

Comments

Raphael Bergoeing: Enrique Mendoza has written an excellent paper. His goal is twofold: first, to quantify the contribution of movements in exchange-rate-adjusted prices of tradable goods and in the price of non-tradable goods relative to tradables as a source of real exchange rate variability, using a thirty-year sample of monthly Mexican data; second, to study whether the observed evidence on exchange rate fluctuations in Mexico is consistent with recently developed theories on sudden stops and the real effects of exchange-rate-based stabilizations in emerging economies. To analyze these issues, he builds a general equilibrium model of endogenous credit constraints with liability dollarization, and he then simulates the model to stress balance sheet effects under large changes in the relative price of non-tradable goods. In particular, he shows that Fisher's deflation mechanism can be an important source of amplification and asymmetry in the response of economies to shocks. The paper also provides key insights into the benefits of inflation targeting rules, a widespread monetary tool in the last decade. This monetary policy, which commits to de jure floating exchange rates, can prove effective in preventing large swings in the real value of the currency.

Traditional models of real exchange rate determination attribute all movements in the real exchange rate to changes in the relative price of nontradable to tradable goods across countries. For instance, Stockman and Tesar, as well as Fernández de Córdoba and Kehoe, develop models in which the real exchange rate is exactly the relative price of nontradables to tradables across countries.¹ This setting contains no role whatsoever for movements in the international relative prices of tradable goods. Several recent papers, however, report large and persistent deviations from the law of one price. Most notably, Engel claims that at almost every horizon and for almost every measure and every country relative to the United States, the failure of the law of one price

1. Stockman and Tesar (1995); Fernández de Córdoba and Kehoe (2000).

accounts for over 90 percent (and up to 99 percent) of real exchange rate variations.² Figures 6 and 7 provide alternative support for these mutually inconsistent facts. Figure 6 illustrates the relation between the bilateral real exchange rate for Germany and the United States with a bilateral relative price of nontradable goods. In this figure, rer is the logarithm of the real exchange rate between Germany and the United States, and $rerN$ is the logarithm of the relative price measure. These variables have been constructed so that if the law of one price holds (that is, if the traditional theory works well and if I use appropriated data to measure relative prices), then the two variables should be the same. This figure shows no perceptible relation between the two series, thus supporting the view that the traditional theory is dead. Figure 7, however, provides evidence to the contrary. This figure illustrates the same relation between bilateral variables as in figure 6, but in this case for Canada and the United States. These additional data suggest that the traditional theory is still valid.³

Mendoza's paper demonstrates that figures such as these do not need to be inconsistent. Mexican data support both depending on the exchange rate regime in place. Engel himself claims that a figure such as figure 6 would fairly represent Mexican data. Using a sample of monthly data from 1991 to 1999, he finds that the fraction of the variance of the peso-dollar real exchange rate accounted for by the variance of the Mexico-U.S. ratio for tradables prices adjusted by the nominal exchange rate is over 90 percent, regardless of the time horizon over which the data are differenced. Mendoza shows, however, that Engel may be drawing on too little evidence, as the period he analyzes was characterized mainly by a floating exchange rate regime. Mendoza includes the 1970s and 1980s, when Mexico followed a managed exchange rate regime; he finds that the contribution of the relative price of nontradable to tradable goods becomes much more relevant, accounting for up to 70 percent of the high variability of Mexico's real exchange rate.

This improved characterization of the evidence is relevant for understanding several issues related to the current discussion on financial crises, sudden stops, liability dollarization, and real exchange rate stabilization. In particular, the coexistence of liability dollarization and credit constraints provides a channel for aggregate shocks to produce large real exchange rate variability and sudden stops, through movements in the relative price of nontradable goods. Both theoretical and policy issues emerged.

