, we shall argue that Keynes' method of analysis changed between the Treatise and the General Theory.

In order to develop our arguments the article has been organized as follows. In section 2, a 'stylized post-Wicksellian model' is presented. Section 3 studies the extent to which the work of some of the exponents of post-Wicksellian monetary economics (Robertson, Ohlin, and Lindhal) conform to the model. Finally, in section 4 ae argue that whereas Keynes's Treatise is an important contribution to the post-Wicksellian tradition, the General Theory represents a departure from it.

2.   The post-Wicksellian model

In this section, we shall present a 'stylized' model characterized by three features. We propose to label the first element of the model as the 'Wicksellian shock', as described by a discrepancy

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[1] The following references provide a guide to the relevant literature: Ohlin (1937), the Ohlin Symposium (1978), Steiger (1978), Patinkin (1978, 1983), Gustavson (1973) and Hansen (1981).

between the flows of current income and aggregate expenditure. The systematic study of the causes of these disturbances owes a great deal to Wicksell (1935, vol. II) who, studying a 'credit system', argued for the independence of investment in relation to saving and, hence, of expenditure in relation to income. The Wicksellian shock is the source of exogenous change *par excellence* in the model; the other two features associated with the adjustment of the system to this change.

Producers, who we assume have been making their decisions over a period of relative normality, are taken by surprise by the shock. The extent of their surprise is measured by the discrepancy between their expected price (or expected level of inventories) and the market clearing price (or actual level of inventories). Once they take notice of the change, their short-period expectations[2] is affected and the planned levels of price, inventory and output change. Expectations play a major role in the reverberation of the shock in the system; the way we assume they are formed in the minds of producers makes a great difference for the method of analysis employed. If they are assumed not to have a definite formation pattern or to be subjectively formed, the system may simply follow a random path over a sequence of short-periods. If, on the other hand, they are assumed to be formed according to a certain rule – an expectational function – the dynamic process may be studied in terms of an equilibria position the system may eventually attain and stability considerations start to play a role. The typical post-Wicksellian contribution though is based on the notion of an erratic path with which ae shall associate the method of 'finite period analysis'. The alternative method shall be referred to as the 'equilibrium' method.

The last feature of the model refers to the adjustment variables 'inside' the short-period and during the transition between two periods. As for the adjustment 'inside' the short-period, in most of the cases studied, the price level is assumed to be the relevant adjustment variable. We shall identify the adjustment through prices with the 'forced saving' mechanism according to which those with fixed (or contractual) money incomes suffer a change in their purchasing power because of the Wicksellian shock and its adjustment. In the case of adjustment between periods, that is, when we go beyond the short-period, output and employment are supposed to adjust as well.

3.   Some post-Wicksellian theorists

Not all monetary theorists of the 1920's and 1930's gave similar weight to the components of the model. Lindhal, however, was an exception and that is why we have chosen him for a detailed

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[2] The short-period corresponds to the shortest time horizon after which the producer can revise his decisions to produce and employ. It refers to what Keynes once called the 'employment' or 'production' period (JMK, XXIX, p. 75) or to the time-unit with which in the General Theory he associates 'daily decisions' producers have to make (JMK, VII, p. 47). The levels of output and employment are *fixed* by construction 'inside' the short-period.

analysis[3]. Others, such as Robertson and Ohlin make partial use of the three components[4]. Before turning to Lindhal, we shall dedicate a few paragraphs to these two other post-Wicksellian theorists.

In the Robertsonian system, we can clearly identify two of the elements of the model: the Wicksellian shock and the forced saving mechanism. As for the former, it springs from Robertson's postulate of a lagged consumption function:[5] today's consumption (C_1) is assumed a function of yesterday's income (E_0), $C_1 = f(E_0)$. Today is saving (S_1) is therefore given by the difference between yesterday's income and today's consumption: $S_1 = E_0 - C_1$. Now, today's income (E_1) – or, we would rather say, expenditure – is given by today's consumption plus investment (I_1): $E_1 = C_1 + I_1$. These equations imply, of course, that $E_1 - E_0 = I_1 - S_1$, the Robertsonian 'expenditure lag' or the Wicksellian expenditure shock. As for the adjustment mechanism, it can be described as follows[6]. An increase in investment demand (driven by higher marginal productivity of capital) leads to a rise in the demand for loanable funds (credit). If the banking system accommodates such demand, production of capital goods increases and so does the wage bill in that sector. The demand for consumption goods is raised but since output is fixed in the immediate period, prices rise, forcing those with a fixed money income to 'lack', i.e., to consume less than they could in expenditure equilibrium conditions. 'Automatic lacking' is the term Robertson uses to describe the forced saving mechanism[7].

