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Stabilizing an unstable economy: Fiscal and monetary policy, stocks, and the term structure of interest rates

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ABSTRACT

Monetary and fiscal policy measures have been applied in order to avert the financial market collapse and counteract the global recession. In this paper we present an integrated macromodel which in particular focuses on the financial markets. We use a Tobin-like macroeconomic portfolio approach, and the interaction of heterogeneous agents on the financial market to characterize the potential for financial market instability. We show that specific but unorthodox fiscal and monetary policies have to be used to stabilize such unstable macroeconomies.

1. Introduction

Financial crises are potential features of advanced macroeconomies and come with huge economic and social costs which could easily amount to a large fraction of a country's GDP and considerably lasting consequences (Reinhart and Rogoff, 2009). Motivated by the events that triggered the financial crises which spread worldwide as a great recession we set up a theoretical macroeconomic framework with an elaborated financial sector characterized by disequilibrium adjustment processes. Using a dynamic portfolio approach based on the work by James Tobin (1982), we are able to identify the sources of financial market instability on the one hand, and the feedback channels from the financial to the real markets and vice versa which, on the other hand, via Tobin's q may give rise to additional sources of macroeconomic fragility.

Furthermore, due to an extension of the portfolio model of Flaschel et al. (forthcoming) by risk-bearing long-term bonds, besides equities, for which capital gains have to be taken into account, the term structure of interest rates will now also be addressed. We show the perilous consequences of speculation by employing a chartist–fundamentalist scheme like Brunnermeier (2008). Chartists behave like speculators and are a kind of technical traders that use here simple adaptive expectation mechanisms. On the contrary fundamentalists care for basic economic data and expect variables to return to steady state values with a certain adjustment speed. Regarded in isolation from the rest of the economic system the first type of agent exerts a destabilizing influence, whereas the latter one is principally stabilizing in the financial markets. Market expectations for equities and long-term bonds evolve then according to a weighted average of fundamentalists' and chartists' expectations schemes.

Since our focus here is on the financial markets and their specific sources of instability, the real side of the economy is kept as simple as possible. Moreover, this has the advantage that the dynamics of the model is rendered analytically tractable and that closed-form solutions implying precise propositions on the (in-)stability of the considered dynamics can be obtained.[1]

The modeled economy has to face two major channels of instability. On the one hand, the interaction of the real and the financial markets through Tobin's q, and on the other hand the interaction of heterogeneous agents on the asset markets. In view of

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[1] A detailed investigation of real markets dynamics based on Keynesian disequilibrium processes and a Tobinian financial sector has been conducted in Asada et al. (forthcoming).

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these feedback structures we propose specific policy measures to tame their centrifugal forces around the steady state of the private sector of the economy. Since it is the interconnectedness of markets which is at the core of our considerations, there is not a single policy instrument that is capable of doing the stabilizing job alone. From the large set of candidates that might be suited to counteract the explosive dynamics, we pick those we regard as being most appropriate and effective to stabilize such potentially unstable macroeconomies. In particular Minsky (1982) has put forth various ideas in this respect. At the end and on the basis of our stability analysis, we will be able to show that a Tobin-type tax of capital gains together with an equity market oriented monetary policy and an open market policy that trades in long-term bonds might indeed be able to stabilize the model, in contrast to conventional types of Taylor rules, which may not be sufficient for the stabilization of such economies.

In the next section we investigate the asset market structure considered in our model type by contrasting it with a traditional Keynesian approach presented in Turnovsky (1995), where static stock price expectations are used for deriving an IS-LM analysis of conventional type. We then investigate in Section 3 the stability of the real-financial market interaction of our model and provide in Section 4 an extension of the core model via the endogenization of capital gain expectations. In Section 5 we use dynamic stability analysis to investigate the specific policy measures that can tame the unstable working of the private sector of the economy. Section 6 concludes.

2. Tobinian asset price dynamics and the Keynesian multiplier

In this section we set up the model including the real side of the economy and the asset markets consisting of stock and bond markets. Capital gain expectations will be first treated as given and later on endogenized. In order to make the argument for our modeling strategy, the dynamic portfolio balance macroeconomic model of Turnovsky (1995) shall be contrasted with the Tobin-like approach we put forth to represent the financial markets.

Regarding the goods market we simplify the real part of the Turnovsky (1995) model by ignoring inflation and growth altogether and by representing the quantity adjustment process by a simple dynamic multiplier approach. This simplifies the Metzlerian inventory accelerator mechanism of the real-side oriented KMG (Keynes–Metzler–Goodwin) model of Chiarella and Flaschel (2000), thus suppressing it as a source of instability besides the wage price spiral of the KMG approach. It makes the real part of the economy always a stable one (from this partial perspective) if the propensity to spend is less than one. We however now take the stock market effect on investment (and consumption) behavior into account, by the impact of Tobin's q on these goods demand functions, since we conceive the share prices here as measuring the state of confidence in the economy and thus use it as argument in the investment (and consumption) function in place of the commonly used short-term rate of interest.

This gives as representation of the real side of the economy the following law of motion for output (denoted by Y)

$$\hat{Y} = \beta_y\left[\left(Y^d - Y\right)/Y\right] = \beta_y\left[\left(a_y Y + a_q(q - q^o) + \bar{A} - Y\right)/Y\right] \tag{1}$$

where $a_y \in (0, 1)$, $a_q > 0$, and where $\bar{A}$ summarizes autonomous expenditures (fiscal policy and more). This is a standard textbook dynamic multiplier process, with a change however in the employed aggregate demand function where Tobin's average q, in its deviation from its steady state value q^o, is now used in place of the short-term interest rates. Since prices, the capital stock and the stock of equities are considered as given in this section we assume $\frac{E}{pK}$ (equity(E) in relation to capital(K) times its price(p)) to be equal to one for simplicity so that Tobin's average $q = \frac{p_e E}{pK}$ is equal to the share price p_e in the following.

Discussing and investigating the implications of traditional macroeconomics, Turnovsky (1995, part I) also make use of a dynamic portfolio balance macroeconomic model where he in particular considers the following representation of the financial part of his portfolio model.[2]

$$M^d = f_m(Y, r, \rho)(M + B + p_k K) \tag{2}$$

$$B^d = f_b(Y, r, \rho)(M + B + p_k K) \tag{3}$$

$$p_k K^d = f_k(Y, r, \rho)(M + B + p_k K) \tag{4}$$

with r the rate of interest, ρ the rate of profit on value capital, r_k the rate of profit on physical capital, implying $\rho p_k = r_k p$, and with

$$f_{m2}(Y, r, \rho) + f_{b2}(Y, r, \rho) + f_{k2}(Y, r, \rho) \equiv 0,$$
$$f_{m3}(Y, r, \rho) + f_{b3}(Y, r, \rho) + f_{k3}(Y, r, \rho) \equiv 0$$

and $M^d + B^d + p_k K^d = M + B + p_k K$ and with the gross substitution assumption being made.[3] This representation of the asset market structure of the economy is similar in scope to the one considered in this paper, since the variable ρ is defined as the (statically expected) rate of return on holding capital at the market value $p_k K$. In the following we however prefer to represent the capital market by means of equities E and their price p_e in an explicit manner and therefore define Tobin's average q in the usual way (and not via the asset price of the capital stock p_k). We also will use heterogeneous and partly forward-looking expectations in our model (in place of Turnovsky's static ones) and will add long-term bonds as a further risky asset to the portfolio structure to be investigated.

Though the rate of return on capital is determined in Turnovsky's approach in equivalence to our equity market representation, it is the lack of (heterogeneous) expectation formation processes with regard to capital gains that is making Turnovsky (1995) very traditional type of IS-LM analysis of his model unsatisfactory. Turnovsky (1995) rightly stresses the need to theorize and analyze how individual balance risk and returns in their portfolio choices, which he considers as a formidable task. This may be true in the context of stochastic differential equations, employing a mean-variance approach, but in a still deterministic framework such an approach boils down to point expectations. There are now many models available that describe heterogeneous expectations formation of chartists' and fundamentalists' or also of herding type. We will use the chartist–fundamentalists distinction in this following in a relatively simple way in order to obtain precise propositions on the (in-)stability of the considered dynamics. Numerical methods – as they are used in New Keynesian DSGE explorations – can of course also be used in our approach towards a macrodynamics of DSGD (is sequilibrium) type.

By contrast, Turnovsky's (1995) traditional Keynesian macroeconomic model is a very tranquil representation of financial markets where expectations play no role at all, since there are no expected capital gains, and where the rate of return on capital owned, ρ, is determined by the rate of profit of firms, r_k, in a straightforward way. Such a situation is usually not considered in the Keynes–Tobin approach to macrodynamics. In this framework monetary policy can influence the rate of return ρ on capital $p_k K$ of the economy directly through the financial market structure of the economy which determines the levels of r and p_k, which in Turnovsky's approach however only impacts the real economy through the real rate of interest in the usual way, and not directly through the rate of return ρ,

[2] In order to make it comparable to our subsequent modeling of such an approach we ignore here however inflation (assuming a given price level p instead) and also transfer the Turnovsky model to the notation used in this paper.

[3] This makes price adjustments on the asset markets a stable process (under static expectations).