Foreign Currency Debt and Expectations

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Abstract

We highlight an expectation channel of corporate foreign currency (FC) borrowing. In theory, if domestic agents have an informational advantage on the state of the economy, FC borrowing might arise if the fundamentals are strong relative to what public signals suggest to foreigners. In these situations, international markets overestimate future currency depreciations, which increases the cost of borrowing in peso and pushes domestic agents to borrow in FC. Empirically, we show that, controlling for fundamentals, negative signals are associated with positive domestic currency excess returns and with more FC borrowing.

Keywords: International Lending, Expectations, Debt Currency Denomination.

JEL codes: G15, F34, D83.

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1 Introduction

Foreign currency borrowing by non-financial firms is pervasive in emerging economies (EM). Between 2004 and 2019, the volume of debt denominated in foreign currency issued by non-financial corporations has been multiplied by eight [Acharya and Vij, 2020]. This phenomenon has given rise to concerns regarding the financial stability of EM, as both firms and the local financial sector are exposed to exchange rate risk [Acharya et al., 2015, Chu, 2014, Schreger and Du, 2014].

In this paper, we document a form of "disconnect" between emerging countries' fundamentals and FC borrowing. This implies that countries with weak fundamentals are as likely as countries with strong fundamentals to have a high share of corporate borrowing denominated in foreign currency. This fact is illustrated in Figure 1. Using a panel 15 countries over the period Q1-1990 to Q4-2019, we represent the relationship between the share of bonds issued in foreign currency (FC) by the non-financial private sector and the strength of the country's fundamentals measured by predicted exchange rate appreciation, based on a set of of contemporaneous macroeconomic fundamentals.[1] We control for time and regional common drivers by computing the residuals of a regression with time and regional fixed effects. There seems to be no systematic link between FC borrowing and fundamentals. This evidence echoes some results of the literature on original sin, namely, that emerging economies suffer from a negative stigma on international financial markets, long after they have improved their fundamentals.[2] Our paper shows that this disconnect is only apparent and hides a more complex relationship between fundamentals and FC borrowing: FC borrowing is not driven by the fundamentals per se, but rather by the relative expectations of domestic borrowers and foreign lenders about the fundamentals.

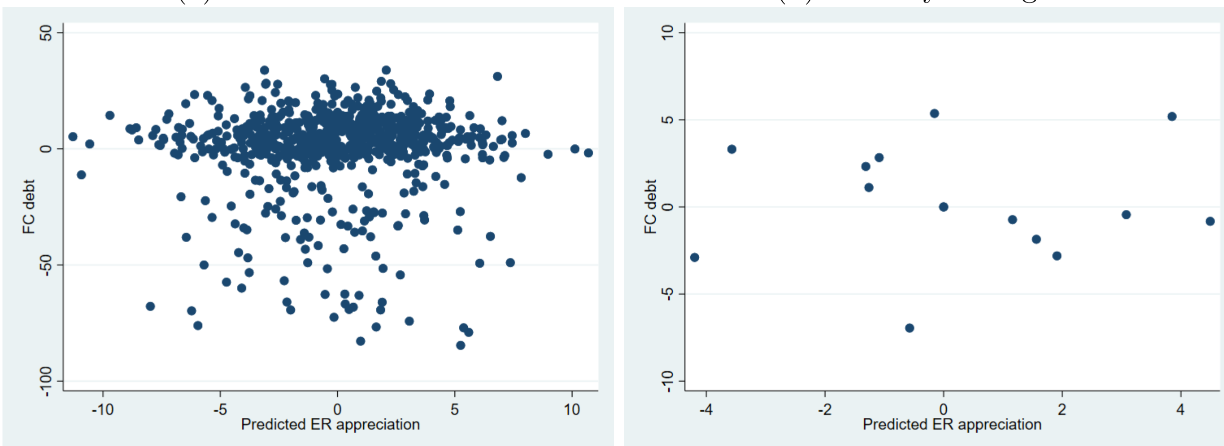
We thus contribute to a better understanding of the sources of FC borrowing by taking into account information asymmetries between foreign and domestic investors and highlighting an expectation channel of FC borrowing. In this setting, FC borrowing results from the comparison of the cost of domestic currency borrowing and the cost of FC borrowing,

[1]See Section 3 for more details on how we construct this measure.

[2]See Hausmann and Panizza [2010]. Only country size, proxied by GDP, is correlated with the amount of dollar debt. See Hausmann and Panizza [2003], Bordo and Meissner [2007].

Figure 1: Foreign currency (FC) debt and predicted exchange rate appreciation

(a) Panel (b) Country averages



Source: Bank of International Settlement (BIS) International Debt Securities Statistics, International Financial Statistics (IMF), authors' calculations.
Note: The y axis represents the percentage of foreign currency debt obligation by the non-financial corporate sector. The x axis represents the predicted exchange rate appreciation. The numbers are the residuals of a regression including time and regional fixed effects. The sample includes 15 emerging economies over the period Q1-1990 to Q4-2019. See Section 3 for more details about this data. The left panel shows the raw data while the right panel shows the country averages.

along with borrowers' beliefs about the stability of the domestic currency. Since the cost of domestic currency borrowing reflects international investors' beliefs about the stability of the domestic currency, then, disagreement between foreign creditors and domestic borrowers is crucial in determining the amount of FC borrowing. As a result, FC borrowing does not derive from fundamentals per se, but from the relative pessimism of international markets and domestic borrowers.

In our model, there is a public signal on the fundamentals, observed by both the domestic and foreign investors. Domestic investors observe also a private signal on the fundamentals. This assumption is justified by the abundant literature documenting the informational advantage of domestic agents.[3] In the model, we account for the fact that financial dollarization

[3]The literature has identified the informational advantage in favor of domestic investors as one of the main determinants of home bias in asset holdings. French and Poterba [1991] show that agents may choose to renounce to diversify their portfolio internationally because of what they describe as "familiarity effect". Tesar and Werner [1995] show that transaction costs associated with trading foreign securities cannot be an explanation to home bias and they conclude that informational constraints can be a determinant of this phenomenon. Brennan and Cao [1997] argue that the observed positive correlation between asset price and foreign purchases is the effect of an informational disadvantage of international investors. A more recent

itself influences exchange rate policies and that this gives rise to strategic complementarities among domestic borrowers, in the spirit of the "global games" literature.[4] We show that for a given public signal, better fundamentals lead to *more* dollarization. On the opposite, for given fundamentals, a better public signal leads to *less* dollarization. Given that the public signal is correlated with the fundamentals, the unconditional correlation between the fundamentals and FC borrowing is weak, as shown in Figure 1.

We test the predictions of the model using a panel dataset covering major emerging market economies. We examine the relationship between the share of bonds issued in foreign currency (FC) by the non-financial private sector and our measure of predicted appreciation, controlling for public signals. We use Standard and Poors' credit rating for sovereign dollar debt to proxy the public signal. Credit ratings are public measures of the fundamentals that are contemporaneously available to investors, while our measure of predicted appreciation is based on indicators that are made public only ex-post (macroeconomic variables are typically published with a lag), hence it is based on an updated information set. We find that FC borrowing is higher when the public signals on the fundamentals are poor (when ratings are downgraded) and when the fundamentals are good (when macroeconomic variables predict an appreciation).

In our model, interest rate differentials, and domestic agents' assessments of deviations from the uncovered interest parity (henceforth UIP) are at the heart of the mechanism. We therefore compute market-based measures of expected currency depreciation, and show that markets tend to overestimate future currency depreciation when the public signals are poor or when the fundamentals are good. This is consistent with our expectation channel and with the assumption that domestic borrowers have an informational advantage.

The reason why emerging countries borrow in dollars in our model is that international investors' pessimism is such that the interest rate charged on peso debt is "unfairly" high from the point of view of the borrowers.[5] This channel is consistent with the microeconomic

approach consists in comparing the performance of domestic and international investors in terms of profits earned: "who knows more gets more". Hau [2001], Choe et al. [1999], Dvorák [2005] and Kalev et al. [2006], make the case that local investors do better than foreigners. Finally Portes et al. [2001], Portes and Rey [2005] and Coval and Moskowitz [1999], using a gravity approach, emphasize how geographic distance matters in the determination of international portfolio equity transactions.

[4]See Carlsson and Damme [1993], and Morris and Shin [1998, 1999, 2002, 2004].

[5]Several studies in fact [Amstad and Packer, 2015, Luitel et al., 2016] have shown that emerging countries

empirical literature. In particular, firms are more likely to borrow in foreign currency with large cross-currency interest differentials and deviations from UIP. Acharya and Vij (2021) finds that interest rate differentials are a strong predictor of foreign currency debt issuance, particularly after the Global Crisis.[6] However, in emerging economies, UIP deviations are also explained by global and country-specific risk.[7] It is important to differentiate between UIP deviations driven by the currency risk premium and the ones driven by the expectation channel because they have different policy implications. In our empirical exercise, we control for this risk channel by including time fixed effects and measures of country risk, and by using instrumental variables. We show that the expectation channel explains UIP deviations and FC borrowing, independently from the risk channel.

The theoretical literature on FC debt in emerging economies has identified several factors that could explain the choice to borrow in foreign currency: Moral hazard created by bailout guarantees [Mckinnon and Pill, 1999, Burnside et al., 2001, Schneider and Tornell, 2001], lack of domestic financial development [Caballero and Krishnamurthy, 2003], commitment problems at the level of domestic firms [Aghion et al., 2004], and domestic monetary policy [Chamon and Hausmann, 2005, Tirole, 2003, Jeanne, 2003, Cowan and Do, 2003, Chang and Velasco, 2006].[8] Our explanation for debt dollarization explains why a disconnect between FC borrowing and fundamentals can be observed, and should be considered as complementary to these. One other difference between our approach and the one adopted in the literature is that in our approach borrowers choose to expose themselves to currency risk. To quote Tirole [2003], "...dangerous forms of debt cannot be presumed to be suboptimal for those who issue them". In other words, while the literature has focused on the "supply side" of FC borrowing (on the ability of domestic agents to borrow in foreign currency), we show that the "demand side" (their willingness to borrow in foreign currency) also plays a role.

systematically receive lower ratings than developed economies with similar features.

[6] See also Keloharju and Niskanen [2001], McCauley et al. [2015a], Brown et al. [2011], Brown et al. [2014], Brauning and Ivashina [2020], Niepmann and Schmidt-Eisenlohr [2017], Bruno and Shin [2017] and Salomao and Varela [2018]. FC borrowing typically responds to global funding conditions on the dollar [Merrouche and Bacchetta, 2019, Bacchetta et al., 2020, Ivashina et al., 2015].

[7] McCauley et al. [2015b] document a "search-for-yield" due to low short-term interest rates in the U.S. Kalemli-Ozcan and Varela [2019] show that political risk is the key factor underlying the UIP deviations for emerging markets.

[8] As Chamon and Hausmann [2005] and Chang and Velasco [2006], we emphasize the endogeneity between the currency denomination of the debt and the policy of the central bank.

The remainder of this paper is organized as follows. Section 2 describes the model and derives testable implications. Section 3 tests the model's implications. Section 4 concludes.

2 The Model

In this section, we specify the assumptions of the model and the equilibrium concepts, then solve the model and derive empirical implications. In the main version of the model, domestic borrowers choose whether to denominate their debt in domestic or foreign currency and the central bank decides to devalue the domestic currency or not based on the country's fundamentals and on the domestic agents' debt denomination. Before solving the full model, we consider a simplified version of it, where the central bank's decision is only conditional on the fundamentals, to emphasize the main mechanisms.

2.1 Agents, Actions and Payoffs

Consider a two-period small open economy populated by a measure-one continuum of domestic agents, a domestic central bank (CB), and a measure-one continuum of international investors. Domestic and foreign agents are risk-neutral. In period 1, in order to finance their production, domestic firms have to borrow one dollar on the international market. Firms can borrow either in the domestic currency, called *peso*, or in the foreign currency, called *dollar*. The supply of funds on the international markets is infinitely elastic. The cost of borrowing in pesos depends on r, the interest rate on peso debt. The cost of borrowing in dollars depends on the international interest rate r^* and on the decision of the CB to devalue or not the domestic currency in period 2. For simplicity, r^* is normalized to 0. The initial exchange rate between the dollar and the peso is equal to 1 in period 1, and to S in period 2.

