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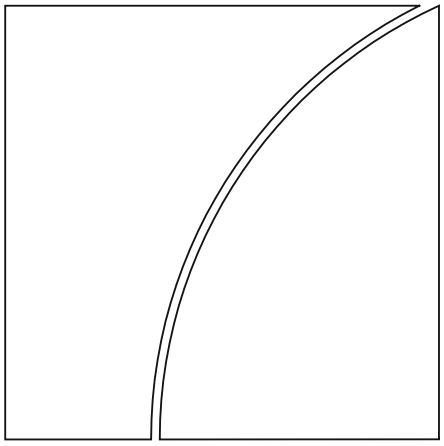

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JEL classification: emerging market corporate debt, currency mismatch, liability dollarization, global financial conditions

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Currency depreciation and emerging market corporate distress*

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Abstract

How do emerging market corporates fare during periods of currency depreciation? We find that non-financial firms that exploit favorable global financing conditions to issue US dollar bonds and build cash balances are also those whose share price is most vulnerable to local currency depreciation. In particular, firms' vulnerability to currency depreciation derives less from the foreign currency debt as such, but from the cash balances that are built up by using foreign currency debt. Overall, our results point to a financial motive for dollar bond issuance by emerging market firms in carry trade-like transactions that leave them vulnerable in an environment of dollar strength.

Keywords: emerging market corporate debt, currency mismatch, liability dollarization, global financial conditions

JEL codes: E44, G15

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1 Introduction

Emerging market corporate bond issuance denominated in US dollars surged after the global financial crisis and has kept up its rapid pace. The total stock of US dollar-denominated debt of non-banks outside the United States stood at $11.4 trillion according to the latest BIS estimate (BIS, 2018), of which non-banks from emerging market economies (EMEs) accounted for $3.7 trillion. This total of $3.7 trillion is more than double the level in 2010.

Foreign currency borrowing helps EMEs to tap diverse funding sources (Acharya et al, 2015) and can mitigate financial frictions (Dell'Ariccia, Laeven, Marquez, 2015). However, whereas currency depreciation would favor the competitiveness of exporting firms, there are adverse balance sheet valuation effects on borrowers (Kaminsky and Reinhart (1999) and Harvey and Roper (1999)). Similarly, financial sector balance sheets are affected and transmit financial conditions through fluctuations in credit supply (e.g., Stein, 2012; Schularick and Taylor, 2012; Dell'Ariccia and Marquez, 2013; Rey, 2013; Miranda-Agrippino and Rey, 2015; Mian and Sufi, 2016; Baskaya, di Giovanni, Kalemli-Özcan, and Ulu, 2017).

Our study focuses on the financial motives underpinning bond issuance by EME firms and how exchange rate movements precipitate vulnerabilities of EME firms who have used the proceeds of dollar bond issuance to fund financial assets, including cash in local currency.

The prevalence of dollar-denominated debt in EMEs is an important backdrop for our study (Goldberg and Tille, 2009; Ito and Chinn, 2013; Gopinath, 2015; Maggiori, Neiman and Schreger, 2018). Within this broad theme, a number of studies have highlighted a financial motive for the prevalence of dollar bond issuances (Graham and Harvey, 2001; McBrady and Schill, 2007; Du and Schreger, 2016). In particular, Acharya and Vij (2016) and Bruno and Shin (2017) find that EME firms tend to borrow more in US dollars during periods when the dollar carry trade is more favorable in terms of an appreciating local currency, high interest rate differential vis-à-vis the dollar, and when the exchange rate volatility is low. As well as financing real assets, a large proportion of the proceeds from the dollar bond issuances is held by the firms as liquid financial assets, including cash.

Other things being equal, higher liquid assets provide a buffer for the firm and hence should promote resilience. However, we raise the possibility that other things may not be equal when

liquid assets are financed with dollar debts. If the financial assets built up in this way are in local currency, the currency mismatch will exacerbate the vulnerability of the firm to an appreciation of the dollar.

We examine how this hypothesis stacks up against the evidence from June 2014 to January 2016, a period characterized by a strengthening dollar against emerging market currencies and volatility in EME financial markets, based on a sample of non-financial publicly traded firms from 18 EMEs. In some instances, such as the surprise realignment of the renminbi exchange rate on August 11, 2015, the empirical exercise of tracking stock returns can build on an event that was largely unanticipated.

Our empirical investigation uncovers the following findings. First, we find that firms with larger increases in liquid financial asset holdings pre-2015 tend to suffer larger declines in stock prices during periods of domestic currency depreciation, and the negative impact is the largest for firms that had issued dollar-denominated debt. The effect is especially pronounced for some emerging market countries, especially China.

Importantly, we find that firms' vulnerability to currency depreciation arises not from foreign currency debt *per se*, but rather from what the firm does with the proceeds of the debt. Put differently, we find that the adverse impact of a local currency depreciation does not derive solely from the *liability side* of the balance sheet (through accumulated foreign debt or increased leverage in general) but in combination with the *asset side* (through higher levels of financial assets in domestic currency that are funded by dollar debt).

We find that higher holdings of cash and liquid financial assets go hand in hand with dollar bond issuance. Specifically, after 2009, issuers of USD bonds increasingly held the bond proceeds as liquid financial assets. Taken together, our findings lend support to the hypothesis that EME firms took advantage of favorable funding conditions to accumulate financial assets in domestic currency by issuing dollar debt. In effect, EME firms were engaged in a carry trade funded with dollars, leaving them vulnerable to risk of loss when the dollar strengthened.

We subject our findings to a battery of robustness tests and find that our results are robust to alternative definitions of the variables used, different specifications (with or without fixed effects, or with firm, country, industry and time observed characteristics), different indicators of firm resilience (such as CDS spreads or the Z-score of corporate distress), different samples (commodity firms,

exporters, etc.), and outliers. We find that domestic currency depreciation also has real effects through lower investment by firms. Delving deeper, we run horserace exercises that reveal the main mechanism of vulnerability transmission to be through the exchange rate and the accumulation of financial assets funded by dollar-denominated bond issuance, rather than other standard macro- or firm-level factors.

Our results hold broader macro implications and provide a point of contact between firm-level analysis and the macroeconomic discussion on global financial conditions. Recent influential work points to the role of private debt in the macroeconomy. Schularick and Taylor (2012) and Gourinchas and Obstfeld (2012) demonstrate that credit growth and currency appreciation are predictors of financial crises, while Stein (2012), Dell'Ariccia, Laeven and Marquez (2014), Miranda-Agrippino and Rey (2015) and Keys, Piskorski, Seru, and Yao (2014) find that US monetary policy is a major influence on credit conditions worldwide and on household balance sheets. Mian and Sufi (2016) find that an increase in credit supply initiated the household boom and bust, and Mian, Sufi, and Verner (2016) find that low interest spreads fuel increases in household debt and a subsequent decline in GDP growth. Du and Schreger (2016) find that financial vulnerabilities in the corporate sector are a source of sovereign risk.

This literature emphasizes the role of the financial sector in explaining boom and bursts. In our setting, *non-financial* firms may play a role in channeling external financial conditions into the domestic financial system. Since corporate financial claims could be in the form of bank deposits, shadow banking products or short-term investments, the consequence of greater financial claims by non-financial corporates may be easier credit conditions for other domestic borrowers. We find that large firms are the most vulnerable to domestic depreciation and may amplify a shock from currency depreciation. Overall, our findings shed light on the possible consequences through deleveraging and the repayment of dollar debts, and on the importance of the exchange rate as a key financial variable.

Our results reinforce the familiar need for caution when associating higher cash reserves with safer corporate debt. For instance, Acharya, Davydenko and Strebulaev (2012) find that for US non-financial firms, higher cash holdings are associated with lower credit ratings, and argue that higher cash holdings reflect an endogenous decision by the firm to mitigate the higher credit risk. In general, certain types of firms may be exposed to more risk. Our results point to one reason why

higher cash holdings may be an endogenous response of the firm as they may reflect firms' decision to take advantage of favorable financial conditions to increase income from financial sources. Higher cash holdings may thus be associated with greater incidence of financial exposures that turn out to be vulnerable to currency movements.

2 Related Literature

Our study is related to three strands of literature. A first strand of the literature focuses on the macro-finance relationships related to currency movements. Kaminsky and Reinhart (1999) find that, as a currency or/and bank crisis near, changes in stock prices are about 40 percent below those observed in noncrisis periods. The weakening in equity prices is, most likely, reflecting both the deteriorating cyclical position of the economy, reduced foreign demand as capital inflows are reversed, and the worsening balance sheets. In another study, Kaminsky and Schmukler (1999) find that during the Asian crisis part of the increase in volatility in the dollar value of stock prices reflected volatility in the exchange rate.

Acharya, Cecchetti, De Gregorio, Kalemli-Özcan, Lane, and Panizza (2015) focus on the risks for EMEs associated with tighter funding conditions. The effect might come both from the quantity and the price sides since there might be a tighter supply of dollars and, in terms of valuation effects, expected dollar appreciation will increase the value of dollar debt. In a cross-country analysis, Du and Schreger (2016) show that a higher reliance on external foreign currency corporate financing is associated with a higher default risk on sovereign debt.

Hau and Rey (2006) investigate the relationship between exchange rate, stock prices and capital flows. They find that higher returns in the home equity market relative to the foreign equity market are associated with a home currency depreciation. This association is stronger for firms with developed equity markets and less so for firms in less developed economies. Doidge, Griffin and Williamson (2006) find that exchange rate movements have an economically significant impact on firm value. Specifically, they find that firms with high international sales outperform those with no international sales during periods of large currency depreciations. Eichengreen and Tong (2015) examine the impact of a renminbi revaluation on non-Chinese's firm stock returns through the trade channel. Claessens, Tong and Zuccardi (2015) analyze stock price responses of nonfinancial

firms in 16 countries to study how the euro crisis affected global corporate valuations. They find that the euro crisis had a larger impact on firms with greater ex ante financial dependence, and particularly so in creditor countries more financially exposed to peripheral euro countries through bank claims.

A second strand of the literature looks at vulnerabilities coming from debt, and focus on the liability side of firms' balance sheets. For instance, Harvey and Roper (1999) found that balance sheet effects driven by high leverage in foreign currency and subdued profitability played a significant role in propagating the Asian financial crisis. Galindo, Panizza, and Schiantarelli (2003) review the early evidence showing that liability dollarization can reduce or possibly reverse the typical Mundell–Fleming result of expansionary devaluations. Forbes (2002) finds that following large depreciation events, firms with higher debt ratios have lower net income growth. Allayannis, Brown, and Klapper (2003) look at the relation between the type of debt and firm performance. They find that during the Asian crisis firms' use of hedged foreign currency debt was associated with worse stock market returns. Aguiar (2005) studies the case of the Mexican peso crisis of 1994 and finds that firms with heavy exposure to short-term foreign currency debt before the devaluation experienced relatively low levels of post-devaluation investment. Kalemli-Ozcan, Kamil and Villegas-Sanchez (2015) quantify the effects of lending and balance sheet channels on corporations during crises in EMEs. Using Korean firm-level data, Kim, Tesar and Zhang (2015) find evidence that holdings of foreign-currency denominated debt negatively affected the economic performance of small firms during the 1997–98 crisis. These results are supportive of the impact through the balance sheet channel during episodes of devaluations in EMEs.

A third strand is the literature on the endogenous determination of corporate cash holdings. Opler et al. (1999) find that firms with strong growth opportunities and riskier cash flows hold relatively high ratios of cash to total non-cash assets. Acharya, Almeida and Campello (2007) develop a theoretical framework in which cash and debt policies are jointly determined within the firm's intertemporal investment problem. Bates, Kahle, and Stulz (2009) find that cash ratios increase because firms' cash flows become riskier. Sufi (2009) examines what affects the use of bank lines of credit as opposed to cash in corporate liquidity management. Riddick and Whited (2009) find that income uncertainty affects savings more than do external financing constraints. Eisfeldt and Muir (2016) find that when the aggregate cost of external finance is low, firms are more likely

to both raise external finance, and to accumulate liquid assets.

The work of Acharya, Davydenko and Strebulaev (2012) explicitly links cash holdings to credit risk and credit spread. They show empirically that larger cash holdings are empirically associated with higher, not lower, levels of credit risk. This finding runs counter to the intuition that firms with larger cash holding should be safer. They propose a theory based on the endogeneity of a levered firm's cash policy to explain their empirical findings. Riskier firms optimally choose to maintain higher cash reserves as a buffer against a possible cash flow shortfall in the future.

When taking into account macro-conditions, the evidence diverges between advanced economy and emerging economy firms. Bruno and Shin (2017) show that in the period following the global financial crisis, characterized by low interest rates and favorable liquidity conditions, EME firms behaved differently from AE firms. While AE firms' behavior is consistent with the precautionary motive, EME firms tend to borrow more during periods when the dollar carry trade is more favorable in terms of an appreciating local currency, high interest rate differential vis-à-vis the dollar, and when the exchange rate volatility is low. Overall, their evidence points to an alternative motive for EME firms to precautionary reasons, corporate governance or credit risk. Specifically, their results point to a greater incidence of financial decisions where dollar borrowing is used to accumulate financial assets, as well as to finance real activity. This is in line with the evidence in McBrady and Schill (2007) who find that corporates consider cross-currency differences in covered and uncovered interest yields in choosing the currency in which to denominate their international debt, and with Graham and Harvey (2001) who find that 44% of firm responding to their survey report that lower foreign interest rates are "important"or "very important"in the decision to use foreign currency debt.

