



Financial liberalization, structural change, and real exchange rate appreciations[☆]

Felipe Meza^{*}, Carlos Urrutia

Centro de Investigación Económica, ITAM, Mexico

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ABSTRACT

The last twenty years have witnessed periods of sustained appreciations of the real exchange rate in emerging economies. The case of Mexico between 1988 and 2002 is representative of several episodes in Latin America and Central and Eastern Europe in which countries opening to capital flows experienced large appreciations accompanied by a significant reallocation of workers towards the non-tradable sector. We account for these facts using a two sector dynamic general equilibrium model of a small open economy with frictions to labor reallocation and two driving forces: (i) A decline in the cost of borrowing in foreign markets, and (ii) differential productivity growth across sectors. These two mechanisms account together for 60% of the decline in the domestic relative price of tradables in Mexico and for a large fraction of the observed reallocation of labor across sectors. The decline in the interest rate faced by Mexico in international markets is quantitatively the most important channel. Our results are robust to the inclusion of terms of trade into the model.

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1. Introduction

Between 1988 and 2002 Mexico experienced a substantial appreciation of its real exchange rate (RER). In spite of the 1995 crisis, in which the RER briefly depreciated as a result of a sudden stop of loans from abroad, the trend in the whole period shows a 40% appreciation. Similar episodes of RER appreciation have been observed in other Latin American and Central and Eastern European countries, coinciding with a period of financial liberalization, capital inflows and trade deficits. In Mexico, starting in 1988, the opening of the capital account increased the ability to borrow in international markets. The interest rate for loans to Mexico, including the country risk premium, fell from about 15% in 1990 to less than 5% in 2002, with a short run jump during the 1995 crisis.

Looking at the Mexican data for the period, we document the following stylized facts: (i) 78% of the RER appreciation corresponds to a decline in the domestic relative price of tradable goods, measured as the GDP deflator in the tradable goods sectors divided by the overall GDP deflator; (ii) changes in relative outputs and relative wages across sectors are an important component of the story, but

changes in factor income shares are not; (iii) growth accounting for each sector reveals an increase in measured TFP in the tradable sector, while TFP remains stagnant in the non-tradable sector; and (iv) there is a substantial reallocation of resources (capital and labor) from the tradable sector towards the non-tradable sector.

The case of Mexico is representative of a more general trend in emerging economies. We document several episodes of RER appreciations in Latin American and European countries following an opening to foreign capital flows. As in Mexico, we observe in these countries large and sustained RER appreciations accompanied by a massive reallocation of labor towards the non-tradable sector. In some episodes, we can also identify a decline in the cost of foreign borrowing driven by a reduction in the country-specific interest rate premium.

In this paper, we use a structural model to analyze the relation between the RER appreciation and different shocks affecting the economy. Our main objective is to provide a quantitative assessment of the decline in the cost of foreign borrowing as a mechanism to explain the stylized facts (i) and (iv) above in a model consistent with facts (ii) and (iii). For this, we build a two sector, deterministic, dynamic general equilibrium model of a small open economy that can accommodate both external interest rate shocks and sectoral TFP changes. The model is real, abstracting from a monetary side, and constrained-efficient, in the sense that given the adjustment costs to capital accumulation and labor mobility the competitive equilibrium is Pareto-optimal. This distinguishes our analysis from alternative stories based on price rigidities, imperfect competition, and so on.

We calibrate the model to some aggregate statistics for the Mexican economy, feed it with the exogenous paths for the international interest rate for Mexico and measured TFP in each sector, and obtain time series for relative prices and other variables of interest. Our model accounts for

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^{*} Corresponding author.

E-mail addresses: felipe.meza@itam.mx (F. Meza), currutia@itam.mx (C. Urrutia).

60% of the change in the domestic relative price of tradable goods observed in the data. We also find that the interest rate channel is quantitatively the most important of the two, accounting on its own for two-thirds of the appreciation. In our model, a reduction in the world interest rate provides incentives for agents to borrow, increasing current consumption and the current account deficit. Depending on how substitutable tradable and non-tradable goods are, agents would demand more of *both* goods shifting resources towards the non-tradable sector and bidding up its price. The model is consistent with the size of the reallocation of labor towards the non-tradable sector and our results are robust to the introduction of international goods differentiation and terms of trade shocks.

Calibrated open economy models have been successfully used to understand the 1995 crisis in Mexico and its effect on real GDP. A few recent examples include Kehoe and Ruhl (2009), Meza (2008) and Pratap and Urrutia (2010). Some of these exercises have implications for the evolution of the RER during the sudden stop. In particular, Kehoe and Ruhl (2009) do obtain an RER appreciation after a jump at the beginning of the crisis, mostly driven by changes in terms of trade rather than changes in the domestic relative price of traded goods. In this paper we switch the focus of our analysis from the short run effects of the 1995 crisis to the whole 1988–2002 period and show that in the long run changes in the domestic relative price of traded goods are indeed more important to explain the RER appreciation. Their model also abstracts from sector-specific TFP shocks.