In the absence of a devaluation, $S = 1$ and the agent who borrows in dollars has a net cost of debt equal to 0 in period 2. A devaluation in period 2, instead, implies that $S = 2$ (two pesos are exchanged for one dollar) and the net borrowing cost in terms of pesos becomes 1. The agent that borrows in pesos instead has a cost of debt equal to r. The borrowing costs are summarized in Table 1.

Table 1: Payoffs

	Devaluation	No devaluation
Dollar debt	1	0
Peso debt	r	r

We assume that the utility function of the agents is of the form

$$U_i = R(S, S^*) - d_i$$

where $R(S, S^*) = -\frac{X}{2}(S - S^*)^2$ and $d_i = S(1 - m_i) + m_i(1 + r)$ are total debt repayments in period 2, expressed in domestic currency, with $0 \leq m_i \leq 1$ the share of debt that is expressed in peso. S^* is the shadow exchange rate, that is, the exchange rate that maximizes the first term. We can think of $R(S, S^*)$ as the trade income of the country, which depends on the terms of trade, and hence on the nominal exchange rate in the presence of nominal rigidities. X controls for the relative weight of trade income as compared to the costs of debt, d_i. For $S^* = 3/2$, a CB that would maximize $R(S, S^*)$ only would be indifferent between $S = 1$ (defending the currency) and $S = 2$ (devaluation).

The central bank The objective of the central bank (CB) is to set S in order to maximize the sum of the individual utilities $W = \int_0^1 U_i di$. Defining the aggregate share of peso debt as $M = \int_0^1 m_i di$, we obtain the central bank's objective function:

$$W(M, S^*, r, S) = R(S, S^*) - (1 - M)S - M(1 + r) \tag{1}$$

In period 2, the central bank observes the shadow exchange rate S^*, the interest rate r and the share of peso debt M, and chooses $S = 1$ or $S = 2$, in order to maximize W.

The central bank devalues the currency if and only if $\Delta W < 0$, where $\Delta W = W(M, S^*, r, 1) - W(M, S^*, r, 2)$, which is equivalent to the devaluation rule:

$$\theta \leq M \tag{2}$$

where $\theta = 1 - X\left(S^* - \frac{3}{2}\right)$. θ corresponds to the "fundamentals" and it is a function of the shadow exchange rate S^* and of the weight of trade income relative to the debt repayments X. Here, it can be interpreted as the income loss incurred with a devaluation. The share of peso debt M is the financial gain from a devaluation, as the difference in unit cost is 1. As a result, when the shadow terms of trade S^* are high enough, it is optimal to devalue the currency. Moreover, when M is high, only a small fraction of domestic agents hold debt denominated in foreign currency, which implies that a depreciation of the currency would not affect the country's total debt repayments too much.[9]

Information and timeline The state of the economy is assumed not to be common knowledge. At time 1 nature selects $\theta \in \mathbb{R}$ that is not directly observed on the markets. Domestic and international agents at time 1 observe a public signal about the state of the fundamentals, denoted by $\mu = \theta + \sqrt{\alpha}^{-1}\lambda$, with $\lambda \sim N(0,1)$. Domestic agents have access to a second source of information represented by a private signal $x_i = \theta + \sqrt{\beta}^{-1}\epsilon_i$. The error term ϵ_i is normally distributed over the population of borrowers with mean 0 and variance 1, $\epsilon_i \sim N(0,1)$. The parameters α and β represent the precisions of –respectively– the public and private signals.

International investors formulate expectations on future exchange rate movements based on the public signal, which will be reflected in the equilibrium peso interest rate. Domestic agents formulate their own expectations based on the public and the private signals. They compare their expectations with the peso and dollar interest rates, and then decide in which currency they want to borrow. The equilibrium share of debt denominated in foreign currency results from the difference between these expectations. At time 2, the CB observes the true state of the economy θ and the share of peso debt M, and chooses whether to devalue or not.

Equilibrium concepts and peso debt A *strategy* for agent i is a decision rule $m_i(x_i, \mu)$ that maps each realization of x_i and μ to an action (i.e., to borrow in dollars or in pesos).

[9] As in Chamon and Hausman (2002), the CB here does not try to expropriate investors to the benefit of domestic residents. The exchange rate policy has the main goal to make dollar debt safer, given that it has already been issued.

An *equilibrium* is a profile of strategies –one for each borrower– such that a borrower's strategy maximizes her expected payoff conditional on the information available, when all the other borrowers are following the strategies in the profile. A *symmetric equilibrium* is an equilibrium such that all individual strategies are identical: $m_i(x_i, \mu) = m(x_i, \mu)$. In a symmetric equilibrium, two distinct individuals receiving the same private signal will choose the same action.

Throughout the paper, we look at monotone (or threshold) symmetric equilibria. That is, equilibria in which $m(x, \mu)$ is monotonic in x. A monotone equilibrium is such that, for any given realization μ of the public signal, an agent borrows in pesos if and only if the realization x of the private signal is less than a threshold $x^*(\mu)$. A monotone equilibrium is then identified by the threshold function $x^*(\mu)$.

In such an equilibrium, the share of peso debt is given by the proportion of agents that observe a private signal x smaller than the threshold $x^*(\mu)$:

$$M(\theta, \mu) = Pr(x < x^*(\mu)|\theta) = \Phi(\sqrt{\beta}(x^*(\mu) - \theta)), \tag{3}$$

where Φ denotes the cumulative distribution function for the standard normal. The share of dollar debt is therefore $D(\theta, \mu) = 1 - M(\theta, \mu)$.

2.2 A simplified version of the model

The devaluation rule (2) gives rise to strategic complementarities among domestic borrowers, because it depends on the aggregate share of peso debt, M. If a domestic borrower expects other domestic borrowers to borrow in dollars, then a devaluation will seem less likely and her incentive to borrow in dollars will be stronger. Before studying the case with strategic complementarities, we focus on a simplified version of the model to better understand the intuition. We first assume that the central bank's decision to devalue depends only on the exogenous fundamentals θ:

$$\theta \leq \theta^*. \tag{4}$$

where θ^* is a constant cut-off point. This rule can be rationalized in a context where the share of trade income, X, is infinite. This case abstracts from the strategic complementarities among domestic borrowers, but still features the main positive implications of information asymmetries between foreign investors and domestic agents.

Strategies and Equilibrium Analysis Given that foreign investors are risk-neutral and that the supply of funds is infinitely elastic, the interest rates on peso and dollar debt must satisfy the uncovered interest parity (UIP). Given that the CB has a binary choice, i.e., devalue or not, and that the dollar interest rate r^* is normalized to zero, the UIP condition implies that the interest rate charged on peso debt is equal to the probability of devaluation formulated by international investors, which is conditional on the public signal μ:

$$r = Pr(\theta \leq \theta^*|\mu), \tag{5}$$

When choosing their borrowing strategy, borrowers compare the probability of devaluation given their information set, $Pr(\theta \leq \theta^*|\mu, x_i)$, with the domestic interest rate r. In other words, they compare their devaluation expectations with international markets' expectations. The optimal strategy can be summarized as follows:

$$m(x^i, \mu) = \begin{cases} 0 & \text{if } Pr(\theta \leq \theta^*|\mu, x_i) < r \\ [0, 1] & \text{if } Pr(\theta \leq \theta^*|\mu, x_i) = r \\ 1 & \text{if } Pr(\theta \leq \theta^*|\mu, x_i) > r \end{cases}$$

It is optimal for the agent to dollarize her debt when her devaluation expectation is lower than the domestic interest rate. On the opposite, when the agent's expectation of a devaluation is higher than the domestic interest rate, it is optimal for her to denominate the debt in pesos. When the expectation of devaluation coincides with the domestic interest rate, then the agent is indifferent between dollarizing or not. Note that, even though UIP holds from the point of view of the foreigners, the domestic borrowers' choice reflects individual deviations from UIP.

For a given interest rate r, there exists a unique threshold $x^*(\mu)$ that makes a domestic agent indifferent between borrowing in pesos or in dollars:

$$r = Pr(\theta \leq \theta^* | \mu, x^*(\mu)). \tag{6}$$

Using the UIP condition (5), the indifference condition (6) reduces to the equality between the probability of devaluation of international investors and the one of the marginal domestic borrower:

$$Pr(\theta \leq \theta^* | \mu) = Pr(\theta \leq \theta^* | \mu, x^*(\mu)). \tag{7}$$

Intuitively, $x^*(\mu)$ is the private signal that makes a domestic agent form the same expectations as foreigners.

The indifference equation (7) characterizes $x^*(\mu)$ uniquely. It can be rewritten as:[10]

$$\Phi\left[\sqrt{\alpha}(\theta^* - \mu)\right] = \Phi\left[\sqrt{\alpha+\beta}\left(\theta^* - \frac{\alpha}{\alpha+\beta}\mu - \frac{\beta}{\alpha+\beta}x^*(\mu)\right)\right] \tag{8}$$

The left-hand side is the foreigners' subjective devaluation probability, while the right-hand side is the marginal domestic borrower's subjective devaluation probability. We can see that the public signal μ has a smaller effect on the domestic borrowers' expectations than on the foreigners'. This is due to the fact that domestic borrowers have an alternative source of information (the private signal). This will determine the equilibrium effect of the public signal on the marginal signal $x^*(\mu)$ and on the share of dollar debt in the economy.

It is useful to rewrite the indifference equation (8) as a function of $\epsilon^*(\theta, \mu)$, where $\sqrt{\beta}^{-1}\epsilon^*(\theta, \mu) = x^*(\mu) - \theta$, so that $x_i < x^*(\mu)$ is equivalent to $\epsilon_i < \epsilon^*(\theta, \mu)$. We then obtain:

$$\Phi\left[\sqrt{\alpha}(\theta^* - \mu)\right] = \Phi\left[\sqrt{\alpha+\beta}\left(\theta^* - \frac{\alpha}{\alpha+\beta}\mu - \frac{\beta}{\alpha+\beta}[\theta + \sqrt{\beta}^{-1}\epsilon^*(\theta,\mu)]\right)\right] \tag{9}$$

When there is asymmetric information (when $\beta > 0$), domestic expectations react not only

[10] We use

$$Pr(\theta \leq \theta^* | \mu) = \Phi(\sqrt{\alpha}(\theta^* - \mu))$$

and

$$Pr(\theta \leq \theta^* | \mu, x^*(\mu)) = \Phi\left(\sqrt{\alpha+\beta}(\theta^* - \frac{\alpha}{\alpha+\beta}\mu - \frac{\beta}{\alpha+\beta}x^*(\mu))\right).$$

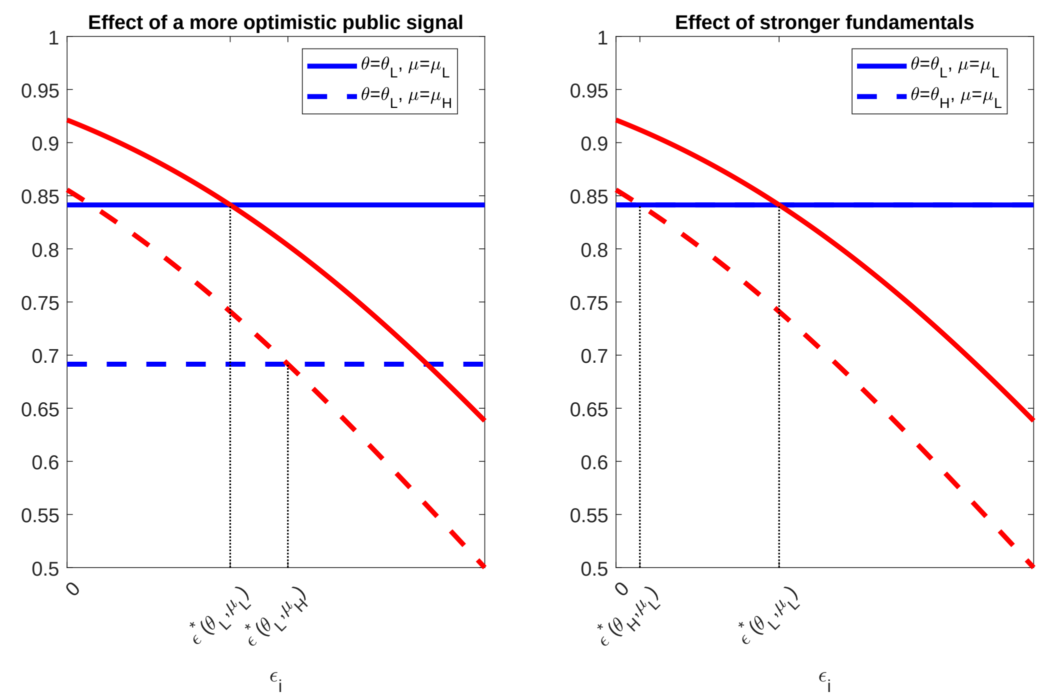
to the public signal μ, but also to the fundamentals θ, to some extent.

