

Firm dynamics, investment, and debt portfolio: balance sheet effects of the Mexican crisis of 1994

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Abstract

We build a partial equilibrium model of firm dynamics under exchange rate uncertainty. Firms face idiosyncratic productivity shocks and observe the current level of the real exchange rate each period. Given their current level of capital stock, firms make their export decisions and choose how much to invest. Investment is financed through one period loans from foreign lenders. The interest rate charged by each lender is set to satisfy an expected zero-profit condition. The model delivers a distribution of firms over productivity, capital stocks and debt portfolios, as well as an exit rule. We calibrate the model using data from a panel of Mexican firms, from 1989 to 2000, and analyze the effect of the 1994 crisis on these variables. As a result of the real exchange rate depreciation, the model predicts: (i) an increase in the debt burden, (ii) an increase in exports and (iii) a large decline in investment. These real effects are consistent with the evidence for the Mexican crisis.

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1. Introduction

In the past decade, several Latin American and East Asian countries have undergone currency crises that have been accompanied by substantial falls in investment and output.

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For instance, Mexico experienced a sudden real exchange rate depreciation of 55% in December 1994. GDP fell by more than 6% in 1995 and capital investment dropped by more than 29% in the same period.

Previous quantitative structural models have explained the fall in output and investment in terms of an exogenous drop in total factor productivity (see for example [Bergoeing et al., 2002](#)). However, given the large change in the relative price of domestic and foreign goods that was associated with these real effects, it is reasonable to expect that movements in the real exchange rate could have a role to play in explaining movements in investment and output.

The existing literature has identified two main channels through which exchange rate depreciations may affect investment (see for example [Krugman, 1999](#)). First, depreciations increase the competitiveness of firms in export markets and lead to higher export revenues. Second, firms that hold foreign currency denominated debt face an increase in the value of their liabilities in domestic goods. The former effect, termed the “competitiveness effect”, increases profits and net worth, while the latter, termed the “balance sheet effect”, reduces the net worth of firms. As the literature on the financial accelerator (see for example [Bernanke and Gertler, 1989](#)) shows, in a world of imperfectly competitive capital markets, changes to the net worth affect firms’ access to external funds and hence do have real effects. We could expect to find a positive or a negative effect of devaluation on investment and output, depending on the relative strengths of the two effects.

In this paper, we visit the same question, namely, how do depreciations affect firm investment. We build a model in which we can observe balance sheet and competitiveness effects. In addition, exchange rate movements also affect the cost of credit to firms in our model through two additional (opposing) channels. The interest rates charged to firms in foreign goods increase in the wake of a devaluation. This effect, however, is mitigated by the fact that after a large depreciation, the expectation of subsequent devaluations is substantially smaller. This reduces the value of future expenditures (including debt repayments) in domestic goods. The net effect of devaluations on the cost of credit then depends on which of these effects dominate. We are therefore able to examine the effects of real exchange rate movements on firms’ net worth and cost of credit in a unified framework and quantify their effect on output, investment and debt.

The model is a partial equilibrium model of a small open economy with heterogeneous firms. There are two goods: a domestic and a foreign good. The relative price of these two goods is the real exchange rate that we assume follows an exogenously given first order Markov process. Firms produce domestic output using capital through a decreasing returns technology. Domestic output can be transformed into exports through a concave technology. In this way, we introduce in a simple way the insight that firms cannot switch their production from domestic markets to exports costlessly, due to, for example, an inelastic world demand for exports.

Firms accumulate capital over time. However, investment can only be financed through internal resources or by borrowing in the international capital market. Domestic borrowing and equity issue are not important sources of funds for firms in underdeveloped countries,

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