3 A first look at the data

Our study draws on a comprehensive database that combines bond issuance information with firm-level financial information. The sample consists of non-financial publicly traded firms in 18 emerging markets economies (EME) that have issued at least one bond over the period 2002 to 2014, and have balance sheet information available in Worldscope and Datastream. Data on bond issuances are from SDC Platinum New Issues Database from Thomson Reuters. We collect data

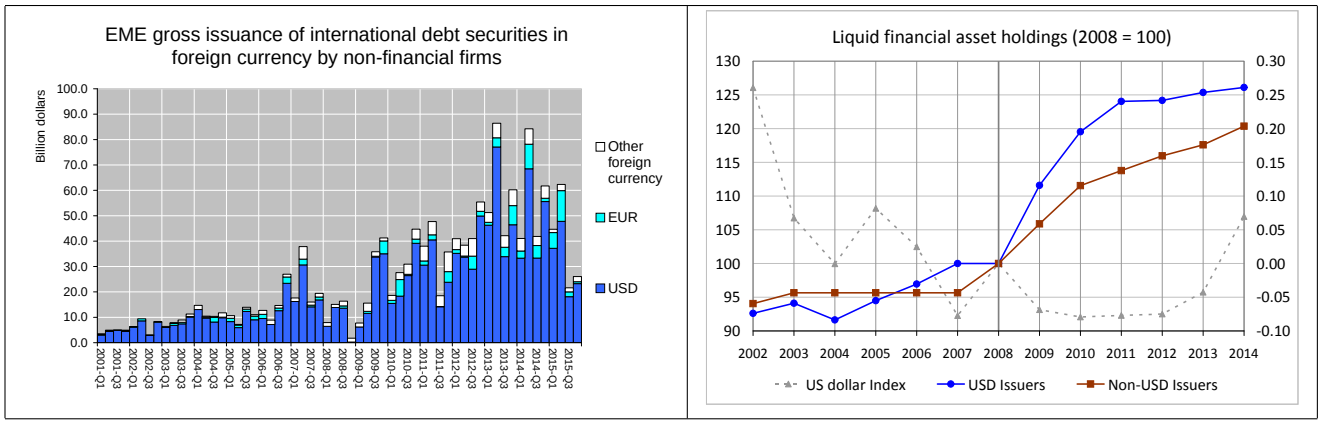

Figure 1: **Gross Issuance of EME non-financial corporate bonds in foreign currency and uses of funds.** The left panel shows quarterly gross issuance of long-term (over 1 year maturity) EME non-financial corporate bonds by issuance currency (from the BIS international debt securities statistics). The right panel, shows the changes in cash and short-term investments, in the right vertical axis and relative to the year 2008, over the period 2002-2014 for a sample of firms that issued at least one USD denominated bond (USD Issuers) or did not issue USD bonds (Non-USD Issuers). The US dollar Index in the left vertical axis is the trade weighted US dollar index from the FED FRED (Index=100 at 2008).

on all bond proceeds issued at the parent company-level, including bonds issued through foreign subsidiaries. We exclude countries with less than three firms with stock market prices reported in Datastream.[1] We are then left with a maximum sample of 1213 EME firms from the following countries: Argentina, Brazil, China, Chile, Colombia, India, Indonesia, Mexico, Malaysia, Pakistan, Peru', Philippines, Poland, Russia, Saudi Arabia, Thailand, Turkey, South Africa.

3.1 Role of the US dollar in foreign currency bond issuance

Aggregate data provide some context for our study. EME corporates have seen the fastest increase in dollar-denominated bond issuance in the post-crisis period. The left panel of Figure 1 presents aggregate data from the BIS on gross bond issuance in foreign currency by all EME non-financial corporates over the period 2001 to 2015. Note the surge in corporate bond issuances after 2008, with the bond issuances denominated in US dollar playing the leading role.

The role of the dollar in the aggregate data is also reflected in our micro dataset. From the master dataset of SDC bond issuances restricted to firms with Worldscope balance sheet data, we identify bond issuances in domestic and foreign currencies for our sample of EME corporates. The right panel of Figure 1 shows the changes in liquid financial asset holdings relative to 2008 for a

[1] We match bond issuance data with firm balance sheet data in Worldscope on the basis of SDC's ultimate parent CUSIP identifier. If the matching by CUSIP is unsuccessful, we use the SEDOL identifier, and take account of mergers and acquisition histories.

Table 1: **Currency Denomination of Bond Proceeds.** The totals refer the SDC sample of EME public firms issuing bonds we matched with Worldscope data. USD (non-USD) is the total amount of bond proceeds issued in US dollar (non-US dollar) denominated currency. Domestic (Foreign) is the total amount of bond proceeds denominated in domestic (foreign) currency. Euro is the total amount of bond proceeds denominated in euro currency. Values are in USD billion.

Year	Total	USD	non-USD	Domestic	Foreign	Euro
2009	289.6	71.9	217.8	203.3	86.3	6.9
2010	257.3	75.9	181.4	168.8	88.5	7.0
2011	260.9	81.4	179.5	167.7	93.3	5.5
2012	302.0	105.3	196.8	173.3	128.8	8.7
2013	368.4	134.2	234.2	212.9	155.5	13.8
2014	232.8	94.4	138.4	116.9	115.9	15.5
Total	1711.0	563.0	1148.0	1042.7	668.3	57.5
% of Total		32.91%				3.36%
% of Foreign-Issues		84.25%				8.60%

split sample of EME corporates, depending on whether they issued dollar-denominated corporate bonds or bonds issued in currencies other than the dollar. Dollar bond issuers had a more rapid growth of liquid financial assets compared to non-dollar issuers. The immediate post-crisis period was characterized by a weak dollar, as shown by the dollar index plot on the same panel.

Table 1 presents summary statistics on the currency denomination of bond issuance. US dollar-denominated issuances comprise 33% of the total issuances over the period 2009-2014. Of the foreign currency-denominated issuances, 84% are in US dollars. The size of the euro denominated bond issuances is about 3% of the total and 8.6% of the foreign-denominated issuances only. These statistics confirm the dominant role of the US dollar as the currency underpinning bond issuances for EME firms. In terms of overall coverage, our gross issuance total constitutes a substantial proportion of that captured in aggregates from official statistics.

3.2 Use of funds

We turn now to the stylized facts on the use of funds raised in the bond market. Bruno and Shin (2017) estimate that, for every dollar raised over the period from 2002 to 2013, on average EME firms hold between 19 and 24 cents in cash and other short term investments, and spend between 7 and 17 cents in capital expenditures, between 11 and 17 cents for long-term debt reduction, and between 3 and 11 cents in R&D, over a three year-horizon. Their analysis, however, provides just an average estimate of the uses of bond proceeds over a decade period. We hereby provide

some evidence on how the propensity to save cash out of cash flows and other sources of funds has *changed over time* by estimating a panel regression equation that is similar to McLean (2011) and Erel et al (2011):

$$\begin{aligned} \Delta Cash_{i,t} &= \alpha + \beta_1 CashFlow_{i,t} + \beta_2 CashFlow_{i,t} \times Post2009Dummy \\ &\quad + \varphi Other_{i,t} + \delta Assets_{i,t-1} + \varepsilon_{i,t} \end{aligned} \tag{1}$$

Here, $CashFlow$ is earnings before depreciation minus dividends, $Other$ accounts for all the other sources of funds except $CashFlow$, and $Assets$ is the logarithm of total assets. $Post2009Dummy$ is a dummy variable equal to 1 for the period 2009-2014, and 0 otherwise.[2] The coefficient β_1 measures the proportion of cash flow used to increase cash (including short term investments) before 2009, while β_2 captures the incremental impact on the fraction held in cash after 2009.

Table 2, column 1, shows that β_2 is negative and statistically significant, meaning that the propensity to save earnings as cash decreased significantly after 2009. When we split the sample between the sample of firms that issued or did not issue US dollar denominated bonds, we see that the lower propensity to save earnings as cash is driven by the subsample of USD bond issuers (column 2).

We dig further by augmenting equation (1) with the amount of USD denominated bond proceeds issued by firms ($USDBonds$) and estimate the following equation:

$$\begin{aligned} \Delta Cash_{i,t} &= \alpha + \gamma_1 USDBonds_{i,t} + \gamma_2 USDBonds_{i,t} \times Post2009Dummy \\ &\quad + \beta CashFlow_{i,t} + \varphi Other_{i,t} + \delta Assets_{i,t-1} + \varepsilon_{i,t} \end{aligned} \tag{2}$$

Column 4 shows that the coefficient γ_2 is positive and statistically significant, meaning that after 2009 issuers of USD denominated bonds significantly increased their propensity to save US

[2] The variable *Total Sources of Funds* (from Worldscope) include internally generated cash flows from firms' continuing operations, as well as other sources of funds from investment and financing activities (i.e., earnings, sale of property, plant and equipment, long-term debt issuance, and sale of common and preferred stock. Hence, *Other* is the difference between *Total Sources of Funds* and *CashFlow*. *Cash* and the sources of cash are scaled by assets. The panel regression is run with firm-fixed effects to control for firms' heterogeneity and robust standard errors clustered at the country-level.

dollar denominated proceeds as cash. Taken together, these results suggest that the propensity to save cash from different sources has changed over time, with the increase deriving from USD bonds proceeds being more pronounced after 2009. The above results are in line with the trends highlighted in Figure 1 that shows the growth in firms' cash allocation as a function of the currency denomination of bond issuance.[3]

Delving deeper, we see that the firms issuing US dollar offshore bonds seem to be the drivers of this change. In fact, when we replace the variable $USDBonds$ with the ratio of US dollar proceeds issued offshore dividend by the total amount of US dollar proceeds, we see that the propensity to save cash increases as the proportion of offshore bonds denominated in US dollar increases (column 5). A bond is issued offshore when the parent company issues bonds through its foreign subsidiaries. This result suggests that some emerging markets corporates use offshore affiliates as financing vehicles to accumulate domestic financial assets.

In Table 3 we investigate further the financial motive underlying cash accumulation by focusing on the relative cost of borrowing in US dollar after 2009. Acharya and Vij (2016) and Bruno and Shin (2017) find that EME firms tend to borrow more in dollars during periods when the dollar carry trade is more favorable in terms of an appreciating local currency, high interest rate differential vis-à-vis the dollar, and when the exchange rate volatility is low. In our setting, we interact $USDBonds$ with the variable $CarryTrade$, defined as the difference between the domestic money market rate and the US money market rate, scaled by the annualized standard deviation of the exchange rate. Consistent with the above-mentioned studies, we find that the interaction term $USDBonds*CarryTrade$ is positive and statistically significant (column 1), meaning that the propensity to save cash out of USD bond proceeds is higher when the carry trade price is most favorable.

We also control for additional firm characteristics and check for alternative interpretations of our results. We use market-to-book ratio as a proxy for growth opportunities (MTB), *Leverage* as defined as the ratio of debt to equity, *Capital Expenditures*, and the *Altman's Z-score* (2005) to test whether riskier firms that are closer to distress may explain higher cash accumulations. For the sample of firms issuing US dollar debt (columns 2 and 3), we find that *Leverage* is positively

[3] Untabulated results (available upon request) test that firms changed their behavior after 2009. Specifically, we find that a subset of firms that saved strongly out of earnings pre-2009 reduced their cash-cash flow sensitivity and increased their cash-US dollar bonds sensitivity after 2009.