This indifference equation then determines the threshold noise $\epsilon^*(\theta, \mu)$. Consider Equation (3). Since ϵ_i is independent of θ and μ, the share of peso debt is monotonously related to $\epsilon^*(\theta, \mu)$:

$$M(\theta, \mu) = Pr(\epsilon_i \leq \epsilon^*(\theta, \mu)) = \Phi\left(\epsilon^*(\theta, \mu)\right) \tag{10}$$

A higher threshold $\epsilon^*(\theta, \mu)$ means that more agents choose to borrow in peso.

Figure 2: Cut-off value for ϵ_i



This figure represents the foreigners' devaluation expectation (blue line), against the domestic investors' devaluation expectations as a function of ϵ_i, (red line). The intersection between these two lines gives ϵ^*, the cutoff value for ϵ_i. If $\epsilon_i < \epsilon^*$, then investor i is relatively more pessimistic than the foreign investors and borrows in domestic currency. If $\epsilon_i > \epsilon^*$, then investor i is relatively more optimistic than the foreign investors and borrows in foreign currency. The figure is based on the following parametrization: $\theta^* = 1.5$, $\theta_L = 0.5$, $\theta_H = 1$, $\mu_L = 0.5$, $\mu_H = 1$, $\alpha = \beta = 1$.

Consider Figure 2, which represents the foreign and domestic devaluation expectations, for given θ and μ. The flat line represents foreigners' devaluation expectations. The decreasing line represents domestic agents' expectations as a function of ϵ_i, which measures the optimism of the private signal. These expectations are equal for $\epsilon_i = \epsilon^*(\theta, \mu)$. For lower values of ϵ_i, the domestic agents issue peso debt, while they issue dollar debt for larger values. Now suppose that μ increases, so that agents receive a more optimistic public signal, while fundamentals θ remain the same (this happens through a change in the noise λ, since $\mu = \theta + \sqrt{\alpha}^{-1}\lambda$). This decreases both foreign and domestic devaluation expectations. However, since foreign expectations react relatively more to the public signal, the more favorable conditions on the peso are not fully offset by the increased confidence of domestic borrowers in the stability of their currency, and more domestic agents then borrow in peso. This is translated in the Figure through an increase in the threshold $\epsilon^*(\theta, \mu)$, which means that the share of dollar borrowing declines.

Now suppose that θ increases, for a given public signal μ (λ must compensate for the change in θ). Domestic agents then receive more optimistic private signals, while foreign expectations do not change. More domestic agents then borrow in dollars. This means that the threshold $\epsilon^*(\theta, \mu)$ declines, and hence the share of dollar debt increases.

We establish the following proposition that summarizes these effects and further explores the role of information asymmetries:

Proposition 1. *From the indifference equation, we can determine the equilibrium cut-off for ϵ_i:*

$$\epsilon^*(\theta, \mu) = A(\mu - \theta^*) - \sqrt{\beta}(\theta - \theta^*)$$

with $A = \sqrt{\alpha}(\sqrt{\alpha + \beta} - \sqrt{\alpha})/\sqrt{\beta} > 0$.

We can additionally show that

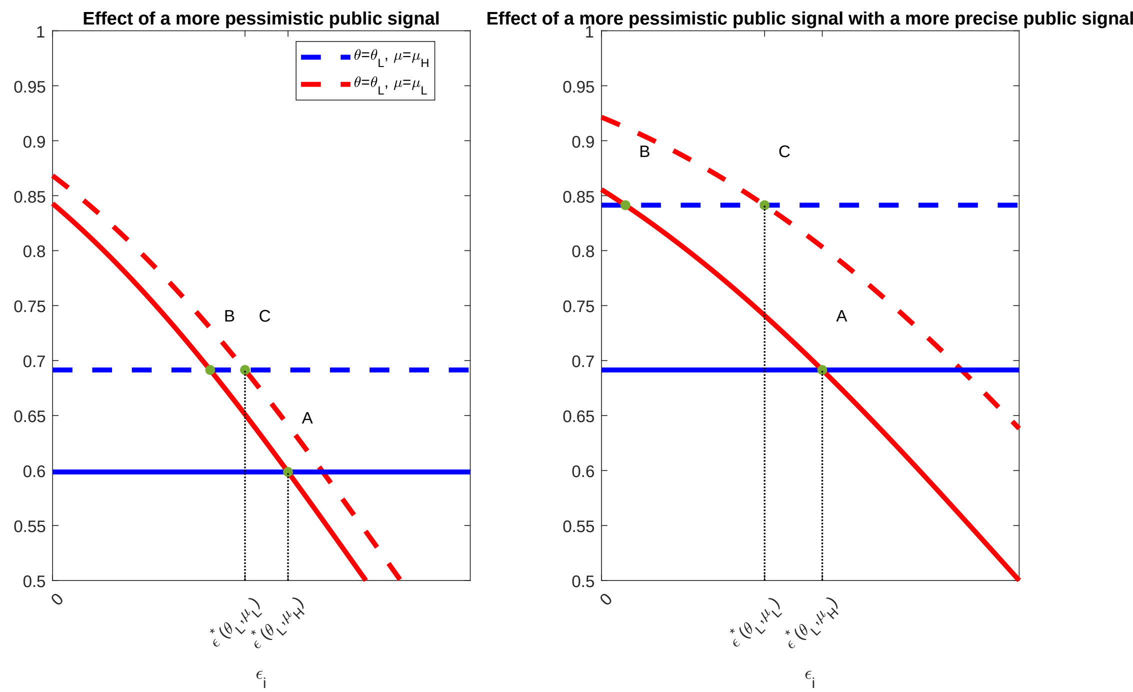
$$\frac{\partial A}{\partial \alpha} = \frac{\left(\sqrt{\alpha + \beta} - \sqrt{\alpha}\right)^2}{\sqrt{\alpha\beta}\sqrt{\alpha + \beta}} > 0$$

Proof. We apply the strictly monotonic transformation Φ^{-1} to both sides of equation (9), then rearrange to obtain the formula for ϵ^*. □

The fact that the effect of μ on the cutoff is positive, and that the effect of θ is negative, confirms our graphical analysis. Note that, contrary to common wisdom, debt dollarization is not caused by weak fundamentals, but by negative public information on the fundamentals. This is because in our model, dollar debt issuance is an equilibrium outcome that arises from the relative assessment of domestic and foreign agents regarding the state of the economy. Weak fundamentals make the domestic agents less confident than foreign investors, while weak signals make the foreign investors less confident.

Note that these implications derive crucially from our assumption that domestic borrowers have an informational advantage over foreign investors. Otherwise, our predictions would be reversed. Strong fundamentals would generate more optimism among foreign investors than among domestic borrowers, so that the former would be more willing to lend in peso. On the opposite, a positive signal would drive more optimism among domestic borrowers than among foreign investors, leading to less peso borrowing.

Figure 3: Cut-off value for ϵ_i for different levels of precision α



This figure represents foreigners' devaluation expectation (blue line), against domestic borrowers' devaluation expectations as a function of ϵ_i, (red line). The intersection between these two lines gives ϵ^*, the cutoff value for ϵ_i. If $\epsilon_i < \epsilon^*$, then borrower i is relatively more pessimistic than foreign investors and borrows in domestic currency (peso). If $\epsilon_i > \epsilon^*$, then borrower i is relatively more optimistic than foreign investors and borrows in foreign currency (dollar). The figure is based on the following parametrization: $\theta^* = 1.5$, $\theta_L = 0.5$, $\theta_H = 1$, $\mu_L = 0.5$, $\mu_H = 1$, $\beta = 1$. In the left panel, $\alpha = 0.25$. In the right panel, $\alpha = 1$.

The positive derivative of A with respect to α means that a more precise public signal (a higher α) leads to a stronger increase in dollar (peso) debt as a response to a negative (positive) public signal. To understand, consider the effect of a negative public signal. As seen earlier, there are two counteracting effects: a foreigners' expectation shift – that leads to an interest rate shift (the peso rate increases) – and a domestic expectation shift (expectations of a depreciation of the peso increase). All in all, the effect of precision depends on whether the foreign expectation shift is relatively more affected than the domestic expectation shift.

In Equation (8), we indeed see that the expectations are non-linear. The subjective probabilities (on the LHS for foreigners and on the RHS for domestic borrowers) depend on the conditional cumulative distribution function, whose sensitivity to the signal depends on the precision α. Because the public signal is the only source of information for international investors, the sensitivity of their cumulative distribution is more dependent on α. As a result, an increase in α makes the international investors even more sensitive to the public signal in comparison to the domestic borrowers, which leads to the observed effect of the precision.

Graphically, the two expectation shifts can be represented respectively in Figure 3 as the switch from point A to point B, and as the switch from point B to point C.

2.3 Strategic behavior of the central bank

In the simplified model, we have assumed that the central bank decision to devalue depends only on the exogenous fundamentals θ. We now introduce the endogenous and empirically relevant policy rule (2) that shows the strategic behavior of the central bank. The rule followed by the CB is such that the devaluation occurs if and only if:

$$\theta \leq M(\theta, \mu) \tag{11}$$

Namely, it is more likely to devalue when there is a relatively large share of peso debt $M(\theta, \mu)$ in the economy, so that this action cannot hurt a large proportion of borrowers.

The difference with the simplified model is that it gives rise to strategic complementarities among domestic borrowers. If an individual domestic borrower expects other domestic borrowers to borrow in dollars, then her devaluation expectations will go down, increasing her incentive to borrow in dollars.[11]

As in the simplified model, we look at monotone (or threshold) equilibria, characterized by a threshold $x^*(\mu)$ below which the agents borrow in pesos. Given the threshold $x^*(\mu)$, the share of peso debt $M(\theta, \mu)$ is decreasing in θ, as is clear from Equation (3). As a consequence, $\theta - M(\theta, \mu)$ is increasing in θ and there exists a unique $\theta^*(\mu)$ such that a devaluation occurs if and only if the state of the fundamentals is less than that threshold. This devaluation threshold is characterized by:

$$\theta^*(\mu) = M(\theta^*(\mu), \mu),$$

which, combined with equation (3), amounts to

$$\theta^*(\mu) = \Phi\left(\sqrt{\beta}(x^*(\mu) - \theta^*(\mu))\right). \tag{12}$$

A monotone equilibrium is then identified by the threshold functions $x^*(\mu)$ and $\theta^*(\mu)$. The indifference equation (8) now depends on the endogenous devaluation threshold $\theta^*(\mu)$:

$$\Phi\left[\sqrt{\alpha}(\theta^*(\mu) - \mu)\right] = \Phi\left[\sqrt{\alpha + \beta}\left(\theta^*(\mu) - \frac{\alpha}{\alpha + \beta}\mu - \frac{\beta}{\alpha + \beta}x^*(\mu)\right)\right] \tag{13}$$

In order to constitute an equilibrium in monotone strategies, $\theta^*(\mu)$ and $x^*(\mu)$ must jointly solve (12) and (13). It is useful to again use $\epsilon^*(\theta, \mu)$, where $\sqrt{\beta}^{-1}\epsilon^*(\theta, \mu) = x^*(\mu) - \theta$. We establish the following proposition:

Proposition 2. *From the indifference and threshold equations, we can show:*

$$\frac{\partial \epsilon^*(\theta, \mu)}{\partial \mu} = A.Z(\mu) > 0 \qquad \textit{and} \qquad \frac{\partial \epsilon^*(\theta, \mu)}{\partial \theta} = -\sqrt{\beta} < 0$$

where $Z(\mu)$ is a multiplier term:

$$Z(\mu) = \frac{1}{1 - B.C(\mu)}$$

[11]Under common knowledge a problem of indeterminacy arises because the existence of multiple equilibria does not allow to make any definitive prediction as to whether the currency is going to be devalued or not. But in our framework, as domestic agents receive private signals, we depart from the assumption of common knowledge on the fundamentals and we can show that the equilibrium is unique. See Appendix A.2 for a proof.

