

Interaction between trend and cycle in Keynesian and Neo-Marxian dynamical models of the economy

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Abstract

This paper investigates the problem of the interaction between economic growth and business cycles concentrating, in particular, on Keynesian (“multiplier-accelerator”) and neo-Marxian dynamical models of the economy. As a benchmark against which to evaluate the various models, we first introduce the theoretical explanations for the cyclical growth of the capitalist economy given by Marx and Schumpeter, two authors which, we believe, more than any others have enhanced our ability to tackle the problem. For Marx, the growth and the economic fluctuations observable in the dynamics of capitalist economies must be considered as strictly interrelated phenomena. From his point of view, the business cycle is not only a short-run phenomenon, but, rather, is the basic way in which capitalist economies develop: it proves to be the unavoidable consequence of the investment process (i.e., of accumulation and the resulting growth of productive capacity) and of the conflict over the distribution of income. Schumpeter, on the other hand, produced a theory of the business cycle in which the economic fluctuations are nothing other than the “by-product of economic progress”. In his theory, business cycles, i.e. the periods of alternating booms and depressions we observe empirically, are simply “the form which progress takes in a capitalist society”.

By contrast, in most of the early literature on the linear modelling of economic dynamics which followed the publication of Keynes' *General Theory*, the prevalent attitude was that of a separate handling of business cycles and growth (see, for example, Samuelson, “Interactions between the multiplier and the accelerator”, in *Review of Economics and Statistics*, 1939). These were usually theories which had as a starting point not exogenous data, but rather purely endogenous relationships explaining the aggregate behaviour of consumers (through the multiplier) and that of entrepreneurs (through some version of the principle of the accelerator or some other theory of aggregate investments). The problem with these theories is that they are able to represent business cycles and economic growth taken separately but do not succeed in representing both phenomena at once. One way out of this puzzle is to assume that the parameters of the model are such that the solution is cyclical (with fluctuations of constant amplitude) and then add to the model an autonomous component of aggregate investment, which grows exogenously in time. In this case, the model gives rise to cyclical growth, but, by construction, there cannot be any interaction between the growth and the cycle components of the dynamics. In the paper we underline that one possible explanation of why this is so is that neither Marxian nor Schumpeterian elements are considered in this approach. We then sketch a possible extension of the basic “multiplier-accelerator” model in which we distinguish between “induced” investment (explained by the principle of accelerator) and Schumpeterian “innovational” investment (an exogenous and periodic function of time). We show

that, in this case, the growth component and the cycle component of the solution of the model crucially interact.

From the late Sixties, a different (“neo-Marxian”) approach to growth cycles has been developed, taking Goodwin’s 1967 model as its starting point (“A growth cycle”, in *Socialism, Capitalism and Economic Growth. Essays Presented to Maurice Dobb*, CUP). As is well known, this is a model that gives rise to endogenous persistent cycles of the growth rate of output and in which a crucial role is played by the dynamics of income distribution. Taking account of the vast literature that has followed the publication of the original contribution (from now on, OVM = Original Version of the Model), we propose and analyse – both analytically and with numerical simulations – two new generalisations of the model. In the first generalisation, starting from Sordi, 2001 (“Growth cycles when workers save: a reformulation of Goodwin’s model along Kaldorian-Pasinettian lines”, forthcoming in *Central European Journal of Operations Research, Special Issue on Nonlinear Dynamics*), we show that there exist cases in which a more important role than in the OVM is played by the income distribution dynamics. In particular, we show that this happens (with unforeseeable consequences for the dynamics of the model) when we introduce into the model the hypothesis of differential savings along Kaldorian-Pasinettian lines. In this first generalisation of the model, however, we maintain all other simplifying assumptions of the OVM. In particular, as in the OVM, we assume a permanent product market equilibrium and we do not consider an *independent* investment function. In the attempt to link up the two different types of dynamic model considered in the paper, we then propose and analyse a second generalisation of the OVM, in which investments are explained by an “accelerator-type” mechanism. The paper concludes with an investigation of the steady state results, the cyclical features and the interaction between the two types of dynamics for both generalisations of the OVM.