



# Financial frictions and total factor productivity: Accounting for the real effects of financial crises <sup>☆</sup>

Sangeeta Pratap <sup>a,\*</sup>, Carlos Urrutia <sup>b</sup>

<sup>a</sup> Dept. of Economics, Hunter College & Graduate Center, City University of New York, 695 Park Ave, New York, NY 10065, United States

<sup>b</sup> CIE and Dept. of Economics, ITAM, Av. Camino a Santa Teresa 930, Mexico D.F. 10700, Mexico

## ARTICLE INFO

### Article history:

Received 11 October 2010

Revised 14 September 2011

Available online 21 September 2011

### JEL classification:

E32

F41

G01

### Keywords:

Financial crises

Total factor productivity

Financial frictions

## ABSTRACT

Financial crises in emerging economies are accompanied by a large fall in total factor productivity. We explore the role of financial frictions in exacerbating the misallocation of resources and explaining this drop in TFP. We build a two-sector model of a small open economy with a working capital constraint on the purchase of intermediate goods. The model is calibrated to Mexico before the 1995 crisis and subjected to an unexpected shock to interest rates. The financial friction generates an endogenous fall in TFP and output and can explain more than half of the fall in TFP and 74 percent of the fall in GDP per worker.

© 2011 Elsevier Inc. All rights reserved.

## 1. Introduction

The financial crises of the last decade in emerging economies have typically been accompanied by large falls in total factor productivity. As Calvo et al. (2006) show, GDP in these sudden stop episodes declined on average by 10 percent, the bulk of which can be attributed to a drop in TFP.<sup>1</sup> Investigating the forces behind these movements in total factor productivity is crucial to understand the real effects of financial crises.

A decline in TFP of this magnitude must be a result of not merely a misallocation of resources, but a misallocation that worsens during crises. In this paper we explore the role of financial frictions in exacerbating existing inefficiencies and

<sup>☆</sup> We are grateful to Roberto Chang, Tim Kehoe, Todd Keister, Kim Ruhl, two anonymous referees and an associate editor for helpful comments. We also appreciate comments from participants at LAMES, ESWM, SED, the Cornell–Penn State Macro Workshop, and seminars at Drexel University, ITAM and Wesleyan University. Jessica Serrano, Vicente Castañon and Reyna Gutierrez provided the sectoral data. We are grateful to Erwan Quintin and Vivian Yue for sharing their computations and to Raul Escorza and Nate Wright for research assistance. The paper was partly written while Pratap was a Fernand Braudel fellow at the EUI and Urrutia was visiting the IMF Institute. The hospitality of these institutions is gratefully acknowledged, as is the financial support of grants from the PSC–CUNY Research Award Program and CONACYT (Grant #81825). We are responsible for all errors.

\* Corresponding author.

E-mail addresses: sangeeta.pratap@hunter.cuny.edu (S. Pratap), curretia@itam.mx (C. Urrutia).

<sup>1</sup> The episodes studied include the Latin American debt crises of the 1980s, the Mexican crisis of the first half of the 1990s and the East Asian and Russian crises of the late 1990s.

explaining the drop in measured TFP. There is ample micro evidence that financial constraints and the increase in the cost of credit affected the performance of firms during the crisis,<sup>2</sup> however their aggregate impact on output is unclear.

We build a deterministic dynamic two-sector model of a small open economy with a working capital constraint where firms have to finance a part of their purchase of intermediate goods prior to production. The economy consists of a traded and a non-traded goods sector, each of which uses labor, capital and intermediate goods to produce output. The output of both sectors is combined to produce a final good and an intermediate good. The former is used as both a consumption and an investment good and the latter is used for production. The economy exports and saves in traded goods. Besides intertemporal adjustment costs for capital, the financial constraint on the purchase of intermediate goods is the only friction in the baseline model.

An exogenous increase in interest rates has a twofold effect. First, it increases the wedge between the producer cost and the user cost of intermediate goods, worsening existing allocative inefficiency. The main objective of our paper is to quantify the impact of this channel on measured TFP. Second, an increase in interest rates reduces the demand for non-traded goods, leading to a fall in their relative price and a real exchange rate depreciation.