Substituting Robertson's *lagged* for *planned* consumption makes his system quite similar to the one described by Ohlin (1937). Not only investment decisions are based on expectations but consumption as well depends on families' expected income in the future[8]. *Ex-ante* consumption (C_A) and saving (S_A) exhaust next period's expected income (E_A): $E_A = C_A + S_A$. Now, planned investment (I_A) may differ from *ex-ante* saving, i.e., $S_A \neq I_A$ – the Stockholm version of the Wicksellian shock. If they do, *ex-post* variables will differ from their *ex-ante* counterparts. The process of adjustment, according to Ohlin, cannot be referred to as 'pure' forced saving since he assumes that not only prices and inventories but output as well may change[9]. Of course, his analysis goes beyond the short-period

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[3] Among the participants of the Stockholm School, Lindhal plays a prominent role in synthetizing Wicksell's theory as the following passage by Ohlin (1937, p. 53) attests: "[Wicksell's] *Geldzing Und Guterpreise* of 1898 and his later books and papers on money contained the embryo of 'a theory of output as a whole', although this fact was not clearly perceived until the late 'twenties, when Professor Lindhal presented his elaboration of Wicksell".

[4] A third name that comes to mind is that of Myrdal whose main contribution was the introduction of the ex-ante/ex-post distinction but who was quite critical of the period analysis method, as we shall notice presently.

[5] See Robertson (1933 and 1936).

[6] See Presley (1978, Part 11, Ch. 4 and 1981, p. 189) for a detailed discussion of the process of adjustment.

[7] For the sake of further comparison, the reader will appreciate that in Keynes's Treatise profits (Q) are the result of a Wicksellian shock, that is, $Q = 1 - S$, and that Keynes himself, in a memorandum sent to Robertson in March of 1932 (JMK, XIII, p. 286), equates Q to L_2, L_2 standing for Robertson's 'automatic lacking'.

[8] Ohlin (1937, p. 62-3) criticizes Keynes's notion of propensity to consume on the ground that it does not account for expectations; he argues "[the] term 'propensity to consume' could well be used to indicate the relation between expected income and planned consumption".

[9] Ohlin argues that during an expansion ex-post saving equals investment because "some individuals and firms find that they have had larger incomes than they expected. In other words, realized savings exceeds planned savings" (1937, p.

– otherwise prices and inventories would carry the burden of the adjustment process.

The explicit introduction of short-period expectations on the part of *producers* differentiates Lindhal from Robertson and Ohlin. The consequence of this emphasis on producers' expectations being a clearer exposition of finite period analysis. Recognition that time plays an important part in understanding the decisions surrounding production and pricing is a decisive step for Lindhal's approach. "Timeless production", he argues, "is ... strictly speaking, impossible" (1939, p. 272). Lindhal departs from a (timeless) static model by introducing two additional elements to the system: the time element by parcelling out the period of analysis into short bits of calendar time and the nature of foresight (perfect or imperfect) with which agents are supposed to make their decisions. Lindhal studies the movement from a timeless system to a system in which the tine factor and expectations are central in his 1929 "The place of capital in the theory of prices".

Assuming perfect foresight – that is, "that individuals have full knowledge of all future data" (1929, p. 285) – implies what Hicks defines as 'intertemporal equilibrium' in Value and Capital; an equilibrium path, which Lindhal characterizes as one in which "prices and costs of production shall coincide, and ... all productive resources shall be fully employed" (1929, p. 330). Allowing for imperfect foresight puts expectations at center stage; unforeseen events change agents' plans. Incorrect expectations drive the system out of equilibrium – as defined above – leading to unexpected gains and losses and undesired utilization of resources. If prices are supposed to 'accommodate agents' unattached plans, the system will be characterized by a series of 'temporary equilibria' – to use the Hicksian term[10]. The aim of the method, as Lindhal himself puts it, is closely associated with the study of the effects of assuming "unforeseen events" which cause "people to modify their ideas regarding the future" leading to "a new price system, corresponding to anticipations during [the present] period" (1939, p. 338)[11].