Table 2: **Cash increases and sources of cash.** This table shows panel firm-fixed effects regressions where the dependent variable is the difference between cash and short term investments at the end of the year and cash and short term investments at the beginning of the year. Cash Flow is earnings minus dividends. USD Bonds is the amount of bond proceeds issued in US dollar denominated currency. USD Bonds Offshore is the ratio of bond proceeds issued in US dollar denominated currency through foreign subsidiaries of parent companies, divided by the total amount of US dollar denominated proceeds. Other Sources is all other sources of cash, excluded Cash Flow (columns 1 to 3) and USD denominated debt (columns 4 and 5). Post 2009 is a dummy equal to 1 for the period 2009-2014, and 0 for the period 2002-2008. The sample consists of firms from 18 emerging economies. Standard errors corrected for clustering of observations at the country level are reported in brackets. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

	(1)	(2)	(3)	(4)	(5)
Sample	All	USD Issuers	non-USD Issuers	USD Issuers	USD Issuers
Cash Flow	0.0920**	0.1768***	0.0506	0.1409***	0.1425***
	[0.0319]	[0.0327]	[0.0336]	[0.0358]	[0.0357]
Cash Flow*Post 2009	-0.0444*	-0.0650*	-0.0262		
	[0.0226]	[0.0309]	[0.0232]		
Post 2009 dummy	0.0096**	0.0139**	0.0077*	0.0003	0.0023
	[0.0036]	[0.0063]	[0.0041]	[0.0080]	[0.0077]
USD Bonds				0.0897	
				[0.0590]	
USD Bonds*Post 2009				0.1757**	
				[0.0801]	
USD Bonds Offshore					-0.0063
					[0.0076]
USD Bonds Offshore*Post 2009					0.0319**
					[0.0133]
Other Sources	-0.0301***	-0.0324	-0.0296**	-0.0394*	-0.0333
	[0.0101]	[0.0198]	[0.0121]	[0.0198]	[0.0197]
ln Assets	-0.0189***	-0.0176***	-0.0201***	-0.0183***	-0.0177***
	[0.0037]	[0.0042]	[0.0032]	[0.0043]	[0.0043]
Constant	0.2641***	0.2481***	0.2806***	0.2620***	0.2551***
	[0.0500]	[0.0585]	[0.0434]	[0.0591]	[0.0589]
Observations	10,226	2,404	7,822	2,404	2,404
R-squared	0.050	0.085	0.039	0.089	0.081
Number of firms	1,213	248	965	248	248

Table 3: **Cash increases and sources of cash.** This table shows panel firm-fixed effects regressions where the dependent variable is the difference between cash and short term investments at the end of the year and cash and short term investments at the beginning of the year. USD Bonds (Non-US Bonds) is the amount of bond proceeds issued in US dollar (not US dollar) denominated currency. Carry Trade is the difference between the domestic money market rate and the US money market rate, scaled by the annualized standard deviation of the exchange rate. Cash Flow is earnings minus dividends. MTB is the market to book ratio, Leverage is the debt to equity ratio, Capital Expenditures are scaled by total asset, and Z-Score is the Altman's (2005) index of corporate financial distress. The sample is for the period 2009-2014. Standard errors corrected for clustering of observations at the country level are reported in brackets. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

	(1)	(2)	(3)	(4)	(5)
Sample	USD Issuers	USD Issuers	USD Issuers	Non-USD Issuers	Non-USD Issuers
USD Bonds	0.3871***	0.3118***	0.3848***		
	[0.0867]	[0.0679]	[0.0550]		
USD Bonds*Carry Trade	0.0217*				
	[0.0106]				
Carry Trade	-0.0002				
	[0.0004]				
Non-USD Bonds				0.0324	0.0462
				[0.0302]	[0.0327]
Cash Flow	0.0442	0.0466	0.0013	-0.0056	0.0141
	[0.1097]	[0.0842]	[0.0899]	[0.0616]	[0.0827]
Other Sources	-0.0636	-0.0646*	-0.0954***	-0.0289	-0.0159*
	[0.0499]	[0.0317]	[0.0225]	[0.0177]	[0.0087]
ln Assets	-0.0355	-0.0405***	-0.0456***	-0.0302***	-0.0271***
	[0.0256]	[0.0123]	[0.0144]	[0.0056]	[0.0062]
MTB		0.0114	0.0518	-0.0103	0.0038
		[0.0267]	[0.0342]	[0.0102]	[0.0050]
Leverage		0.0066**		0.0020**	
		[0.0031]		[0.0009]	
Capital Expenditures		-0.0348	-0.0626	-0.0039	-0.0139
		[0.1103]	[0.1239]	[0.0175]	[0.0210]
Z-score			-0.0033		0.0030**
			[0.0027]		[0.0014]
Constant	0.5364	0.5973***	0.7112***	0.4318***	0.3682***
	[0.3998]	[0.1885]	[0.2296]	[0.0794]	[0.0895]
Observations	875	1,214	1,086	4,196	3,878
R-squared	0.081	0.084	0.097	0.024	0.025
Number of firms	157	225	214	889	870

associated with higher cash. The amount of USD denominated bond proceeds issued by firms continues remaining positive and significant, too.

For the sample of firms issuing domestic and non-US dollar debt (columns 4 and 5), cash accumulations are explained by higher leverage and closeness to distress (higher Z-score), a result that is consistent with the findings in Acharya, Davydenko and Strabulev (2012) and with the precautionary reason for cash savings. The amount of non-USD bonds issued by firms are not statistically significant and do not explain why firms have accumulated cash after 2009.

So far, we have established that the sources of cash allocation have changed over time and that, for some firms, after 2009 cash saving has been motivated by financial reasons (carry trade

opportunities and through offshore financial vehicles) more than growth opportunities or corporate distress. We now focus on the consequences of financial asset accumulation funded by USD bond proceeds. In particular, we will investigate whether potential vulnerabilities arise from a general increase in borrowing (i.e., higher leverage) or more specifically from the use of US dollar debt for accumulating financial liquid assets.

4 Impact of currency depreciation

We now focus our investigation on the impact of currency depreciation on the change in stock prices from mid-2014 to January 2016, and how the impact of currency depreciation varies systematically with differences in firm characteristics *pre* 2014. The MSCI Emerging Market Index dropped by about 35% from mid 2014 to end-January 2016, indicating a period of financial turbulence for EME firms. This was also a period when the US dollar strengthened against emerging market currencies, putting strains on firms that had borrowed in dollars during the earlier period when dollar credit was more accommodative.

In general, firms with higher cash buffers should also more resilient in periods of financial turbulence. Furthermore, if the trade channel prevails, currency depreciation should have a positive effect for those firms with foreign cash flows. However, if firms use the proceeds of US dollar issuances for financial investments in domestic currency, then a currency mismatch may appear on the firm's balance sheet. In this case, corporates that accumulated liquid assets in domestic currency funded by US dollar debt should fare worst in presence of currency depreciation.

Figure 2 is an illustration of the key findings in our paper seen through a particular event. On August 11th, 2015, the Chinese authorities announced a change in the currency regime governing the renminbi, causing its biggest one-day loss in two decades. The announcement came as a surprise to market participants, and led to a sharp depreciation of the renminbi on the day of the announcement (about 2%) as well as on subsequent days. Figure 2 shows the stock price reactions of non-financial corporates in China, arranged by how much cash holdings and other short-term assets of the firms had increased up to then.

The horizontal axis in Figure 2 measures the ratio whose numerator is the increase in liquid assets of the firm over the 2009 to 2014 period, scaled by the firm's market capitalization. This ratio

Figure 2: **Stock returns for dollar bond issuers from China around renminbi devaluation episode of August 11, 2015.** The scatter chart plots stock return from August 10, 2015 to August 21 2015 against the percentage increase in the cash and short-term assets to market cap ratio for the sub-sample of firms from China with history of bond issuance in US dollars.

indicates the extent to which the firm's cash holding had increased prior to the surprise currency depreciation in August 2015. The firms in the sample have a history of dollar bond issuance in the period up to 2014. Figure 2 shows the snapshots over three days (August 12th, August 14th, August 21st) of how the stock prices of the firms evolved following the surprise currency realignment. The scatter chart has a negative slope, indicating that firms that had increased their liquid assets more experienced sharper declines in their share price following the devaluation.

A challenge of our analysis is that we do not have information on the currency denomination of cash and other short term-investments. These data are not publicly available.[4] Consequently, our empirical strategy is based on a series of tests aimed at capturing how firms had fared in a period of turbulence in currency markets. In particular, we examine what types of firms are hit more by a domestic currency depreciation. Are they firms with larger cash accumulations during the period 2009-2014? Are they firms with large cash accumulations that have also issued USD denominated bonds? A positive answer to these questions would be in line with our conjecture of potential financial vulnerabilities arising from accumulated financial assets denominated in domestic currency

[4]We could only access detailed currency denomination data for cash holdings of Chinese firms. The source of the currency denomination information is the China Stock Market & Accounting Research (CSMAR) Database. The average ratio of cash held in domestic currency is very close to 100% throughout. The ratio ranges from 96% in 2006 to 99.8% in 2016. These statistics clearly shows that Chinese firms hold cash in domestic currency. We thank Yi Huang for sharing the data with us.

and funded by foreign denominated debt. A set of subsequent robustness checks and horseracing exercises will test our conjecture against alternative channels and explanations.

The dependent variable is the monthly stock market return for each firm in the sample during the period May 2014 and January 2016. We find monthly stock market prices available in Datastream from May 2014 to January 2016 for a sample of 1013 EME firms. The stock price is in local currency and it is adjusted for dividends and capital actions. In some specifications, we follow Tong and Wei (2011) and control for risk by adding the three factors from Fama and French (1992): firm size (log assets), the ratio of the market value to book value (MTB), and beta (the correlation between the firm's stock return and the country-level market return). The inclusion of these factors reduces to sample to 957 firms.

Exchange rate data are for the end of the month and are taken from IMF IFS. We compute the monthly percentage change of the local currency exchange rate against the US dollar ("*Depreciation*"), so a positive value indicates that the currency is depreciating w.r.t. the US dollar.

We compute the increase or decrease in accumulated cash holdings over the period 2009 to 2014 by taking the difference of cash and other short-term investments between 2014 and 2008, scaled by the market capitalization of the firm at the beginning of the period ("*Cash*").[5] We also verify that the results are robust to alternative constructions of the cash variable (e.g., average annual increases, median value, or scaled by assets net of cash). We focus on how much the cash has increased in the period 2009 to 2014 to investigate whether there is a relation between how the cash has been funded over that period and firms' vulnerability. Appendix A presents the summary statistics on stock market returns, exchange rate, cash holdings, and bond issuances for our sample of firms and countries.

We use country fixed effects to focus on differences across firms within countries and control

[5] In Thomson Reuters, cash and other short-term investments (Field 02001) is the sum of cash (Field 02003) and short-term investments (Field 02008). They are defined as follows. Field 02003 represents money available for use in the normal operations of the company. It is the most liquid of all of the company's assets. It includes but is not restricted to cash on hand, cash in banks, cash in escrow, letters of credit, checks, money orders, demand deposits, mortgage bond proceeds held in escrow, central bank deposits, marketable securities. Field 02008 represents temporary investments of excess cash in marketable securities that can be readily converted into cash. It includes but is not restricted to: short-term obligations of the U.S. government, stocks, bonds, or other marketable securities listed as short-term investments, time certificates of deposit, time deposits, Eurodollar bank time deposits, U.S. government treasury bills, corporate securities (stocks, bonds), municipal securities, commercial paper, money market mutual fund shares, post office time deposits (non-U.S.), short-term investments, temporary investments.

for changes in conditions at the country level. We also use time (month) fixed effects to control for changes in global conditions. In most specifications we will use country-time fixed effects to control for time specific country shocks. Standard errors are clustered at the country-level and reported in brackets. In additional robustness tests, we also verify that our results are robust to standard errors clustered at the firm level. Values are winsorized at the 1% level.

We build the analysis sequentially as follows. In section 4.1 we look at the role of corporate bond issuances in the nexus cash/exchange rate/stock returns, whereas in section 4.2 we look at the crucial role of the currency denomination of bond issuances as the driving factor behind our results. In Section 4.3 we run a series of horseracing tests to verify that firms' vulnerability comes from exchange rate depreciation coupled with large accumulations of cash and liquid assets, and it is not spuriously affected by other macro- or firm-level factors.

4.1 Stock returns, depreciation, and bond issuers

In Table 4, we start with a panel specification with country, industry (2 digit SIC code), and month fixed effects that includes the three Fama-French factors (columns 1 to 4). Following Whited and Wu (2006), Tong and Wei (2011) and Calomiris, Love and Martinez Peria (2012), we incorporate the standard risk factors by entering the relevant firm characteristics directly into the regression, rather than entering them indirectly through a factor model: firm size (as measured by the log of book assets), market asset to book asset ratio, and beta, are measured as at the end of 2013. We see in column 1 that the coefficient of *Depreciation* is negative but not statistically significant.

Column 2 includes the interaction term between *Cash* and *Depreciation* that captures how domestic currency depreciation has a different impact on stock prices of firms with a different degree of cash accumulations during the period from 2009 to 2014. The coefficient of the interaction term *Depreciation*Cash* is negative and statistically significant, meaning that when local currency depreciates, firms with the largest increases in cash holdings during the period 2009-2014 suffer a larger decline in stock prices.

We further investigate the source of external financing as a potential channel in explaining the negative association between cash holdings, exchange rate depreciation and stock market returns. We identify firms that issued at least one bond over the period 2009-2014 (*Bond Issuer*) and firms that did not (*No Bond Issuer*). The firms that did not issue any bond during 2009 to 2014 account

Table 4: **Depreciation, Cash Savings and Stock Returns.** This table shows panel regressions where the dependent variable is the monthly change in stock prices during the period June 2014 to January 2016. The sample consists of firms from 18 emerging economies. Cash is the increase or decrease in cash holdings during the period 2009 to 2014. Depreciation is the monthly exchange rate percentage change of the local currency against the US dollar. Beta is the firm-level market beta, Size is the log of book assets, and MTB is the market to book ratio, all as of the end of 2013. Issuers (Non-Issuers) are firms that issued (did not issue) at least one bond during the period 2009 to 2014. Standard errors corrected for clustering of observations at the country level are reported in brackets. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Cash	0.0024*	0.0031**	0.0027*	0.0132***		
	[0.0013]	[0.0012]	[0.0014]	[0.0029]		
Depreciation	-0.0899	-0.0645	-0.0379	-0.1900	-0.0292	
	[0.1181]	[0.1156]	[0.1161]	[0.1424]	[0.1040]	
Depreciation*Cash		-0.0696*	-0.0703*	-0.0350	-0.1053**	-0.0832***
		[0.0361]	[0.0339]	[0.1746]	[0.0396]	[0.0235]
Beta	-0.0070**	-0.0070**	-0.0076**	0.0015		
	[0.0032]	[0.0032]	[0.0028]	[0.0106]		
MTB	0.0004	0.0004	0.0003	0.0007		
	[0.0006]	[0.0006]	[0.0007]	[0.0010]		
Size	-0.0023	-0.0023	-0.0012	-0.0072**		
	[0.0026]	[0.0026]	[0.0026]	[0.0025]		
Constant	0.1299***	-0.0828	-0.1062	0.0220	0.0157	-0.0261***
	[0.0313]	[0.0772]	[0.0816]	[0.0431]	[0.0147]	[0.0002]
Observations	18,145	18,145	15,109	3,036	15,914	15,914
R-squared	0.155	0.155	0.169	0.125	0.151	0.323
Number of firms	957	957	792	165	838	838
Firm FE	N	N	N	N	Y	Y
Country, Industry FE	Y	Y	Y	Y	Y	-
Month FE	Y	Y	Y	Y	Y	-
Country-month FE	-	-	-	-	-	Y
Sample	All	All	Issuers	Non-Issuers	Issuers	Issuers

for 17% of the sample. Columns 3 and 4 of Table 4 show results of the basic specification with firm risk factors for the sample of EME firms that issued or did not issued a bond, respectively. The coefficient of the interaction term *Depreciation*Cash* is statistically significant only for the sample of firms that issued at least one bond during the period 2009-2014. In other words, the negative effect of higher cash savings on price following a depreciation of the domestic currency is driven by the sample of bond issuers.

