RESEARCH INSIGHTS

Do Primary Commodity Prices Account for the Fluctuations of Exchange Rates?

- We explicitly derive a relationship between bilateral real exchange rates and primary commodity prices in a model that highlights the role of heterogeneity in production structures across countries.
- Fluctuations of just a few primary commodity prices account for between one third and one half of the volatility of the bilateral exchange rates of the United States against Germany, Japan, and the United Kingdom.
- Once we calibrate our quantitative model with data from input-output matrices and shocks to generate the observed commodity price fluctuations, our model delivers the same volatility and persistence of real exchange rates as in the data.

CONTEXT

While there is much debate on the causes of fluctuations in real and nominal exchange rates and whether those fluctuations need to be counteracted, there is still little empirical or theoretical understanding of the behavior of exchange rates. In Latin America, policymakers often acknowledge the connection between exchange rates and primary commodity prices, but that is not the case elsewhere—and this channel is also not well understood. In this project, we formalize the connection between commodity prices and exchange rates, showing that it is quantitatively significant and applies to a wide range of country pairs.

Key concept

NOMINAL EXCHANGE RATE

The number of units of the domestic currency that can purchase a unit of a given foreign currency.

PROJECT

We develop a multi-country general equilibrium model with a commodity sector and explicitly derive a relationship between exchange rates and primary commodity prices. We quantify the importance of this relationship in two ways. First, we regress changes in bilateral real exchange rates on changes in the prices of several primary commodities, finding a substantial and statistically significant correlation between them. Second, we use data on input-output matrices to calibrate our model economy and generate fluctuations in commodity prices similar to those in the data. Our results show that the volatility and persistence of the real exchange rate in the model match those observed in the data.

RESULTS

We connect exchange rates to primary commodity prices. By explicitly incorporating a primary commodity sector into an otherwise standard model of international macroeconomics, we derive an explicit relationship between exchange rates and the prices of primary commodities. This relationship highlights the role of heterogeneity in natural resources endowments and in production structures across countries, and it applies to any country pair.

In our empirical exercise, regressions of changes in exchange rates on primary commodity price variations show substantial and statistically significant correlations. Shocks that move just four primary commodity prices such as oil, aluminum, maize, or copper can account for between one third and one half of the volatility of the real exchange rates between the United States and the United Kingdom, Germany, and Japan. In addition, we show that sub-periods with high primary commodity price volatility are also those with high exchange rate volatility.

In our quantitative exercise, we use data on input-output matrices to calibrate our model. We show that heterogeneity in production structures across countries is quite large. Large and persistent fluctuations in primary commodity prices do translate into large and persistent fluctuations in real exchange rates, as in the data.

Key Concept

REAL EXCHANGE RATE

The ratio of the consumer price level abroad and the domestic consumer price level, where the foreign price level is converted into domestic currency units via the nominal exchange rate.

POLICY IMPLICATIONS

Primary commodity prices can account for a large share of the puzzling exchange rate fluctuations observed in the data. Therefore, the inclusion of a commodity sector in applied international macroeconomic models should enhance their performance in terms of accounting for the exchange rate fluctuations observed in the data. These expanded models should be used for a wide range of country pairs instead of being restricted to economies with export baskets concentrated in a single commodity or a small number of commodities. This improvement in our understanding of exchange rates will in turn result in better policy recommendations, ultimately improving the welfare of our citizens.