Once the role of expectations recognized and wade clear, the door is open to study Lindhal's version of the post-Wicksellian model which he presents in "The rate of interest and the price level" (1930). His objective and method are clear enough, that is to say, to study "a *dynamic process* as a *series* of *temporary equilibria*, between which there occur *unforeseen events* with consequent gains

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[10] Hicks himself went through the same movement – from 'intertemporal' to 'temporal' equilibrium in Value and Capital. In fact, he recognizes Lindhal's influence in his contributions (see Hicks, 1977 and 1982). It is rather interesting to note that Hicks (1936, p. 86) was the first to mention a similarity between the contributions of the Stockholm School and Keynes's General Theory.

[11] Many critics have referred to the danger of this method as being the abandonment of the notion of equilibrium, and, therefore, of 'definite results' or consequences of changes in the data or primary factors Myrdal (1939, p. 31) was the first to point out that Lindhal's 'attempt to rid himself of [the concept of equilibrium] has deprived his theoretical analysis of the clarity in some directions it might otherwise have attained". Hicks, whose Value and Capital has been widely regarded as the most influential work on the 'temporary equilibrium' method, also indicated its problems when he wrote in 1936 that 'the method [of expectations] is an admirable one for analysing the impact effects of disturbing causes, but it is less reliable for studying the further effects... The more ae go into the future the greater is the source of error, so that there is the danger, when it is applied to long periods, of the whole method petering out" (1936, p. 87).

and losses" (1939, p. 11; emphasis added). The central element of the analysis is a price equation according to which the price of consumption goods (p) is related to nominal income (E), the propensity to save (s) and the quantity of goods (X) available in a certain period: $pX = (1-s)E$. The price level is supposed to depend on s, E and X.

He conducts an exercise in which the source of external shock is associated with a change in the policy of the Monetary Authorities whose "actions can ... be regarded as *primary causes* from the point of view of the determination of prices" (1939, p. 151; emphasis added). The effects of a change in monetary policy is studied through the price equation presented above; although Lindhal briefly discusses the effects on income (E) and the propensity to save (s), he greatly eaphasizes the effects on the output of consumption goods (X) which essentially "depend on what assumptions are made as to the productive organization of the community and the *expectations of entrepreneurs*" (1939, p. 162; emphasis added). Let us assume that the change in monetary policy reduces interest rates. The immediate effect is to increase the stocks of consumption goods due to the reduction in the cost of holding inventories, which tend to reduce their supply and, thus, bring about a rise in the price level. Further effects (throughout the following periods) depend essentially on the change in the profitability of investment and the expectations of entrepreneurs as to the future trend of consumer goods prices[12].

The effect of lower interest rates on investment demand characterizes the Wicksellian shock. Further developments, which depend on entrepreneurs' expectations as to the relative profitability of producing consumption and capital goods, give rise to the study of a dynamic process in which expectations drive the system, characterizing the 'finite period analysis' method. As for the third and last feature of the model, it is also clearly present in the analysis. Forced saving as characterized by a reduction in the purchasing power of earners of fixed money incomes is the mechanism of adjustment whenever full utilization of resources is assumed. Lindhal recognizes this by asserting that "[t]he rise of the price level reduces real income for all persons with contractual earnings ... in favour of other recipients of income. The shift in the price level will be sufficiently large to cause such a change in the distribution of incomes that total saving in the community will correspond to the value of real investment, the extent of which is primarily determined by the rate of interest" (1939, p. 175). Lindhal also considers the case where there are idle resources and where the response to the new policy would be an increase in output (rather than only prices) throughout the process of expansion.

In his "Note on the Dynamic Pricing Problem" sent to Keynes in 1934, Lindhal emphasizes even more than in 1930 the role of producers' expectations in the characterization of dynamic processes. Here is a summary of the ideas expressed in the note. At the beginning of any period

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[12] Lower interest rates tend to increase the profitability of investment; at the same time, it is assumed that if the price of consumption goods is expected to increase, the profitability of current investment is increased. These effects tend to induce a transference of factors of production from the consumption to the capital goods sector, leading to a reduction in the output of the former and a rise in its price level.

producers are assumed to have an expectation of what мі11 be the value of the goods delivered during the period, $E[pX]$, where $E[]$ stands for an expectation operator, p is the price level and X the physical volume of the goods to be transacted. Lindhal assumes that this expected value is equal to the income (E) of the factors of production, that is, $E = E[pX]$. At the end of the period the value, actually delivered equals $Y = pX$ where Y actual expenditure is. Consumers and investors decide how much to consume and demand capital goods. Although each individual agent may not see their (ex-ante) expenditure plan realized, the sum of all plans determines the (ex-post) flow of aggregate expenditure.