Columns 5 and 6 show results from specifications that include firm fixed effects in lieu of firm-level control variables, which also allows us to work with a larger sample of firms. In particular, column 6 saturates our benchmark specification with country-month fixed effects to control for time-varying observed and unobserved country characteristics. Regardless of the fixed effects used (country, industry, month, or country-month) the interaction term *Depreciation*Cash* continues remaining statistically significant for the sample of EME firms that issued bonds during the 2009-2014 period.

Taken together, to the extent that cash and leverage are endogenously determined and that EME corporate debt issuances are associated with larger cash accumulations, these preliminary results suggest that larger cash increases are associated with a larger decrease in price following a depreciation through the channel of corporate bond issuances. It is therefore important to look at how cash increases are financed.

4.1.1 Robustness tests

Alternative Specifications. We relegate in the Appendix a first set of robustness tests of the specifications presented in Table 4, and additional analysis. Table 15 in the Appendix shows that results are robust to clustering standard errors at the firm-level in lieu of country-level, to excluding the year 2014 and the oil and gas industry from the sample. Results are confirmed also when we replicate the analysis with quarterly changes in stock market prices and in exchange rates, or we use industry-month fixed effects (in lieu of country-month fixed effects) to control for time-varying observed and unobserved industry characteristics.

Case of Advanced Economies. Column 6 of Table 15 shows results for a sample of firms from 23 advanced economies (AE). The interaction term *Depreciation*Cash* is statistically insignificant, meaning that the relationship between currency depreciation, cash savings and stock returns

observed in EME firms does not translated to AE firms. The estimated coefficient of *Depreciation* alone is positive and statistically significant, which is consistent with the positive association between stock returns of AE firms and currency depreciation found in Hau and Rey (2006).

Overall, these results show a different behavior between AE and EME firms. Albeit both AE and EME firms have increased their bond issuances in the aftermath of the crisis, the channel of the transmission of vulnerabilities is different. Bruno and Shin (2017) show that EME firms took advantage of favorable liquidity and funding conditions (i.e., high interest rate differentials and low exchange rate volatility) to issue corporate bonds and used the bond proceeds to accumulate financial assets, including cash and short-term instruments denominated in domestic currency. In contrast, AE firms' decision behind cash accumulation was more consistent with the precautionary motive. To the extent that cash holdings have been determined by financial reasons for EME firms and by precautionary reasons for AE firms, the contrasting results between AE and EME firms highlight the different channel of transmission of exchange rate depreciation.

Cross-countries differences. In Table 16 in the Appendix we investigate cross-countries differences for the following six countries: China, Brazil, Turkey, South Africa, Russia and India. These countries experienced currency depreciations with different strength and at different times. China stands out as one of the countries where firms are mostly affected by domestic currency depreciations. Firms with large cash increases in Brazil and Russia are also negatively affected by domestic depreciations, but the magnitude of the effect is slightly lower. The effect of depreciation is actually positive or not statistically significant for firms with large cash savings in Turkey and India. Taken together, this evidence shows heterogeneity across countries, with firms in China, Brazil, and Russia suffering more from domestic currency depreciations especially in the presence of large cash increases.

4.2 Depreciation, cash, and dollar bond issuance

We further delve into our data and we investigate whether the currency denomination of the bond plays a role. We divide EME firms in two groups: those that issued at least one USD denominated bond over the period 2009-2014 (*USD Issuers*), and those firms that issued bonds but not in USD currency over the same period (*Non-USD Issuers*). The firms that issued at least one USD denominated bond over the period 2009-2014 account for 24% of the issuers-sample. Firms that

Table 5: **Depreciation, USD Bond Issues and Stock Returns.** This table shows panel regressions where the dependent variable is the monthly change in stock prices during the period June 2014 to January 2016. Depreciation is the monthly exchange rate percentage change of the local currency against the US dollar. Cash is the increase or decrease in cash holdings during the period 2009 to 2014 scaled by the firm market capitalization, except: in column 4 it is scaled by total assets net of cash; in column 3 Cash is defined as the average annual cash increases. The sample consists of firms from 18 emerging markets economies (columns 1 to 4) or from China (columns 5 and 6). Furthermore, the sample consists of firms that, during the period 2009-2014, issued at least one USD denominated bond (columns 1, 3, 4, 5), or firms that did not issue any USD denominated bonds (columns 2, 6). Standard errors corrected for clustering of observations at the country level (columns 1 to 4) or for heteroscedasticity (columns 5 and 6) are reported in brackets. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Depreciation*Cash	-0.2026**	-0.0171	-1.4528**	-1.3647**	-0.6271**	-0.1178
	[0.0933]	[0.0698]	[0.6634]	[0.6383]	[0.2960]	[0.4145]
Constant	0.0093***	-0.0148***	0.0107***	0.0108***	0.0578**	-0.0843***
	[0.0001]	[0.0006]	[0.0000]	[0.0000]	[0.0233]	[0.0073]
Observations	3,801	12,113	3,801	3,801	941	4,551
R-squared	0.284	0.361	0.284	0.284	0.265	0.486
Number of firms	200	638	200	200	49	242
Firm fixed effects	Y	Y	Y	Y	Y	Y
Industry fixed effects	-	-	-	-	Y	Y
Month fixed effects	-	-	-	-	Y	Y
Country-month fixed effects	Y	Y	Y	Y	-	-
Sample	USD Issuers	non-USD Issuers	USD Issuers	USD Issuers	China USD Issuers	China non-USD Issuers

did not issue any bond during 2009-2014 are excluded from this analysis.

We start by dividing the sample between USD and non-USD bond issuers in a specification that maximizes the sample size by using firm and country-month fixed effects. Table 5, column 1, shows that the coefficient of the interaction term *Depreciation*Cash* is negative and statistically significant only for the subsample of firms that have issued at least one USD denominated bond. We interpret this result as evidence that larger cash savings, partially funded by USD denominated bond proceeds, are associated with a larger decrease in price following a currency depreciation. The magnitude of the economic impact is high: on average, a one percent domestic currency depreciation decreases firm stock returns by 0.3 percent more in firms with large cash accumulation than in firms with low cash accumulation (upper tercile versus lower tercile).

In columns 3 and 4 of Table 5 we verify that our results are robust to alternative constructions of the cash variable. Specifically, in column 3 we consider the average change in cash holdings during the period 2009 to 2014 by taking the average of the annual change in cash. In column 4, instead, we take the difference of cash between 2014 and 2008 scaled by total assets net of cash. We see that the negative association between cash-depreciation and stock prices continues to hold. In unreported results, we further verify that our results are not sensitive to outliers by using the

median value of annual cash increases.

Finally, we look at the case of China. Column 5 shows results for the sample of Chinese firms that issued at least one USD denominated bond over the period 2009-2014, while column 6 shows results for the sample that issued bonds over the same period but not in USD. We see that the interaction term *Depreciation*Cash* is negative and statistically significant only for the sample of Chinese firms that issued USD denominated bonds, in line with the evidence shown in Figure 2 and the fact that Chinese firms hold cash in domestic currency (see footnote 4).

One limitation of our study is that detailed hedging activities are not available at the firm level, but the widespread practice of borrowing in dollars beyond the resources sector (and tradeable sector generally) suggest that operating hedges as motivation for dollar-denominated issuance cannot fully account for our findings.[6] The 2016 Risk Management Practice Survey by Wells Fargo documents that about 26% of firms do not hedge foreign currency balance sheet positions. For the case of Indonesia, Harisuddin (2015) reports that 36% of total private sector external debt reporters have hedged their debt, while the rest 64% have unhedged debt. Du and Schreger (2016) report for a sample of countries that total foreign currency debt outstanding is greater than total cross-currency swaps outstanding, which supports that idea of the existence of a large portion of firm balance sheets vulnerable to currency depreciation.

4.2.1 Mechanism of transmission: foreign currency debt and carry trades

The preceding evidence shows that the negative effect of higher cash increases on firm stock returns following a depreciation of the domestic currency is driven by the sample of firms that have issued USD denominated bonds. The specification with country-month and firm fixed effects omits all single variables for collinearity reasons. We now use a specification where the total amount of bond proceeds comes into play to explicitly test whether the negative effect following a domestic currency depreciation derives directly from the *liability side* (through accumulated USD denominated debt) or from the *asset side* (through cash funded by USD denominated debt).

In Table 6, column 1, the variable *USD Bond Proceeds* is the sum of the total bond proceeds

[6] In Capital IQ we could find 49 firms reporting data on hedging activities. The average percentage of hedging activities as a proportion of total debt or US dollar denominated debt is very small, 1.3% and 7.8% respectively. In untabulated results we find a positive effect from hedging actvities on stock price, suggesting that unhedged firms indeed face currency mismatches in the balance sheet.

Table 6: **Depreciation and Bond Issues: Foreign currency debt, Carry Trade, and Offshore issuances** This table shows panel regressions where the dependent variable is the monthly change in stock prices during the period June 2014 to January 2016. Depreciation (Dep) is the monthly exchange rate percentage change of the local currency against the US dollar. USD Bond Proceeds (non-USD Bond Proceeds) is the sum of the total bond proceeds in USD (non-USD) denominated currency issued during the period 2009-2014. High USD Proceeds (Low USD Proceeds) is a dummy equal to 1 if a firm issued a large (low) amount of USD bond proceeds during the period 2009-2014, and 0 otherwise. The subsample High (Low) Carry Trade groups firms that issued the majority of USD Bond Proceeds in more favorable (less favorable) carry trade conditions. Offshore is a dummy variable equal to 1 if a firm has issued bonds through its foreign subsidiaries, 0 otherwise. Cash is the increase or decrease in cash holdings during the period 2009 to 2014. The sample consists of EME firms that issued USD denominated bonds, except column 2 (firms that did not issue any USD denominated bonds) during the period 2009 to 2014. Standard errors corrected for clustering of observations at the country level or for heteroscedasticity (column 6, sample of China firms) are reported in brackets. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Specification	(1) Proceeds Amount -USD-	(2) -non USD-	(3) High vs. Low -USD-	(4) High Carry Trade	(5) Low Carry Trade	(6) China Offshore
Dep*Cash	0.1400	-0.0420		0.4186***	0.0016	0.0868
	[0.1397]	[0.0536]		[0.1101]	[0.9750]	[0.5209]
Dep*USD Bond Proceeds	1.8040			3.1598	5.5197	
	[2.0291]			[2.2492]	[6.5538]	
Dep*Cash*USD Bond Proceeds	-5.6830**			-9.7252***	-2.9688	
	[2.3539]			[2.0377]	[20.9296]	
Dep*non-USD Bond Proceeds		-2.1207**				
		[0.8846]				
Dep*Cash*non-USD Bond Proc.		0.5989				
		[0.6573]				
Dep*Cash*Low USD Proceeds			0.1086			
			[0.5077]			
Dep*Cash*High USD Proceeds			-0.2220**			
			[0.1022]			
Dep*Cash*Offshore						-1.0119*
						[0.5172]
Constant	0.0092***	-0.0128***	0.0114***	-0.0054**	0.0224***	-0.1621***
	[0.0002]	[0.0012]	[0.0005]	[0.0022]	[0.0043]	[0.0280]
Observations	3,801	12,113	3,801	1,449	1,199	941
R-squared	0.286	0.361	0.284	0.395	0.312	0.268
Number of firms	200	638	200	77	62	49
Firm FE	Y	Y	Y	Y	Y	Y
Country-month FE	Y	Y	Y	Y	Y	month
Sample	USD Issuers	non-USD Issuers	USD Issuers	USD Issuers	USD Issuers	USD Issuers

in USD issued during the period 2009-2014 scaled by the firm market capitalization. The variable *USD Bond Proceeds* enters the specification with the double interaction *Depreciation*USD Bond Proceeds* and the triple interaction *Depreciation*Cash*USD Bond Proceeds*, while the firm and country-time fixed effects absorb the residual characteristics. Column 1 shows that only the triple interaction *Depreciation*Cash*USD Bond Proceeds* is statistically significant and negative, which means that firms with large increases in cash holdings and large issuances of USD denominated bonds are hit more by a domestic currency depreciation. Quite striking, the double interaction *Depreciation*USD Bond Proceeds* is not statistically significant. This result reinforces our conjecture that the negative impact of domestic currency depreciation on stock returns does not directly derive from large bond issuances in foreign currency, but from the use of such foreign currency-denominated debt for accumulating liquid financial assets.