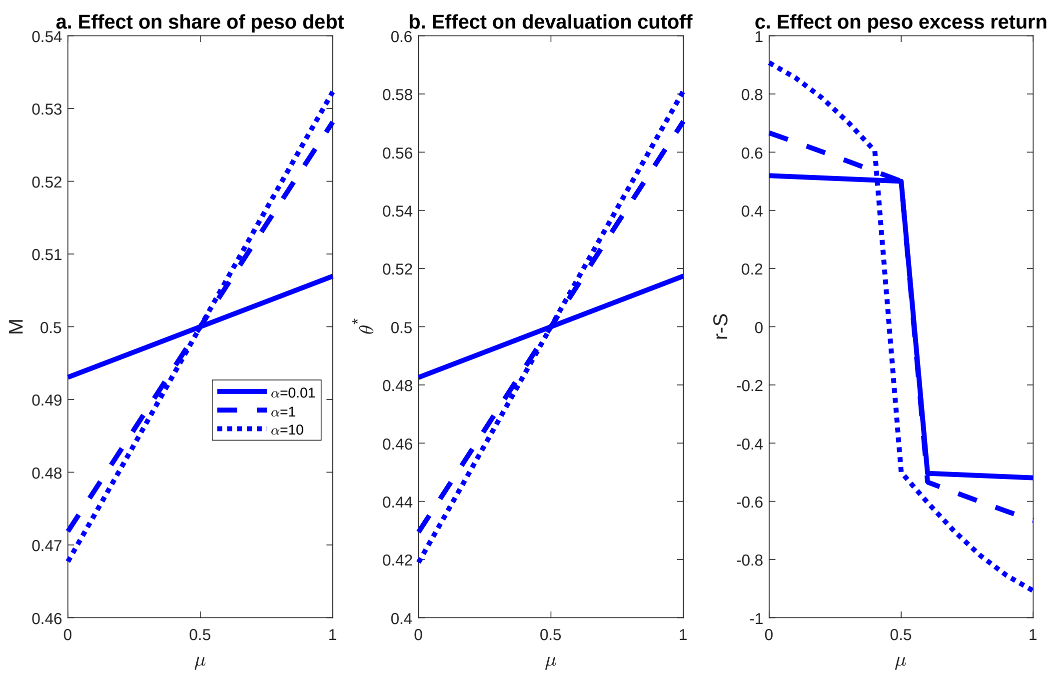
with $B = \sqrt{\alpha+\beta}(\sqrt{\alpha+\beta} - \sqrt{\alpha})/\beta = 1 - A$. *and* $C(\mu)$ *describes how the central bank's threshold* θ^* *is affected by the agents' threshold* x^**:*

$$C(\mu) = \frac{\sqrt{\beta}\Phi'\left(\sqrt{\beta}\left(x^*(\mu) - \theta^*(\mu)\right)\right)}{1 + \sqrt{\beta}\Phi'\left(\sqrt{\beta}\left(x^*(\mu) - \theta^*(\mu)\right)\right)}$$

As both B *and* $C(\mu)$ *are strictly positive and lower than 1, then* $Z(\mu) > 1$.

Proof. See proof in Appendix A.1 □

Figure 4: Effect of the signal μ



This figure represents the effect of the public signal μ on θ^*, ϵ^* and on peso borrowing M, for a given θ. We use the following parametrization: $\theta = 0.5$ and $\beta = 1$.

The effect of θ and μ on the cutoff are similar to the baseline case, up to a multiplier term in the case of μ. The fact that this multiplier, $Z(\mu)$, is larger than 1 reflects an amplification effect due to strategic complementarities. Take for example the effect of a weaker signal. A deterioration $\partial\mu$ in the signal, for a given central bank's strategy, increases the interest rate on peso debt, which leads domestic agents to borrow more in dollars: the dollarization cutoff decreases by an amount $\partial\epsilon_0^* = A\partial\mu$, equal to the baseline. However, more dollarization means that the central bank has more incentives to defend the currency. The devaluation cutoff decreases by $\partial\theta_0^* = AC(\mu)\partial\mu$, where C depends on the normal density function around the dollarization cutoff point, for a given signal μ. The more agents are concentrated around the cutoff point, the more they switch to peso debt, the higher the incentive to defend the currency. Furthermore, as the agents know this, they increase their dollar borrowing even further: the dollarization cutoff decreases by an additional amount $\partial\epsilon_1^* = B\partial\theta_0^* = ABC(\mu)\partial\mu$. These feedback effects accumulate, so that the dollarization cutoff ϵ^* decreases by $\partial\epsilon = \partial\epsilon_0^* + \partial\epsilon_1^* + ... = A.Z(\mu)\partial\mu$, an amount greater than the baseline $A\partial\mu$.

Figure 4 shows the effect of μ on the share of peso debt M (first panel), for a given θ. It confirms that the main insights of the baseline model remain valid when we take into account the strategic behavior of the central bank. The cutoff value, and hence the share of peso debt, decreases when the signal becomes more pessimistic (for given fundamentals), and more so as the public signal is more precise (α is higher). Note that, as the signal becomes more pessimistic, the cutoff value for devaluation $\theta^*(\mu)$ decreases (second panel), so a pessimistic signal will actually mitigate the devaluation risk, for given fundamentals, thanks to the disciplining effect of dollar debt.

FC borrowing arises here because the majority of domestic borrowers are more optimistic than the foreigners on the stability of the peso and expect the cost of dollar debt to be lower. What about the effective cost? In the figure, we can see that more pessimistic signals (a lower μ), for given fundamentals, are associated with a higher peso excess return $r - S$ (third panel), as we may expect. Thanks to their informational advantage, domestic agents are more likely to denominate their debt in dollar when the dollar is actually cheaper. Note that the negative relationship between the peso excess return and μ is due to two mechanisms. First, a more pessimistic signal leads to a higher peso rate, while the fundamentals remain constant. Second, while in this example the CB does not defend the currency in the absence of dollar debt, a pessimistic enough signal, by leading to more dollar borrowing, constrains the CB to defend the currency, which further increases the peso excess return (this is visible through the discontinuity of the curves in the third panel).

Finally, we can see in the figure that a higher precision exacerbates the effect of the signal, just like in the simple model.

All in all, the model's testable implications remain the same as in the simple model, namely: (1) Stronger fundamentals θ increase the share of dollar borrowing, for a given public signal μ. (2) (a) A stronger public signal μ, given the fundamentals θ, decreases the share of dollar borrowing, and (b) this effect is stronger, the higher the precision of the public signal α.

2.4 The role of the exchange rate regime

In our model, we consider a fixed exchange rate regime. Our results do not hinge on that assumption. In Appendix B, we discuss an extension where the CB pursues a flexible exchange rate policy by setting the second-period exchange rate S flexibly in order to maximize $W(M, S^*, r, S)$, taking M and r as given, with the same signal structure and equilibrium concept. The optimal exchange rate is $S = S^* - (1 - M)/X$. We define the fundamentals as $\theta = 1 - XS^*$, so that $S = (M - \theta)/X$. The difference with the fixed exchange rate case is that here domestic borrowers and international investors compare directly their expectations of θ, while in the fixed exchange rate case they compare their subjective devaluation probability, which is a non-linear function of θ.

We show that changes in θ, keeping μ constant, and changes in μ, keeping θ constant, have the same qualitative effect as in the main model with a fixed exchange rate. This is intuitive, as the borrowing decision of the domestic agents rely on their assessment of the fundamentals relative to that of the foreigners, and domestic agents still have an informational advantage when assessing the fundamentals.

However, now a more precise signal does not amplify the response of the peso debt to the public signal. This is due to the linearity of expectations. As we have seen, the role of precision in the fixed exchange rate case is due to the non-linearity of expectations. Indeed, the subjective probabilities depend on the conditional cumulative distribution function, whose sensitivity to the signal depends on the precision α.

In practice, we may expect that some degree of fear of floating, even for inflation targeters, will lead to an amplifying effect of the precision of the signal.

3 Empirical Analysis

In this section, we provide empirical evidence that is consistent with the two predictions derived from our model:

1. Stronger fundamentals increase the share of dollar borrowing, for a given public signal.
2. Given the state of the fundamentals, (a) a positive public signal decreases the share of dollar borrowing, and (b) this effect is stronger, the more precise the public signal.

3.1 Data

In order to test our predictions, we need a measure of FC borrowing, macroeconomic fundamentals, a public signal, and a measure of public signal precision.

Our measure of FC borrowing comes from the Bank of International Settlement (BIS)'s International Debt Securities Statistics. They cover 15 countries over the period Q1-1990 to Q4-2019 and concern new bonds issued in the international market.[12] For our analysis, we consider the proportion of bonds denominated in foreign currency (mostly dollars) by the private non-financial sector.

The sovereign dollar debt credit rating is our proxy for the public signal. We choose sovereign ratings as our public signal because they are widely used by foreign investors in their decisions to invest in Emerging countries.[13] A rating is a synthetic summary of a country's fundamentals in one quantifiable value, based on contemporaneously available public information. We use the Standard & Poors rating because it is the most populated for the countries in our sample.

The precision of the public signal is captured by a dummy variable that we name "Precise" that takes value one if a sovereign is rated by more than one credit rating agency and the average rating split (the difference between the highest and lowest grade) during the quarter is less than 2 notches. We use Fitch and Moody's as other sources of credit rating and we assign the common scale of Hau and al. (2014) to convert the ratings from the three agencies

[12]The countries in our sample are Argentina, Brazil, Chile, China, Colombia, India, Malaysia, Mexico, Peru, Philippines, Poland, Russia, South Africa, Thailand and Turkey.

[13]Dittmar and Yuan [2008] show that in emerging markets information flows from the sovereign market to the corporate market, hence improving the price discovery process.

into numerical values. We invert that scale, so that an increase in the rating is a signal of better fundamentals.

It is important to note that ratings are an imperfect measure of investors' perception of the country's depreciation risk. They also reflect credit risk and can affect the share of foreign currency borrowing through other channels than the expectation channel. We therefore control for measures of country-specific risk and uncertainty: the standard deviation of the nominal effective exchange rate within the quarter, and the political risk index and the exchange rate risk index from ICRG. We invert the scale of the original indices so that a higher value indicates higher risk. We also address the issue of omitted variables by instrumenting the ratings using the contemporaneous expected depreciation over the next 24 months, which we denote by $E_t(\Delta S^j_{t,t+8})$. Expected exchange rate data come from Consensus Economics. We make the reasonable assumption that the expected depreciation (a first moment) is uncorrelated with country risk (a second moment).

We collect data on various fundamentals that are susceptible to be relevant drivers of the exchange rate. We follow the literature in our choice of fundamentals: real GDP growth, international reserves , the current account, the government primary balance, government effectiveness and exchange market pressure (EMP).[14] These variables are sufficiently populated and most tend to be published at low frequencies and with a lag, and are thus not contemporaneously available. These data come from the IMF International Financial Statistics, with the exception of EMP, which comes from Desai et al. [2017], and the government effectiveness index, which comes from the World Bank's Worldwide Governance Indicators. The effective exchange rate is collected from the BIS statistics database. International reserves, the current account and the government primary balance are computed as fractions of GDP. The government effectiveness index varies between 0 and 100, a higher value indicating higher effectiveness. EMP, expressed in percentage change in exchange rate, measures the change in exchange rate that would have taken place had the central bank not intervened [Desai et al., 2017].

