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State of confidence, overborrowing and macroeconomic stabilization in out-of-equilibrium dynamics

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ABSTRACT

We model macroeconomic instability as the outcome of the dynamic interaction between debt accumulation and the "state of confidence" in a small open economy with a super-fixed exchange-rate arrangement. We use a system dynamic approach and show that instability is a likely feature when macroeconomic behaviour is characterized by out-of-equilibrium dynamics with balance-sheet effects and deviation amplifying expectation formation rules that interact endogenously. We address the issue of the macroeconomic stabilization puzzle and carry out a quantitative evaluation based on sensitivity analysis with reference to Argentina, during the currency-board arrangement. We find that a tight fiscal policy is likely to be destabilizing inasmuch as it adds to the fall in expenditure, output and the "state of confidence". On the other side, a traditional monetary policy can fail in switching off macroeconomic instability if the reduction in interest rates does not compensate for the fall in the "state of confidence", whilst a direct stimulus to aggregate expenditure is required to avoid an economic collapse.

1. Introduction

As a stylized fact money is strongly pro-cyclical; in a small economy this feature is accentuated by its integration into global financial markets. High capital mobility increases the amount of liquidity flowing in and out the economy, thus making it more vulnerable to systemic instability. As known, monetary authorities can – partly – neutralize external disturbances by opting for a flexible exchange rate regime. Yet, small emerging economies often choose to peg. It increases reputation regarding inflationary biases and creates expectations of sound fiscal policies. The perceived monetary stability improves investors' expectations of the future rate of return on capital, *i.e.*, the market "state of confidence", and creates the conditions for an acceleration of capital inflows. Agents expect the situation of booming profits to be maintained in the future and, in a typical "Minskyan" fashion, this increases the amount of leverage they consider acceptable. A debt-supported expansion is then on the course. Corporate balance sheets progressively deteriorate and the economy becomes financially fragile. At that point, adverse balance-sheets effects dominate and the amount of debt tolerated is drastically reduced. Investors' "state of confidence" deteriorates and a capital reversal takes place.

In the above sequence, the driver of economic instability is an endogenous interaction mechanism between the "state of confidence" and liquidity growth which stems from disequilibrium dynamics: on the one side, agents use simple rules to assess future profitability of investment, *i.e.*, the current state is the best prevision for the future, on the other side, investors' willingness to provide finance is not determined on a pure price basis, *i.e.*, credit markets are imperfect.

When rational expectations paths are not imposed, macroeconomic instability is a likely outcome, and not necessarily the result of a large shock to the economy.[1]

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[1] This argument is emphasized in De Grauwe and Grimaldi (2006), De Grauwe and Ji (2014) that refuse the "equilibrium" approach for the explanation of financial dynamics whilst emphasizing the role of heuristics in macroeconomic behaviour.

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In this paper we address the issue of financial fragility and systemic instability in the perspective of Minsky's theoretical contribution.[2] The analysis is set within the system dynamics approach, along the lines of Keynesian integrated macroeconomic modelling based on stock-flows macrodynamics, such as Chiarella et al. (2009) and Asada et al. (2011).The focus is on stabilization policies in small open economies with super-fixed exchange rates. Differently from other works that use system dynamics to investigate this issue, such as Charpe et al. (2011), here the emphasis is on the role of foreign lending to firms and the related issue of the exchange-rate arrangement, as the primarily sources of financial fragility, and therefore the role of investors' portfolio decisions is left aside. Stock-flow consistent macroeconomics is also in Godley and Lavoie (2005), that study the behaviour of an economy when monetary authorities choose to maintain a fixed interest rate through sterilization policies. Here our focus is on small emerging market economies and hence we cannot take that view, whilst our aim is precisely to explain the causes that lead to the observed increase in spreads – *i.e.*, the risk premium – over a credit boom cycle. In our framework interest rates are thus determined endogenously.

We build on Cavallaro et al. (2011) and Maggi et al. (2012) that deal with a macro-dynamic monetary model for a small open economy, with a super-fixed exchange-rate arrangement, where a nonlinear interaction mechanism between the state of confidence and liquidity growth drives an over-indebtedness process that makes the economy unstable.

