The Pasinetti Paradox

Rahul A. Shastri & A. Nagaraj*

Introduction

Pasinetti's[1] results have intrigued several economists, notably Modigliani and Samuelson.[2] We attempt, in this brief article to demonstrate that the results rest on one crucial assumption. This assumption is so restrictive that it appears to deprive the investment rate of its exogenous role, thereby erasing the Keynesian flavour of the model. Relaxation of this assumption almost revalidates the generality of Kaldor's model. Pasinetti in a personal letter points out that the crucial assumption of his model are in reality conditions of long run equilibrium. In which case, Kaldor's[3] first article is in a context different from Pasinetti's. It seems Pasinetti's model has the background of Golden Ages whereas Kaldor's articles does not seem to be restricted to the Golden Age only. Thus Pasinetti's model seems to be a departure from, and not merely an amendment of Kaldor's formulation.

In his model of distribution, Pasinetti has corrected the minor lapse in Kaldor's model[3], and arrived at the apparently strange result that even when workers save and invest, share of profits depends solely upon the rate of investment, given the propensity to save of capitalists. Symbolically :

$$P/Y = I/Y - 1/s_c \qquad [1]$$

(Strange as it may seem it can be proved, given Pasinetti's assumptions, that s_w alone matters in distribution of income, see Appendix D)

Eclipse Sw

1.2 What has become of s_w the savings propensity of the workers? In Pasinetti's model s_w does not seem to play any role.[4] P/Y in Pasinetti's model is profits of capitalists and workers put together. His intriguing result gives a feeling that there is a catch somewhere and that it needs to be cleared.

1.3 The catch can be located in one of his assumptions (Kw/ K= Sw/S) due to which his model gravitates towards the special case of Katdor, where $s_w=0$ and all profits accrue to the capitalists alone. What Pasinetti adds with one hand

---

* Late Prof. A. Nagaraj was the Founder-Director of NAD, and Dr. Rahul A. Shastri is currently the Joint Director of NAD (National Akademi of Development). The full version of this paper is available in Asian Economic Review, Vol. XXVII, No. 1 & 2, April & August, 1985, or upon contact: rahulshastri@hotmail.com.

To Kaldor's model, he takes away with the other, and arrives at a result which looks as if $s_w = 0$ and all profits go to the capitalists.[5]

Crucial Assumption

1.4 In his model, it can be shown that:

$$P/Y = I/Y \cdot I/s_c \cdot \left(\frac{1-S_w/S}{1-K_w/K}\right) \quad [2][6]$$

In his analysis, Pasinetti makes a specific assumption that in a situation of dynamic equilibrium Sw/S=Kw/K Therefore in equation [2] the term within parenthesis assumes a value equal to unity, yielding :

$$P/Y = (1/s_c) - (1/Y) \qquad [3]$$

1.5 It is obvious that the savings propensity of workers is implicit in Pasinetti's astounding result, but does not surface in his final equation only because of his specific assumption. If Sw/S and Kw/ K were not equal to each other, Pasinetti's equation would not be so strange and 'sticky'.

Implications of the Assumption

1.6 The eclipse of Sw apart, Pasinetti's assumptions have very implications for the economic logic of his model. The assumption is highly restrictive. For one, it fixes the shares in capital at the historically obtained level.[7] This must be so. Since Sw/S= Kw / K, KW / K can never vary. That is, if workers' share in incremental capital is the same as their share in existing capital, their share in wealth cannot alter over time. Since Kw/K is fixed, so is Sw/S.

1.7 From this emerges a contradiction in logic. Constancy in workers' share of savings contradicts the post-Keynesian proposition that changes in investment rate alter the shares in National income. As long as workers save something, changes in their share of National Income will alter their share of savings. Hence any change in the share of workers in income will go against the assumption Sw/S=Kw/ K.

Heuristically this can be proved as follows :

Since Sw/S is given, so is Sw/Sc. We know that s_c Pc = Sc and s_w (Pw +W)=Sw. Hence:

$$Sc/Sw = (s_c/s_w) \{Pc/(Pw + W)\} \quad [4a]$$

Since in [4a], Sw/S is constant, (Pc/Pw+W) cannot change. Thus Pasinetti's assumption from which his startling conclusion follows, is so restrictive, as to preclude any redistribution of incomes.