[14] The literature considers a menu of fundamentals that comprises the standard monetary fundamentals most commonly used since Mark [1995], along with other variables suggested by exchange rate determination theory, including net foreign assets, interest rates, the trade balance, and lagged values of exchange rate changes. See for instance Andersen et al. [2003] and Abhyankar et al. [2005].

Table C.1 in the Appendix reports descriptive statistics of our data. Our sample is unbalanced, countries enter the BIS statistics at different dates and rating data tend to be more frequently available starting in the 2000s. On average, 92 percent of the bonds issued in the international markets are denominated in foreign currency. But the variability in the data is important, especially across countries, with a standard deviation of 20 percent. Our sample period is sufficiently long to cover several business cycles, implying that the macroeconomic variables also display a lot of variability, both across countries and over time. The range of credit ratings is also wide, from -23 to -4, with a higher numerical rating indicating stronger credit quality. On average, 80 percent of the ratings are "Precise", i.e., the average rating split (the difference between the highest and lowest grade) is less than two notches. In Table C.2 in the Appendix, we provide a correlation matrix of all the variables. Consistently with our predictions, we find that the correlation between the share of foreign currency debt and the rating is negative. Moreover, the instrument (expected depreciation 24 months ahead) is negatively correlated with the rating.

3.2 Empirical strategy

Our empirical strategy proceeds in two steps. In the first step, we build a synthetic measure of the quality of fundamentals. To do so, we estimate the exchange rate change predicted by fundamentals, then we use the results obtained in the first step to test predictions (1) and (2).

A synthetic measure of fundamentals To estimate the exchange rate change predicted by the fundamentals, we use the following specification:

$$\Delta EER_{t+8} = c + F_{it}\beta + \gamma_t + \alpha_i + \epsilon_{it}, \tag{14}$$

where F is the vector of fundamental macroeconomic variables, c is a constant, and γ_t and α_i are time and country fixed effects. ΔEER_{t+8} is the change in the effective exchange rate between t and $t+8$, where EER is the nominal effective exchange rate expressed as the price of domestic currency in terms of foreign currency, so that a positive change means an appreciation of the domestic currency. We consider an 8 quarter horizon for the exchange rate in the baseline and perform robustness checks using shorter horizons (1 quarter and 4 quarters).

Table 2: First stage: predicting the exchange rate appreciation

	(1)	(2)	(3)
VARIABLES			
Rating		1.001***	0.567***
		(0.135)	(0.191)
Growth	2.410***		1.175
	(0.793)		(0.718)
Reserves	0.350***		0.225***
	(0.049)		(0.043)
Current account	-1.210***		-0.736***
	(0.267)		(0.261)
Gov. primary bal.	0.612***		0.478***
	(0.154)		(0.130)
Gov. Effectiveness	0.151***		0.035
	(0.030)		(0.035)
EMP	-0.177		-0.175
	(0.122)		(0.115)
Observations	735	886	727
R-squared	0.381	0.337	0.380
Time FE	Yes	Yes	Yes
Regional FE	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variable is the log change of the nominal effective exchange rate; a higher value indicates a higher appreciation of the domestic currency. Rating is the S&P numerical rating of the sovereign dollar debt; a higher value indicates higher credit quality.

The results of estimating regression (14) are reported in column (1) of Table 2. As predicted by the theory, stronger fundamentals are associated with a significant future appreciation of the domestic currency (column (1)). Precisely, the currency appreciates with higher growth, larger international reserves, a lower current account balance (i.e. higher capital inflows), a higher government primary balance, a more effective government and a lower exchange market pressure, albeit not significantly for the latter. Interestingly, the public signal captured by the rating is also a good predictor of changes in the value of the currency (column (2)). Last, the size of the estimated rating coefficient declines significantly when we add fundamentals to the regression (column (3)), but remains significant.

We use specification (1) in Table 2 to define the predicted exchange rate appreciation, as follows:

$$\widehat{\Delta EER}_{t+8} = \hat{c} + F_{it}\widehat{\beta} + \hat{\gamma}_t + \hat{\alpha}_i \tag{15}$$

$\widehat{\Delta EER}_{t+8}$ then constitutes our synthetic measure of fundamentals.

Testing the model's predictions In a second step, we test predictions (1) and (2) using the following specification:

$$fs_{it} = c + \beta_1 \widehat{\Delta EER}_{t+8} + \beta_2 Rating + \beta_3 Precise + \beta_4 Rating * Precise + \beta_5 X_{it} + \gamma_t + \delta_r + \epsilon_{it} \tag{16}$$

Where fs is the proportion of newly issued bonds denominated in foreign currency, *Rating* is the S&P sovereign rating, *Precise* is a dummy indicating whether the rating signal is precise, X are control variables and γ_t and δ_r are respectively time and regional fixed effects. We do not add time-specific controls (the VIX and the Fed Funds rate) because they are already captured by the time fixed effects. We expect β_1 to be positive (prediction (1)), β_2 to be negative (prediction (2.a)) and β_4 to be negative (prediction (2.b)).

In column (1) of Table 3, we report the unconditional effect of fundamentals. Consistently with the literature and with our preliminary evidence shown in Figure 1, we do not find any significant effect. In column (2), we add the rating. The effect of the rating is significant and negative, suggesting that a better rating results in less foreign currency borrowing. Consistent with our prediction the effect of the fundamentals is positive, albeit statistically insignificant. Specifications (1) and (2) however do not account for other potentially important drivers of FC borrowing that are presumably correlated with ratings and fundamentals.

In column (3), we take into account the fact that country risk may play a role in foreign currency borrowing. In particular, country risk may generate a risk premium that increases the domestic interest rate relative to the foreign one, for a given expected change in the

Table 3: Explaining the propensity to borrow in foreign currency

	(1)	(2)	(3)	(4)	(5)
VARIABLES	OLS	OLS	OLS	IV	Reduced-form
$\Delta \widehat{EER}_{t,t+8}$	0.102	0.435	0.560*	1.387***	0.686**
	(0.226)	(0.306)	(0.323)	(0.424)	(0.291)
Rating		-0.651**	-0.992***	-2.461***	
		(0.252)	(0.260)	(0.735)	
$E_t(\Delta S_{t,t+8})$					0.736***
					(0.223)
Pol. Risk			-0.806	-1.952**	-0.327
			(0.659)	(0.778)	(0.667)
XR Risk			-0.491	-0.938*	-0.290
			(0.476)	(0.538)	(0.471)
SD(EER)			1.451**	2.227***	1.427*
			(0.738)	(0.792)	(0.737)
Chinn-Ito index			0.705	0.755	0.307
			(0.832)	(0.800)	(0.779)
Observations	759	752	715	665	665
R-squared	0.153	0.156	0.163	0.163	0.184
Time FE	Yes	Yes	Yes	Yes	Yes
Regional FE	Yes	Yes	Yes	Yes	Yes
F-stat				63.11	

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variable is the percentage of new debt obligations issued by the private sector denominated in foreign currency. Rating is the S&P numerical rating of the sovereign dollar debt; a higher value indicates a higher credit quality. $\widehat{\Delta EER}$ is the predicted log change in the nominal effective exchange rate; a higher value indicates a higher predicted appreciation of the domestic currency. Precise is a dummy that takes value one if the government is rated by more than two rating agencies and the rating split is less than 2 notches. The results for the IV estimator reported in column (4) uses the expected domestic currency depreciation at the 24-month horizon as an instrument for ratings. The results for the reduced-form regression reported in column (5) replace ratings with the instrument.

exchange rate, hence causing a deviation from the UIP. In that case, if domestic borrowers are less risk-averse than foreign lenders, then more country risk may lead them to take advantage of a cheaper foreign interest rate and borrow more in foreign currency. If we assume that a higher country risk implies a lower rating, then not controlling for country risk may bias the estimate of the rating effect downwards (by generating a more negative coefficient). If domestic borrowers are more risk averse, then more country risk may lead them to decrease their exposure to the dollar. This may lead to bias the estimates of the rating effect upwards (by generating a less negative coefficient). Once we introduce the measures of country risk in the regression, we find that the rating has a stronger (more negative) effect and that the effect of fundamentals becomes statistically significant. As predicted by our theory a better rating is associated with less FC borrowing, while better fundamentals cause more FC borrowing.

Another approach to addressing the omitted variables problem is to use instrumental variables (IV). Column (4) reports the IV results, where we use the Consensus Economics expected domestic currency depreciation at the 24-month horizon as an instrument for the rating.[15] The IV estimates of the rating and the fundamentals are over twice as large as the OLS estimates and statistically significant. Our results are not plagued by a weak instruments problem, as the Kleibergen-Paap Wald F statistic is high.[16] In column (5) we also report the reduced-form regression, with a positive estimated effect for the fundamentals and a positive estimated effect for the Consensus Forecast expected depreciation (i.e. a worse signal is associated with more FC borrowing). All in all, our results are consistent with predictions (1) and (2.a). They also makes sense of column (1)'s result and Figure 1: since the rating is negatively correlated with the fundamentals, the unconditional effect of the fundamentals is weak.

Not controlling for country risk produces an upward bias in the OLS estimate of the rating signal. Since country risk is negatively correlated with ratings, we predict that more country risk is associated with less foreign currency borrowing. This is consistent with the coefficients of political and exchange rate risk estimated in column (4): more political and

[15] Table C.3 in the Appendix reports the first stage of the IV procedure.

[16] We check that the F-stat is above the 5% Stock-Yogo weak identification test critical value.

Table 4: The role of rating precision

	(1)	(2)	(3)
VARIABLES	IV	IV	IV
$\Delta\widehat{EER}_{t,t+8}$	2.165***	1.789***	1.948***
	(0.670)	(0.558)	(0.635)
Rating	-2.304**	-2.660***	-5.135***
	(0.958)	(0.818)	(1.767)
Precise	-27.125**		
	(11.698)		
Rating*Precise	-2.820**		
	(1.201)		
Precise		-36.595**	
		(16.564)	
Rating*Precise (stricter)		-3.715**	
		(1.743)	
Rating Split			10.042***
			(3.101)
Rating*Rating Split			0.800***
			(0.273)
Pol. Risk	-3.475**	-3.494***	-3.712***
	(1.364)	(1.169)	(1.348)
XR Risk	-1.026*	-0.552	-1.383*
	(0.561)	(0.547)	(0.753)
SD(EER)	2.834***	2.025**	2.839***
	(0.970)	(0.815)	(0.945)
Chinn-Ito index	0.913	0.923	0.311
	(0.924)	(0.871)	(0.813)
Observations	665	665	658
R-squared	0.055	0.130	0.096
Time FE	Yes	Yes	Yes
Regional FE	Yes	Yes	Yes
F-stat	13.76	22.96	16.82

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variable is the percentage of new debt obligations issued by the private sector denominated in foreign currency. Rating is the S&P numerical rating of the sovereign dollar debt; a higher value indicates a higher credit quality. $\widehat{\Delta EER}$ is the predicted log change in the nominal effective exchange rate; a higher value indicates a higher predicted appreciation of the domestic currency. Precise is a dummy that takes value one if the government is rated by at least two rating agencies and the rating split is less than 2 notches. Precise (stricter) is a dummy that takes value one if the government is rated by at least two rating agencies and the rating split is less than 1 notch. The rating split is the quarter mean difference between the largest and lowest rating within a month. The results show the IV estimator reported using the expected domestic currency depreciation at the 24-month horizon and its interaction with the precision measure as instruments for ratings their interaction with the precision measure.

exchange rate risk are associated with less foreign currency borrowing.

In Table 4, we report the results when interacting the rating with the precision dummy in the IV specification. In column (1) the interaction of the rating with the *Precise* dummy is negative and significant, which means that the effect of rating is stronger when the rating is precise. This is consistently with prediction (2.b). We confirm this result by using alternative measures of rating precision. In column (2), we use a stricter measure: the average rating split has to be lower than one notch for the dummy to be equal to one. According to that measure, only 30% of ratings are "precise". The interaction term remains negative and is even larger. Finally, in column (3), we remove all observations with only one rating agency and use the rating split as a measure of ratings' imprecision. The estimated effect of the interaction terms is positive, which confirms our theoretical prediction.

