

Can sticky prices account for the variations and persistence in real exchange rates?

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Abstract

This paper provides an empirical assessment of the importance of sticky prices in accounting for the variations and the persistence in real exchange rates. Vector autoregressions with five variables from two countries that always include the United States are estimated. Restrictions are imposed to identify a global shock, and two sets of country specific output shocks. One set of shocks is associated with instantaneous price adjustments, while the other has delayed effects on prices. Data from the G7 countries reveal that US sticky price shocks are the dominant source of real exchange rate variations. But these shocks have reasonably short half-lives and cannot account for the observed real exchange rate persistence. Non-sticky price shocks can induce very persistent real exchange rate dynamics, even though they account for little of the historical real exchange rate variations.

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1. Introduction

Casual observation suggests that that prices are sticky, in the sense that they do not change on a frequent basis. Evidence provided by Carlton (1986), Cecchetti (1986), Blinder et al. (1997), among many others, confirm that many firms adjust prices only with delays. The assumption of nominal rigidity is now at the heart of models we use to study business cycles.¹ When coupled with real rigidities such as

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¹ See, for example, Goodfriend and King (1997).

imperfect competition, closed economy sticky price models have properties that are consistent in many respects with the observed data.

In an open economy setting, it is generally observed that the law of one price, or purchasing power parity (PPP), does not always hold. Even though transportation costs, trade barriers, and border effects can in theory explain why the price of traded goods between countries are not perfectly arbitrated after exchange rate adjustments, Engel and Rogers (1996) and Parsley and Wei (1996) have also found that distance alone cannot account for the observed deviations from the law of one price. Indeed, if frictions to international trading are time invariant, deviations from PPP, or the real exchange rate, should be constant over time. Yet, two observations stand out. Deviations in the law of one price since the collapse of the Bretton Woods have taken longer to dissipate. The consensus view, as surveyed by Froot and Rogoff (1995), is that the half-life of shocks to real exchange rates is between three to five years. Furthermore, as Mussa (1986) noted, real exchange rates track nominal exchange rates closely, and therefore inherit the volatility of the nominal exchange rates. The profession is thus left to explain why real exchange rates can be highly persistent on the one hand, and yet have high short-term volatility on the other. Rogoff (1996) referred to this as the Purchasing Power Parity Puzzle.

Two leading explanations have been used to explain persistence in real exchange rates. One view is that firms set prices for local markets and adjust for changes in the nominal exchange rate only with a lag. Another view is that firms set prices for goods sold in foreign markets to compete with foreign firms selling in that market. An exporting firm would not adjust prices in response to nominal exchange rate changes. Although the micro foundations of the two theories differ, they share the common thread that some prices are presumed to be sticky. Sticky prices have also been used to explain the variability in real exchange rates since nominal exchange rate changes will then translate one-for-one into real exchange rate changes.²

Therefore, taken as a whole, there is a presumption that sticky prices will help resolve bits and pieces of the purchasing power parity puzzle. But quantitatively, just how much of the persistence and variations in real exchange rates are attributable to sticky prices? Is real exchange rate persistence a result of price stickiness in one country, or both? The objective of this paper is to provide such an investigation using vector autoregressions (VARs). Many authors have used VARs to study real exchange rate dynamics³, relying primarily on longrun restrictions to identify demand and supply shocks. The present study does not impose cointegration and is not concerned with which shocks have permanent effects. Instead, I classify shocks according to whether they induce delayed price responses. I take as a starting point the observation that the largest source of variations in wages and prices in identified VARs is shocks to themselves, and these disturbances produce substantial instantaneous response by the nominal variables (see, e.g. Leeper et al. (1996)). This is

² Stockman (1988) suggests that the larger variance of real shocks in the floating exchange rate era can explain the increased variability in real exchange rates since 1973. But the importance of real shocks in output variations is itself an unresolved issue.

³ See, for example, Clarida and Gali (1994); Lee and Chinn (1998); Kim et al. (1999).

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