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Financial crises and exchange rate policy☆,☆☆

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ABSTRACT

This paper studies exchange rate policy in a small open economy model featuring an occasionally binding collateral constraint and Fisherian deflation. The goal is to evaluate the performance of alternative exchange rate policies in sudden stop-prone economies. The key element of the analysis is a pecuniary externality arising from frictions in the international credit markets, which creates a trade-off between price and financial stability. The main result is that depreciating the exchange rate during a financial crisis has a positive impact on welfare, because the stimulus provided by a depreciation sustains asset prices, value of collateral, and access to the international credit markets.

1. Introduction

Since the financial liberalization wave of the 1980s, several countries have experienced financial crises characterized by sudden arrests of international capital inflows and sharp drops in output, consumption and asset prices.[1] These episodes, known as sudden stops, have sparked great interest in the design of monetary and exchange rate policies in financially fragile economies. Should these economies let their exchange rate float or rather anchor it to a foreign currency? Should monetary policy be concerned only with its traditional objective of granting price stability or should it also care about financial stability?

In this paper, I address these questions focusing on a pecuniary externality originating from frictions on the international credit markets. I present a theoretical framework that shows how the combination of financial frictions and nominal rigidities gives rise to a trade-off between financial and price stability. The main result is that a narrow focus on offsetting nominal rigidities can lead to a sub-optimal monetary policy in sudden stop-prone economies, and that it is optimal to devalue the exchange rate during financial crises to sustain the value of collateral and access to international credit markets.

I study a small open economy with imperfect access to the international financial markets, in the spirit of Mendoza (2010). Domestic agents borrow from foreign investors against collateral. Collateral consists in a physical asset used in production, called land, valued at market price. When the collateral constraint binds a financial accelerator mechanism akin to Fisher's debt deflation arises: aggregate demand for land falls, the price of land drops and collateral declines. Because of this Fisherian deflation mechanism, when the collateral constraint binds the economy experiences a financial crisis driven by a sudden stop in capital inflows. Moreover, since domestic agents are atomistic they do not take into account the general equilibrium effect of their actions on the price of land and on the value of their collateral. This is the pecuniary

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[1] Diaz-Alejandro, (1985)is the classic reference on the link between financial liberalization and financial crises in emerging economies. Calvo et al. (2004) provide an overview of the facts characterizing sudden stop events.

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externality that creates scope for policy interventions in the financial markets.

Wages are nominally rigid.[2] During a financial crisis nominal wages fail to adjust downward, potentially worsening the impact of financial turmoil on the real economy. The central bank can mitigate the downturn associated with a financial crisis by engineering an exchange rate depreciation that increases the competitiveness of the economy. Importantly, the stimulus provided by exchange rate depreciation has a positive effect on the aggregate demand for land and on the value of collateral. Through this channel, exchange rate policy affects domestic agents' access to the international credit markets during crisis events.

I use the model to compare the performance of three alternative monetary rules: a fixed exchange rate rule and two types of floating exchange rate regimes. The first type of float considered is a policy of *strict wage inflation targeting*. This rule eliminates all the distortions arising from nominal wage stickiness, and corresponds to the price stability rule of closed-economy sticky price models. The second type of float is a *financial stability* regime under which the central bank is allowed to respond to developments on the financial markets. Under this regime, the central bank depreciates the exchange rate when the collateral constraint binds, sustaining the collateral value of land and access to international financial markets.

The main result of the paper concerns the role of financial frictions in determining the welfare ranking between the wage inflation targeting rule and the financial stability regime. I show that in a version of the model in which the collateral constraint is replaced by a fixed borrowing limit, and hence in which Fisher's debt deflation channel is not present, wage inflation targeting is the regime that delivers higher welfare. This finding is in line with the well known result that, in models in which the only distortions come from monopolistic competition and nominal rigidities, a policy that corrects for nominal rigidities approximates well the optimal policy.[3]

I then show that the pecuniary externality implied by the Fisherian deflation mechanism affects the welfare ranking among the policy rules considered. In fact, once the Fisherian deflation mechanism is introduced the financial stability regime welfare-dominates wage inflation targeting, because under the financial stability regime exchange rate policy mitigates the fall in the price of land and in capital inflows during crisis events. In contrast, the peg is always welfare dominated by the other two rules. This happens because during tranquil times the peg does not remove the distortions due to wage stickiness, while during crisis times pegging the exchange rate amplifies the fall in the price of land and in capital inflows compared to the other two regimes.

