



## Structural vulnerability and resilience to currency crisis: Foreign currency debt versus export



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### ABSTRACT

Is there any factor that is not analyzed in the literature but is important for preventing currency crises? I argue that exports are an important factor to prevent currency crises that has not been frequently analyzed in the existing theoretical literature. Using the third generation model of currency crises, I derive a simple and intuitive formula that captures an economy's structural vulnerability characterized by the elasticity of exports and repayments for foreign currency denominated debt. I graphically show that the possibility of currency crisis equilibrium depends on this structural vulnerability and also analyze how this vulnerability impacts the effectiveness of monetary policy response.

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## 1. Introduction

The literature on currency crises has analyzed causes and mechanisms of how the crises occur and what happens when countries experience the crises. Little theoretical literature has focused on factors that prevent currency crises other than policy responses. Is there any factor that is not analyzed in the literature but is important for preventing currency crises?

To answer this question, in this paper, I discuss and show that exports are a potentially important factor for the prevention of a currency crisis. I introduce exports into the third generation models of currency crises and derive an intuitive and important formula that captures the structural vulnerability of the economy. I also conduct graphical equilibrium analysis to explore the roles of exports in currency crises and investigate how this structural vulnerability influences the effectiveness of monetary policy response.

The organizational structure of this paper includes a review of the literature, in which I briefly summarize and discuss the relevant literature on currency crises models and the specific model that I chose for my analysis and compelling reasons for doing so. I then discuss the importance of exports as addressed in the empirical literature. Furthermore, I develop a theoretical model to analyze the role of exports graphically.

## 2. Literature and motivation

### 2.1. Three generations of currency crisis models

A currency crisis can be defined as a sudden devaluation of a currency that often ends in a speculative attack in the foreign exchange market. There have been three 'generations' of models of currency crises (Glick & Hutchison, 2013). The first

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generation models focus on inconsistencies between domestic macroeconomic policies, such as a fixed exchange rate regime and a persistent government budget deficit that eventually must be monetized (Flood & Garber, 1984; Krugman, 1979). These models describe a government that attempts to maintain a pegged exchange rate system, but is subject to a constant loss of international reserves, due to the need to monetize government budget deficits. These two characteristics of the policy are inconsistent with each other, and provoke an eventual speculative attack on the reserves of the central bank. Thus, in the first generation models, the key factor is the government activity, and the models predict that the fixed exchange rate regime must collapse. In second generation models, policymakers weigh the cost and benefits of defending the currency and may abandon an exchange rate target. In these models, the government maximizes an explicit objective function, i.e., Obstfeld (1996) developed models in which the central bank minimizes a quadratic loss function that depends on inflation and on the deviation of output from its natural rate. In these models, an interaction between investors' expectations and actual policy outcomes can lead to self-fulfilling crises. The third generation models focus on how distortions in financial markets and banking systems can lead to currency crises. The basic idea is that banks and firms in emerging countries have currency mismatches on their balance sheets since they borrow in foreign currency and lend or invest in local currency. Aghion, Bacchetta, and Banerjee (2000, 2001) and Nakatani (2016) analyzed the effects of credit constraints on currency crises by focusing on private foreign currency denominated debt. They explored how problems in the financial markets interact with currency crises, and how crises can have real effects on the economy. Another type of third generation model was developed as an application of the Diamond and Dybvig (1983) model by Chang and Velasco (2001), who focused on how distortions in the banking system can lead to currency crises, and Caballero and Krishnamurthy (2001), who developed a model in which firms finance risky long-term projects with short-term domestic and foreign debts and face a liquidity problem caused by uncertainty about future production and limited amounts of internationally accepted collateral. The other type of third generation models is based on the idea that government guarantees to the banking system can generate moral hazard problems that lead to crises (Burnside, Eichenbaum, & Rebelo, 2001; Corsetti, Pesenti, & Roubini, 1999; Dekle & Kletzer, 2002; Dooley, 2000; McKinnon & Pill, 1996; Schneider & Tornell, 2004).

## 2.2. Aghion-Bacchetta-Banerjee model

In this paper, I extend the third generation model focusing on credit constraints of firms that was originally developed by Aghion et al. (2000, 2001). There are several reasons to use this model. As shown in Aghion, Bacchetta, and Banerjee (2001), their model (the ABB model) can include the features of the first and the second generation models. In addition, the possibility of multiple equilibria can also be included. Moreover, by using this model and introducing exports, we can describe the tradeoff between the costs and benefits of large currency depreciation for firms in the open economy. Furthermore, with this type of model, we can have short-run nominal rigidity, which is supported by empirical evidence, and see how financial friction can cause currency crises. Finally, during the recent global financial crisis in 2008–09, central bankers were concerned with the possibility of currency crises in some countries. Those concerns were strong especially for emerging European countries that had high foreign debt in their economies. This ABB model illustrates the situation of those emerging countries accurately. Nakatani (2017) empirically applied the ABB model and found that both productivity shocks and country risk premium shocks affect exchange rates.

A recent extension of the ABB model was developed by Bergman and Jellingsø (2010), who examined the medium-term effects of interest rate defense in the ABB model. Their finding was that even though an interest rate hike is successful in preventing a currency crisis in the short-term, it may cause a currency crisis in the medium-term. This occurs because the first-period interest rate hike results in lower inflation in the medium-term, which in turn raises the real interest rate and thus increases the burden of domestic debt. In this paper, I focus on equilibrium in the short-term to obtain clear theoretical and policy implications, because disregarding the medium- and long-term equilibrium effects is not a potential problem, given that it is highly likely that exports do not affect output beyond the short-term.

Another extension of the ABB model was developed by Miller, García-Fronti, and Zhang (2006). They introduced demand factors into the ABB model, including exports. This introduction of exports into the model is justified because empirical research found that exports have a key role in preventing and recovering from currency crises, as discussed in greater detail in the next section. However, the problem in their paper is that exports were assumed to be an exogenous constant variable. In other words, exports do not respond to exchange rates in their model. This assumption contradicts the fact that currency depreciation improves price competitiveness in the export sector and leads to an increase in exports. Therefore, in my analysis, I assume that an export is a function of exchange rates, which is a more practically reasonable assumption, and study how this introduction of endogenous exports into the ABB model can change the policy implications.

## 2.3. Importance of exports

Theoretical models of currency crises have focused on the vulnerabilities of external exposures in order to identify causes of the crises. The first and second generation models have focused on the government budget deficit that can be supported by the capital inflows of foreign investors. The third generation models have focused on the foreign currency denominated debt of private firms, external funding of commercial banks and moral hazard problems triggered by the government guarantees.

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