2. Engel (1999).

3. See Betts and Kehoe (2005) for a detailed description of these data.

FIGURE 6. Germany-U.S. Real Exchange Rate

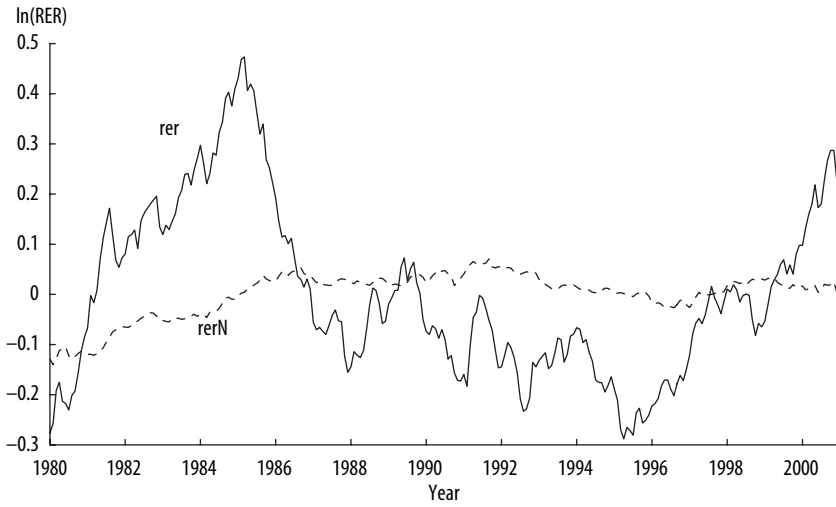
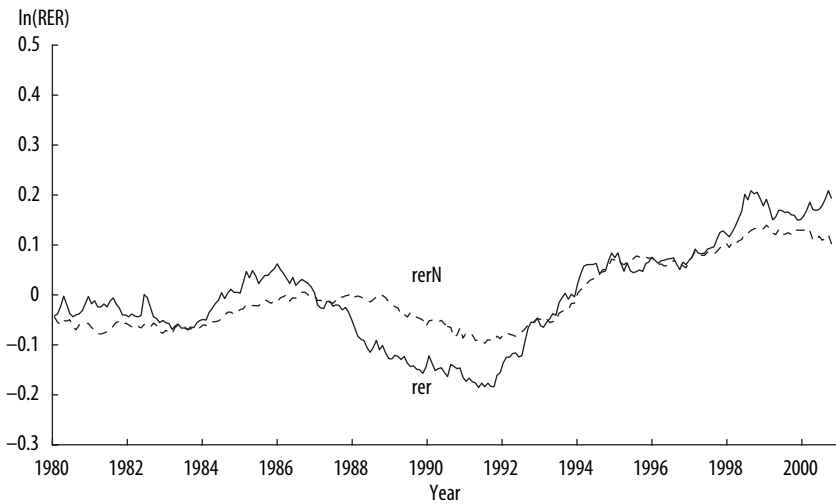


FIGURE 7. Canada-U.S. Real Exchange Rate



Mendoza claims that the channels stressed in his theory are relevant. Measuring their importance, however, requires a good characterization of the facts and a robust quantification of the model's implications. The paper provides insightful analysis of both issues, although I would raise several caveats. Particularly, and as already presented in figures 6 and 7, I expect the variations in the real exchange rates and in a ratio of nontradables prices between two economies to be the same if, and only if, the traditional theory works well and appropriate data are used to measure relative prices. In what follows, I comment on the theory and the data.

The literature provides alternative theories to address the expected role of movements in the relative price of tradables across countries versus movements in the relative price of nontradables to tradables as drivers of real exchange rate movements. For instance, two recent papers consider endogenous tradability. Naknoi develops a framework in which productive heterogeneity drives firm-specific pricing strategies and international trade.⁴ With a managed exchange rate, changes in the prices of tradable goods are delayed, and the prices of nontradable goods adjust more sharply. Betts and Kehoe present a model in which home bias is endogenously determined.⁵ They determine tradability both by the degree of substitutability in consumption between units of the same good produced in different countries and by the transaction costs that must be incurred to consume goods outside their country of origin. In both cases, the implication is that the relative tradables price makes a much greater contribution to overall real exchange rate volatility under a fixed exchange rate regime than under a flexible regime, as in the data reported by Mendoza. Other theoretical issues involve incorporating political economy aspects to model actual experiences. The strategic forces behind the actual policy implementation process in Latin America are certainly relevant to understanding financial crises in the region. Sensitivity analysis could provide further evidence on the importance of these aspects from a quantitative perspective, in particular, to illustrate the potential magnitude of the balance sheet effect and Fisher's deflation.