These welfare results are derived in a model in which crisis events are endogenous and rationally anticipated by agents, and in which monetary policy affects precautionary savings and crisis probability.[4] In fact, the currency peg is the regime that stimulates more the accumulation of precautionary savings, followed by the policy of targeting wage inflation and by the financial stability regime. The intuition is simple: the more crises disrupt economic activity, the more agents accumulate precautionary savings to reduce the probability that the collateral constraint binds. Since the peg is the regime under which crises have the strongest impact on output and consumption, the peg is also the regime under which the accumulation of precautionary savings is more pronounced. Moreover, since crises are milder when the central bank adopts a financial stability rule, agents accumulate less precautionary savings under the financial stability regime than under a policy of strict wage inflation targeting.

This paper is related to two strands of the literature. The first one focuses on the design of monetary policy in financially fragile small open economies. Cespedes et al. (2004), Moron and Winkelried (2005) and Devereux et al. (2006) compare the performance of different monetary regimes in small open economies featuring financial market imperfections. Contrary to this paper, their models focus on business cycle fluctuations and are not suited to study economies occasionally subject to financial crises. Christiano et al. (2004), Cook (2004), Gertler et al. (2007), Braggion et al. (2007)and Curdia (2007) all use quantitative models to analyze the impact of monetary policy interventions during crisis times. In their frameworks crises are unexpected one-shot events, while this paper presents a model in which crises alternate with tranquil times and crisis probabilities are rationally anticipated by agents. This literature typically finds that the presence of financial frictions does not alter the welfare ranking among monetary policy rules, while the main insight of this paper is that financial frictions are a key determinant of which policy rule delivers higher welfare. Aghion et al. (2004), Caballero and Krishnamurthy (2003), Bordo and Jeanne (2002) and Benigno et al. (2011) consider monetary economies featuring both tranquil periods and crises. However their focus is on static models, while the dynamics of debt accumulation play a key role in the model presented in this paper.[5] This paper shares with Schmitt-Grohé and Uribe (2011) the focus on the performance of different exchange rate regimes in economies subject to the risk of experiencing a deep recession. The key difference is that their model does not feature a collateral constraint, while here the interaction between the exchange rate regime and Fisher's debt deflation is crucial.

The second strand of related literature employs dynamic real business cycle models featuring occasionally binding credit constraints and financial accelerator mechanisms, building on Mendoza (2002, 2010), to draw implications about policy conduct in small open economies prone to sudden stops. Examples are Benigno et al. (2013), Bianchi (2011), Bianchi and Mendoza (2010) and Jeanne and Korinek (2010). The novelty of this paper with respect to this literature resides in the focus on monetary policy and on the interplay between Fisher's debt deflation and nominal wage rigidities. In a recent paper Ottonello (2013) studies exchange rate policy in a model in which collateral is based on current income, as in Mendoza (2002). In his setting a depreciation reduces the value of collateral, because it leads to a reduction in the foreign currency value of income derived from the non-tradable sector, and exacerbates the pecuniary externality. Taken together, our contributions point toward the importance of empirically understanding the nature of the key sources of collateral for the conduct of exchange rate policy.

The rest of the paper is structured as follows. Section 2 describes the analytical framework. Section 3 presents the results using numerical simulations. Section 4 provides a sensitivity analysis. Section 5 concludes.

[2] A growing body of evidence emphasizes how nominal wage rigidities represent a key transmission channel through which monetary policy affects the real economy. For instance, this conclusion is reached by Christiano et al. (2005) using an estimated medium-scale DSGE model of the US economy. Moreover, Olivei and Tenreyro (2007) show that monetary policy shocks in the US have a bigger impact on output if they occur during the first or second quarter of the year. They argue that this finding can be explained with the fact that most US firms adjust wages during the fourth quarter, and hence wages tend to be more rigid during the first half of the year. There is also evidence describing the role of nominal wage rigidities in exacerbating the downturn during financial crises, especially if coupled with fixed exchange rates. This point is made by Eichengreen and Sachs, (1985)and Bernanke and Carey, (1996) in the context of the Great Depression, while Schmitt-Grohé and Uribe (2011) document the importance of wage rigidities for the 2001 Argentine crisis and for the 2008–2009 recession in the Eurozone periphery. Micro-level evidence on the importance of nominal wage rigidities is provided by Fehr and Goette, (2005), Gottschalk, (2005), Barattieri et al. (2010) and Fabiani et al. (2010).

[3] Kollmann (2002) and Schmitt-Grohé and Uribe (2007) derive this result using models with monopolistic competition in the product market and nominal price rigidities. However, a similar logic should apply to models with monopolistic competition in the labor market and in which the presence of sticky wages is the only source of nominal rigidities.

[4] Schmitt-Grohé and Uribe (2011) and Ottonello (2013) also study exchange rate policy in models in which crises are rationally anticipated by agents.

[5] I refer to these frameworks as static because they consider economies that last two or three periods, in which the stock of external debt at the onset of a crisis is essentially taken as an exogenous variable.