

A proposito del modello di Harrod e della sua instabilità

(Una discussione fra Bruno Trezza e Bruno Miconi)

In his recent article Mr. B. Miconi [1] criticizes the main conclusion reached in my comment on the Hahn and Matthews formalisation of Harrod's model [2] [3]. According to Miconi, I « failed to understand the difference between ex post results and ex ante behaviour assumptions in the model »; needless to say Hahn and Matthews, in agreeing with me [4], are also unable to distinguish in their own model the difference between results stemming from the solution of the model and the behaviour assumption the model is based upon. (Miconi (ibidem)).

As far as I am concerned no such confusion ever existed and, I think, this applies to Hahn and Matthews as well. To put this point clear I may briefly describe the structure of the model under consideration. Equations (1) and (2) of my paper — which are also the first two equations in Hahn and Matthews original paper — describe the investment function, that is, they embody the ex ante behaviour hypothesis attributed to entrepreneurs. Given the investment function the saving investment equality closes the model under the usual hypothesis of a keynesian saving function. The behaviour of the whole model is described by equation (7) in my paper and by the less clear equations (5) in the original H and M paper.

The change in signs discussed in my paper, as well as in Miconi's, occurs in equation (2) and, as such, relates to a modification in the assumed entrepreneur behavior and only indirectly, contrarily to what Miconi seems to assume, does it change the time behaviour of the solution.

That this is the right way in which to view the model can be most

clearly seen from the following consideration: if equation (2) is interpreted as the solution of the model instead of simply embodying entrepreneurs behaviour, the whole analysis developed by Hahn and Matthews and by myself would be thoroughly useless since equation (2) by itself would be sufficient to establish the stability properties of the model. In fact equation (2) as written by Hahn and Matthews, says that the incremental capital output ratio is higher than the desired one when the latter is greater than the actual capital output ratio; it follows, therefore, that the actual capital output ratio increases when this ratio is higher than the desired one and viceversa, hence the system is unstable. In this way instability would be assumed from the outset and not proved.

It should now be clear that Miconi's criticism arises from a misinterpretation of the model proposed by Hahn and Matthews: in this respect I may also add that, once this issue is clarified, there is no conflict between Miconi's views and mine on the spirit of Harrod's model. Moreover, as the conclusion drawn by H and M in their reply is that the weak point of their model lies in the failure to introduce expectations in the investment function, a proper interpretation of their model provides a further justification of Miconi's own analysis in which he attempts to introduce expectations about the rate of growth of income in the investment function in order to explain instability in a Harrod type model.

Bruno Trezza

[1] B. MICONI - *On Harrod's model and instability*, L'industria, dic. 1967, pagg. 473-74.

[2] B. TREZZA - *Stability of Harrod's model: a comment on Hahn and Matthews*, « Economic Journal », dec. 1966.

[3] F. HAHN and R. C. O. MATTHEWS - *The theory of economic growth; a survey*, « Economic Journal », 1964, pagg. 806-807.

[4] F. HAHN and R. C. O. MATTHEWS - *Stability of Harrod's model: a reply*, « Economic Journal », dec. 1966.

A Reply

I welcome prof. Trezza's comment on my article, as a practice which could perhaps be used more often in Italian journals to exchange ideas and animate discussion publicly.

If my criticism of Trezza's sentence, quoted in the appendix to my article and here below, is on the wrong line it is not for the reasons he puts forward in his present comment (misinterpretation of Hahn and Mat-

thews' model, confusion between behavior and solution equations), but because of my possible misinterpretation of Trezza's quoted sentence. I did not take Trezza's and Hahn and Matthews' equation (2) as a solution of their formulations of Harrod's model. I only said that (2) had to be justified in terms of a more complete model (On this point Trezza seems to agree with me in his comment). Moreover (2) as it is written is not in Harrod's spirit, because Harrod claims the validity of a relation which is just opposite to (2). (i.e. equation (2) with changed sign).

I did take however Trezza's sentence « that it is rather difficult to imagine... entrepreneurs who, when the actual capital output ratio is higher than the desired one, plan investments carrying a still higher capital intensity » to mean that $\text{sign}(h_t - v) = - \text{sign}(v - V_t)$. (i.e. equation (2) with changed sign). This is a relation interpreting Harrod's spirit and it is derived as an ex post result in my model. Hence my criticism to Trezza, as quoted at the beginning of his present comment. It now seems to me that Trezza meant that $\text{sign}(h_t - V_t) = - \text{sign}(v - V_t)$, instead. If this is so, I apologise for my misunderstanding. Although I feel that also this second relation should still be valid as an ex post result of my model, I am unable to give a complete proof of it. In any case the proof of this results is not central to any of the conclusions of my model.

Bruno Miconi