With regard to the quality of the data, the key question is whether relative prices are correctly measured. Betts and Kehoe provide insight into the problems of measuring relative prices.⁶ They investigate measures of relative prices of nontradables to tradables across a sample of fifty-two countries, as

4. Naknoi (2005).

5. Betts and Kehoe (2000).

6. Betts and Kehoe (2005).

well as the bilateral real exchange rates between the United States and five of its most important trade partners. They find that the observed relations depend crucially on the choice of price series used to measure relative prices and on the choice of trade partners. The relation is stronger when they measure relative prices using producer prices rather than consumer prices, and when the trade relationship between the analyzed trade partners is more important. However, even in cases of a strong relationship between the real exchange rate and the relative nontradables price, a large fraction of real exchange rate fluctuations is due to deviations from the law of one price for tradable goods.

This again raises the question of whether Mendoza's results are robust, as well as their relevance for better understanding other emerging market experiences and their implications for inflation targeting regimes. The paper could do more to address these questions. For instance, given that most countries are moving toward more flexible exchange rate regimes, tradables prices could explain a large fraction of real exchange rates movements in the future.

In short, this paper addresses not only old issues, such as how well the law of one price holds, but also more recent ones, such as what accounts for emerging market financial crises. The implications within an inflation targeting setting are particularly interesting, given that several emerging countries implemented this monetary regime in the last decade and advanced economies such as the United States will probably adopt it in the near future. As countries have moved to flexible exchange rates, they have been forced to search for new monetary anchors. Inflation targeting has been the regime of choice. On the same matter, a relevant discussion deals with the benefits and disadvantages of maintaining a national currency for a small economy versus moving toward a regional currency. A lot must still be learned, however, before these issues are resolved. Mendoza's paper is an important contribution toward that goal.

Nouriel Roubini: Enrique Mendoza has written a very interesting and well researched paper on an important topic. Specifically, he explores the determinants of real exchange rate movements and volatility in emerging market economies, asking whether they stem from movements in the relative price of tradable goods across countries or movements in the relative price of nontradable versus tradable goods. After establishing that movements in the latter are important in episodes of a managed exchange rate, he goes on to consider how they affect the dynamics of financial crises that are triggered by the collapse of fixed pegs and that lead to severe balance sheet effects in the presence of liability dollarization. The paper is divided in two

parts, an empirical section that identifies the determinants of real exchange rate volatility in a typical emerging market economy (Mexico) and a theoretical section that presents some calibrated simulations to show the importance of the balance sheet channel when shocks lead to sharp movements of the relative price of nontradable goods.

Since Mendoza is convinced of the importance of balance sheet effects for explaining crises in dollarized economies characterized by sharp movements of nontradables prices, he needs to show that a significant part of the movements of the real exchange rate—especially under managed exchange rate regimes—is due to movements in the relative price of nontradable goods. The classic empirical studies on the determinants of the real exchange rate conclude that, at least for advanced economies, 90 percent of the volatility of the real exchange rate can be explained by the relative price of tradable goods.¹ Mendoza argues that for the case of Mexico in periods of a managed exchange rate, the contribution of the relative price of nontradable goods is much more significant than the relative tradables price. The author's statistical analysis is very careful, and I find his conclusions sensible and convincing: movements in the relative prices of nontradable to tradable goods are indeed an important factor in explaining movements in Mexico's real exchange rate relative to the U.S. dollar in periods when Mexico implemented semi-fixed exchange rates. Mendoza then makes some broad inferences on what these results may imply for ongoing debates on what drives real exchange rate movements. He argues that if movements of the relative tradables price matter less than is currently believed, then traditional explanations of the volatility of the real exchange rate—based on deviations from PPP or from the law of one price, pricing to market, or stickiness of the price- or wage-setting mechanism—may be incorrect. Mendoza is arguing that optimizing models that are not based on such frictions can adequately explain movements of the real exchange rate.

