Reverse speculative attacks

Manuel Amador [a,b], Javier Bianchi [a], Luigi Bocola [c], Fabrizio Perri [a*]

[a] *Federal Reserve Bank of Minneapolis, United States*
[b] *University of Minnesota, United States*
[c] *Northwestern University, United States*

A R T I C L E   I N F O

A B S T R A C T

In January 2015, in the face of sustained capital inflows, the Swiss National Bank abandoned the floor for the Swiss Franc against the Euro, a decision which led to the appreciation of the Swiss Franc. The objective of this paper is to present a simple numerical framework that helps to better understand the timing of this episode, which we label a "reverse speculative attack". We model a central bank which wishes to maintain a peg, and responds to increases in demand for domestic currency by expanding its balance sheet. In contrast to the classic speculative attacks, which are triggered by the depletion of foreign assets, reverse attacks are triggered by the concern of future balance sheet losses. Our key result is that the interaction between the desire to maintain the peg and the concern about future losses, can lead the central bank to first accumulate a large amount of reserves, and then to abandon the peg, just as we have observed in the Swiss case.

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1. Introduction

In January 2015, in the face of sustained capital inflows, the Swiss National Bank (henceforth SNB) decided to abandon the floor for the Swiss Franc against the Euro, a decision which led to a sudden 20% appreciation of the Swiss Franc. Following Cochrane (2015) we name such an event a "Reverse Speculative Attack".[1] This decision by the SNB had a significant effect on financial markets, which seemed to have been surprised by the move. An article on the January 2015 edition of the Economist Magazine suggests that "The doffing of the cap surprised and upset the foreign exchange markets, hobbling several currency brokers," while Brunnermeier and James (2015) state that "The risks created by the SNB's decision – as transmitted through the financial system – have a fat tail."

The decision by SNB is also surprising when seen through the lens of standard speculative attack models. It is well known that a Central Bank may be forced to abandon a peg when its foreign currency reserves get depleted, and it no longer has the ability of preventing its currency from depreciating. That is, maintaining the peg can eventually become infeasible.[2] However, the case of Switzerland in January 2015 does not fit this narrative. In principle, it could have been feasible for SNB

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* Corresponding author.
  E-mail address:
[1] Switzerland is not the only example of this. In May 1971, the Bundesbank decided to abandon the peg against the U.S. dollar, which also led to an appreciation of the German currency (see Brunnermeier and James, 2015).
[2] There exists a very large literature on standard speculative attacks, i.e. when a central bank abandons a peg, and lets its currency depreciate, as its foreign reserves are drained. See, among others, the seminal papers by Krugman (1979) and Flood and Garber (1984), or the very recent survey by Lorenzoni (2014). However, to our knowledge, there is much less analysis on reverse speculative attacks, which are quite different in nature. Exceptions are Grilli (1986) and Amador et al. (2016), which we discuss below.

to increase its domestic liabilities (i.e., currency) while acquiring the foreign currency assets necessary to maintain the peg. The SNB decided to do otherwise.

The goal of the present paper is to develop a simple theoretical and quantitative framework, in order to better understand the timing of the Swiss peg's abandonment, and how changes in fundamentals, such as international interest rates, affected its likelihood.

After reviewing some basic facts about the Swiss experience we trace out a simple theory of the Central Bank's problem. The starting point is the specification of the Central Bank objective. We assume a Central Bank that would like (for reasons we do not model) to maintain a currency peg with a foreign currency.[3] Consistently with the Swiss experience, we also assume that the Central Bank operates in an environment where the demand for its currency is increasing. As a result, if the supply of domestic currency were not to increase accordingly, the exchange rate would appreciate. Maintaining the peg involves expanding its reserve holdings and its liabilities. We make two additional key assumptions for our results. First, we assume that there is an exogenous probability that the exchange rate will be below the peg level in the future. This risk is assumed to be outside the control of the Central Bank today, and it makes the holding of reserves (which are denominated in foreign currency) risky, relative to the monetary liabilities issued (denominated in domestic currency). Second, we introduce balance sheet concerns in the following way: we assume that the Central Bank keeps its potential balance sheet losses bounded by a threshold value.

In this set-up, the fear of future losses on its balance sheet may force the Central Bank to abandon a peg. In particular, we show that the Central Bank faces the following trade-off when the demand for its currency increases: it can either choose to maintain the peg and accumulate reserves, or it can let the currency appreciate today. The first choice leads to no losses today, but it involves possibly large losses in the future. The latter choice generates some losses today but, by reducing the future appreciation risk, reduces the future losses. When the balance sheet increases significantly, the second choice becomes more attractive, and the Central Bank chooses to abandon the peg.

After describing the model we proceed to solve it numerically, so to assess whether the economic mechanism we propose can explain the Swiss experience. In particular we introduce shocks to the demand for Swiss currency, shocks to the international interest rates, and we estimate a demand for Swiss currency that is consistent with the patterns of Swiss monetary base and Swiss short term rates before, during and after the peg. Our key result is that increases in money demand and/or fall in the international interest rates can lead the Central Bank to first accumulate large amount of reserves and then to abandon the peg. The model's predicted size of the reserve accumulation and of the exchange rate appreciation following the abandonment are comparable to what is observed in the data.

Our paper is closely related to the work of Grilli (1986), who analyzes speculative attacks assuming the Central Bank has both an (exogenous) upper bound and (exogenous) lower bound on reserves holdings. Our work is different as the bound on reserves arises endogenously from the possibility of future losses to the Central Bank's balance sheet, and as a result, is affected by the Central Bank's exchange rate policy today.[4] This paper is also related to Amador et al. (2016), which develops a general framework to analyze the impact of a given exchange rate policy on asset returns, capital flows and domestic welfare. Also in the present work we do not consider the implications of a lower bound constraint on interest rates, while Amador et al. (2016) shows that when the economy operates at that lower bound, losses and distortions from exchange rate policies are potentially large.

The paper is organized as follows. In Section 2 we present some data that characterize the Swiss experience with the peg to the Euro, Section 3 presents the model and Section 4 contains our main results. Section 5 discusses sensitivity analysis and Section 6 concludes.

2. Evidence on the Swiss experience

In this section we briefly provide some evidence on the experience of the Swiss National Bank with its peg and subsequent abandonment, as these events are the main motivation of our work. The SNB, mentioning overvaluation of the Swiss franc and its negative effect on the Swiss economy, announced in September 2011 a currency floor with the Euro, stating that:

> "With immediate effect, it will no longer tolerate a EUR/CHF exchange rate below the minimum rate of CHF 1.20. The SNB will enforce this minimum rate with the utmost determination and is prepared to buy foreign currency in unlimited quantities."

In January 2015 the SNB abandoned the floor, which resulted in a substantial devaluation of the Euro with respect to the CHF. Panel A of Fig. 1 shows the path of the CHF/Euro exchange rate in the years preceding the floor, during the peg (the

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[3] Although the SNB explicitly targeted a floor on the exchange rate, for simplicity in our theoretical analysis we will focus on the case of a peg, and throughout the rest of the paper we will use the two terms interchangeably.

[4] The implications of a large balance sheet is an issue that is being currently debated in monetary economics given the large increase in the balance sheets of major Central Banks (see, among others, Del Negro and Sims, 2015 and Hall and Reis, 2015). For early contributions on the topic also see Stella (1997, 2005).