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# Macroeconomic effects of nominal exchange rate regimes: new insights into the role of price dynamics

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## Abstract

This paper analyzes the effects of pegged and floating exchange rates using a two-country dynamic general equilibrium model that is calibrated to the US and a European aggregate. The model assumes shocks to money, productivity and the interest rate parity condition. It captures the fact that the sharp increase in nominal exchange rate volatility after the end of the Bretton Woods (BW) system was accompanied by a commensurate rise in real exchange rate volatility, but had no pronounced effect on the volatility of GDP. This holds irrespective of whether flexible or sticky prices are assumed—which casts doubt on the widespread view that the roughly equal (post-BW) rise in nominal and real exchange rate volatility reflects price stickiness. A flex-prices variant of the model captures better the fact that the correlation between US and European GDP has been higher in the post-BW era than under BW.

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## 1. Introduction

Much research has been devoted to explaining the macroeconomic effects of exchange rate regimes. After the end of the Bretton Woods (BW) pegged-exchange rate system, the volatility of nominal and real exchange rates between the major currency blocs (US, Europe, Japan) rose sharply. By contrast, the volatility of real GDP showed little change after the end of BW, but the cross-region correlation of GDP increased markedly. For example, the standard deviation of Hodrick–Prescott filtered log quarterly nominal and real exchange rates between the US and an aggregate of the three largest continental European economies (EU3: Germany, France, Italy) rose from less than 1% under BW to about 8% in the post-BW era. The standard deviation of US and EU3 GDP was between 1% and 2%, in both eras; the US–EU3 GDP correlation rose from  $-0.18$  (BW) to  $0.48$  (post-BW).

This paper analyzes these facts using a quantitative two-country dynamic general equilibrium (DGE) model. Interest centers on the relevance of these facts for a central and controversial issue: the role of price stickiness in (international) macroeconomic models. The simultaneous rise in nominal and real exchange rate volatility after the end of the BW system, is widely viewed as reflecting price stickiness—and used to justify (Keynesian) sticky-prices models, see; e.g., [Mussa \(1986, 1990\)](#), [Dornbusch and Giovannini \(1990\)](#), [Caves et al. \(1993\)](#), and [Obstfeld and Rogoff \(1996\)](#).

The results presented in this paper cast doubt on this view. A flexible-prices variant of the model here—that features shocks to money supply, productivity and to the uncovered interest rate parity (UIP) condition—can capture the stylized facts described in the first paragraph. A sticky-prices variant accounts for the post-BW rise in nominal and real exchange rate volatility, but fails to explain the rise in the cross-country GDP correlation. Thus, the simultaneous rise in nominal and real exchange rate volatility after the BW era cannot be interpreted as evidence for price stickiness (flex- and sticky-prices variants both capture this phenomenon).

The widespread view described above seems to be based on the assumption that money shocks are the main source of real exchange rate fluctuations—standard theory predicts that money shocks have no effect on the real exchange rate under price flexibility, but induce real exchange rate movements that closely track the nominal exchange rate when prices are (sufficiently) sticky. However, econometric attempts to predict post-BW short-run exchange rate movements from changes in money and other macroeconomic fundamentals (productivity, fiscal policy) have failed ([Rogoff \(2000\)](#)). Also, structural models driven only by these fundamentals generate insufficient exchange rate volatility. This applies both to flex- and to sticky-prices models.<sup>1</sup>

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<sup>1</sup> E.g., the [Backus et al. \(1995\)](#) flex-prices (RBC) model captures only one tenth of the standard deviation of post-BW real exchange rates. Sticky-prices models may generate more volatile exchange rates than RBC models (possibility of Dornbusch-style exchange rate overshooting) but require unrealistically long price adjustment lags to match post-BW volatility ([Kollmann, 2001a, b](#)).

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