The business cycle: dynamical coupling and chaotic fluctuations

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PART III

PARTIAL MARKETS, CHAOS AND THE BUSINESS CYCLE:

This part is inspired by the R.M. Goodwin’s 1947-article: *Dynamical Coupling with Especial Reference to Markets having Production Lags*. In this article, Goodwin models two markets in which prices and production show lagged reactions to each other. His conclusion was: “When two sectors of an economy are interdependent in some way (coupled, we may say), and when we have another than the null or trivial solution of no change, then it is quite inadmissible to discuss the one sector assuming the other to remain unchanged. For, if the one does not remain constant, the other cannot either, by virtue of the coupling. Therefore to allow one sector to vary and keep the other constant would be to hold contradictory assumptions” (Goodwin(1947), 181). Or, as stated later by Currie and Kubin(1994, 20): “we have argued that an inexorable consequence of the latter phenomenon [interdependent sectors] is that the legitimacy of partial analysis is called into question”.

As early as 1837, Lord Overstone offered a description of the trade cycle in terms of the role of the banker (see W. Eltis, in Newman(1992), 47). The primary source of the cycle, however, was sought in the real sector, for example a change in real foreign trade causing a large inflow of gold. Later authors saw both the real and the monetary sector as major sources of fluctuations. Other authors deny the influence of the monetary sector as an independent source of fluctuations. Goodwin(1982) remarks that he abandoned the notion of monetary management as long ago as the 1940s because “of the tedious connection between the control parameters and actual spending of money, and because of the ways in which producers can circumvent attempts at control”(Goodwin(1982), vii). Mullineux(1990, chapter 3) reviews work on the financial instability hypotheses. He agrees with Goodwin on the possibilities of the banking sector escaping regulations because of the complexity of the financial system. Yet, as he lists the unfinished research agenda, number four on his list is the relationship between the real and monetary factors within the business cycle. Morishima(1992) concluded that, when production is not instantaneous, “not only the real economy influences the monetary economy, but also the latter influences the former and, therefore, it becomes impossible to analyse the real economy independently from the monetary world” (Morishima(1992), 184).
In part two, several features were mentioned that should be part of a macroeconomical model of the business cycle. In this part the following relationships are modelled:
- the behaviour of the banks and the relationship between the interest rate and savings;
- the conflict over income between workers and producers;
- investment and production decisions and their relationship to costs of production factors.

The behaviour of non-economic groups like politicians is only implicitly taken in account.

From part four, the methods of analysing chaos are taken. Where possible, the bifurcation diagrams and the Lyapunov characteristic exponents will be calculated to determine the several kinds of possible dynamics.

As shown, there are three methods to intervene in a non-linear system. These methods will be used to describe the possibilities of government policies. With respect to the models reviewed in part two, the models developed in this part fall into the category “financial markets” and their relation with the real sector (see Foley(1987)’s model of the interaction between profits, the interest rate, production and fluctuations).

This part concentrates on the coupling as a source of fluctuations. The economy analysed hereafter consists of firms, banks and households. Each contributes in its own way to the production of a final good. Firms by offering the capital, banks by supplying credit and deposits, households by offering labour and savings. This is modelled respectively as a money market, a labour market and a goods market. The production costs consist of the costs of credit (the interest rate) and of labour (the wage rate). These costs and the level of production determine the profit rate, which determines investment and utilisation.

Central questions in this part are:
1. Does the occurrence of an interaction (coupling) between the real and the monetary sector change the behaviour of the aggregate economy?
2. Is it possible for the labour and money market to exhibit a fundamentally different pattern compared to the dynamics of the aggregate economy?
3. When the economy fluctuates as result of the interaction between markets, what are the possibilities for a stabilisation policy?