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# Real and financial shocks, exchange rate regimes and the probability of a currency crisis<sup>☆</sup>

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## Abstract

We analyze the relationships among shocks, exchange rate regimes, and capital controls in relation to the probability of a currency crisis. Based on the theoretical model by Nakatani (2016, 2017a), we use panel data on 34 developing countries and apply a probit estimation. We find that both productivity shocks and risk premium shocks trigger currency crises, whereas productivity shocks are important for severe currency crises. We also find that the effects of these shocks on the probability of a crisis are larger for floating exchange rate regimes and that capital controls mitigate the effects of productivity shocks in pegged regimes. © 2017 The Society for Policy Modeling. Published by Elsevier Inc. All rights reserved.

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## 1. Introduction

Preventing financial crises has become one of the top priorities of policymakers in many countries, especially in light of the recent global financial crisis. The most frequent type of financial crisis in modern history is a currency crisis. Many economists and scholars in academia, international financial institutions and central banks have analyzed the mechanisms of currency crises

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both theoretically and empirically. In theory, the main areas of focus were inconsistent macroeconomic policies, a self-fulfilling prophecy caused by the interaction between policymakers and investors, and financial frictions and regulations as causes of currency crises. On the empirical side, many policymakers attempted to establish Early Warning Indicators to predict a future potential crisis.

However, despite the abundant theoretical and empirical literature, almost no literature has analyzed what types of shocks triggered currency crises. As we will discuss in greater detail in the literature review section, in most theories, it is assumed that a certain type of shock, such as a financial shock or a real shock, can lead to a currency crisis. For example, Nakatani (2016, 2017a) recently developed a model in which a productivity shock in the real sector and/or a shock to a country's risk premium can lead to a currency crisis. Despite this theoretical background, the question of which types of shocks led to past currency crises is purely an empirical issue, which has thus far only been analyzed by Nakatani (2017b). Nakatani (2017b) analyzed the effects of both productivity shocks and risk premium shocks on exchange rate dynamics, but he did not analyze the effects on the probability of a crisis. For this reason, in this article, we are the first to analyze the effects of financial and real shocks on the probability of a currency crisis using a probit estimation technique.

We elucidate the currency crisis mechanism empirically from the perspectives of policymakers by asking and answering three key questions. First, the types of shocks that can increase the probability of a currency crisis and its severity are investigated. In other words, this is the first empirical paper that studies the effects of two (real and financial) shocks on crisis probability. It is important to study the types of shocks that trigger currency crises and increase the severity of the situation because such knowledge will have invaluable implications for economists and policymakers who formulate international macroeconomic policies to prevent such crises. If financial shocks are important triggering factors of the crises, policymakers need to concentrate on developing financial supervisions and macroprudential policies. In contrast, if productivity shocks appear to be more important, they need to focus more on macroeconomic and industrial policies (e.g., product market regulations, labor market reforms, etc.) that can influence the real side of the economy. This paper addresses the question empirically based on the theoretical currency crisis model developed by Nakatani (2014, 2016, 2017a), which has several advantages over other types of models, as we will elaborate later. Following this model, we focus on two types of shocks—real shocks and financial shocks—using the data and analytical framework developed by Nakatani (2017b). We aim to contribute to the existing literature through an analysis of the effects of these shocks on the probability of a currency crisis, which is necessary because exclusion of the shocks from the independent variables can generate an omitted variable bias on the estimated coefficients. In terms of data and methodology, we use unbalanced annual panel data comprising 34 emerging market and developing countries, and we apply a panel probit model. Our results suggest that both productivity shocks in the real sector and shocks to a country's risk premium in the financial markets affect the probability of a currency crisis occurring, while productivity shocks appear to be more important for severe currency crises.

Next, we further investigate the relationship between exchange rate policies and shock-induced crisis probability. Policymakers have been keen to understand the effectiveness of policy instruments to combat currency crises. Most literature has analyzed the effects of monetary policy responses to currency crises. For instance, Nakatani (2017b) used panel data on developing countries and found that an increase in the policy interest rate is associated with an appreciation of the domestic currency. However, an interest rate defense is not the only policy tool that can be used to manage currency crises. If a shock triggers the currency crisis, different exchange rate policies

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