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Real Exchange Rate and International Reserves in the Era of Financial Integration

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In an era of high financial integration, we investigate the relationship between the real exchange rate and international reserves using nonlinear regressions and panel threshold regressions over 110 countries from 2001 to 2020. Our study shows the level of financial institution development plays an essential role in explaining the buffer effect of international reserves. Countries with a low development of their financial institutions may manage the international reserves as a shield to deal with the negative consequences of terms-of-trade shocks on the real exchange rate. We also find the buffer effect is stronger in countries with intermediate levels of financial openness.

The current surge in international reserves hoarding has become a topic of debate in international economics, although it is not a new phenomenon in the history of international economics. Economists consider the cost-benefit model to analyze the relationship between changes in international services holding and other macroeconomic indicators such as exchange-rate intervention policy, real exchange rate (Aizenman and Riera-Crichton, 2008), commodity terms of trade shocks (Aizenman et al., 2012), and so

on. Hoarding of international reserves could be considered a self-insurance tool or buffer against external shocks. Hoarding of international reserves could be considered a self-insurance tool or buffer against external shocks (Aizenman and Lee, 2007; Delatte and Fouquau, 2011; Ghosh et al., 2017; Cabezas and De Gregorio, 2019; Choi and Taylor, 2022).

As the effects are different between advanced and developing economies (e.g., most

emerging countries are exposed to terms-of-trade shocks due to the composition of their exports), our study attempts to explain the heterogeneity from geographical and economic perspectives. Second, this study provides a benchmark for each country to reconcile their policies in the general context. Once we consider the threshold approach, we extend the existing literature that shows international reserves and real exchange rates are associated with the nonlinear shape.

Holding international reserves is not a free lunch for countries, however, policymakers are also keen on making use of this tool to cope with the terms of trade shocks by managing the real exchange. Given the heterogeneity in the levels of economic development and financial institutions resilience, several countries have followed their own approaches to managing their macroeconomic indicators.

Main Objectives

The main objectives of our research are the following:

- 1) Confirming the buffer effect of reserves in an era of high financial integration (see Figure 1).
- 2) Considering heterogeneity in the level of economic development, in the level of the financial development.
- 3) Investigating the existence of nonlinear effects and threshold effects for a large macroeconomic panel.
- 4) Evaluating if such threshold effects in the buffer effect are linked to the level of financial development.

Financial development encompasses several dimensions in our study since we distinguish

financial market development, financial institution development and financial openness.

Materials and Methods

We use annual data for a macroeconomic panel of 110 countries from 2001 to 2020. We follow (Aizenman and Riera-Crichton, 2008) to construct our variables, such as the real effective exchange rate, *rer*; trade openness, *to*; terms of trade *tot*; effective terms of trade, *etot*; and international reserves, *res*. We also add some common determinants of the real effective exchange rate, namely, GDP per capita, *gdppk*, and government expenditures as a percent of GDP, *govexp*. We use three indexes of financial development, financial institution development, and financial market development where several characteristics of financial markets are considered, namely depth, access, and efficiency. Along with panel nonlinear regressions with interaction terms, we use panel threshold regressions.

Results

First, the buffer effect of international reserves is more pronounced in Europe and Central Asia at a certain level above 17% of international reserves over GDP.

Second, the level of financial-institution development plays an important role in explaining the buffer effect of international reserves. To be more precise, hoarding international reserves could be beneficial for countries experiencing slower financial development.

Third, the buffer effect of international reserves is stronger for intermediate levels of financial openness. For observations

(countries and periods) associated with a low level of financial openness, the buffer effect is six times lower than for intermediate openness. For the advanced level of financial openness, the effect is also six times lower than for intermediate openness, but only significant at the 10% level.

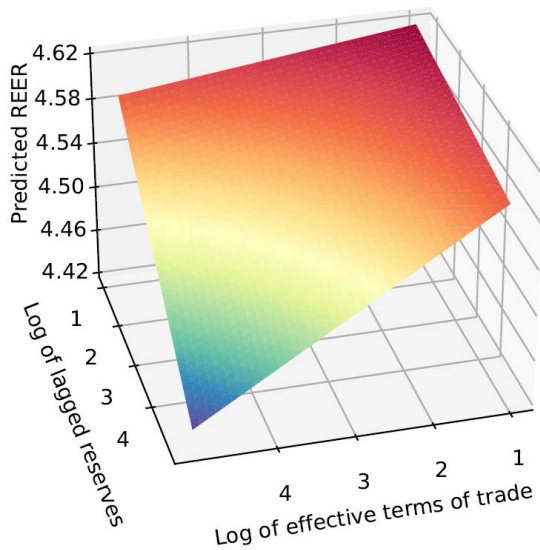


Figure 1: 3-D plot for the buffer effect

We find a significant threshold effect for the financial-institution index (FI). For observations (countries and periods) with a low development level of their financial institutions, the buffer effect is stronger; that is, the coefficient is negative for observations

inferior or equal to the threshold. Countries with a low development of their financial institutions may use the international reserves as a shield to deal with the negative consequences of terms of trade shocks on the real exchange rate.

Conclusions

The aim of this research was to understand the consequences of holding international reserves in open economies. We namely found that during the 2000s and 2010s, high international financial integration has not led to the reduction in reserve holdings. International reserves seem to be a substitute to sound financial institutions. Thus, development of sound financial institutions may be viewed as an alternative policy.

Forthcoming Research

Further research will be conducted in the following directions: a) Considering monetary policy and macro-prudential policy (heterogeneous causal inference), b) Understanding the consequences of the GFC and the euro crisis or c) Exploring the threshold effects in the common factors.

Possible policy implications

The buffer effect is only observed in countries and periods where the development of financial institutions is low. Indeed, countries with a low development of their financial institutions may use the international reserves as a shield to deal with the negative consequences of terms-of-trade shocks on the real exchange rate. Thus, several countries could use international reserves as a substitute for sound financial institutions. We also find the buffer effect is more powerful in countries with intermediary levels of financial openness. In many emerging and developing economies, the development of sound financial institutions may be viewed as an alternative policy.

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