These broad conclusions are not convincing for a number of reasons. First, the traditional Engel results hold for the full sample period. Second, even in periods when the exchange rate was managed, the relative price of tradable goods explains a significant part of the real exchange rate volatility. Third, optimizing models without nominal frictions have a hard time explaining why the determinants of the real exchange rate should be so different under fixed and flexible exchange rate regimes. The fact that he finds such differences is *prima facie* evidence that nominal factors—such as irrelevance of the

1. See, for example, Engel (1999).

exchange rate regime in a frictionless world—are very important. Thus while the author finds valid evidence that movements of nontradables prices are important for emerging market economies, his broader inferences on what this implies for larger debates on monetary economics are somewhat unwarranted.

Next, the author builds a model in which the interaction of shocks, financial frictions, and liability dollarization can explain financial crises in emerging market economies where sharp movements in the relative nontradables price (triggered by a currency crisis) lead to balance sheet effects that explain the real and financial consequences of such crises. However, while the relative price of nontradable goods moves a lot in emerging market economies, this is not clearly the basis of most financial crises in such countries or even in Mexico in the last thirty years. Since the 1970s, Mexico has almost always faced a currency crisis around the time of its six-year presidential elections, as regular attempts to repeg the exchange rate after the collapse of a peg consistently ended in a new currency crisis. The fixed-rate peg that Mexico maintained in the 1960s (which led to the famous “peso problem” in the forward exchange rate) became unsustainable during the 1976 presidential election and ultimately collapsed. An attempt to restore a managed exchange rate after this crisis led to the foreign debt accumulation of the late 1970s, resulting in the currency and debt crisis of 1982—another election year. After 1982, policymakers avoided formal attempts to repeg while the country dealt with its debt and economic crisis, yet another currency crisis emerged during the 1988 presidential year. The response to this crisis was another attempt to implement a managed exchange rate: the exchange-rate-based stabilization program known as *El Pacto* again produced an overvalued currency, a large and growing current account deficit, and the eventual collapse of the peg in the next election year, 1994. The only presidential election year in which a currency crisis did not occur was 2000. Mexico finally learned the lesson that managed exchange rates and pegs are unstable and floating exchange rates are superior. Thus, both sound economic reforms and the choice of a floating rate regime explain the lack of a currency crisis in 2000.

A simple optimizing model (even one with financial frictions) cannot fully capture the political economy of pegged exchange rates that lead to overvalued currencies and unsustainable current accounts, which in turn cause a currency crash and produce another exchange-rate-based stabilization program. It took over twenty years for Mexico to realize that such peg regimes become unsustainable and that a full float is thus preferable. The model presented in

the paper cannot capture these political economy nuances of the cycle of currency pegs followed by crises. Another limitation of a real model without money is that modeling currency crises becomes cumbersome. A full explanation of fixed and flexible exchange rates and the dynamics of crises requires a monetary model in which monetary factors may play a role in the crises. Modeling a real depreciation in a model without money is also awkward: Mendoza models this real depreciation as a tax on private nontradables consumption that serves to “approximate the relative price effects of changes in the rate of currency devaluation.”

The model in the paper is a stripped-down version of the models with liability dollarization and financial frictions that Mendoza and other authors have developed over the last few years.² Cavallo and others present a similar model with two goods, in which exogenous shocks can lead to overshooting of real exchange rates and trigger strong balance sheet effects that cause financial distress, current account adjustments, and a sharp output contraction.³ The channels presented in the current paper are thus quite well known in the literature on the balance sheet effects of crises. Compared with these earlier models, however, the analytical framework is kept to a minimum: the model does not include capital or a labor supply reaction; the margin constraint is modeled as a simple maximum ratio between debt and the income level (rather than as a limit on debt relative to the capital stock in the economy); and the slow portfolio adjustment, which other models use to trigger sharp asset price movements, is absent.

