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Dynamics of currency crises with asset market frictions

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Abstract

This paper presents a dynamic model of currency crises with frictions. By construction, a speculative attack is not an instantaneous event but takes a little time to deplete the country's reserves and, in the event of an attack, agents are uncertain about whether they will be able to act before the devaluation comes. The currency will be overvalued ('ripe for attack') for a long time before an attack takes place. A discrete and sizable devaluation will occur. Small changes in fundamentals may trigger an attack. The model brings insights about the dynamics of currency crises and the effects of some key policy variables.

Keywords: Currency crisis; Dynamics; Speculative attack; Asset market frictions

JEL classification: F3; D8

1. Introduction

The so-called 'first generation' models of currency crisis (Krugman (1979), Flood and Garber (1984)) show that policies incompatible with a pegged exchange rate regime lead to speculative attacks that produce massive falls in a country's level of reserves and force a government to abandon the peg. Agents attack the currency whenever the "shadow

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exchange rate" exceeds the current exchange rate,[1] a speculative attack instantaneously depletes the country's reserves. The currency is never overvalued before the attack and discrete jumps in the exchange rate are ruled out.

However, contrary to what those models imply, currencies seems to stay ripe for attack for long periods of time; attacks that take little time to force the abandonment of a pegged regime take much time to start (and sometimes are triggered without major perceived changes in economic fundamentals), and large discrete devaluations are observed.[2]

In Flood and Garber (1984), discrete devaluations may occur if the "shadow exchange rate" jumps discretely right before the currency attack, but the currency is never overvalued. Other more recent contributions have generated discrete jumps following the abandonment of a peg. Pastine (2002) includes a maximizing government that cares about reserves and does not like speculative attacks in a first generation setup. It shows that the government randomizes the timing of abandoning the peg instead of passively waiting for the agents to attack the currency. So, crisis cannot be predicted and a discrete devaluation occurs because the abandonment of the peg by the Central Bank is not fully expected. In the model of Broner (2001), there is a 'secular deterioration of fundamentals' and agents try to guess when the currency will be 'ripe for attack'. There may be a discrete devaluation because agents are uncertain about the shadow exchange rate. Chamley (2003) also deals with incomplete information and learning: agents are uncertain about whether the mass of speculators is enough to force the Central Bank to abandon the peg. Broner (2004) shows that a discrete devaluation may also occur if some uninformed agents are included in the model. Abreu and Brunnermeier (2003) show how incomplete information can lead to bubbles and crashes. They show that agents may decide to buy an overvalued asset although they know that the bubble will burst at some point in the future. Rochon (2004) applies their argument to currency crises to show that agents delay their attack to the currency.

This paper takes a different approach. Instead of attempting to explain why agents do not perfectly coordinate on attacking the currency whenever it is overvalued, it takes the frictions as its starting point and studies what happens in a dynamic model of currency crises if: (i) an attack does not occurs instantaneously, it takes some (little) time until it forces the abandonment of a peg; and if (ii) agents are uncertain about whether, in the event of an attack, they will be able to escape before the devaluation comes. A simple way to include those features in a model, is to assume that agents get the opportunity of changing position according to a Poisson process, as in Calvo (1983). Due to the Poisson assumption, all agents that are long in the currency at a given point in time face the same probability of being caught by the devaluation.

By modelling frictions in this stylized way, this paper is not explaining why a speculative attack lasts for more than a second — that occurs by assumption. But it is showing that an attack that takes a little time (say, 2 or 3 weeks) to deplete the country's reserves and force the currency to float will take much more time (say, several months) to get started if the

[1] The shadow exchange rate is what the exchange rate would be if an attack forced the currency to float.

[2] For example, in the first 3 weeks of December 1994, a strong speculative attack drove *Mexican Peso* to lose a third of its value in a bit more than a week. Following the Russian crisis in August 1998, Brazil lost a third of its foreign reserves in 3 weeks and, in January 1999, *Brazilian Real* lost 40% of its value. In the recent episode in Argentina, the depreciation of the *Peso* was even higher.