Currency excess return We have assumed that domestic borrowers exploit an informational advantage and borrow more in foreign currency when foreign currency financing is cheaper from their point of view. This informational advantage should materialize in positive excess returns on the domestic currency in these situations. Namely, controlling for the fundamentals, we expect a positive public signal to make market prices excessively optimistic on the currency. Controlling for the public signal, we expect market prices to miss good fundamentals. To test this prediction, we estimate a regression similar to Equation (16) where the dependent variable is a measure of excess returns.

We measure the currency excess return as the annualized excess returns to a U.S. investor on a currency forward contract of maturity h. Under covered interest parity (CIP), the excess return is equal to the difference in the nominal interest rates between the domestic country and the United States at maturity h plus the ex-post realized change (in log difference) in the nominal exchange rate:

$$f^j_{h,t} - s^j_{t+h} = i^j_{h,t} - i^{US}_{h,t} - \Delta s^j_{t,t+h},$$

where s^j_{t+h} is the log of the spot exchange rate between the domestic currency j and the U.S. dollar at time $t+h$ and $f^j_{h,t}$ and is the corresponding log forward exchange rate of maturity

h at time t, $i^j_{h,t}$ is the domestic money market rate of maturity h at time t, $i^{US}_{h,t}$ is the US LIBOR of maturity h at time t and $\Delta s^j_{t,t+h}$ is the effective depreciation of currency j between t and $t+h$ vis-à-vis the dollar.

As argued by Hassan (2013), it is better to use data on forward premia rather than data on interbank rates because forward contracts are not affected by potential variation in sovereign default risk across countries. We therefore use forward rates to compute the excess returns at the 3 months (1 quarter), 12 months (4 quarters) and 24 months (8 quarters) maturity. We adapt our measure of fundamentals by using a measure of predicted appreciation at the corresponding horizon, i.e. at the 1-quarter, 4-quarter and 8-quarter horizons. A predicted appreciation at the 8-quarter horizon is the one that we have considered so far. For the 1-quarter and 4-quarter horizons, we use the same specification. Table C.4 in the Appendix shows the results of the regressions. At the 4-quarter horizon, the current account becomes insignificant. At the 1-quarter horizon, exchange market pressure becomes significant, while the other explanatory variables become all insignificant.

A potential issue is that we cannot rule out that forward contracts are affected by currency risk. To see how this can affect our results, we decompose the currency excess return into the expected currency excess return and an expectation error:

$$f^j_{h,t} - s^j_{t+h} = f^j_{h,t} - E_t(s^j_{t+h}) + E_t(s^j_{t+h}) - s^j_{t+h}$$

where $E_t(s^j_{t+h})$ corresponds to international investors' exchange rate expectation. The first term can be interpreted as a currency risk premium, while the second term is the foreign expectation error on the exchange rate. We therefore also directly estimate the expectation channel by regressing the expectation error on the rating and the fundamentals. We use the expected US dollar exchange rate from Consensus economics to compute the 1-quarter, 4-quarter and 8-quarter expectation errors.

Table 5 shows the results using the IV approach. We use as exogenous instruments the expected depreciation at the corresponding horizon. Ratings and our measure of fundamentals affect both the currency excess return and the expectation error with the expected sign, expect in column (3), i.e. for the 8-quarter currency excess return (this dependent variable is

Table 5: Channels: Currency excess returns and expectations errors

	(1)	(2)	(3)	(4)	(5)	(6)
		Excess return			Consensus error	
VARIABLES	1q	4q	8q	1q	4q	8q
$\Delta\widehat{EER}_{t,t+1}$	0.887***			1.609***		
	(0.146)			(0.222)		
$\Delta\widehat{EER}_{t,t+4}$		0.649***			1.627***	
		(0.231)			(0.290)	
$\Delta\widehat{EER}_{t,t+8}$			-0.335			1.697***
			(0.484)			(0.268)
Rating	-4.766***	-1.898**	1.743	-9.879***	-4.007***	-4.242***
	(1.026)	(0.811)	(1.271)	(1.681)	(1.051)	(0.714)
Pol. Risk	-3.313***	-1.154*	0.236	-7.194***	-2.240***	-2.872***
	(0.914)	(0.628)	(0.700)	(1.636)	(0.836)	(0.608)
XR Risk	-1.409	0.783	0.137	-3.361**	-0.444	-0.126
	(0.921)	(0.514)	(0.466)	(1.621)	(0.643)	(0.499)
SD(EER)	1.396	0.908	0.422	3.540**	2.907***	2.093***
	(1.089)	(0.633)	(0.580)	(1.477)	(0.679)	(0.573)
Chinn-Ito index	3.080**	0.691	-3.936***	7.195***	2.142***	1.641***
	(1.227)	(0.676)	(1.095)	(1.687)	(0.704)	(0.563)
Observations	623	620	463	666	656	629
R-squared	-0.461	-0.112	0.071	-1.798	-0.638	-1.261
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Regional FE	Yes	Yes	Yes	Yes	Yes	Yes
F-stat	46.90	35.26	14.21	48.20	40.82	45.67

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variables are currency excess returns, measured by the excess return on US dollar forward contract at the 1, 4 and 8-quarter maturities, and the forecast error on the exchange rate, at the 1, 4 and 8-quarter maturities. Rating is the S&P numerical rating of the sovereign dollar debt; a higher value indicates higher credit quality. $\widehat{\Delta EER}$ is the predicted log change in the nominal effective exchange rate; a higher value indicates a higher predicted appreciation of the domestic currency. We use the IV estimator with the following instruments: $E_t(\Delta s^j_{t,t+1})$ (columns (1) and (4)), $E_t(\Delta s^j_{t,t+4})$ (columns (2) and (4)), $E_t(\Delta s^j_{t,t+8})$ (column (3) and (6)).

the less populated among the 6 considered here). A better rating, controlling for fundamentals, is associated with a weaker currency than what markets (and professional forecasters) expected. On the opposite, better fundamentals, controlling for the rating, are associated with a stronger currency than market expectations. In the former situation, we have seen that domestic agents borrow less in foreign currency. In the latter, they borrow more in foreign currency. These results are thus consistent with a domestic informational advantage.

Depending on the horizon, in terms of magnitude, for given ratings, a 1% increase in the predicted appreciation of the domestic currency based on the fundamentals leads to a 0.6-0.9% increase in excess currency return, and a 1.6% overestimation of the depreciation rate. For given fundamentals, a one-notch upgrade (driven by the expected exchange rate) generates a 2 to 5% decline in the currency excess return and an underestimation of the depreciation rate of 4 to 10%, depending on the horizon. These estimates are reasonable because the excess return variables are annualized (for instance, in column (1) an annualized 4% excess return means approximately a 1% excess return over 1 quarter). To relate the results in Table 5 to the corresponding expectations, we report the reduced-form regressions in Table C.5 in the Appendix. A 1% depreciation expectation by professional forecasters, controlling for fundamentals, decreases the currency excess return by 0.3 to 0.5% and the expectation error by 0.7 to 1.2%, with the highest estimates obtained at the shortest horizon.

Table 6 considers the role of the precision of rating signal when the dependent variable is either the currency excess return or the expectation errors. As for foreign currency borrowing, we interact our measure of signal precision with the rating. Interestingly, a higher rating causes an even lower currency excess return (and expectation error) when the signal is precise.

3.3 Robustness

We perform several robustness checks, reported in Table C.6 in the Appendix. In column (1) we report the baseline. Then we re-estimate Equation (16) by using as alternative measures of the fundamentals: the predicted appreciation at the 4-quarter and 1-quarter horizon (columns (2) and (3)). Our results appear robust to changing the horizon of the fundamentals, except when we concentrate on the very short-term, i.e. when we use predicted appreciation at the 1-quarter horizon the estimate is much smaller. This could be because

Table 6: Channels: Currency excess returns, expectations errors and rating precision

	(1)	(2)	(3)	(4)	(5)	(6)
		Excess return			Consensus error	
VARIABLES	1q	4q	8q	1q	4q	8q
$\Delta\widehat{EER}_{t,t+1}$	1.005***			1.954***		
	(0.185)			(0.331)		
$\Delta\widehat{EER}_{t,t+4}$		0.898***			2.478***	
		(0.346)			(0.574)	
$\Delta\widehat{EER}_{t,t+8}$			0.596			2.559***
			(0.556)			(0.719)
Rating	-3.938***	-2.563**	1.845	-7.807***	-4.866***	-3.011***
	(1.364)	(1.231)	(1.602)	(2.336)	(1.631)	(1.018)
Precise	-29.267	2.529	-30.317***	-72.338*	-16.168	-32.160**
	(20.596)	(11.944)	(10.742)	(38.439)	(17.198)	(15.214)
Rating*Precise	-4.190**	-0.504	-2.805***	-9.753**	-2.894*	-4.335**
	(2.073)	(1.146)	(0.938)	(3.835)	(1.731)	(1.731)
Pol. Risk	-6.065***	-2.266**	-0.660	-13.355***	-5.000***	-4.927***
	(1.587)	(1.072)	(0.954)	(2.991)	(1.630)	(1.639)
XR Risk	-1.887*	0.612	0.053	-3.550*	-0.518	0.108
	(1.041)	(0.552)	(0.447)	(1.880)	(0.767)	(0.533)
SD(EER)	2.050	1.432*	0.681	4.737**	4.005***	2.457***
	(1.300)	(0.774)	(0.601)	(1.951)	(0.930)	(0.762)
Chinn-Ito index	3.502**	0.864	-2.702**	7.992***	2.763***	1.841***
	(1.481)	(0.780)	(1.138)	(2.246)	(1.001)	(0.639)
Observations	623	620	463	666	656	630
R-squared	-1.145	-0.292	0.209	-4.264	-2.008	-4.245
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Regional FE	Yes	Yes	Yes	Yes	Yes	Yes
F-stat	14.36	9.697	2.678	14.67	9.424	4.954

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variables are currency excess returns, measured by the excess return on US dollar forward contract at the 1, 4 and 8-quarter maturities, and the forecast error on the exchange rate, at the 1, 4 and 8-quarter maturities. Rating is the S&P numerical rating of the sovereign dollar debt; a higher value indicates higher credit quality. $\widehat{\Delta EER}$ is the predicted log change in the nominal effective exchange rate; a higher value indicates a higher predicted appreciation of the domestic currency. Precise is a dummy that takes value one if the government is rated by more than two rating agencies and the rating split is less than 2 notches We use the IV estimator with the following instruments: $E_t(\Delta s^j_{t,t+1})$ (columns (1) and (4)), $E_t(\Delta s^j_{t,t+4})$ (columns (2) and (4)), $E_t(\Delta s^j_{t,t+8})$ (column (3) and (6)).

corporate borrowing typically takes place at longer maturities, so that the fundamentals that have a predictive power for the exchange rate at a short maturity do not matter (here the exchange market pressure). Further, we use as alternative public signals the domestic 5-year government bond yield spread from Reuters and the forward premium at different horizons (8, 4 and 1 quarter) (columns (4) to (7)). Again, our results are robust: a higher spread, or a higher forward premium, which are bad news, lead to more FC borrowing. At the 8-quarter horizon the effects are less precisely estimated due to a small sample size. In column (8), we use an alternative measure of foreign currency debt that includes domestic bond markets, while our baseline measure covers international market issuances only. We use the SDC Platinum database to produce a measure of foreign currency borrowing equal to the proportion of new bonds issued in foreign currency by non-financial firms. The coefficients of fundamentals and ratings are significant and have the expected sign and magnitudes comparable to our baseline results. Finally, column (9) shows the results when we use the expected depreciation at the 8-quarter, 4-quarter and 1-quarter horizons as an alternative set of instruments. Again, our results continue to hold.