If aggregate expenditure exceeds income ($Y > E$), producers will find that "demand ... has been greater ... than [they] expected when [they] previously announced the supply price" (1934, p. 124). In this case, either $p > E[p]$ (if inventories are assumed to remain fixed) or $X > E[X]$ (if the price is fixed). These inequalities – the consequence of unforeseen events – shall be taken into account by producers in their next period's decisions. The interplay of expected and realized results is the basic idea behind Lindhal's dynamic process analysis. At the end of his note Lindhal states quite clearly the method of analysis employed in the model; he argues that the "dynamic process" being analysed

> "is not a continuous one, but ... it consists of two types of movements: first the events during certain periods of time and, secondly, the events at the transition points between these periods. The determinants of these latter discontinuous changes, that is, the alterations of the plans of production and consumption ... may be regarded as the central part of the dynamic theory" (JMK, XXIX, pp. 130-31).

4.   Keynes in the Treatise and the General Theory

We also can identify the elements of the post-Wicksellian model in Keynes's Treatise. According to the Treatise's model, firms are assumed to fix the levels of output and employment at the beginning of the 'production' period based on the expected demand for their product and the conditions prevailing in the markets for 'factors of production'. Given the remuneration rates of the latter (which, to simplify, we shall identify with the wage rate (w)), technology and the *expected* sale proceeds, firms fix the level of output (X^*) and employment (N^*). The expected price ($E[p]$) is given by the average cost of production X^*[13], that is,

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[13] Differently from the General Theory where profit maximization is assumed (and, therefore, the marginal cost is equated to the price), in the Treatise, it is assumed that the average cost is equated to the price. Harrod notices this point as early as 1936 in his The Credit Cycle (p.66); Patinkin (1976, p. 7) also notes the "complete failure to make use of marginal analysis [in the Treatise]". The notion of equilibrium underlying the Treatise's model – Marshall's long period equilibrium – explains why producers are supposed to equate the price to the average cost.

$$E[p] = \frac{w}{a(N^*)} \tag{1}$$

where $a(N^*)$ is the average product of labour – or "human effort", as Keynes refers to it in the Treatise (JMK, V, p. 122). Assume that firms do not carry stocks from one period into another. If expectations are disappointed, the expected and actual (or market clearing) prices corresponding to X^* will differ, i.e., $p \neq E[p]$. Profits or losses (Q) would therefore be written as[14]:

$$Q = (p - E[p])X^* \tag{2}$$

which, together with equation (1), gives rise to a first version of the fundamental equations:

$$p = E[p] + \frac{Q}{X^*} = \frac{w}{a} + \frac{Q}{X^*} \tag{3}$$

The price level according to equation (3) can be seen as composed by an expected plus an unexpected (or windfall) element, or by a cost (w/a) plus a profit (Q/X^*) component.

We now turn to the conventional interpretation of the Treatise according to which, as in all post-Wicksellian contributions, the lending policy of the banking system plays an important part in making investment (l) índependent of saving (S). Saving and consumption are assumed to exhaust income, that is $E = C + S$. Since, on the other hand, expenditure is determined by consumption and investment, $Y = C + I$, profits are given by the difference between expenditure and income or investment and saying, that is,

$$Q = Y - E = I - S \tag{4}$$

Equations (3) and (4) give rise to the second version of the Fundamental equation:

$$p = \frac{w}{a} + \frac{I - S}{X^*} \tag{5}$$

Equilibrium requires the flows of investment and saving to match ($I = S$) and that expectations be fulfilled ($E[p] = p$). Both conditions are met when profits are zero ($Q = 0$) and the price level is

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[14] 'Profits' in the Treatise are essentially unexpected; thus Keynes's recurrent reference to 'windfall profits'. He actually writes that '[i]t has been suggested ... that it might be better to employ the term *windfalls* for what I here call *profits* (JMK, V, p. 113).

equal to "the rate of efficiency earnings" (w/a) (JMK, V, p.122)[15]. According to this construction, the real wage would be given by

$$w^* = a(N^*)\left[1 - \frac{I - S}{X^*}\right]$$

(6)

That is to say, given a Wicksellian shock ($I \neq S$), distribution will accommodate. This 'forced saving' adjustment mechanism results from the assumption of fixed aggregate output (X^*) 'inside' the short-period. If we go beyond the short-period – as, indeed, we would argue Keynes goes in his chapters on the credit cycle (JMK, V, chapters 16-19) – output may also adjust[16]. Going beyond the short-period allows the analysis of a sequence of these periods leading to what we have referred to as the 'finite period analysis' method.