1.8 In fact the assumption Sw/S=Kw/K implies a unique unalterable P/Y given by the relation:

$$P/Y = \frac{s_w}{a \cdot s_c + (1-a) \cdot s_w} \quad [5][8]$$

where 'a' is the share of workers in total wealth

This shows that given the propensities to save and the historically given distribution of wealth, there can be only one determined distribution of National Income. The flexibility is lost. The rate of investment plays no role in the determination of the share of profits.[9] In fact, the investment rate is itself determined in terms of the fundamental parameters and is no more exogenously determined.[10]

1.9 Though the relationship $P/Y = 1/s_c \; I/Y$, continues to hold, it is a relationship between two dependent variables, the values of each being determined by thriftiness conditions and the historically determined distribution of wealth. The assumption of a fixed share of wealth and saving of workers, is so restrictive, as to rob the autonomy of the rate of investment. The Keynesian flavour of the model is lost, and it becomes rigid.

Distribution in Disequilibrium

1.10 Once we drop the condition of 'dynamic equilibrium' (see para 1.3), the equation [2] becomes relevant. It is now clear that an increased investment rate will raise the share of profits in National Income invariably. Only in the special case, where workers' share in wealth is constant, we have the well known Pasinetti result given by equation [3]. If the workers' share of wealth is falling, P/Y will be greater than indicated by Equation [3];and vice-versa.

Pasinetti vis-à-vis Kaldor

1.11 It is interesting to place Pasinetti's corrections in Kaldor's format. Upon simplification of [2], the fundamental equation of distribution would look as :

$$P/Y = \frac{1}{1-a}\left(\frac{I/Y}{s_c - s_w} - \frac{s_w}{s_c - s_w}\right) \qquad [6]^{11}$$

where a = Kw / K

Therefore:

$$P/Y = \frac{K}{K_c}\left(\frac{I}{Y}\,\frac{I}{s_c - s_w} - \frac{s_w}{s_c - s_w}\right) \qquad [7]$$

It is obvious that Kaldor's basic equation is in no way transformed except that it is prefixed by an overall multiplier given by the term K/Kc. When the workers do not invest, K/Kc equals unity, and the equation reverts to the original Kaldorian form. The class bias in the capitalist system of distribution, in the general case, works more subtly, than hitherto believed.

Notes and References

1. L. Pasinetti, "Rate of Profit and Income Distribution in Relation to the Rate of Economic Growth", Review of Economic Studies,Vol.29, 1962.

2. Modigliani and Samuelson, "The Pasinetti Paradox in Neo-classical and more General models". Review of Economic Studies, Vol33, 1966. Modigliani and Samuelson examine Pasinetti's results in the context of standard Neoclassical assumptions. In our essay, however, we examine the internal consistency of the model.

3. Kaldor, N., "Model of Distribution" Growth Economics, Ed. A. K. Sen.

4. This contrasts glaringly with the case of capitalists' share in National Income, in the determination of which both s_w and s_c play a role (Pasinetti, 1962).

5. Pasinetti explains that his results occur because the total savings of

workers will equal what capitalists would have saved from the workers' profits, if these had accrued to them (Pasinetti, 1962). His argument is based upon the 'proportionality relation' between profits and savings. This relation implies Pw / Pc = Sw / Sc . Since Pw / Pc = Kw / Kc, the 'proportionality relation can hold only if Sw / Sc = Kw / Kc, which is the 'crucial assumption' of Pasinetti, analysed below (in the form Sw/ S=Kw/ K).

6. For proof, see Appendix A.

7. For proof, see Appendix B.

8. For proof, see Appendix C.

9. The independence of the Investment rate is considered crucial to any 'Keynesian' model of distribution, see Kaldor, p. 84 (op. cit).

10. This result is not so strange as it appears. A little manipulation with Pasinetti's assumptions (See Appendix D) yields a relationship between P/Y and I/Y, from which s_c is wholly absent. Symbolically

$$P/Y = 1/(1-a) - \frac{I}{Y}\left(\frac{a}{s_w(1-a)}\right) \qquad [8]$$

Where a = Kw / K

It may be noted that this equation is independent of the other equation derived by Pasinetti referred to earlier (3). It follows that Pasinetti's model contains two independent equations in two unknowns P/Y and I/Y, given in terms of the parameters s_w, s_c and the historically given distribution of wealth.

11. For derivation from eq. 2 see Appendix E. The equation can also be easily derived from the Kaldor's amended equation (Pasinetti, 1962).