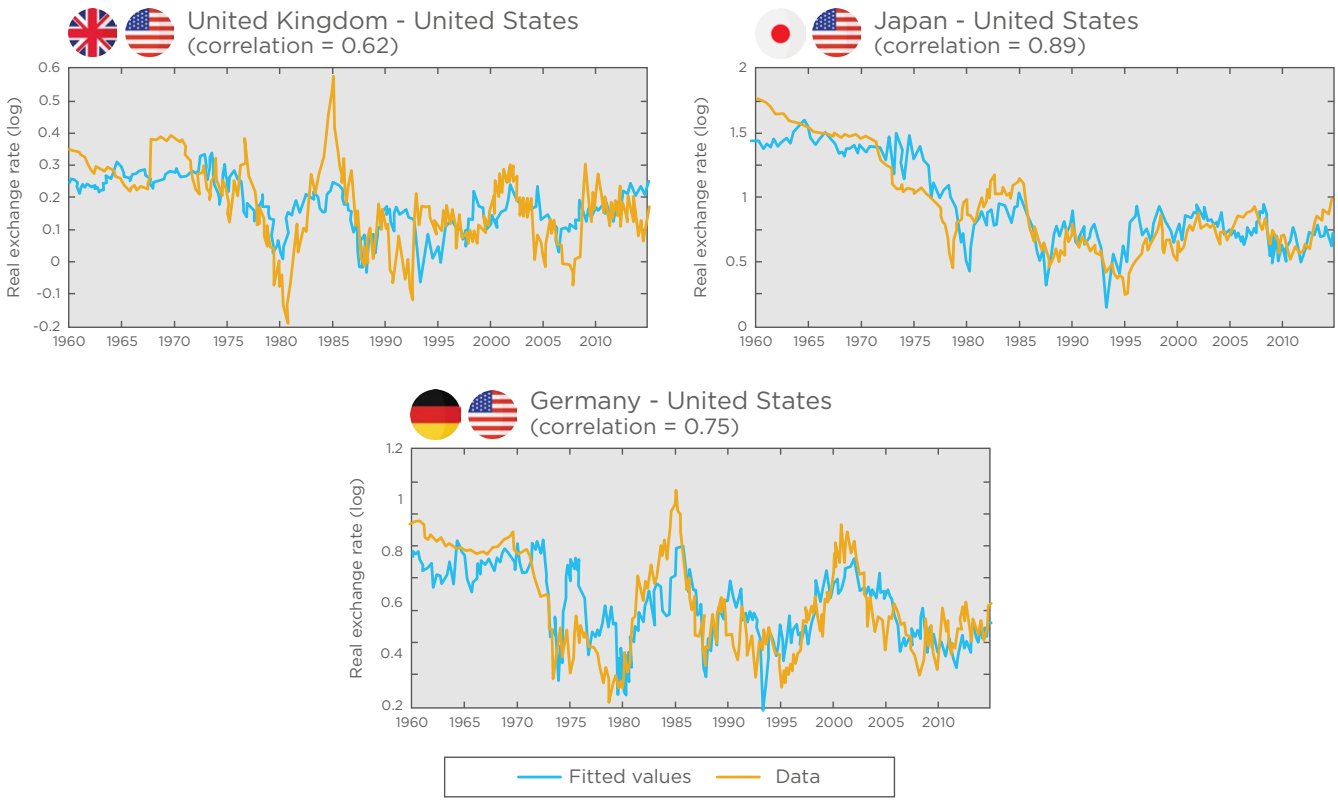
More specifically, countries that have adopted floating exchange rate regimes constantly debate whether or not they should interfere in the exchange rate market to counteract their fluctuations. Many of them do interfere, giving rise to the expression “fear of floating.” We show that if the fluctuations in exchange rates stem from fluctuations in primary commodity prices, they ought to be expected as commodity markets are subject to many shocks such as droughts and production and trade disruptions, among others. According to our analysis, policymakers should not expect large welfare gains from interfering in the market in such cases. In addition, there are other shocks that can move exchange rates and primary commodity prices together, and policymakers should keep that possibility in mind.

Key concept

PRIMARY COMMODITY

A raw or unprocessed material that is extracted or harvested and requires very little processing before consumption, such as oil, sugar, soybeans, copper, or iron ore.

Figure 1. Correlation between Exchange Rates and Four Commodity Prices



FULL STUDY

Ayres, João, Constantino Hevia, and Juan Pablo Nicolini. 2019. "Real Exchange Rates and Primary Commodity Prices."

DEPARTMENT OF RESEARCH AND CHIEF ECONOMIST

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