Table C.7 provides the results when re-estimating Equation (16) using different sub-samples to assess whether our results are driven by specific time periods or countries. Column (1) focuses on the pre-crisis period (1992-2007) while column (2) focuses on the post-crisis (2008-2018) period. Column (3) excludes the crisis period (2008-2009). Column (4) focuses on the financially open countries (we exclude countries with a Chinn and Ito index below -1). Columns (5) to (7) exclude respectively Latin America, Asia, and the other regions. The results are robust across these sub-samples. One exception is the pre-crisis period. The coefficient of fundamental-based predicted depreciation is still significantly positive, but the coefficient of ratings, while remaining negative, is not precisely estimated due to a small sample size.

4 Conclusion

This paper has highlighted a new channel of FC borrowing, the expectation channel, and has shown that it is at play in the data, using a sample of 15 large emerging economies.

FC borrowing arises from the disagreement between domestic borrowers and foreign lenders. Notably, domestic borrowers issue debt in foreign currency when fundamentals are good or when public signals are pessimistic, which also corresponds to situations where the foreign currency is cheaper (the domestic currency has an excess return on the dollar).

Importantly, once we control for public signals, FC borrowing is more prevalent in countries with good fundamentals, that is, countries with a low depreciation risk, suggesting that financial stability implications in this case are limited. But higher FC borrowing may be observed in countries with poor fundamentals (and hence a high depreciation risk) if foreign lenders receive overly pessimistic public signals. In that case, high foreign currency borrowing results from a penalty on domestic borrowing. Asymmetric information between domestic borrowers and foreign lenders is therefore a potential source of financial fragility.

In light of these results, some important questions arise. First, what policy actions can be adopted to effectively reduce the asymmetric information between foreign lenders and domestic borrowers? Second, how does transparency, that is, the precision of the public signal, affect financial fragility? Finally, what determines transparency? These questions are beyond the scope of this paper and are left for future research.

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A Proofs

A.1 Proof of Proposition 2

Substituting equation (3) into equation (12) we get:

$$\theta^*(\mu) = \Phi(\sqrt{\beta}\,(x^*(\mu) - \theta^*(\mu))\,. \tag{17}$$

Through (17), $\theta^*(\mu)$ is implicitly defined as a function of $x^*(\mu)$: $\theta^*(\mu) = \Theta^*(x^*(\mu))$.

By differentiating (13) with respect to μ, we obtain

$$x^{*'}(\mu) = A + B\Theta^{*'}(x^*(\mu))x^{*'}(\mu)$$

Hence

$$x^{*'}(\mu) = \frac{A}{1 - BC(\mu)}$$

with $C(\mu) = \Theta^{*'}(x^*(\mu))$. Then, notice that $\partial\epsilon^*(\theta,\mu)/\partial\mu = x^{*'}(\mu)$. Finally, since $x^*(\mu)$ is independent of θ, $\partial\epsilon^*(\theta,\mu)/\partial\theta = -1$.

A.2 Equilibrium uniqueness

Equation (13) in the text can be described as

$$G(\theta^*(\mu)) = g(\mu), \tag{18}$$

where where $g(\mu) = \mu - \sqrt{\frac{\alpha}{\alpha+\beta}}\mu$ and

$$G(\theta^*(\mu)) = \theta^*(\mu) + \frac{\beta}{\sqrt{\alpha(\alpha+\beta)}}\theta^*(\mu) + \sqrt{\frac{\beta}{\alpha(\alpha+\beta)}}\Phi^{-1}(\theta^*(\mu)) - \sqrt{\frac{\alpha}{\alpha+\beta}}\theta^*(\mu).$$

In order to establish the existence and analyze the determinacy of the equilibrium, we need to look at the properties of the function G. For every $\mu \in \mathbb{R}$, $G(\theta(\mu))$ is continuous in θ.

$$G(\underline{\theta}) = \sqrt{\frac{\beta}{\alpha(\alpha+\beta)}}\Phi^{-1}(0) = -\infty, \tag{19}$$

$$G(\overline{\theta}) = \sqrt{\frac{\beta}{\alpha(\alpha+\beta)}}\Phi^{-1}(1) = \infty, \tag{20}$$

where we assumed that $\underline{\theta} = 0$ and $\overline{\theta} = 1$. Equations (13) and (14) show that there is a solution $\theta^*(\mu) \in (\underline{\theta}, \overline{\theta})$. In order to prove the uniqueness of the solution we need to look at the region in which the derivative of function G with respect to θ is positive:

$$\frac{\partial G(\theta)}{\partial \theta} = 1 + \frac{\beta}{\sqrt{\alpha(\alpha+\beta)}} + \sqrt{\frac{\beta}{\alpha(\alpha+\beta)}}\frac{1}{\phi(\Phi^{-1}(\theta))} - \sqrt{\frac{\alpha+\beta}{\alpha}} > 0 \tag{21}$$

Since $\max_{\omega\in\mathbb{R}} \phi(\omega = \frac{1}{\sqrt{2\pi}})$, we can rewrite (15) as

$$\frac{\partial G(\theta)}{\partial \theta} = 1 + \frac{\beta}{\sqrt{\alpha(\alpha+\beta)}} + \sqrt{\frac{\beta}{\alpha(\alpha+\beta)}}\sqrt{2\pi} - \sqrt{\frac{\alpha+\beta}{\alpha}} > 0 \tag{22}$$

Equation (16) can be manipulated and rewritten as

$$-\frac{1}{\sigma_x + \sqrt{\sigma_x^2 + \sigma_\mu^2}} < \sqrt{2\pi}, \tag{23}$$

where σ_μ^2 and σ_x^2 are respectively the variances of the public and the private signals. As long as the standard deviations of the two shocks are positive, this inequality is always satisfied and multiple equilibria are excluded.

B Extension with flexible exchange rate

In our model, we consider a fixed exchange rate regime. Our results do not hinge on that assumption. To illustrate this, consider a CB that sets the second-period exchange rate S flexibly in order to maximize $W(M, S^*, r, S)$, taking M and r as given. The optimal exchange rate is $S = S^* - (1 - M)/X$. We define the fundamentals as $\theta = 1 - XS^*$, so that $S = (M - \theta)/X$.

We suppose that the signals foreigners and domestic borrowers receive on θ are the same as in the fixed exchange rate case, and we consider monotone symmetric equilibria as well, where an agent borrows in pesos if and only if her private signal is less than a threshold $x^*(\mu)$. As a result, the share of peso borrowing M is a function of θ and μ, and $M(\theta, \mu)$ is defined by Equation (3).

The UIP condition implies that the peso interest rate r is equal to $E(S|\mu)$, the expected depreciation conditional on foreigners' information. Replacing S, we obtain

$$\frac{1}{X} E\left(M(\theta, \mu) - \theta|\mu\right) = r. \tag{24}$$

The domestic borrowers make their debt-denomination decisions based on their public and private signals μ and x_i. A domestic borrower receiving a signal $x_i = x^*(\mu)$ would be indifferent between peso and dollar debt if and only if:

$$\frac{1}{X} E\left(M(\theta, \mu) - \theta|\mu, x^*(\mu)\right) = r$$

which implies that, for $x_i = x^*(\mu)$, the domestic agent has exactly the same expectations as the foreigners:

$$E\left(M(\theta, \mu) - \theta|\mu, x^*(\mu)\right) = E\left(M(\theta, \mu) - \theta|\mu\right) \tag{25}$$

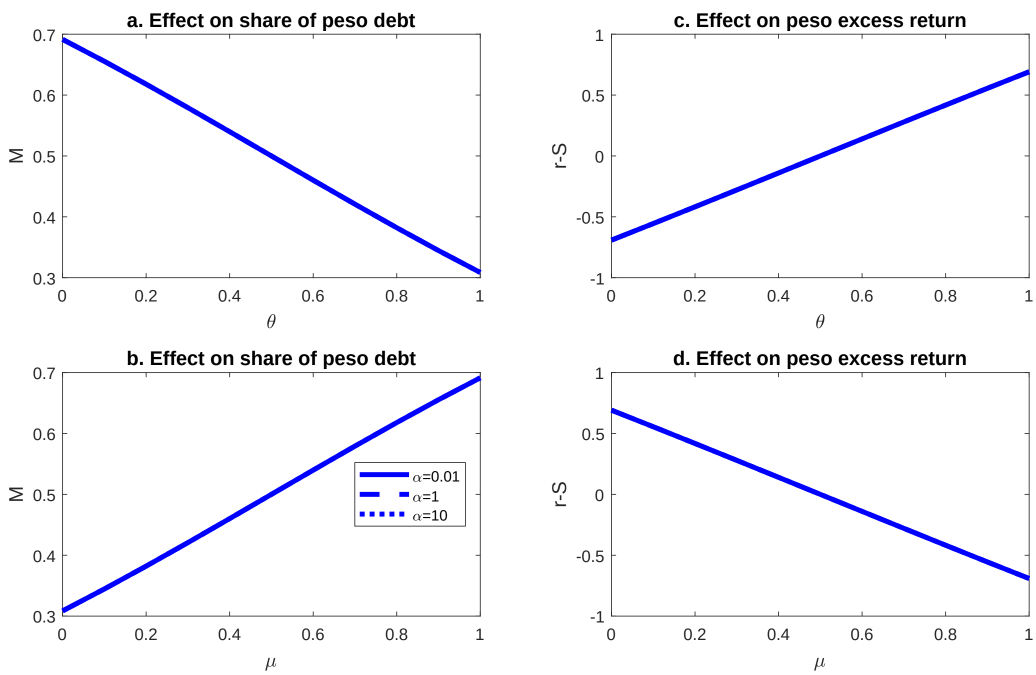
All borrowers with a signal $x_i < x^*(\mu)$ will borrow in peso and all borrowers with a signal $x_i > x^*(\mu)$ will borrow in dollar. The functions $x^*(\mu)$ and $M(\theta, \mu)$ are jointly defined by Equations (3) and (25). We already see here that the structure of the problem is the same as in the fixed exchange rate case.

After substituting for $M(\theta,\mu)$ using (3), we can see that $x^*(\mu)$ is implicitly defined by

$$E\left(\Phi(\sqrt{\beta}(x^*(\mu)-\theta))-\theta|\mu,x^*(\mu)\right)=E\left(\Phi(\sqrt{\beta}(x^*(\mu)-\theta))-\theta|\mu\right)$$

After solving for $x^*\mu)$, we can derive the share of peso debt $M(\theta,\mu)$. Figure B.1 shows the effect of θ and μ on peso borrowing and on the currency excess return. Changes in θ, keeping μ constant, and changes in μ, keeping θ constant, have the same qualitative effect as in the main model with a fixed exchange rate. This is intuitive, as the borrowing decision of the domestic agents rely on their assessment of the fundamentals relative to that of the foreigners, and domestic agents still have an informational advantage when assessing the fundamentals.

Figure B.1: Effect of the fundamental θ and of the signal μ



Panels a. and c. of the Figure represent the effect of the public signal μ on peso borrowing M and on $r-S$, the currency excess return, for a given θ, in the flexible exchange rate extension. We use the following parametrization: $\theta=0.5$ and $\beta=1$. Panels b. and d. of the Figure represent the effect of the fundamental θ on peso borrowing M and on the currency excess return $r-S$, for a given μ, in the flexible exchange rate extension. We use the following parametrization: $\mu=0.5$ and $\beta=1$.

However, now a more precise signal does not amplify the response of the peso debt to the public signal. To understand, notice that the private signal that would make the domestic borrower form exactly the same expectation on θ as foreigners is $x_i = \tilde{x}(\mu) = \mu$. Indeed, the expectations of θ are linear: $E(\theta)|\mu) = \mu$ and $E(\theta)|\mu, x_i) = (\alpha\mu + \beta x_i)/(\alpha + \beta)$, so that $E(\theta)|\mu) = (\theta)|\mu, x_i)$ implies $x_i = \tilde{x}(\mu) = \mu$. This term does not depend on the precision of the signal. The role of precision in the fixed exchange rate case is due to the non-linearity of expectations.