Our analysis also borrows from the *structural transformation* literature, which focuses on the long run reallocation of labor across sectors. Ngai and Pissarides (2007) study how differences in TFP growth rates across sectors lead to structural change in a model with an investment and a consumption sector, while Guerrieri and Acemoglu (2008) study how differences in capital shares across sectors lead to more rapid growth of employment in less capital-intensive sectors. In the context of our model, the tradable sector includes manufacturing, which is an investment good produced in a capital intensive industry, while the non-tradable sector can be mapped into the consumption, labor intensive sector. Differently to these papers, we analyze the process of structural transformation in an open economy model and show that the ability to borrow from abroad is key to understand the size and the speed of labor reallocation across sectors.

Our paper also relates to the empirical literature on the Balassa–Samuelson effect and the long run determinants of the RER (see, for example, Asea and Mendoza (1994), Canzoneri et al. (1999), and Choudhri and Khan (2005)). The results in this literature offer mixed support for the importance of faster productivity growth in the tradable sector as a long run determinant of RER movements. Our approach is different, though, in that we use a structural model to evaluate the impact of sectoral TFP shocks measured from the data.¹ We find that changes in the cost of accessing foreign credit can amplify the impact of differential productivity growth and therefore should be included in any empirical analysis of long run RER determinants.

Finally, our work is related to the research on the relation between financial liberalization and growth. Tornell and Westermann (2005) study the impact of financial liberalization on economic growth and whether it leads to financial fragility, in an environment in which there are credit market imperfections that preclude firms in the non-tradable sector to borrow. Their model displays boom–bust cycles driven by changes in the international interest rate and amplified

¹ Another difference between our analysis and the literature on the Balassa–Samuelson effect is that we use a different decomposition of the RER, as discussed in Section 2.1.1. Unlike Engel-style decompositions, focusing on the *domestic* relative price of tradable goods allows us to isolate the role of labor reallocation and sectoral productivity growth in a small open economy from the direct impact of international prices.

through a domestic credit channel for which financial frictions are key. Hence, the real exchange rate displays high volatility in economies undergoing a process of financial liberalization. In contrast, our paper abstracts from financial market imperfections and from the short run crisis episodes, focusing instead on the long run response of the economic structure after a process of financial liberalization.

The paper is organized as follows. In Section 2 we discuss the evidence from the 1988–2002 Mexican data and show that this experience is similar to other episodes in Latin America and Central and Eastern Europe. Section 3 introduces the model, while the calibration and the main quantitative exercise are described in Section 4. In Section 5, we discuss in more detail the mechanisms driving our results. Section 6 modifies the basic model to allow for international good differentiation and terms of trade shocks. Finally, we conclude.

2. Looking at Mexican data: 1988–2002

The first step in our investigation is to look carefully at the RER appreciation in Mexico between 1988 and 2002. We show that a fall in the domestic relative price of tradable goods accounts for about 78% of the real appreciation. We also provide a decomposition of the changes in the relative price of tradable over non-tradable goods which guides our choice of a model in the next section. We perform sectoral growth accounting exercises for the tradable and non-tradable sectors and identify TFP shocks (Solow residuals) affecting their relative productivity. Finally, we document other experiences in emerging markets sharing the same characteristics as the Mexican case.

2.1. Real exchange rate and relative prices

We construct the bilateral, GDP based real exchange rate for Mexico against the US using the standard definition:

$$RER \equiv \frac{eP^*}{P}$$

where e is the nominal exchange rate (pesos per dollar) and P and P^* are the GDP deflators in Mexico and the US. Fig. 1 displays the time series for this variable between 1988 and 2002, normalized to take the value 100 in 1988. Our measure shows a large 40% appreciation in the RER for Mexico between 1988 and 2002 together with a sharp, but short lived, depreciation during the 1995 crisis. We focus in this paper on the long run negative trend, instead of the short run spike of 1995.

Fig. 1 also compares our measure of the RER against a multilateral, CPI based measure reported by Banco de Mexico. These two measures are very similar and capture the same long run trend. If anything, the multilateral CPI based RER features more volatility, with a larger depreciation during the 1995 crisis and a bigger appreciation (45%

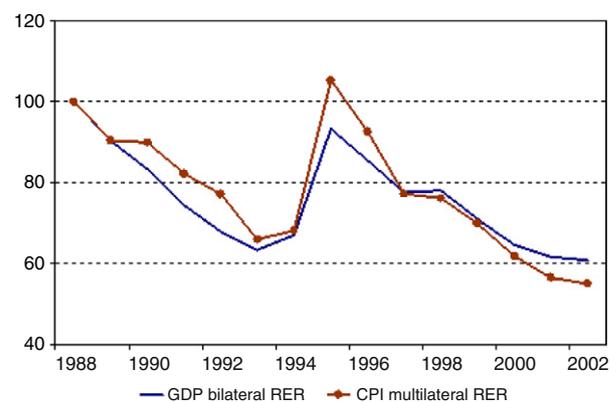


Fig. 1. Evolution of the real exchange rate in Mexico, 1988–2002.

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