An additional conclusion might be drawn from what has been argued so far, namely, that both Lindhal and Keynes had to make use of imperfect foresight or expectational errors to explain deviations from an equilibrium position characterized by full employment. In the remainder of this paper we shall argue that Keynes, *en route* to the General Theory, made a different movement: he went from a profit disequilibrium model in which expectational errors had a role to play (Treatise) to an equilibrium theory of (un)employment with no sight of imperfect foresight on the part of producers (General Theory).

In the General Theory, the role of short-period expectations is much reduced[17]. In fact, in the final *expose* of Keynes's new theory of employment (to be found in chapter 13 of the General Theory and the 1937 article "The General Theory of Employment") they are completely abandoned[18]. This implies a situation of continuous 'profit equi1ibrium', that is, $[Ep] = p$ and $Q = 0$. In addition to profit equilibrium, Keynes now assumes profit maximization cum perfect competition giving rise to a different price equation, namely, $p = w/e(N)$, where $e(N)$ stands for the marginal product of labour[19].

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[15] The reader will appreciate that, together with the condition referred to above (i.e., $p = w/a$), equilibrium in the Treatise is characterized by full employment of the factors of production (JMK, V, p. 137); precisely the same conditions that characterize Lindhal's equilibrium.

[16] When describing the cycle in the Treatise Keynes writes that given a primary stimulus (say, an increase in investment demand), "[w]e have, under the influence of the windfall profits accruing from the price rise ..., a secondary stimulus to an increased volume of output". (JHK, V, p. 258).

[17] In the General Theory, in particular chapters 3 and 5, short-period expectations still play a part in determining the level of effective demand. At the end of ch. 5, however, Keynes writes that "[i]t will often be safe to omit express reference to short-term expectations, in view of the fact that in practice the process of revision of short-term expectations is a gradual and continuous one, carried on largely of the light of realized results" (JMK, VII, p. 50).

[18] The abandonment of expectations was a deliberate decision taken because they only add unnecessary complications to the analysis. In his 1937 lecture notes, Keynes argues that "[t]he theory of effective demand is substantially the same if we assume that short-period expectations are always fulfilled" (JMK, XIV, p. 131).

[19] To the assumption of perfect coopetition and the principle of profit maximization, Keynes adds the assumption of

Another innovative element of the General Theory is the introduction of the principle of effective demand according to which, given a change in investment, income (prices *and* output) will accommodate in such a way that, the change in saving will be equal to the initial change in investment. Essential for this principle is the enunciation of Keynes's 'psychological law' according to which consumption varies together with income but not to the same extent. The law provides the stability condition for the adjustment process following a change in investment.

The relevant points for a comparison between the General Theory and the post-Wicksellian model have been laid down; let us proceed to the comparison itself. There is no essential difference in terms of the Wicksellian shock: in the General Theory Keynes preserves the notion that the system is essentially driven by disturbances in the flow of income and expenditure. The fundamental differences are related to the adjustment mechanism and the method of analysis. As for the former, the introduction of systematic changes in output makes a significant difference: given the assumption of decreasing returns, it is still the case that a worker with a fixed (or contractual) nominal remuneration will suffer a loss in his purchasing power. However, a larger number of workers will be employed and the overall purchasing power – measured by the output of the consumption goods sector will be increased. In terms of methods of analysis, Keynes departs from period analysis by adopting the equilibrium method. Essential for such transition are the assumption of continuous profit equilibrium and the enunciation of the 'fundamental psychological law'[20].

As for a comparison with Lindhal and the Treatise, the reader will appreciate that unemployment in the General Theory may be depending on the determinants of effective demand – a characteristic of the equilibrium position. It is neither a result of an expectational errors nor a characteristic of disequilibrium positions.

decreasing marginal returns (JMK, VII, p. 17) implying an inverse correlation between the level of employment and the real wage.

[20] Patinkin (1983, chaps 1 and 4) has emphasized the equilibrating role of output and stabilizing role of the 'psychological law' is the development of the principle of effective demand. We would add the essential role of assuming profit equilibrium (or perfect foresight) both in relation to the equilibrating mechanism and the stability of the process of adjustment.

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