Even in this simplified framework, Mendoza shows how the interaction between liability dollarization and the financing constraints can lead to interesting crisis dynamics when shocks hit the economy. The mechanism that delivers the results in the paper is as follows: if a shock occurs that makes the financing constraint binding (for example, a fall in the tradables endowment), then the country cannot borrow; this causes tradables consumption to fall, which lowers the price of nontradables; and, finally, this reinforces the country’s reduced borrowing ability via the balance sheet effect and the liability dollarization of the economy. This adjustment mechanism features as Fisher’s debt deflation: “The price of nontradables falls with tradables consumption; this drop in price tightens the credit constraint, which makes tradables consumption fall further, which in turn makes the price of nontradables fall further.”

2. See, for example, the survey of this literature in Mendoza and Smith (2002).

3. Cavallo and others (2003).

Mendoza shows that Fisher's debt deflation mechanism is similarly triggered when the exogenous shock is an increase in the tax rate on private nontradables consumption (a proxy for real depreciation) rather than a tradables endowment shock. While this is an interesting exercise, the analysis finesses the point of why a government would choose a real depreciation if the policy were to lead to such balance sheet effects. In the model, the currency crisis is not an endogenous phenomenon triggered by a shock, but an exogenous—and unexplained—policy choice of the government. The author's calibration exercises suggest that the quantitative effects of the credit constraints and Fisher's deflation captured by the model can be significant and similar to the actual pattern followed by major macroeconomic variables during a currency crisis: a steep fall in consumption, a significant drop in the relative price of nontradables, strong real depreciation, and a sharp adjustment of the current account. Mendoza concludes that "Fisher's deflation mechanism may thus help account for the empirical observation that the relative nontradables price accounts for a significant fraction of the variability of the real exchange rate in economies with managed exchange rate regimes."

This inference is not clearly warranted, however. The basic model could be interpreted, interchangeably, as a model with fixed or flexible exchange rates. Consequently, the effects of the output shocks described in the model do not necessarily apply only to fixed rate regimes. Moreover, the shock that is proxying for a real depreciation does not show the dynamics of an economy with real exchange rates, but rather the dynamics of an economy in which the real exchange rate collapses during a depreciation. Given that Mendoza's empirical results focus on the determinants of real exchange rates during a fixed rate period rather than during the time in which the fixed rate collapses, the calibration results of the paper do not necessarily explain the variability of the real exchange rate during a managed exchange rate period. The author seems to be confusing the behavior of the real exchange rate during a currency crisis with the dynamics of the real exchange rate during a fixed rate period when the currency has not yet collapsed.

The paper ends with policy implications for the choice of the appropriate or optimal exchange rate regime for a liability-dollarized economy. Mendoza appears to support policies of hard pegs that stabilize the real exchange rate or even outright dollarization that, in his view, would remove the problem of liability dollarization. Such policy implications are not warranted. First, fixed rate regimes—even hard pegs such as currency boards—

can collapse in the face of large shocks. Second, exchange rate flexibility may help reduce currency mismatches if it leads to more currency hedging; it also creates a valve for releasing pressures on the currency from shocks, which might otherwise result in a collapse of the peg. Third, dollarization does not resolve the problem of balance sheet effects: if a shock triggers a change in the relative price of nontradable goods, the shock will have balance sheet effects with or without formal dollarization. Indeed, in the paper's real model without money, such balance sheet effects occur regardless of the currency regime. The literature contains a meaningful analytical debate on whether flexible rate regimes dominate temporarily fixed ones when balance sheet effects are at work. This study, however, does not systematically consider the relative performance and welfare of an alternative exchange rate regime.

In conclusion, this is a good, well-researched paper on an important topic. Some of the arguments in the paper are convincing, but I am left with the impression that the emphasized mechanisms—while important—do not explain most of the phenomena of currency and financial crises that have afflicted emerging market economies for the last decade. In particular, the political economy dynamics that lead countries to choose fixed pegs and then let them collapse need to be fleshed out in a framework in which policies are not optimally chosen and thus can fail.

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