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Exchange rate volatility and productivity growth: The role of financial development ☆

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ABSTRACT

The vast empirical exchange rate literature finds the effect of exchange rate volatility on real activity to be small or insignificant. In contrast, this paper offers empirical evidence that real exchange rate volatility can have a significant impact on productivity growth. However, the effect depends critically on a country's level of financial development. The results appear robust to time window, alternative measures of financial development and exchange rate volatility, and outliers. We also offer a simple monetary growth model in which real exchange rate uncertainty exacerbates the negative investment effects of domestic credit market constraints.

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1. Introduction

Throughout the developing world, the choice of exchange rate regime stands as perhaps the most contentious aspect of macroeconomic policy. For example, China's relatively inflexible exchange rate system has been subject to intense international criticism meanwhile South African policymakers are chastised for not doing enough to stabilize their country's highly volatile currency. Despite the perceived centrality of the exchange rate regime to long-run growth and economic stability, the existing theoretical and empirical literatures on exchange rates or on growth offer little guidance on this subject. The theoretical exchange rate literature is mainly tailored to richer countries with highly developed institutions and markets (e.g., Garber and Svensson, 1995; Obstfeld and Rogoff, 1996), and it offers almost no discussion of

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long-run growth. The empirical literature on exchange rates is largely negative, suggesting to some that the degree of exchange rate flexibility simply does not matter for growth, or for anything except the real exchange rate.[1]

This paper tests whether a country's level of financial development matters in choosing how flexible an exchange rate system should be if the objective is to maximize long-run productivity growth. Significant and robust evidence is found that the more financially developed a country is, the faster it will grow with a more flexible exchange rate. The volatility of real shocks relative to financial shocks—which features so prominently in the literature on developed country exchange rate regimes—also matters for developing countries. But because financial shocks tend to be greatly amplified in financially underdeveloped economies, one has to adjust calibrations accordingly.

Fig. 1 shows the relationship between productivity growth and exchange rate flexibility for countries at different levels of financial development. The upper graphs consider the volatility of the effective real exchange rate and the lower graphs deal with the exchange rate regime classification proposed by Reinhart and Rogoff (2004). Each case provides a comparison between the residuals of a productivity growth regression on a set of variables and the residuals of an exchange rate flexibility regression on the same variables. This gives adjusted measures of volatility and flexibility that are purged from any collinearity with the standard growth determinants. Countries are ranked according to their level of financial development measured by private credit to GDP averaged over five-year periods. The left-hand side in both panels shows the lower quartile whereas the right-hand side shows the upper quartile of the distribution. There is clearly a negative relationship between productivity growth and exchange rate flexibility for less financially developed countries, whereas there is no such relationship for the most developed economies.

The results in Fig. 1 represent preliminary evidence that the growth effects of real exchange rate volatility and the flexibility of the exchange rate regime vary with the level of financial development. The main purpose of this paper is to explore the robustness of this finding and to rationalize it. The next section determines the extent to which the level of financial development affects the impact of exchange rate volatility on growth. A systematic panel data analysis is conducted, using a data set for 83 countries over the years 1960–2000. When a country's de facto degree of exchange rate flexibility is interacted with its level of financial development the results prove to be both robust and highly significant. Various measures of exchange rate flexibility are considered, including the volatility of the real effective exchange rate and the exchange rate regime. The classification of Reinhart and Rogoff (2004) is used in the main analysis, but the results are generally robust to other de facto classifications.[2] A high degree of exchange rate flexibility consistently leads to lower growth in countries with relatively thin financial markets. Moreover, these effects are not only statistically significant, they appear quantitatively significant as well. For example, the estimates indicate that a country which lies in the middle of the lower quartile (e.g., Zambia in 1980), with credit to GDP of 15%, would have gained 0.94% of annual growth had it switched from a flexible to a totally rigid exchange rate. Even a country in the middle of the second quartile (like Egypt in 1980), with credit to GDP of about 27%, would have gained 0.43% growth per year by adopting a uniform pegged exchange rate.

The core results appear to hold intact against a variety of standard robustness tests, including attempts to quarantine the results against outliers and regional effects and allowing for alternative control variables. Alternative measures of exchange rate volatility are considered and the country's distance to the technological frontier is introduced as both, an alternative, and a supplementary, interaction variable. To address the problem of exchange regime endogeneity, we use techniques within the GMM methodology and we also examine the broader historical evidence on the choice of exchange rate regime. Finally, we propose an alternative estimation strategy based on a difference-in-differences approach using an industry-level data set. All these tests contribute to making us confident that the empirical results are indeed robust and capture the causality from exchange rate volatility to growth.

Even though the focus on financial development as a key factor affecting the link between exchange rate volatility and growth is novel, we carefully examine the related exchange rate literature and show that it can be fully reconciled with our results.

In Section 3, a model that rationalizes the empirical evidence is presented. It is an open monetary economy model with wage stickiness, where exchange rate fluctuations affect the growth performance of credit-constrained firms. Exchange rate fluctuations in turn are caused by both real and financial aggregate shocks. The basic mechanism underlying the positive growth interaction between financial development and exchange rate volatility can be explained as follows. Suppose that

[1] The classic paper is Baxter and Stockman (1989). In their survey, Ghosh et al. (2003) state that "perhaps the best one can say is that the growth performance of pegged regimes is no worse than that of floating regimes". More recent studies include Levy-Yeyati and Sturzenegger (2003), Razin and Rubinstein (2006), Husain et al. (2005), De Grauwe and Schnabl (2008), and Dubas et al. (2005). We note that Baldwin (1989), in his analysis of European Monetary Union, argued that a single currency might have growth effects on Europe by reducing the exchange rate premium on capital within Europe. Husain et al. (2005) argue informally that fixed rates may be more important for countries with more fragile political and financial institutions, but they do not provide any direct evidence for this view. There is some evidence of an effect of exchange rate volatility on trade levels (e.g., Rose, 2000). The effect, however, does not appear to be large and it is even less clear that the resulting trade expansion has any great impact on welfare (see Krugman, 1987; Bacchetta and van Wincoop, 2000). Dubas et al. (written independently) conclude relatedly to our starting Fig. 1, that low income countries grow faster under fixed rates. Levy-Yeyati and Sturzenegger (2003), however, find the opposite. In the next section, we will show how our results can be reconciled with the literature.

[2] The classification of Reinhart and Rogoff is more appropriate in our context, since they focus mainly on exchange rate volatility, in particular including dual and multiple exchange rates. Other classifications, such as Levy-Yeyati and Sturzenegger (2003), capture better the constraints on monetary policy by including changes in reserves in defining their classification. However, the focus of this paper is on exchange rate volatility.

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