In column 2, we look at what happens to those firms that did not issue any USD denominated bonds. The variable *non-USD Bond Proceeds*, is the sum of the total bond proceeds denominated in a currency other than the US dollar (predominately in domestic currency) issued during the period 2009-2014, and normalized by the firm market capitalization. For those firms, only the double interaction *Depreciation*Bond Proceeds* is statistically significant and negative, which means that a possible source of vulnerability for such firms during periods of financial turbulence derives from large accumulations of debt. This result is in line with the findings of Allayannis, Brown, and Klapper (2003).

In column 3, we look at an alternative way of testing our conjecture by constructing a dummy equal to 1 if a firm raised a large amount of bond proceeds denominated in USD currency (*High Proceeds USD*) or a low amount (*Low Proceeds USD*), and 0 otherwise. The sample is divided on the basis of the median of the amount of proceeds raised in the period 2009-2014. The dummy variables are then interacted with *Depreciation*Cash* in a specification saturated with firm and country-month fixed effects. We find that the interaction term *Depreciation*Cash* is negative and statistically significant for the sample of firms that have issued a large amount of proceeds in USD, consistent with the evidence in column 1.

Columns 4 and 5 of Table 6 replicate column 1 results by splitting the sample between firms that have issued the majority of USD denominated bonds during periods of favorable vs. less favorable carry trade conditions. The variable carry trade is defined as the difference between the domestic

money market rate and the US money market rate, scaled by the annualized standard deviation of the exchange rate. Periods of favorable carry trade conditions (*High Carry Trade*) are when the difference between the domestic money market rate and the US money market rate scaled by the exchange rate volatility increases from the period before.[7]

Quite striking, in column 4 we observe that the significance of the negative coefficient of the triple interaction *Depreciation*Cash*USD Bond Proceeds* is driven by the sample of firms that issued USD denominated bonds during improving dollar carry trade conditions. The coefficient *Depreciation*Cash* by itself is positive and significant, meaning that firms with high cash balances that were not funded by foreign debt fared best during periods of financial turmoil, which is consistent with the standard precautionary story. However, firms that funded cash increases with bonds issued in USD to take advantage of carry trade opportunities, are those that fared worst during periods of local currency depreciation (*Depreciation*Cash*USD Bond Proceeds* is statistically negative only for the sample of firms that issued USD bonds during high carry trade periods, column 4).

Finally, we look at the case of China. In Table 5 we saw that firms incorporated in China, that issued US dollar denominated bonds and saved the proceeds as cash, are negatively affected by a local domestic depreciation. In column 6 of Table 6, we interact *Depreciation*Cash* with a dummy variable *Offshore* equal to 1 if a parent firm issued bonds in US dollar denominated currency through its foreign subsidiaries (about a third of the sample). The triple interaction term *Depreciation*Cash*Offshore* is negative and statistically significant, meaning that the firms that issued offshore bonds denominated in US dollar are the most affected by a domestic currency depreciation. China is a country that has maintained capital account restrictions. Our results may point to offshore issuances being motivated by circumvention of capital controls and accumulation of financial assets. This result is consistent with the findings in Huang, Panizza, and Portes (2017) who find a positive correlation between intra-firms loans and dollar bond issuances.

4.2.2 Real effects

The financial distress following domestic depreciation may not necessarily turn in bankruptcy or default in the short term. Firms may temporarily cut down on investment or suffer from some

[7] We also split the sample by using the country mean and median carry trade ratio, with similar results.

Table 7: **Depreciation and USD Bond Issues: Alternative Dependent Variables** This table shows regressions where the dependent variable is the change in capital expenditures from 2013 to 2015 (columns 1, 3, and 4) or from 2013 to 2016 (column 2). In columns 5 and 6 the dependent variable is the change in the Altman's Z-score index from 2013 to 2015 or from 2013 to 2016, respectively. Depreciation is a dummy equal to 1 if the domestic currency depreciated more than 10 percent against the US dollar during 2014-2015, 0 otherwise. Cash is the increase or decrease in cash holdings during the period 2009 to 2014. The sample consists of firms that during the period 2009-2014 issued at least one USD denominated bond, except in column 4 where the sample consists of non-USD issuers. Standard errors corrected for clustering of observations at the country level are reported in brackets. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	ΔCapex	ΔCapex	ΔCapex	ΔCapex	ΔZ-score	ΔZ-score
Cash	0.1784**	0.1606***	0.1872***	0.0831**	-0.2836*	-0.0756
	[0.0665]	[0.0509]	[0.0639]	[0.0375]	[0.1379]	[0.0502]
Depreciation	0.3663	0.2630	0.4610*	0.1204	-0.1996	-0.1734
	[0.2353]	[0.2111]	[0.2491]	[0.1013]	[0.1805]	[0.1968]
Depreciation*Cash	-0.3417*	-0.6396**	-0.4893**	-0.1212	0.2612*	0.0798
	[0.1723]	[0.2735]	[0.2177]	[0.1040]	[0.1381]	[0.0711]
ΔROA	2.0594***	0.2858	-0.3898	-0.0669	1.2733**	0.6164
	[0.5140]	[0.3236]	[0.2570]	[1.2913]	[0.5688]	[0.3906]
ΔMTB	0.0028	0.0391**	0.0361**	0.1100	-0.0174	-0.0772**
	[0.1388]	[0.0182]	[0.0161]	[0.1617]	[0.1982]	[0.0330]
ΔLeverage	-0.0287**	0.0024	0.0106	-0.0048	-0.0117	0.0022
	[0.0105]	[0.0036]	[0.0085]	[0.0048]	[0.0180]	[0.0027]
Constant	-0.8218*	-0.8598**	-0.7051	-2.6839***	-0.0665	-0.3372*
	[0.4231]	[0.3105]	[0.8861]	[0.6051]	[0.0769]	[0.1844]
Industry FE	Y	Y	Y	Y	Y	Y
Observations	181	176	174	585	171	165
R-squared	0.323	0.354	0.321	0.106	0.270	0.227
Sample	USD Issuers	USD Issuers	USD Issuers	non-USD Issuers	USD Issuers	USD Issuers

other form of distress. We hereby compare the change in capital expenditures from 2013 to 2015 of firms that issued dollar denominated bonds as a function of dollar appreciation. Our conjecture is that firms that accumulated cash funded by dollar bond proceeds during the period of dollar weakening, should fare worst when the dollar strengthens, with a negative effect on investments.

We construct a dummy that take the value of 1 in the presence of a domestic depreciation larger than 10%, and 0 otherwise (*Depreciation*, about 60% of the sample). We regress the change in capital expenditures (*Capex*), normalized by total sales or total assets, over the increase in cash holdings after 2009 (*Cash*), the variable *Depreciation*, and their interaction term. We also add the change in profitability (*ROA*), growth opportunities (*MTB*), leverage, and industry dummies.

Columns 1 and 2 of Table 7 show results when the change in *Capex* normalized by total sales is used as dependent variable and for the sample of firms that issued US dollar denominated bonds. The coefficient estimate of the interaction term *Depreciation*Cash* is negative and statistically significant, meaning that firms with large cash accumulations and that issued US dollar bonds tend

to reduce their investments following a large domestic depreciation. Specifically, firms with large cash holdings (at the 66th percentile of *Cash*) will decrease capital expenditures by 0.096 more than firms with low cash accumulations (at the 33rd percentile).

When we look at the change in Capex the year after the domestic depreciation (2016), the negative effect is still present (column 2), meaning that the real effect on investments is long lasting. Column 3 shows that results are robust to normalizing capex by total assets. In column 4 we replicate the test for the subsample of firms that did not issue US dollar denominated bonds. We see that the interaction term *Depreciation*Cash* is statistically insignificant, meaning that a large domestic depreciation does not affect firms' investment decisions. Taken together, these results show that following a domestic depreciation, firms with large cash savings, partially funded by USD denominated bond proceeds, decrease their investments as a result of financial distress due to balance sheet currency mismatches.

4.2.3 Alternative measure of corporate financial distress

We use the Altman's Z-score index as an alternative dependent variable. A higher Z-score indicates higher financial distress. Column 5 of Table 7 shows results related to the change in Z-score between 2013 and 2015, while column 6 reports results for the subsequent year 2016. Column 5 shows that higher cash accumulations reduce financial distress in the absence of a large currency depreciation (*Cash* is negative and statistically significant). Instead, the coefficient estimate of *Depreciation*Cash* is positive and statistically significant, meaning that domestic depreciation hits the firms that have accumulated cash holdings out of USD bond proceeds. The effect, however, is not long lasting (column 6).

4.2.4 Firm characteristics

The message of our study is that higher cash holdings are associated with greater dollar debt and may make the firm more vulnerable to sharp currency movements. At the same time, firm type may endogenously explain why we observe higher cash holdings that are correlated with lower stock returns. In the absence of an exogenous variation in cash or suitable instrumental variables, we control for as many firm characteristics as possible to better understand the source of firm

endogeneity.[8]

In Table 3, columns 1 to 3, we see that firm size and leverage are determinants of cash holdings, whereas growth opportunities, capital expenditures and financial distress are not. Firms also tend to save more cash out of USD bonds issued during periods of favorable carry trade conditions. Other studies (e.g., Bruno and Shin, 2017; Huang et al, 2017) find that emerging market firms issue USD denominated bonds even when they already have large cash savings, which makes liquidity needs a less plausible explanation for their bond issuances.

We dig deeper by looking at additional firm characteristics. Alfaro, Asis, Chari and Panizza (2017) find that currency depreciations amplify the impact of leverage on financial vulnerability for large firms during a crisis. They argue that large firms may amplify macroeconomic vulnerabilities in emerging markets. At the same time, firm size can also proxy for financing constraints. Almeida, Campello, and Weisbach (2004) establish a link between financial constraints and a firm's demand for liquidity. In particular, they find that financially unconstrained firms (e.g., large firms) do not have a systematic propensity to save cash, while firms that are constrained have a positive cash flow sensitivity of cash.

We test these hypotheses by running our benchmark specification for two subsamples of firms, large vs. small firms. The results in Table 8, columns 1 and 2, show that the estimated coefficient of *Depreciation*Cash* is negative and statistically significant for both subsamples of firms. However, the difference between the coefficients for the two different subsamples is significant with a p-value of 0.0138, indicating that larger firms that have accumulated larger cash savings funded by US dollar bond issuances are the most vulnerable to a domestic depreciation.

We interpret this result as evidence that large firms are better placed to take advantage of favorable financial conditions for carry-trade purposes, ie., raising US dollar funds and invest them in domestic financial assets. Large firms could even become a conduit to transmit corporate distress to other firms by drawing down their money market instruments and potentially amplify the shock from currency depreciation.

We also look at leverage as a source of vulnerability correlated to currency depreciation. We divide the sample of firms in two groups, those with higher leverage and those with lower leverage with respect to the sample median. Table 8, columns 3 and 4, shows that for both groups the

[8] We thank an anonymous referee for this suggestion.

Table 8: **Depreciation and Bond Issues: Robustness Tests.** This table shows panel regressions where the dependent variable is the monthly change in stock prices during the period June 2014 to January 2016. Size is total assets as of 2014, Leverage is the ratio debt to equity, Short-term Debt is the ratio of short-term debt to total debt. High and Low indicate subsets of firms above or below the sample median. Depreciation is the monthly exchange rate percentage change of the local currency against the US dollar. Cash is the increase or decrease in cash holdings during the period 2009 to 2014. The sample consists of firms that during the period 2009-2014 issued at least one USD denominated bond. Standard errors corrected for clustering of observations at the country level are reported in brackets. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Firm type	Size		Leverage		Short-term Debt		
	High	Low	High	Low	High	Low	
Depreciation*Cash	-0.3379***	-0.1210*	-0.2670*	-0.1231**	-0.3085**	-0.1554*	
	[0.1101]	[0.0669]	[0.1472]	[0.0419]	[0.1060]	[0.0840]	
p-value (H-L=0)	0.0138		0.2402		0.0019		
Depreciation*Short Debt							0.3157
							[0.2256]
Constant	0.0338***	0.0257***	-0.0067***	0.0219***	0.0257***	0.0146***	-0.0198***
	[0.0009]	[0.0002]	[0.0002]	[0.0002]	[0.0007]	[0.0002]	[0.0009]
Observations	1,996	1,805	1,794	1,820	1,753	1,845	3,598
R-squared	0.403	0.305	0.346	0.319	0.323	0.357	0.278
Number of firms	102	98	101	99	99	100	199
Firm fixed effects	Y	Y	Y	Y	Y	Y	Y
Country-month-fixed effects	Y	Y	Y	Y	Y	Y	Y
Sample	USD Issuers	USD Issuers	USD Issuers	USD Issuers	USD Issuers	USD Issuers	USD Issuers

coefficient of *Depreciation*Cash* is negative and statistically significant. The difference between the coefficients for the two different subsamples is however statistically insignificant (p-value= 0.2402).

