Journal of International Money and Finance 30 (2011) 1265–1279

Contents lists available at ScienceDirect

Journal of International Money and Finance

journal homepage: www.elsevier.com/locate/jimf

# The relationship between investment and large exchange rate depreciations in dollarized economies

Luis Carranza [a], Jose E. Galdon-Sanchez [b,*], Javier Gomez-Biscarri [c]

[a] Universidad San Martin de Porres, Facultad de Ciencias Contables, Economicas y Financieras, Ciudad Universitaria, Jr. Las Calandrias No 151-291, Santa Anita, Lima 43, Peru
[b] Universidad Publica de Navarra, Departamento de Economia, Campus de Arrosadia, 31006 Pamplona, Spain
[c] Universitat Pompeu Fabra and Barcelona GSE, Departament d'Economia i Empresa, Ramon Trias Fargas, 25-27, 08005 Barcelona, Spain

*JEL classification:*
F31
F33

*Keywords:*
Large depreciation
Dollarization
Balance-sheet effect
Investment
Currency mismatch

A B S T R A C T

We use a simple financial friction in an economy with high degree of liability dollarization – and currency mismatch – to show that the negative balance-sheet effect of an exchange rate depreciation may be observable only if the magnitude of the depreciation is large enough. This result justifies the difficulty to find strong empirical evidence for balance-sheet effects and suggests the convenience of including a "large depreciation" term in empirical analyses. We review some of the related empirical literature and provide some new evidence of this large depreciation effect.



## 1. Introduction

There is ample evidence of large real exchange rate depreciations that are accompanied by GDP contractions, at least in the short-run. Such behavior has been observed in several countries during the last 20 years (see Table 1 for some examples). The literature on liability dollarization and currency mismatch (Cespedes et al., 2004; Choi and Cook, 2004; Magud, 2010; Ize and Levy-Yeyati, 2005; Batini et al., 2007; Bleakley and Cowan, 2008; Carranza et al., 2009) has suggested that a balance-sheet effect induced by exchange rate depreciations could be an explanation for this negative impact: when firms' liabilities are denominated in a foreign currency, a depreciation may lead to a reduction in firms' net

* Corresponding author. Tel.: +34 948 169338; fax: +34 948 169721.
*E-mail addresses:* luiscarranzau@gmail.com (L. Carranza), jose.galdon@unavarra.es (J.E. Galdon-Sanchez), javier.gomez@upf.edu (J. Gomez-Biscarri).

0261-5606/$ – see front matter © 2011 Elsevier Ltd. All rights reserved.
doi:10.1016/j.jimonfin.2011.07.006

**Table 1**
GDP Growth and Large Exchange Rate Swings.

| Country | Year | Exchange Rate Depreciation[a] | Domestic inflation[b] | GDP Growth rate[c] |
|---|---|---|---|---|
| Argentina | 2002 | 206 | 25.87 | −10.90 |
| Brazil | 1999 | 56 | 4.86 | 0.25 |
| Mexico | 1995 | 90 | 35.00 | −6.22 |
| Nicaragua | 1991 | 2930 | 116.60 | −0.20 |
| Paraguay | 2002 | 39 | 10.51 | 0.00 |
| Peru | 1999 | 15 | 3.52 | 0.91 |
| Dominican Republic | 2003 | 66 | 27.45 | −0.30 |
| Russia | 1998 | 67 | 27.68 | −5.35 |
| Thailand | 1998 | 32 | 8.08 | −10.50 |
| Venezuela | 2002 | 60 | 22.43 | −8.90 |

Note: [a,b,c]in percentages.Source: World Bank[a], IMF[b,c].

worth which, in the presence of financial constraints, reduces access to credit and investment and, consequently, generates a contractionary effect that goes counter the traditional competitiveness effect of the depreciation. This effect is amplified when maturity mismatches exist, triggering also, in most cases, credit crunch episodes.

Recent empirical analyses, however, have found only weak evidence for this effect (see Luengnaruemitchai, 2003, for a review), and usually only in the context of quite large depreciations (see, among others, Burstein et al., 2005; the papers in Galindo et al., 2003; Leiderman et al., 2006). These empirical findings suggest that the aggregate investment function may present a nonlinearity in its dependence on the (real) exchange rate:

$$\Delta I_t = H(z_t) + (\lambda + \rho D_t)\Delta e_t; \quad D_t = 1[\Delta e_t > \varphi] \tag{1}$$

where $\Delta I_t$ is the change in aggregate investment, $H(z_t)$ contains the effect of relevant variables other than the real exchange rate, $\Delta e_t$ is the change in the real exchange rate, $\lambda$ is the sensitivity of investment to "regular" real depreciations and $\rho$ is the additional impact of a real depreciation that is "large" (i.e. greater than some threshold $\varphi$). Finally, $\mathbf{1}[\Delta e_t > \varphi]$ is an indicator function that takes value one if the change in the real exchange rate is larger than $\varphi$.

In Eq. (1), the coefficient $\lambda$ may be positive or negative, since it is a combination of a positive competitiveness effect (a real depreciation increases the output of firms that sell tradeables), of an increased relative cost of imported capital (a financial cost effect) and of a negative impact of the increase in relative worth of foreign currency liabilities (the balance-sheet effect). In this paper we argue, however, that the coefficient $\rho$ is negative. We show in Section 2 how a simple financial friction may lead to an investment function of the form shown in (1), a result which explains the difficulty of finding robust empirical evidence for the balance-sheet effect of real depreciations. We then review in Section 3 some of the recent empirical literature on balance-sheet effects and the relationship between investment and real depreciations and show the results of an empirical analysis which support the possible nonlinear relationship between investment and the real exchange rate.

## 2. Investment and large exchange rate depreciations

We use a simple model in the spirit of that of Bleakley and Cowan (2002). Assume a small country with a continuum of firms that produce tradeables and a continuum of firms that produce non-tradeables.[1] There are two periods. Firm $i$ enters period one with some long-term debt, which may be denominated in foreign $(L_i^*)$ or local $(L_i)$ currency. Thus, the ratio $L_i^*/L_i$ is a measure of the degree of

[1] Alternatively, we could think of firms producing a share of tradeables and a share of nontradeables. The results would not change at all but we believe that keeping both types of firms separate facilitates the interpretation and it simplifies some of the derivations of the model's solution.