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Monetary policy and noise traders: A welfare analysis

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ABSTRACT

This paper studies the choice of monetary policy regime in a small open economy with noise traders in forex markets. We focus on two simple rules: fixed exchange rates and inflation targeting. We contrast the above two rules against optimal policy with commitment under productivity shocks. In general, the presence of noise traders increases the desirability of a fixed exchange rate regime. We also evaluate the welfare impact of Tobin taxes in this milieu. These taxes help unambiguously in the absence of productivity shocks; their welfare impact under productivity shocks depends on the monetary regime in place and trade elasticity between domestic and foreign goods.

1. Introduction

There exists a large literature which focuses on market microstructure models that examine the role of noise traders in generating excess volatility in the foreign exchange market. This paper incorporates noise traders into a small open economy with incomplete markets and examines the role of monetary policy and Tobin taxes in such a setup. Within this setting, we welfare-rank two simple rules, namely a fixed exchange rate regime (PEG) and an inflation rate targeting regime (IT) by comparing them with optimal policy under commitment. Our objective is to identify the simple rule that in terms of welfare is closest to the optimal monetary policy under commitment. In addition, we examine the welfare implications of imposing Tobin taxes in such a setup.

Our results show that the differences in welfare across these regimes can be mapped with the real exchange rate volatility that the regimes allow relative to what optimal policy calls for. The analysis shows that in the face of productivity shocks, optimal monetary policy calls for a significantly lower volatility of the real exchange rate in the presence of noise traders. It therefore follows that a PEG outperforms an IT regime when there are noise traders in the economy. Further, we find in such a setup, the impact of Tobin taxes on welfare is critically dependent on the elasticity of substitution between domestic and foreign goods.

The work in this paper builds on the large literature which has sought to analyze monetary policy objectives in an open economy. An important debate in this literature has centered around the issue of whether monetary policy should focus

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only on targeting domestic inflation rates or should stabilization of the exchange rate also be a policy objective. Clarida et al. (2002) and Galí and Monacelli (2005), in seminal contributions show that the open economy version of optimal monetary policy problem is "isomorphic" to its closed economy counterpart. In this case, absent cost push shocks, a policy of strict domestic inflation targeting is always optimal. This literature laid the intellectual foundation for inflation targeting to be widely adopted in open economies.

Calvo and Reinhart (2002) in their seminal study, however, document that many developing countries which on paper classify themselves as inflation targeting regimes, in practice, actively stabilize their exchange rate. These countries exhibit unusually low exchange rate volatility, high volatility in interest rate and forex reserve prompting the authors to conclude that there is extensive "fear of floating".

Contributions, among others, by Clarida et al. (2002); Benigno and Benigno (2003); Pappa (2004) and De Paoli (2009a) have sought to explain the observed stabilization of the exchange rate by emphasizing the role of the "terms of trade externality". These authors have argued that, in an environment where domestic and foreign goods are not perfect substitutes, a strict form of domestic inflation targeting may not be optimal and some degree of terms of trade (or exchange rate) stabilization is welfare enhancing. Others such as Caballero et al. (2005) and Levy Yeyati (2006) have argued that extensive liability dollarization may lead central banks to avoid exchange rate flexibility fearing financial instability and bankruptcies.

Our paper instead emphasizes the role of noise traders for the equilibrium terms of trade variability and its implications for an optimal monetary policy design. We build on De Paoli (2009b) who emphasizes the structure of asset markets in trying to explain monetary policy objectives in an open economy. Importantly, De Paoli shows that in an economy with a high elasticity of substitution between domestic and foreign goods, the PEG regime is preferred under complete financial markets whereas an IT regime is welfare superior under incomplete markets. In contrast, we show that if there are noise traders in the economy, then even with incomplete markets and a high elasticity of substitution between domestic and foreign goods, a PEG outperforms an IT regime.

The rest of the paper proceeds as follows. Section 2 develops the basic model with noise traders. Section 3 studies and welfare ranks the alternative monetary policy arrangements. Section 4 provides a summary of the results and concludes.

2. The model

2.1. Households

The framework is a small open economy with incomplete markets and closely follows De Paoli (2009b). The world economy is populated with a continuum of household of unit mass, where the fraction of the population in the segment $[0, n)$ belongs to the home country, H, and the remainder of the world population in the segment $[n, 1]$ belongs to the foreign country, F. The utility function of the representative household in country H is

$$U_t = E_t \sum_{s=t}^{\infty} \beta^{s-t} \left[\frac{C_t^{1-\rho}}{1-\rho} - \frac{1}{n} \int_0^n \frac{\epsilon_t^{-\eta} y_t(z)^{1+\eta}}{1+\eta} dz \right] \tag{1}$$

where C_t is individual consumption stream, ρ is the coefficient of relative risk aversion, η is equivalent to the inverse of the elasticity of labor supply, ϵ_t is the shock to productivity, and $y_t(z)$ is output of home-produced differentiated good z. The consumption aggregate for countries H and $F$are given by:

$$C = \left[\nu^{1/\theta} C_H^{\frac{\theta-1}{\theta}} + (1-\nu)^{1/\theta} C_F^{\frac{\theta-1}{\theta}} \right]^{\frac{\theta}{\theta-1}}, \; C^* = \left[\nu^{*\frac{1}{\theta}} C_H^{*\frac{\theta-1}{\theta}} + (1-\nu^*)^{1/\theta} C_F^{*\frac{\theta-1}{\theta}} \right]^{\frac{\theta}{\theta-1}} \tag{2}$$

The parameter $\theta > 0$ is the intratemporal elasticity of substitution between home and foreign produced goods, C_H and C_F. The parameter determining home consumer's preferences for foreign goods, $(1-\nu)$ is a function of the relative size of the foreign economy, $(1-n)$, and of the degree of openness, λ; more specifically, we follow De Paoli (2009b) and Sutherland (2002) in assuming $(1-\nu) = (1-n)\lambda$ and $\nu^* = n\lambda$. Further, it is assumed that $\nu \neq \nu^*$, which gives rise to "home bias" in consumption. It turns out that this feature gives rise to deviations from purchasing power parity. "Home bias", as in their papers implies that home agents give a higher weight to home goods and foreign agents attach a higher weight to foreign goods. The home (foreign) consumption of domestic and foreign produced goods is given by C_H (C_H^*) and $C_F(C_F^*)$, respectively, where:

$$C_H = \left[\left(\frac{1}{n}\right)^{\frac{1}{\sigma}} \int_0^n c(z)^{\frac{\sigma-1}{\sigma}} dz \right]^{\frac{\sigma}{\sigma-1}}, \quad C_F = \left[\left(\frac{1}{1-n}\right)^{\frac{1}{\sigma}} \int_n^1 c(z)^{\frac{\sigma-1}{\sigma}} dz \right]^{\frac{\sigma}{\sigma-1}} \tag{3}$$

$$C_H^* = \left[\left(\frac{1}{n}\right)^{\frac{1}{\sigma}} \int_0^n c^*(z)^{\frac{\sigma-1}{\sigma}} dz \right]^{\frac{\sigma}{\sigma-1}}, \quad C_F^* = \left[\left(\frac{1}{1-n}\right)^{\frac{1}{\sigma}} \int_n^1 c^*(z)^{\frac{\sigma-1}{\sigma}} dz \right]^{\frac{\sigma}{\sigma-1}} \tag{4}$$

where $\sigma > 1$ is the elasticity of substitution across the differentiated goods. The corresponding price indices are

$$P = \left[\nu P_H^{1-\theta} + (1-\nu) P_F^{1-\theta} \right]^{1/(1-\theta)} \tag{5}$$