Finally, we investigate whether the short maturity component of debt may be a source of vulnerability. We divide the sample of firms between high versus low ratio of short term debt over total debt. In Table 8, columns 5 and 6, we find that the coefficient of *Depreciation*Cash* is negative and statistically significant for both groups of firms. The difference between the coefficients for the two different subsamples is significant with a p-value of 0.0019, indicating that a domestic currency depreciation hits the firms that have accumulated cash holdings out of US dollar bond proceeds, and that the firms with higher refinancing risk are hit even more.

Interestingly, when we look at short term debt as a direct source of firm vulnerability, Table 8, column 7, we do not find a statistically significant evidence: the interaction between *Depreciation* and the ratio of short term debt over total debt (*Short Debt*) is statistically insignificant. We interpret this as evidence that refinancing risk is not a direct source of vulnerability. Instead, it amplifies the effect deriving from currency mismatches.

Putting this into context, the above results are in line with our investigation. Firms that exploited carry trade opportunities will be hit when carry trade strategies unwind. In addition to the losses deriving from the carry trade unwind, firms also face refinancing risks during periods of financial volatility and currency depreciation.

Overall, these results are informative of what type of firm is more vulnerable to currency depreciation. In particular, the results on firm size illustrate a potential amplification effect deriving from large firms. The results on short-term debt show a further potential amplification effect deriving from refinancing risk. At the same time, controlling for various firm characteristics does not change the main result that higher cash is associated with greater dollar debt accumulated during favorable financial conditions and makes the firm more vulnerable to sharp currency movements when the cycle reverses.

4.2.5 Additional Robustness tests

In Tables 9 and 17 we show a series of robustness tests to verify that the evidence found is robust to additional firm and time variables, alternative definitions of the variable *Depreciation*, different clustering of the standard errors, controlling for outliers or for firm size, and using an alternative measure to stock returns that captures distress. Table 17 is presented in the Appendix.

Our empirical results show that currency depreciation leads to lower stock returns among firms that issued USD denominated bonds and increased cash, and we argue that this is due to a currency mismatch. Alternatively, firms could use the bond proceeds to invest in real assets that generate revenues in local currency, thus also potentially suffering from a currency mismatch. We test for this alternative hypothesis by adding to the baseline specification the increase in property, plans, and equipment over the period 2009-2014 (*Real Assets*), interacted with *Depreciation.* Column 1 of Table 9 shows that for the sample of USD bond issuers, the interaction term *Depreciation*Real Assets* is positive and statistically significant, suggesting that firms that used USD bond proceeds for real investments suffered less from currency depreciation than those firms that invested the proceeds in liquid financial assets. The interaction term *Depreciation*Cash* continues remaining negative and significant.

Table 3 showed that leverage can be a factor explaining cash accumulations. To better identify the channel leading to lower returns following a domestic currency depreciation, i.e., deriving from

Table 9: **Depreciation and Bond Issues: Robustness Tests.** This table shows panel regressions where the dependent variable is the monthly change in stock prices during the period June 2014 to January 2016, except: in columns 5 and 6, it is the quarterly change in stock prices. High Depreciation is a dummy variable equal to 1 in the quarters when the exchange rate of the local currency against the US dollar depreciates more than 6.25%, 0 otherwise. Depreciation is the monthly exchange rate percentage change of the local currency against the US dollar. Cash is the increase or decrease in cash holdings during the period 2009 to 2014. Real Assets and Leverage are the increase or decrease in property, plants, and equipment, and in the ratio debt to equity, respectively, over the period 2009 to 2014. Profitability is the quarterly growth in earnings per share. VIX is the monthly CBOE volatility index. BETA is the firm-level beta, Size is the log of book assets, and MTB is the market to book ratio, all as of the end of 2013. The sample consists of EME firms that during the period 2009-2014 issued USD denominated bonds (columns 1, 2, 3, 5) or did not issue any USD denominated bonds (columns 4, 6). Standard errors corrected for clustering of observations at the country level are reported in brackets. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Cash			0.0073***	-0.0002		
			[0.0021]	[0.0024]		
Depreciation			-0.2969**	-0.5378***		
			[0.1251]	[0.1539]		
Depreciation*Cash	-0.2092**	-0.2202**	-0.1956*	-0.0488		
	[0.0952]	[0.0873]	[0.1045]	[0.0468]		
Depreciation*Real Assets	0.0241**					
	[0.0086]					
Depreciation*Leverage		-0.0828				
		[0.9132]				
High Depreciation					0.0627	0.0574
					[0.0419]	[0.0635]
High Depreciation*Cash					-0.0422**	-0.0022
					[0.0147]	[0.0103]
Profitability			0.0191	0.0125***		
			[0.0176]	[0.0027]		
VIX			-0.0029***	-0.0040***		
			[0.0011]	[0.0009]		
BETA			-0.0004	-0.0092***		
			[0.0047]	[0.0035]		
MTB			0.0023**	-0.0006		
			[0.0009]	[0.0004]		
Size			0.0001	-0.0042***		
			[0.0017]	[0.0012]		
Constant	0.0339***	0.0196***	0.0742***	0.1436***	-0.0243	0.1079
	[0.0002]	[0.0012]	[0.0198]	[0.0294]	[0.0236]	[0.0673]
Observations	3,801	3,222	2,788	9,151	1,162	4,661
R-squared	0.284	0.292	0.295	0.481	0.129	0.166
Number of firms	200	169	179	557	200	813
Firm effect	FE	FE	RE	RE	FE	FE
Country-month FE	Y	Y	-	-	-	-
Quarter FE	-	-	-	-	Y	Y
Industry FE	-	-	Y	Y	-	-
Country FE	-	-	Y	Y	-	-
Sample	USD Issuers	USD Issuers	USD Issuers	non-USD Issuers	USD Issuers	non-USD Issuers

a general increase in leverage or specifically from USD bonds issuances, we compute the increase in leverage over the period 2009-2014, interact it with *Depreciation*, and add it to the baseline specification (column 2). The coefficient *Depreciation*Leverage* is negative but not statistically significant, which confirms our hypothesis that the negative effect on stock returns is mostly driven by cash accumulations funded by USD bond proceeds.

In columns 3 and 4 we use firm-level variables in lieu of firm-fixed effects to verify that our evidence is robust to observed firm characteristics that may explain stock return changes. Specifically, we use a random-effects specification with country and industry fixed effects with the following additional regressors: growth in earnings in each quarter of the period June 2014-January 2016 (*Profitability*), and the risk factors *Size*, *Beta*, and *Market-to-Book* as previously defined and measured at the end of 2013. We also add a global factor (the monthly CBOE volatility index (*VIX*)) in lieu of time fixed effects. The VIX has been found to explain capital flows volatility (Forbes and Warnock, 2012) and international financial conditions (Cerutti, Claessens, and Ratnovski, 2014; Bruno and Shin, 2015). We see that the interaction term *Depreciation*Cash* continues remains negative and significant for the subsample of USD bond issuers.

Desai, Foley, and Forbes (2008) define depreciation episodes as periods when the exchange rate depreciates by over 25% compared to the value of the exchange rate one year earlier. We adapt their definition to quarterly frequencies and consider depreciation episodes when the exchange rate depreciates by over a forth of 25% in a quarter, i.e., 6.25%, as compared to the earlier quarter.[9] We create a dummy variable *High Depreciation* that is equal to 1 in the quarters when the exchange rate depreciates by more than 6.25%, and 0 otherwise. We then interact it with *Cash* and use it in a specification with quarterly stock returns, firm fixed effects, and quarter fixed effects. Table 9, column 5, shows that periods of high depreciation hit firms that have more cash and issued USD denominated bonds. In contrast, column 6 shows that the interaction *Depreciation*Cash* is not statistically significant for the sample of firms that have issued non-USD denominated bonds.

Table 17 in the Appendix shows that results are confirmed when we use robust standard errors clustered at the firm level. When we use the trade-weighted effective exchange rate in lieu of the bilateral exchange rate vis-a-vis the US dollar, the coefficient estimates of the interaction terms *Depreciation*Cash* become statistically insignificant. This result suggests that in our setting the

[9] Results are robust to using 10% as the threshold level.

financial channel dominates the trade channel, and it is supportive of the central role of the dollar outside the United States for EME corporations. Because large firms may have an influence on the domestic exchange rate, we exclude from the sample the largest four companies in each country and obtain unchanged results. We final similar evidence when we exclude the oil and gas industry (with most of the cash flows in US dollar currency) from the sample estimation and when we use default swaps (CDS) as an alternative dependent variable. Finally, instead of running separate estimations between USD issuers and non-USD issuers, we run triple interaction specifications on the overall sample of issuers with unchanged results.[10]

4.3 Horseracing tests

We run a series of horseracing tests to verify that firm vulnerability comes from exchange rate depreciation coupled with large accumulations of cash and liquid assets, and it is not spuriously affected by other macro- or firm-level factors, such as: global factors (VIX), country factors (GDP, Inflation, Trade, Corporate Governance, and Macroprudential policies), tradable vs. non-tradable industries, firms with sales in US dollar, etc. We also delve deeper in the composition of the variable *Cash* to better disentangle the effect from "cash" and "other short term assets" separately. In this set of tests we focus on the mechanism of transmission through USD bond issuances. Hence, most specifications are restricted to the sample of firms issuing USD denominated bonds over the period 2009-2014.

4.3.1 Macro factors

The identification strategy in this first set of tests concurrently accounts for the effects of global factors (the VIX) or country factors (GDP, Inflation, Trade, Corporate Governance, and Macroprudential policies) that may be also correlated with the exchange rate effect. Specifically, we horserace the interaction term *Depreciation*Cash* with *Cash* interacted with GDP growth, inflation growth, trade weighted effective exchange rate, the strength of country investor protection, and an index capturing capital account openness.[11] We use a parsimonious choice of fixed effects that allows to

[10] In untabulated results, we test the liquidity benefit from holding cash. We find that firms that are financially constrained benefit from cash holdings more than unconstrained firms. However, this result holds for the subsample of firms that did not issue US dollar denominated bonds, only.

[11] GDP and CPI data are from the IMF IFS database, trade weighted effective exchange rate data are from the BIS statistics, investor protection data are from the World Bank Doing Business database, and capital control data

Table 10: **Depreciation and USD Bond Issues: Horseracing Tests.** This table shows panel regressions where the dependent variable is the monthly change in stock prices during the period June 2014 to January 2016. The sample consists of firms from emerging economies that issued at least one USD denominated bond during the period 2009 to 2014. Depreciation is the monthly exchange rate percentage change of the local currency against the US dollar. Cash is the increase or decrease in cash holdings during the period 2009 to 2014. VIX is the monthly CBOE volatility index. GDP is the quarterly change in real gdp. Trade Weighted is the monthly trade-weighted effected exchange rate. CPI is the monthly change in inflation. Investor Protection is the 2016 World Bank Doing Business index of the strength of legal rights. Capital Controls is the Fernandez et al. (2015) overall index of capital restrictions. Standard errors corrected for clustering of observations at the country level are reported in brackets. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Control	VIX	GDP	Trade Weighted	CPI	Investor Protection	Capital Controls
Depreciation*Cash	-0.1569*	-0.2111*	-0.2951**	-0.2037*	-0.2046**	-0.2240**
	[0.0815]	[0.1023]	[0.1328]	[0.0965]	[0.1024]	[0.1035]
Control*Cash	-0.0019***	-0.0115	-0.0838	0.0013	-0.0037***	0.0049
	[0.0005]	[0.1420]	[0.0784]	[0.0017]	[0.0014]	[0.0111]
Depreciation	-0.3067	0.3330*	0.0558	0.3729**	0.3565**	0.3480**
	[0.1787]	[0.1645]	[0.1845]	[0.1645]	[0.1704]	[0.1615]
Cash					0.0274***	0.0038
					[0.0071]	[0.0083]
Control	-0.0042***	-0.2383	-0.3925	0.0025	0.0040*	-0.0067
	[0.0014]	[0.3498]	[0.3064]	[0.0018]	[0.0022]	[0.0144]
Constant	0.0858***	-0.0121	0.0755**	-0.0422***	-0.1141***	-0.0838**
	[0.0241]	[0.0141]	[0.0317]	[0.0143]	[0.0306]	[0.0326]
Observations	3,801	3,704	3,781	3,752	3,606	3,801
R-squared	0.038	0.119	0.125	0.124	0.124	0.121
Number of firms	200	199	199	200	190	200
Firm Effects	Fixed	Fixed	Fixed	Fixed	Random	Random
Month Effects	N	Y	Y	Y	Y	Y
Country Effects	N	N	N	N	N	N
Industry Effects	N	N	N	N	Y	Y
Sample	USD Issuers	USD Issuers	USD Issuers	USD Issuers	USD Issuers	USD Issuers

investigate the various interaction terms and does not soak up the macroeconomic variation.

In Table 10 we see that the interaction term *Depreciation*Cash* continues to remain negative and statistically significant in every specification. Among the various macro factors, the VIX also has a statistical association with stock returns (column 1), but it does not diminish the exchange rate effect. Taken together, these estimates strongly suggest that the main mechanism of transmission is through the exchange rate and not through other macroeconomic channels.