We calibrate our model to the Mexican economy prior to the sudden stop of 1994 and introduce the sequence of interest rates observed in Mexico during the sudden stop as an unexpected shock. The experiment delivers a reduction in aggregate TFP of about 3.5 percent, which accounts for 52 percent of the TFP drop in the data and 74 percent of observed fall in real GDP per worker. The model is also consistent with a current account reversal and a real exchange rate depreciation, or an increase in the price of traded goods relative to the price of non-traded goods, as observed in the data. However, the baseline model also predicts that the depreciation of the real exchange rate should reallocate inputs from the non-traded to the traded goods sector, leading to a large increase in the output of the latter and a corresponding decline in that of the former. As we show in the following section, this prediction runs counter to the facts.

Our results on the impact of interest rate shocks on aggregate TFP survive a set of experiments designed to assess their robustness with respect to (i) the strength of the financial friction; (ii) the size of the interest rate increase during the crisis; (iii) the degree of substitutability between intermediate goods and other inputs; and (iv) the presence of additional frictions to the reallocation of capital and labor across sectors. The last of these experiments, which is consistent with the observed sectoral movement of factors of production across the two sectors by design, still delivers a 2.5 percent drop in aggregate TFP.

Our paper borrows a key insight from Chari et al. (2005), who show that a sudden stop does not generate a fall in output in a frictionless economy. They suggest that financial constraints on the purchase of inputs can generate TFP effects and output drops only if they create a wedge between the user and producer prices of these inputs. We build a fully fledged model with such constraints and quantitatively assess their plausibility to explain the real effects of financial crises.

We also contribute to a more general literature on financial frictions and sudden stops in emerging economies. Mendoza (2010) and Mendoza and Yue (2009) use financial frictions as a device to amplify the economy's aggregate response to a sequence of bad realizations of exogenous TFP shocks. We show in contrast, that financial frictions can endogenously generate a large fall in TFP after an unexpected interest rate shock, highlighting the different response of the traded and non-traded goods sectors. In this sense, our paper complements the analysis in Kehoe and Ruhl (2009), who demonstrate that deterministic two-sector models of a small open economy can reproduce the current account reversal and real exchange rate depreciation observed following a sudden stop. Without financial frictions however, their model cannot generate an output drop. In a related exercise, Benjamin and Meza (2009) analyze the real effects of Korea's 1997 sudden stop and generate TFP effects out of a sudden stop. Their mechanism is not financial frictions, but a reallocation of resources toward low-productivity sectors, which in their model correspond to non-tradable, consumption goods. We do not observe such a reallocation pattern in the Mexican data.

Our paper is also related to a more general literature on resource misallocation as a source of low TFP. Restuccia and Rogerson (2008) and Hsieh and Klenow (2009) show that barriers to equating the marginal product of labor and capital across establishments can depress manufacturing TFP substantially. Buera et al. (2011) show that financial frictions can cause a misallocation of capital among heterogeneous firms with adverse consequences for aggregate TFP. Bergoeing et al. (2002) suggest that barriers to the exit of firms (due, for example, to restrictive bankruptcy laws) can explain the slow recovery from a crisis. Lama and Urrutia (2011) identify labor market regulation as a key institutional feature preventing low productivity firms from exiting in a recession, exacerbating TFP volatility along the business cycle. Unlike these papers, the misallocation we consider is not across production units but in the input mix used by all firms.

Finally, our paper relates to Neumeyer and Perri (2005) in that we also analyze the role of a financial friction, modeled as a working capital constraint for firms, as a propagation mechanism for external interest rates shocks. However our friction affects the purchase of intermediate goods instead of the wage bill, as in their paper, which allows us to obtain TFP effects. In their model, any output drop generated by an increase in interest rates is due to a decline in the labor supply and equilibrium employment. As discussed before, sudden stops in emerging economies are characterized by large falls in TFP and comparatively minor reductions in labor, so we simplify our model and consider labor supply to be exogenous.

<sup>2</sup> Aguiar (2005) and Pratap et al. (2003) show that the presence of dollar denominated debt depressed firm investment during the 1994 crisis in Mexico. Pratap and Urrutia (2004) build a model that accounts for most of the fall of investment in Mexico due to balance sheet effects of a real exchange rate depreciation.

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات