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A note on IYLM, ISLM and General Theory-compatible modelling

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Introduction

In a recent article titled 'IYLM: a *General Theory*-compatible replacement to ISLM', Roderick O'Donnell and Colin Rogers (2016, *Cambridge J. of Econ.* 40(1), 349-364) offer a model claimed to be 'a representation of the *GT*'s central general propositions' substantially different from the ISLM version. In this short note, it is shown that: a) the IY equation (product market equilibrium condition) is mis-specified, b) once the additional 'overall equilibrium condition' i = mec is added, the IY-LM model is formally an IS-LM model. It is argued furthermore that the effects of the entrepreneurs' long-term expectations and of the state of liquidity preference can be made explicit in the investment and money demand functions to account for those highly Keynesian features within the IS-LM framework.

The IYLM model

The IYLM model can be summarized as follows (p 356):

- 1) IY equation: Y = C(Y) + I(mec), 0 < C' < 1, I' < 0
- \rightarrow decreasing relationship between Y and mec: Y (mec), Y' < 0
- Y: aggregate output, C: aggregate consumption, mec: marginal efficiency of capital
- 2) LM equation: M = L(PY, i)
- \rightarrow relationship between *Y* and *i*: *Y*(*i*),
- Y' > 0 in the exogenous money version (positively sloped LM),
- $Y' = \infty$ in the endogenous money version (horizontal LM)
- M: quantity of money, i: long-term interest rate, P: output price
- 3) "Overall equilibrium condition": *i* = *mec*

The investment function in equation IY is quite surprising:

i) it is a *decreasing* function of the *mec*

ii) it overlooks the interest rate

iii) as a result, the product market equilibrium equation is independent of the rate of interest.

The authors argue that the function I(mec) in equation IY is the 'mec schedule' 'not conflated with an investment demand curve' (p 353). The 'mec schedule' according to them 'ranks the accumulated value of investment projects against a descending mec'. But, since the function I(*mec*) is a schedule, not an investment demand function, it should not appear along with the aggregate demand for consumption in the demand side of the goods market equilibrium equation IY. The IY equation is mis-specified because the schedule I(mec) is not a determined demand insofar as the rate of interest is not considered. The investment demand, in *The General Theory*, is determined by the condition mec = i (remember that *mec* is a decreasing function of investment; *GT* p. 136), so that IY is mis-specified as long as I(mec) is not replaced by I(i), or equivalently I(mec=i); but the authors use the function I(mec)instead.

As a consequence of the IY mis-specification, the product market does not depend on the rate of interest if one only considers the IY equation. Then the authors introduce an additional 'overall equilibrium condition for simultaneous equilibrium in both markets': i = mec. By substituting *i* for *mec* in the IY equation, the mis-specification is removed, but now the investment function is a standard decreasing function of the rate of interest, and the IY equation a standard IS equation. One may agree that 'It is the economics incorporated into the diagrams and equations that matters, not the mathematics' (p 352), but the IYLM model amounts formally to an ISLM model.

The economics incorporated into equations

Although the I(i) and L(Y, i) functions look very much like the orthodox IS-LM functions, there is something that makes them very different actually. In standard economics, demand and supply functions result from optimal decision making based on expectations that are determined by the individuals' knowledge about the future, in spite of the existing risks. This is because the future, it is assumed, is not fundamentally uncertain, but only risky, in the sense that the risks can be measured objectively and, therefore, they can be covered by means of appropriate insurance contracts. Expectations therefore just reflect -but do not influence- the system predetermined laws.

Keynes's theory, on the other hand, acknowledges that the future is fundamentally uncertain, so that individuals, even rational, cannot learn about the future, although they do forecast. The system is deprived of any predetermined equilibrium position they could objectively discover in advance but by chance. According to *The General Theory*, therefore, long-term expectations are deprived of an objectively predictable anchor, in such a way that individual cannot but form demand and supply plans according to their subjective views about the future. As a consequence, the subjective views about the future determine the equilibrium position at

any point in time, for the demand and supply functions – hence the equilibrium prices and quantities, depend on the subjective views at any point in time:

"A monetary economy, we shall find, is essentially one in which changing views about the future are capable of influencing the quantity of employment and not merely its direction. But our method of analysing the economic behaviour of the present under the influence of changing ideas about the future is one which depends on the interaction of supply and demand, and is in this way linked up with our fundamental theory of value. We are thus led to a more general theory, which includes the classical theory with which we are familiar, as a special case." (GT, p xvi)

"Or, perhaps, we might make our line of division between the theory of stationary equilibrium and the theory of shifting equilibrium -- meaning by the latter the theory of a system in which changing views about the future are capable of influencing the present situation." (GT, p 293)

It is essential, to any *General Theory* compatible model, that the investment and moneydemand functions reflect the views about the future, and move in accordance with any change affecting them. This entails that the position of the I(i) and L(Y, i) curves, and, thereby, the equilibrium interest rate and output level, depend and shift according to the views about the future.

Keynes's insightful concept of 'shifting equilibrium' would be reflected much more effectively in the models if the entrepreneurs' long-term expectations and the state of liquidity preference appeared explicitly as explanatory variables in the functions. This can be done by defining the investment function at a point in time as a negative function of the rate of interest *i* and a positive function of a variable representing the state of long-term expectations, noted *LTE* for instance:

IS_K) $Y = C(Y) + I(i, LTE), I'_i < 0, I'_{LTE} > 0$

As for the LM function, limiting the discussion to the Keynes 'vertical' case:¹

 LM_{K}) $M = L(Y, i), L'_{Y} > 0, L'_{i} < 0,$

the money-demand function can be defined as a positive function of a variable representing the state of liquidity preference, noted *SLP*: *L* (*Y*, *i*, *SLP*), $L'_{SLP} > 0$. This makes it explicit that the position of the IS_K and LM_K curves at any point in time depends on *LTE* and *SLP*, with obvious impact on equilibrium interest rate and output at any time, and on their movements through time.²

¹ Keynes's 'vertical' money supply (stock) does not conflict with the post-Keynesian endogenous credit-money supply (flow); see 'Insights on endogenous money and the liquidity preference theory of interest', A. Asensio, *J. of Post Keynesian Economics*, forthcoming.

² See "A 'static model of a dynamic process': underemployment equilibrium with flexible wages and prices", A. Asensio, in *Money, Method and Contemporary Post-Keynesian Economics*, Sheila Dow, Jesper Jespersen & Geoff Tily (Eds), Edward Elgar, forthcoming.