C Additional Tables

Table C.1: Descriptive Statistics

	(1) mean	(2) sd	(3) min	(4) max
FC borrowing	92.01	20.29	0.00	100.00
Rating	-10.53	3.34	-4.00	-23.00
Precise	0.79	0.41	0.00	1.00
Growth	1.01	0.96	-4.07	3.56
Reserves	14.25	10.31	0.05	51.06
Current account	0.05	1.55	-4.30	6.24
Gov. primary bal.	0.16	2.74	-6.39	8.34
Gov. Effectiveness	56.54	15.44	18.13	87.38
EMP	-0.18	4.17	-27.04	44.02
Pol. Risk	-0.25	1.77	-4.76	6.24
XR Risk	-8.27	2.14	-10.00	0.00
SD(EER)	2.19	6.41	0.00	148.74
$E_t(\Delta S_{t,t+8})$	2.29	4.27	-4.37	29.70
Observations	2027			

Note: The data cover 17 emerging market countries over the period Q1-1990 to Q4-2019. Foreign currency share is the share of private sector newly issued bonds denominated in foreign currency. ΔEER is the log change in the nominal effective exchange rate. A higher value indicates an appreciation of the domestic currency. Rating is the sovereign dollar debt S&P rating. Precise is a dummy that takes value 1 if a country is rated by more than 1 agency and the rating split (the difference between the highest and lowest rating) is lower than 2 notches.

Table C.2: Pairwise correlations

	(1) FC bor.	Rating	Precise	Growth	Reserves	Current account	Gov. pri. bal.	Gov. Effect.	EMP	Pol. Risk	XR Risk	SD(EER)	$E_t(\Delta S_{t,t+8})$
FC bor.	1												
Rating	-0.0867**	1											
Precise	-0.0473	0.283***	1										
Growth	0.0347	0.136***	-0.118***	1									
Reserves	-0.0198	0.537***	0.285***	0.152***	1								
Cur. acc.	-0.0704*	0.316***	0.0658**	0.0380	0.453***	1							
Gov. pri. bal.	0.0234	-0.0648*	-0.0662**	0.0914***	-0.0590*	0.0557*	1						
Gov. Effect.	-0.0411	0.651***	0.0669*	0.0106	0.302***	0.359***	-0.0179	1					
EMP	0.0294	-0.155***	-0.0386	-0.334***	-0.201***	-0.159***	-0.0639*	-0.0606*	1				
Pol. Risk	0.0264	-0.422***	0.0587*	-0.0498*	-0.166***	-0.249***	-0.0618**	-0.607***	0.0427	1			
XR Risk	0.0707*	-0.300***	-0.243***	-0.261***	-0.398***	-0.0933***	0.0172	-0.0956***	0.256***	0.184***	1		
SD(EER)	0.0315	-0.194***	-0.0396	-0.184***	-0.146***	-0.00133	0.0223	-0.0774**	0.409***	0.0540*	0.222***	1	
$E_t(\Delta S_{t,t+8})$	0.0583	- 0.571***	-0.271***	-0.204***	-0.561***	-0.148***	-0.0104	-0.234***	0.0805**	0.168***	0.304***	0.140***	1
Observations	2027												

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Note: * shows significance at the .01 level.

Table C.3: IV First stage regression

	(1)
VARIABLES	
$\Delta \widehat{EER}_{t,t+8}$	0.285***
	(0.028)
$E_t(\Delta S_{t,t+8})$	-0.299***
	(0.027)
Pol. Risk	-0.660***
	(0.079)
XR Risk	-0.264***
	(0.069)
SD(EER)	0.325***
	(0.100)
Chinn-Ito index	0.182*
	(0.101)
Observations	665
R-squared	0.630
Time FE	Yes
Regional FE	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variable is the S&P numerical rating of the sovereign dollar debt; a higher value indicates higher credit quality.

Table C.4: First stage: predicting the exchange rate appreciation - 1 and 4 quarters ahead

VARIABLES	(1) $\Delta EER_{t,t+1}$	(2) $\Delta EER_{t,t+4}$
Growth	3.338*	3.913
	(1.716)	(2.938)
Reserves	0.556***	-0.004
	(0.167)	(0.220)
Current account	0.873	0.506
	(0.689)	(1.409)
Gov. primary bal.	0.557**	-0.294
	(0.281)	(0.574)
Government Effectiveness	0.407**	0.246
	(0.200)	(0.199)
EMP	-0.299	-2.543***
	(0.213)	(0.869)
Observations	768	768
R-squared	0.398	0.410
Time FE	Yes	Yes
Regional FE	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variable is the log change of the nominal effective exchange rate; a higher value indicates a higher appreciation of the domestic currency. Rating is the S&P numerical rating of the sovereign dollar debt; a higher value indicates higher credit quality.

Table C.5: Channels: Currency excess returns and expectations errors - Reduced-form regressions

	(1)	(2)	(3)	(4)	(5)	(6)
	Excess return			Consensus error		
VARIABLES	1q	4q	8q	1q	4q	8q
$\Delta\widehat{EER}_{t,t+1}$	0.406***			0.711***		
	(0.086)			(0.094)		
$\Delta\widehat{EER}_{t,t+4}$		0.199**			0.641***	
		(0.098)			(0.096)	
$\Delta\widehat{EER}_{t,t+8}$			0.270**			0.558***
			(0.105)			(0.083)
$E_t(\Delta S_{t,t+1})$	0.557***			1.205***		
	(0.094)			(0.103)		
$E_t(\Delta S_{t,t+4})$		0.317***			0.696***	
		(0.114)			(0.123)	
$E_t(\Delta S_{t,t+8})$			-0.244			0.870***
			(0.151)			(0.091)
Pol. Risk	0.166	0.095	-0.706**	0.636	0.426	0.206
	(0.432)	(0.280)	(0.288)	(0.441)	(0.286)	(0.200)
XR Risk	0.650	1.401***	-0.110	0.807	0.857**	1.175***
	(0.554)	(0.418)	(0.436)	(0.809)	(0.399)	(0.257)
SD(EER)	-1.438*	-0.019	0.862*	-0.066	1.376**	0.644*
	(0.795)	(0.510)	(0.471)	(0.864)	(0.567)	(0.355)
Chinn-Ito index	-0.507	0.047	-2.858***	1.442**	1.159***	0.911***
	(0.690)	(0.473)	(0.511)	(0.686)	(0.443)	(0.304)
Observations	623	620	463	672	662	634
R-squared	0.156	0.067	0.252	0.367	0.145	0.239
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Regional FE	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variables are currency excess returns, measured by the excess return on US dollar forward contract at the 1, 4 and 8-quarter maturities, and the forecast error on the exchange rate, at the 1, 4 and 8-quarter maturities. Rating is the S&P numerical rating of the sovereign dollar debt; a higher value indicates higher credit quality. $\widehat{\Delta EER}$ is the predicted log change in the nominal effective exchange rate; a higher value indicates a higher predicted appreciation of the domestic currency.

Table C.6: Explaining the propensity to borrow in foreign currency - Robustness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	Baseline	4q hor.	1q hor.	Alt. signal	Alt. signal	Alt. signal	Alt. signal	Alt. FC debt	Alt. Inst.
$\Delta\widehat{EER}_{t,t+8}$	1.387***			2.632***	0.016	1.041***	1.103***	2.322***	1.700***
	(0.424)			(0.861)	(0.794)	(0.370)	(0.387)	(0.669)	(0.490)
$\Delta\widehat{EER}_{t,t+4}$		1.214***							
		(0.438)							
$\Delta\widehat{EER}_{t,t+1}$			0.274*						
			(0.144)						
Rating	-2.461***	-3.387***	-2.497***					-3.358**	-3.460***
	(0.735)	(1.097)	(0.861)					(1.557)	(0.955)
Spread				6.593**					
				(2.851)					
For. prem. 8q					-4.284				
					(2.834)				
For. prem. 4q						0.997***			
						(0.295)			
For. prem. 1q							1.056***		
							(0.355)		
Pol. Risk	-1.952**	-2.636***	-2.369**	-2.073	-0.452	-0.192	-0.106	-6.295***	-2.717***
	(0.778)	(0.953)	(0.943)	(1.387)	(1.069)	(0.653)	(0.676)	(1.642)	(0.890)
XR Risk	-0.938*	-1.155	-1.268*	-4.559**	-2.182	-0.852	-1.146*	-0.685	-1.334**
	(0.538)	(0.732)	(0.730)	(2.188)	(1.652)	(0.594)	(0.696)	(1.384)	(0.638)
SD(EER)	2.227***	2.694***	1.783*	0.509	0.568	1.842**	1.832**	-0.569	2.831***
	(0.792)	(0.972)	(0.989)	(1.789)	(2.196)	(0.823)	(0.894)	(1.650)	(0.906)
Chinn-Ito index	0.755	1.424	2.081**	4.420**	-6.578*	0.875	0.654	9.284***	0.840
	(0.800)	(0.928)	(1.004)	(2.066)	(3.682)	(0.942)	(0.925)	(1.685)	(0.823)
Observations	665	660	671	557	461	624	627	619	655
R-squared	0.163	0.025	0.132	-0.214	-0.424	0.169	0.140	0.450	0.130
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-stat	63.11	43.11	48.18	10.28	3.125	91.48	51.93	52.34	17.91

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variable is the percentage of new debt obligations issued by the private sector denominated in foreign currency. Rating is the S&P numerical rating of the sovereign dollar debt; a higher value indicates a higher credit quality. $\widehat{\Delta EER}$ is the predicted log change in the nominal effective exchange rate; a higher value indicates a higher predicted appreciation of the domestic currency. Spread is the 5-year government bond yield. Forward premia are premia on US dollar forward contract at the 1, 4 and 8-quarter maturities. We use the domestic currency depreciation forecast at the 8-quarter horizon as an instrument for signal variables (ratings, government bond yield spread and forward premia) in all regressions, except in regressions (2) and (5), where we use the 4-quarter forecast, regressions (3) and (6), where we use the 1-quarter forecast and regression (9), where we use the 1-quarter, 4-quarter and 8-quarter forecasts as instruments.

Table C.7: Explaining the propensity to borrow in foreign currency - Alternative samples

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	1992-2007	2008-2018	Excluding 2008-2009	Financially open	w/o Latin America	w/o Asia	w/o Other regions
$\Delta \widehat{EER}_{t,t+8}$	1.301***	1.437***	1.160***	1.103***	1.835**	1.147***	1.377***
	(0.393)	(0.458)	(0.391)	(0.286)	(0.930)	(0.372)	(0.387)
Rating	-1.825	-1.990***	-2.074***	-1.498*	-4.067*	-2.047**	-2.387***
	(1.365)	(0.719)	(0.703)	(0.870)	(2.268)	(0.915)	(0.578)
Pol. Risk	1.691	-4.163***	-1.721**	-0.927	-0.934	-2.456**	-2.056**
	(2.013)	(0.913)	(0.783)	(1.205)	(1.209)	(1.218)	(0.864)
XR Risk	-1.414	-0.416	-0.910	0.749	-1.197	-0.394	-0.572
	(1.040)	(0.742)	(0.567)	(0.554)	(1.117)	(0.705)	(0.612)
SD(EER)	2.280**	1.912*	2.155***	1.021	2.453*	2.524***	1.928**
	(1.057)	(1.031)	(0.808)	(0.707)	(1.388)	(0.915)	(0.838)
Chinn-Ito index	0.263	-0.454	0.316	-0.479	-1.035	-1.661*	0.884
	(1.257)	(1.189)	(0.824)	(1.441)	(2.347)	(0.943)	(0.694)
Observations	258	407	596	438	368	409	533
R-squared	0.165	0.076	0.066	0.066	-0.034	0.110	0.002
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regional FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-stat	44.58	67.77	58.15	64.24	9	27.33	56.12

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The dependent variable is the percentage of new debt obligations issued by the private sector denominated in foreign currency. Rating is the S&P numerical rating of the sovereign dollar debt; a higher value indicates a higher credit quality. $\widehat{\Delta EER}$ is the predicted log change in the nominal effective exchange rate; a higher value indicates a higher predicted appreciation of the domestic currency. We use the domestic currency depreciation forecast at the 8-quarter horizon as an instrument for ratings.