4.3.2 Industry and firm factors

In Table 11 we horserace the variable *Cash* – in its interaction with *Depreciation* – with corresponding interactions of other variables that can also concurrently account for the change in stock

are from Fernandez et al (2015) database.

prices following a depreciation of the domestic currency, such as tradable sectors, firms with cash flows in US dollar, and total debt.

Specifically, in columns 1 and 2 we interact *Depreciation* with a dummy variable *Tradable* equal to 1 that identifies tradable industries, and 0 otherwise.[12] We see that the interaction term *Depreciation*Tradable* is not statistically significant, while *Depreciation*Cash* continues to be negative and statistically significant. In columns 3 and 4 we further explore cross-sectional differences by looking at those firms that sale their products in the US market, thus having a partial hedge in the product market for local currency depreciations to the US dollar. We take data on sales in the United States from Worldscope (Geographic Segment Data) and we construct dummy variables equal to 1 (0 otherwise) that identify firms reporting sales in the US (*US Sales*). The coefficient of *Depreciation*US Sales* is positive and significant, meaning that a depreciation of the local currency vis-a-vis the US dollar has a favorable impact for the group of firms with sales in the US. However, the coefficient of the interaction term *Depreciation*Cash* continues to be negative and statistically significant, meaning that a depreciation of the local currency has a negative effect for those firms with large cash accumulations and without US sales. Firms without sales in the US market account for 77% of the sample.

We also verify that the main mechanism of transmission of vulnerabilities is through the accumulated financial assets (*Cash*) rather than directly from an increase in total debt. We compute the increase in total debt (bank and bond debt, from Worldscope, *Total Debt*) during the period 2009-2014, normalized by the firm capitalization, and interact it with *Depreciation*. In column 5, the interaction term *Depreciation*Total Debt* is negative and statistically significant at the 10% level, meaning that firms that increased their debt the most are those that also suffer more from a depreciation of the domestic currency. However, column 6 shows that when we add the term *Depreciation*Cash*, the coefficient of *Depreciation*Total Debt* is no longer significant, whereas *Depreciation*Cash* is consistently negative and statistically significant. This result is in line with what we found in Table 6. Estimates therefore confirm that the accumulation in financial assets affects stock prices in conjunction with a currency depreciation, even after controlling for potential alternative confounding effects.

[12] Tradable sectors include agriculture, mining, and manufacturing industries. Nontradable sectors include construction, transportation, communication, utilities, and services.

Table 11: **Depreciation and USD Bond Issues: Horseracing Tests.** This table shows panel regressions where the dependent variable is the monthly change in stock prices during the period June 2014 to January 2016. The sample consists of firms from emerging economies that issued at least one USD denominated bond during the period 2009 to 2014. Depreciation is the monthly exchange rate percentage change of the local currency against the US dollar. Cash is the increase or decrease in cash holdings during the period 2009 to 2014. Tradable is a dummy variable equal to 1 that identifies tradable sectors, 0 otherwise. Tradable sectors correspond to the following 2 digit SIC codes industries: 01 to 14, 20 to 39. US Sales is a dummy variable equal to 1 that identifies firms with sales in the US, 0 otherwise. Total Debt is the increase or decrease in total debt (bank loans and bond issuances) during the period 2009 to 2014. All specifications include firm fixed effects and month fixed effects. Standard errors corrected for clustering of observations at the country level are reported in brackets. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Tradable sectors		Sales in the US		Bank and Bond debt	
Depreciation	0.0398	0.1409	-0.0832	0.0451	0.2646*	0.3148*
	[0.1846]	[0.1698]	[0.0856]	[0.1099]	[0.1496]	[0.1686]
Depreciation*Cash		-0.2444**		-0.1916**		-0.2436**
		[0.0990]		[0.0832]		[0.0957]
Depreciation*Tradable	0.2143	0.2679				
	[0.2328]	[0.2138]				
Depreciation*US Sales			0.7182***	0.6673***		
			[0.2253]	[0.1964]		
Depreciation*Total Debt					-0.0757*	0.0151
					[0.0428]	[0.0387]
Constant	0.0771**	0.0768**	0.0772**	0.0771**	0.0769**	0.0769**
	[0.0326]	[0.0324]	[0.0323]	[0.0321]	[0.0325]	[0.0323]
Observations	3,801	3,801	3,801	3,801	3,801	3,801
R-squared	0.120	0.122	0.125	0.126	0.120	0.122
Number of firms	200	200	200	200	200	200
Firm effects	Y	Y	Y	Y	Y	Y
Month effects	Y	Y	Y	Y	Y	Y
Country, industry effects	N	N	N	N	N	N
Sample	USD Issuers	USD Issuers	USD Issuers	USD Issuers	USD Issuers	USD Issuers

4.3.3 Cash, short-term investments and other uses of funds

Finally, in Table 12 we attempt to have a more granular investigation of cash and other possible uses of funds. In fact, *what is cash*? The standard measure of cash holdings in the literature includes "cash and cash equivalents" and "short-term investments". There are at least two reasons why this measure is inclusive of short-term investments. First, sub-level data as "cash and cash equivalents" and "short-term investments" are available for a smaller number of firms. Second, it is common view that industrial firms invest in risk-free assets that are considered near cash-securities.

However, Duchin, Gilbert, Harford, and Hrdlicka (2016) hand-collected data of firms' non-operating assets and found that for US firms the traditional measure of cash holdings is composed of at least 23% risky securities on average. For non-US firms, however, we do not have information on each assets comprising "cash and cash equivalents" and "short-term investments", and each firm has flexibility in the assets classification, which makes them hardly comparable across-countries. With these caveats in mind, we nevertheless attempt to investigate the cash components, while at the same time controlling for other possible uses of funds.

We download data on "cash and cash equivalents" (*Cash & Equivalents*), "short-term investments" (*STI*), "other long-term investments" (*Other LTI*), and take the increase (or decrease) during the period 2009 to 2014, normalized by the firm market capitalization, as we did for the case of *Cash*. We also collect data on capital expenditures (*CAPEX*) and take the sum of capital expenditures over the period 2009-2014. We then use them in our baseline specification with firm and country-month fixed effects.

Table 12 shows that depreciation does not have a statistically significant impact on firms that have spent more in capital expenditures or other long-term investments, regardless of the currency denomination of the bond issuances (columns 3 to 7). Regarding the components of cash, we see that depreciation has a statistically significant and negative effect on those firms that have issued USD-denominated bonds and accumulated more short-term investments (columns 2 and 5) during the period 2009-2014. In contrast, EME firms that issued non-USD bonds - predominantly in domestic currency - and accumulated more cash and equivalents fared the best during periods of financial turmoil (column 6).

Overall, these results suggest that firms have used the proceeds of USD denominated bond

Table 12: **Depreciation and USD Bond Issues: Horseracing Tests.** This table shows panel regressions where the dependent variable is the monthly change in stock prices during the period June 2014 to January 2016. The sample consists of firms from emerging economies that issued at least one USD denominated bond (columns 1 to 5) or did not issue any USD denominated bond (columns 6 and 7) during the period 2009 to 2014. Depreciation (Dep) is the monthly exchange rate percentage change of the local currency against the US dollar. Cash & Eqv, STI, Other LTI are the increase or decrease in cash and equivalents, or in short-term investments, or in other long-term investments, respectively, during the period 2009 to 2014. CAPEX is the sum of capital expenditures during the period 2009 to 2014. Standard errors corrected for clustering of observations at the country level are reported in brackets. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dep*Cash & Eqv	-0.0634			0.0435		0.1626*	
	[0.0880]			[0.1267]		[0.0883]	
Dep*STI		-0.2914**			-0.3096***		0.0430
		[0.1102]			[0.0957]		[0.0926]
Dep*Other LTI			0.0350	0.0255	0.0578	-0.1615	-0.0258
			[0.2292]	[0.2179]	[0.1777]	[0.1101]	[0.1053]
Dep*CAPEX			-0.0542	-0.0684	-0.0074	0.0111	-0.0029
			[0.0517]	[0.0519]	[0.0244]	[0.0349]	[0.0350]
Constant	-0.0041***	-0.0184***	-0.0151***	-0.0023**	-0.0029*	0.0074***	0.0124***
	[0.0002]	[0.0004]	[0.0013]	[0.0010]	[0.0014]	[0.0003]	[0.0011]
Observations	3,319	2,850	3,513	3,165	2,715	8,211	6,588
R-squared	0.303	0.340	0.292	0.322	0.370	0.316	0.316
Number of firms	173	147	183	164	139	427	342
Firm effects	Y	Y	Y	Y	Y	Y	Y
Country-month F.E.	Y	Y	Y	Y	Y	Y	Y
Sample	USD Issuers	USD Issuers	USD Issuers	USD Issuers	USD Issuers	non-USD Issuers	non-USD Issuers

issuances to invest in higher-yield financial assets, which is in line with the findings in Duchin et al (2016) of a growing and unregulated shadow asset management industry. In our setting, firms' vulnerability does not come from the accumulation of money-like financial assets per se, but by the fact that the financial assets have been funded by USD denominated bonds, which reinforce our conjecture of the existence of a currency mismatch between the source of funds (USD bonds) and uses of funds (cash). In fact, the interaction term *Depreciation*STI* is statistically significant for the sample of USD denominated bond issuers (columns 2 and 5), and it is statistically insignificant for the sample of non-USD bond issuers (column 7).

Interesting, the interaction *Depreciation*Cash & Equivalents* is positive and statistically significant for the issuers of domestic denominated bonds (column 6). This is consistent with the conjecture that such firms do not have a potential currency mismatch in the balance sheet, and it is in line with the standard view of a beneficial role of cash as a cushion during financial turmoils. A more detailed level of information on the composition of financial assets will help better understanding the implications of these financial surrogating activities within non-financial firms.

5 Concluding remarks

Our analysis is set in the context of the broad-based increase in dollar-denominated debt of EME corporates. During this period, EME firms also accumulated financial assets (including cash and short-term investments), which may open them up to vulnerabilities associated with currency mismatch and an appreciation of the dollar.

We tested this conjecture in the light of the recent period of EME turbulence in currency markets from mid 2014 to early 2016, and found that firms that had the largest increases in cash holdings concurrently with their dollar denominated bond issuances are also those that are most adversely affected by exchange rate depreciation. Robustness and horseracing tests lend further support to our hypothesis.

Our sample period provides a good backdrop for our investigation, as the earlier part of the sample period was characterized by accommodative financial conditions conducive to financial investments by non-financial firms. Whereas currency depreciation would favor the competitiveness of exporting firms, our results suggest that the negative impact of the financial channel swamps the trade competitiveness effect. The trade competitiveness channel would imply a positive effect of currency depreciation on firm performance. Our results find a divergence between advanced economy and EME firms. Currency depreciation does not have positive impact on EME firms, but do favor advanced economy firms.

Furthermore, precautionary savings cannot fully account for our findings. During the mid-2014 to early 2016 period when the MSCI Emerging Market Index dropped by about 35%, firms with larger cash accumulations funded with dollar bond issuance tended to fare worse. Our results underline the importance of tracking of the source of funds in the accumulation of financial assets. Accumulating financial assets funded by dollar debt issuance can lead to greater exposure for the firm. Although one limitation of our study is that hedging activities are not available for the entire sample of firms, the widespread practice of borrowing in dollars beyond the resources sector (and tradeable sector generally) suggest that operating hedges as motivation for dollar-denominated issuance cannot fully account for our findings.

Overall, our findings reinforce the well-known point that corporate cash holding is endogenous, and that the motives for cash accumulation should be considered explicitly. In particular, our

findings focus the attention on the joint determination of cash holding and the firm's financing decision. For EME corporates, we find that high cash holdings go hand in hand with financing decisions that increase the firm's exposure to currency depreciation shocks. Of course, we cannot rule out potential other reasons of why firms choose to issue in US dollar denominated currency and save the proceeds in cash.

Our results also reinforce the importance of the exchange rate as a key financial variable, which holds broader macro implications. Since corporate cash holdings could be in the form of bank deposits, shadow banking products or short-term instruments issued by other firms, the consequence of cash accumulation by firms has knock-on effects by easing credit conditions for other domestic borrowers, either directly, or indirectly through banks and other intermediaries. The case of China, where some firms borrow in US dollar and hold cash in domestic currency, is an example. For China, non-financial firms are an important provider of money market funding and direct firm-to-firm lending. As well as the deposits, non-financial firms are connected to the shadow banking system through the bank-issued wealth management products, trust products, and entrusted loans. Ehlers, Kong and Zhu (2017) show that the growth of these holdings has been very rapid since 2013. In this way, non-financial firms may have played a role in channeling external financial conditions into the domestic financial system.

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A Appendix

In this Appendix, we report summary statistics for our data, robustness tests and additional analysis. Table 13 shows summary statistics of monthly firm-level stock market returns and country-level percentage changes in exchange rates between June 2014 and January 2016. All values are winsorized at the 1% level. The average monthly stock market return is 0.69% across all sample, but we observe differences across countries. Brazil accounts for the lowest mean and median stock market returns (-2.05% and -2.44%, respectively), whereas China is among the countries with the highest average stock market returns (2.19%). During the period considered, on average the domestic currencies depreciated by 1.43% on a monthly basis. We again observe heterogeneity across countries, with Brazil and Russia suffering the largest average depreciations (3.13% and 3.71%, respectively), followed by Colombia (2.98%) and South Africa (2.19%). China has one of the lowest average depreciations (0.33%) as the domestic currency started depreciating only after the second half of 2015.