Here our focus is on the issues of stabilization policy. To this end, we study the long-run behaviour of the model by the tools of dynamic stability analysis, focusing on the structure of the real-financial feedback mechanisms, in the presence of investors that differ as to the behavioural rule used for expectation formation. The analysis verges to detecting the stable and unstable chains that govern the model. The final goal is to highlight the implications of the out-of-equilibrium dynamics, arising from deviation amplifying mechanisms, for the effectiveness of stabilization policies, *i.e.*, the ability to keep under control the unstable chains.

Indeed, in this framework the question of the policy stabilization puzzle arises because the traditional "equilibrium" adjustment mechanisms are not at work. If higher interest rates do not make foreign investors willing to provide new finance, because foreign assets (loans) are not perfect substitutes of domestic assets from the investor's perspective, then the traditional monetary mechanism operating through the interest rate channel is clearly questioned. Indeed, in the downturn of a cycle, the amount of lending foreign investors are willing to supply, at any given interest rate differential, decreases sharply. And the increase in interest rate spreads is incapable to stop the capital reversal in place. The rationale here is that the deterioration of the "state of confidence" more than offsets the increase in interest rates.

Accordingly, we find that conventional stabilization policies may fail in controlling the unstable dynamics, because they operate only partly on the unstable chains. On the one side, a quantitative easing activated by monetary authorities may fail in switching-off instability, because the induced fall in interest rates does not compensate the fall in the "state of confidence". On the other side, the choice of a fiscal austerity program is likely to be destabilizing inasmuch as it reduces aggregate expenditure and output.

We perform a quantitative analysis relative to Argentina during the currency-board years. The "experimental" study we conduct is what the implications would have been for dynamic stability of "appropriate" monetary and fiscal policies. To this aim we carry out a sensitivity analysis on stability based on the continuous-time econometric counterpart of our theoretical model. Our results confirm the theoretical analysis, thus providing a useful lesson for the Euro-area countries on the dangerousness of austerity policies in a recession, and the necessity of coordinated monetary and fiscal policies in order to stabilize a fragile economy. Our quantitative approach, based on disequilibrium equations, reveals particularly suitable for its coherence with the theory developed both in terms of the dynamic stock-flow analysis and for the freeness from *a priori* on the existence and/or viability of any equilibrium.

The paper is organized as follows: section 2 presents the theoretical analysis and develops the long-run dynamic behaviour of the economy, section 3 the economic policy implications, sections 4 and 5 expound the quantitative analysis, section 6 concludes.

2. The theoretical framework

2.1. The model

Building on Cavallaro et al. (2011) and Maggi et al. (2012) we model a small open economy with a super-fixed exchange-rate arrangement, *i.e.*, a currency board or dollarization/euroization. There are two types of agents, workers that consume entirely their income, and capitalists that save and make investment decisions. We consider a fixed-price setting.[3] The private sector is characterized as follows.

All variables are expressed in units of capital. *i.e.*, as a ratio to the stock of capital. We assume a Kaleckian investment function based on the principle of increasing risk:

$$k = \gamma(\pi^e - i), \quad \gamma_1 \equiv \gamma_{\pi^e - i} > 0 \tag{2.1}$$

where $k \equiv I/K$ is the rate of investment on the stock of capital, which is an increasing function of the difference between the expected net profit rate π^e and the interest rate i. The above formulation states that investment decisions are made on the basis of the expected relative profitability of investment in new capital goods, *i.e.*, as a function of the difference between the marginal efficiency of capital and its (replacement) cost, in the spirit of the Keynesian tradition. As to the expected net profit rate, we define it as the current profit rate, π, plus its expected change, ρ, net of interest payments on firms' outstanding debt, il_p, that is, $\pi^e \equiv \pi + \rho - il_p$. Interest payments on outstanding debt l_p are assumed to be instantaneous. By so doing we identify in ρ the variable that captures the "state of confidence", or market sentiment.[4]

[2] Minsky, 1975, 1977, 1982 and 1986.

[3] As known, before entering the currency board Argentina undertook inflation targeting policies successfully and recovered from the double-digit inflation rate. During the currency-board years, inflation did not play an important role in the development of the vulnerabilities that triggered the crisis. Therefore, in the theoretical analysis we neglect this variable, so as to allow for an analytical solution of the dynamic system.

[4] This use of the variable ρ for the state of confidence was first made by Taylor and O'Connell (1985) and then Franke and Semmler (1989) and, more recently, Chiarella and Di Guilmi (2011) that microfound Minsky's financial fragility approach in the case of heterogeneous and evolving agents.