

Does the exchange rate regime matter for real shocks? Evidence from windstorms and earthquakes[☆]

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Abstract

Does the choice of exchange rate regime affect an economy's adjustment to real shocks? Exploiting the unpredictability and economic exogeneity of windstorms–hurricanes and typhoons—and earthquakes this paper assesses the often contrasting answers found in the theoretical literature. There is robust evidence that exchange rate flexibility helps an economy better adjust to real shocks. And consistent with the channels emphasized in the classic literature on exchange rates and shocks, differences in the behavior of the export sector help explain the different reactions between the two regimes.

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1. Introduction

Does the choice of exchange rate regime affect an economy's adjustment to real shocks? This question has long been at the center of the debate over optimal exchange rate regimes, and has spawned a now classic theoretical literature. Variations of standard arguments imply that nominal exchange rate movements can restore equilibrium faster in economies with rigid prices (Friedman, 1953; Mundell 1961; Poole 1970). By depreciating the currency, the monetary

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authorities in a flexible rate regime can increase the domestic price of exports, helping to offset the effects of an adverse shock. Higher price levels can also reduce real wages, hastening the adjustment process. In contrast, after a negative shock in fixed rate regimes, output declines until wages and prices fall to their new equilibrium level, with the pace of adjustment determined by nominal rigidities.¹

However, the many recent instances of macroeconomic instability suggest some important caveats to this classic literature. In part because of concerns about their commitment to price stability, very few central banks in developing countries may have the ability to effectively pursue countercyclical monetary policy (Kaminsky et al., 2004; Frankel et al., 2002). Thus, an important component of the adjustment process in flexible rate regimes may be limited in practice. Also, prices may not be particularly rigid in many developing countries, making adjustment through the nominal exchange rate superfluous.

Moreover, fixed rate regimes can reduce exchange rate variability and lower transaction costs, thereby stimulating trade, investment and growth (Frankel and Rose, 2002). And depending on the balance sheet exposure of firms, nominal exchange rate movements can exacerbate the impact of real shocks. Therefore, some have argued that a credible fixed rate regime can be appropriate even for a developing country facing real shocks. The literature on exchange rate choice is extensive, and helpful surveys include Calvo and Mishkin (2003), Corden (2002) and Dornbusch (2001).

Although the relationship between the choice of exchange rate regime and adjustment to real shocks has generated contrasting theoretical predictions, and remains a key question among macroeconomists and policy makers, systematic empirical testing has been sparse, in part for very good reasons. The exchange rate regime is a policy choice that remains little understood, and selection bias can plague attempts to discriminate between the various predictions. Policy makers may choose a particular regime because of the shocks that they expect to receive. Or the choice of regime may influence the types of shocks that a country experiences. In both instances inference is likely to be misleading, and the identification of shocks may hinge on potentially implausible assumptions about the policy maker's information set.

Even the few empirical studies that have provided important insights into this relationship using the terms of trade as a source of shocks are not immune from these concerns (Broda, 2001; Edwards and Levy-Yeyati, 2003). The choice of exchange rate regime can influence an economy's trade patterns and level of openness, and thus, the frequency and intensity of terms of trade shocks. Alternatively, a policy maker may choose a particular regime based on expectations about the costs of terms of trade fluctuations. Both these possibilities can affect inference.

Using data on natural disasters such as windstorms–hurricanes, tornadoes, typhoons—and earthquakes, this paper develops stylized facts and empirical tests to help evaluate the contrasting theoretical predictions about the exchange rate regime and the economic adjustment to real shocks.² Natural shocks cause extensive damage to physical and human capital, and are easily observable, yet highly unpredictable. There is of course the celebrated 1975 Haicheng Earthquake in China, where based on abnormal animal behavior an earthquake was correctly predicted sufficiently in advance to reduce casualties. But the Haicheng Earthquake is so celebrated because it remains anomalous.³ Most importantly, the scientific community generally agrees that natural

¹ Modern formulations of these ideas can be found in Végh (in press) and Obstfeld and Rogoff (2002).

² Other examples of empirical research that use natural disasters as part of their identification strategy include Bluedorn (2003, 2005) and Yang (2005).

³ True to form, 18 months later there was no formal prediction when an earthquake of a similar magnitude occurred in Tangshan, China killing a quarter of a million people (Fradkin, 1999).

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