Table 14 shows firm-level summary statistics of the average increases in cash holdings and number of bond issuances between 2009 and 2014. Of the total 1013 firms in the sample, 838 firms issued at least one bond between 2009 and 2014, and 200 firms issued a bond in USD. We focus on the post crisis period from 2009 to 2014 because this period was characterized by a surge in corporate bond issuances, especially in EMEs.

Table 15 shows robustness tests of the specifications presented in Table 2. Columns 1 to 5 refer to the EME sample of firms, while column 6 refers to the AE sample of firms. Column 1 shows that results are robust to clustering standard errors at the firm-level in lieu of country-level. Due to the existence of cases of smaller clusters of firms, in the main body of the paper we continue showing specifications with robust standard errors clustered at the country-level and with firm-fixed effects. Columns 2 and 3 show that our results are robust to excluding the year 2014 and the oil and gas industry (SIC code 13), respectively, from the sample. Column 4 replicates the analysis with quarterly changes in stock market prices and in exchange rates. Results are similar to the specification with monthly returns, confirming that a depreciation of the local currency hurts EME firms with large increases in cash holdings during the period 2009-2014. Column 5 saturates the main specification with industry-month fixed effects to control for time-varying observed and unobserved industry characteristics, with unchanged results.

Column 6 shows results for a sample of firms from the following 23 advanced economies (AE): Australia, Austria, Belgium, Germany, Switzerland, Denmark, Spain, Finland, France, UK, Greece,

Table 13: **Summary Statistics.** This table shows descriptive statistics of firms from 18 emerging economies for the period June 2014 to January 2016. Column 1 shows average and median of the firm-level monthly percentage change in stock prices. The stock price is from Datastream and is adjusted for dividends and capital actions. Column 2 shows average and median of country-level monthly exchange rate percentage change in the local currency against the US dollar (Depreciation). Exchange rate data are from the IMF IFS.

	(1) stock market returns			(2) currency depreciation	
Country	average	median	obs	average	median
Argentina	4.94%	1.74%	215	1.71%	1.05%
Brazil	-2.05%	-2.44%	1700	3.13%	2.64%
Chile	-0.42%	-0.49%	639	1.31%	1.62%
China	2.19%	1.84%	6164	0.33%	-0.07%
Colombia	-2.12%	-0.99%	134	2.98%	3.49%
Indonesia	-0.94%	-1.83%	911	1.04%	1.30%
India	1.05%	-0.51%	4193	0.71%	0.39%
Mexico	0.22%	0.04%	730	1.78%	1.33%
Malaysia	-1.04%	-1.23%	1201	1.29%	0.78%
Pakistan	2.43%	1.14%	199	0.31%	0.05%
Peru	-1.87%	-1.23%	101	1.04%	1.04%
Philippines	-0.47%	-0.89%	493	0.42%	0.29%
Poland	1.94%	0.47%	80	1.60%	1.76%
Russia	1.16%	0.59%	704	3.71%	4.37%
Saudi Arabia	-1.21%	-1.43%	119	0.04%	0.00%
Thailand	-0.46%	-0.99%	1024	0.43%	0.51%
Turkey	1.03%	0.51%	188	1.79%	1.95%
South Africa	-0.93%	-1.37%	311	2.19%	2.13%
Total	0.69%	-0.27%	19106	1.43%	0.87%

Table 14: **Summary Statistics.** This table shows descriptive statistics of firms from 18 emerging economies. Column 1 shows average and median of the firm-level increase or decrease in cash holdings during the period 2009 to 2014. Column 2 shows how many firms of the sample issued at least one bond during the period 2009 to 2014. Column 3 shows how many firms issued at least one bond in USD denominated currency during the period 2009 to 2014. Accounting data are from Worldscope and bond level data are from SDC Platinum.

	(1) change in cash			(2) bond issuers	(3) USD bond issuers
Country	average	median	N of firms	N of firms	N of firms
Argentina	0.918	0.565	11	7	5
Brazil	0.344	0.204	91	76	21
Chile	0.157	0.092	37	28	10
China	0.451	0.190	327	291	49
Colombia	0.202	0.037	7	7	3
Indonesia	0.508	0.230	51	24	12
India	0.152	0.051	215	185	16
Mexico	0.117	0.074	41	33	23
Malaysia	0.318	0.105	64	41	8
Pakistan	0.287	0.057	10	4	1
Peru	0.000	0.010	7	6	4
Philippines	0.845	0.428	25	24	9
Poland	0.022	0.017	4	4	0
Russia	0.350	0.230	38	35	12
Saudi Arabia	0.148	0.133	6	6	2
Thailand	0.306	0.053	53	46	12
Turkey	0.971	0.465	10	8	7
South Africa	-0.002	-0.007	16	13	6
Total	0.340	0.121	1013	838	200

Table 15: **Depreciation, Cash Savings and Stock Returns.** This table shows panel regressions where the dependent variable is the monthly change in stock prices during the period June 2014 to January 2016, except: in column 2, it is the monthly change in stock prices during the period January 2015 to January 2016; in column 4, it is the quarterly change in stock prices from Q2 2014 to Q4 2015. The sample consists of firms from 18 emerging economies (columns 1 to 5) or firms from 23 advanced economies (column 6). In column 3, the oil and gas industry (SIC code 13) is excluded from the sample. Cash is the increase or decrease in cash holdings during the period 2009 to 2014. Depreciation is the monthly exchange rate percentage change of the local currency against the US dollar, except: in column 4, it is the quarterly exchange rate percentage change of the local currency against the US dollar. Standard errors corrected for clustering of observations at the firm-level (columns 1 to 3) or at the country-level (columns 4 to 6) are reported in brackets. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Specification	All Firms	Yr 2014 excluded	Oil & gas excluded	Quarter	Industry-month f.e.	AE firms
Depreciation	-0.0500	0.1386**	0.1348**	-0.1988	-0.0159	0.5749***
	[0.0523]	[0.0630]	[0.0647]	[0.2855]	[0.1008]	[0.0959]
Depreciation*Cash	-0.1159**	-0.1373**	-0.1532**	-0.1259*	-0.0961**	0.0100
	[0.0562]	[0.0658]	[0.0704]	[0.0613]	[0.0442]	[0.0456]
Constant	0.0169***	-0.0690***	0.0919***	0.0746*	0.0014	-0.0332***
	[0.0038]	[0.0053]	[0.0040]	[0.0398]	[0.0065]	[0.0066]
Observations	19,106	11,365	11,006	5,823	19,106	29,133
R-squared	0.138	0.180	0.180	0.154	0.220	0.142
Number of firms	1,013	1,008	977	1,013	1,013	1,482
Firm FE	Y	Y	Y	Y	Y	Y
Country, Industry FE	Y	Y	Y	Y	-	Y
Month FE	Y	Y	Y	-	-	Y
Quarter FE	-	-	-	Y	-	-
Industry-month FE	-	-	-	-	Y	-
Sample	EME	EME	EME	EME	EME	AE
Cluster s.e.	firm	firm	firm	country	country	country

Hong Kong, Ireland, Israel, Italy, Japan, South Korea, Netherlands, Norway, New Zealand, Portugal, Singapore, Sweden. As in the case of EME firms, these firms have issued at least one bond over the period 2002 to 2014 and have monthly stock market prices available in Datastream from May 2014 to January 2016.[13] We see that the interaction term *Depreciation*Cash* is statistically insignificant and with a very high standard error for the sample of AE firms, meaning that the relationship between currency depreciation, cash savings and stock returns observed in EME firms does not translated to AE firms. Furthermore, column 6 shows that the coefficient of *Depreciation* is positive and statistically significant, which is consistent with the positive association between stock returns of AE firms and currency depreciation found in Hau and Rey (2006).

In Table 16 we investigate cross-countries differences by constructing a dummy variable equal to 1 for each country of interest (*Country X*), and interacting it with *Depreciation* and *Depreciation*Cash*. We select the following six countries, for which we have a sufficient large number of

[13] For our sample of AE corporates, US dollar denominated issuances comprise 27% of the total issuances over the period 2009-2014. Of the foreign currency-denominated issuances, 75% are in US dollars. The size of the euro denominated bond foreign-issuances is about 6% of the total issuances and 16.6% of the total foreign-denominated issuances. These statistics show the central role of the US dollar in non-domestic bond issuances also for AE firms.

Table 16: **Depreciation, Cash Savings and Stock Returns: Cross-countries Analysis.** This table shows panel regressions with firm fixed effects where the dependent variable is the monthly change in stock prices during the period June 2014 to January 2016. The sample consists of firms from 18 emerging economies. Cash is the increase or decrease in cash holdings during the period 2009 to 2014. Depreciation is the monthly exchange rate percentage change of the local currency against the US dollar. Country X is a dummy variable equal to 1 and 0 otherwise when the country of incorporation of the firm is China (column 1), Brazil (column 2), Turkey (column 3), South Africa (column 4), Russia (column 5), or India (column 6). Other Countries is a dummy variable equal to 1 if a firm is incorporated in any country except Country X. All specifications include industry and month fixed effects. Standard errors corrected for clustering of observations at the country level are reported in brackets. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Country X equal to	China	Brazil	Turkey	S. Africa	Russia	India
Depreciation*Other Countries	-0.0162	-0.1309	-0.0464	-0.0580	-0.1206	-0.0091
	[0.0876]	[0.1558]	[0.0993]	[0.1041]	[0.1220]	[0.0836]
Depreciation*Country X	-2.1311***	0.0855	-0.5074***	0.1700**	0.1989*	-0.6423***
	[0.2271]	[0.0570]	[0.1166]	[0.0786]	[0.1023]	[0.1574]
Depreciation*Cash*Other Countries	-0.0763*	-0.1578**	-0.1164**	-0.1104**	-0.1357**	-0.1335**
	[0.0390]	[0.0663]	[0.0516]	[0.0469]	[0.0621]	[0.0509]
Depreciation*Cash*Country X	-0.2635***	-0.0484***	0.0860***	-2.5413***	-0.0372***	-0.0145
	[0.0144]	[0.0052]	[0.0052]	[0.0503]	[0.0014]	[0.0128]
Constant	0.0270*	0.0178	0.0169	0.0167	0.0167	0.0170
	[0.0153]	[0.0139]	[0.0141]	[0.0140]	[0.0141]	[0.0140]
Observations	19,106	19,106	19,106	19,106	19,106	19,106
R-squared	0.145	0.139	0.138	0.139	0.139	0.130
Number of firms	1,013	1,013	1,013	1,013	1,013	1,013
Firm FE	Y	Y	Y	Y	Y	Y
Month, industry FE	Y	Y	Y	Y	Y	Y

firms: China, Brazil, Turkey, South Africa, Russia and India. For instance, in column 1 *Country X* is a dummy variable equal to 1 for China and 0 otherwise, while *Other Countries* is a dummy variable equal to 1 for all countries except China, and 0 otherwise. By doing so, the double and triple interactions directly show the total effects for *Country X* and for all the *Other Countries* excluded country X. All specifications are run with firm, month and industry fixed effects.

China stands out as one of the countries where firms are mostly affected by domestic currency depreciations. In fact, the coefficients of the variables *Depreciation*Country X* and *Depreciation*Cash*Country X* are highly statistically significant and with a large negative magnitude. Firms with large cash accumulations in Brazil and Russia are also negative affected by domestic depreciations, but the magnitude of the effect is slightly lower. South Africa also stands out for its large negative coefficient of *Depreciation*Cash*Country X*, but in this case it is more difficult to make inferences on the economic magnitude of the impact based on a relative smaller sample of firms (16 in total). The effect of depreciation is actually positive or not statistically significant for firms with large cash increases in Turkey and India. Taken together, this evidence shows heterogeneity across countries, with firms in China, Brazil, South Africa and Russia suffering more from domestic currency depreciations especially in the presence of large cash increases.

Table 17 shows robustness tests of the specifications presented in Table 5. In column 1 of Table 17 we cluster standard errors by firm instead of by country. The p-values are smaller when we cluster at the firm-level. In column 2 we use the trade-weighted effective exchange rate (from the BIS statistical data) in lieu of the bilateral exchange rate vis-a-vis the US dollar. The coefficient estimates of the interaction terms *Depreciation*Cash* are statistically insignificant for the bond issuers. This result provides evidence that the financial channel dominates the trade channel, and it is supportive of the central role of the US dollar outside the United States for EME corporations.

We re-run our specification after excluding the largest four companies in each country. Column 3 shows that our results are confirmed. Column 4 shows that our evidence is also robust to excluding firms in the oil and gas industry that tend to have cash flows denominated in US dollar currency.

We manually match our sample of firms with the credit default swaps (CDS) available for each firm. We successfully match 34 firms of our sample of EME firms that have CDS identifiers in Datastream, but we could find meaningful price information only for 25 firms. The largest majority of such firms (16) have issued at least a bond denominated in US dollar currency. We then take the mid rate spread change between the entity and the benchmarked curve. We show results for the 3 year CDS as it maximizes our sample size, but results are robust to alternative year horizons. Column 5 shows that the interaction term *Depreciation*Cash* is positive and significant, meaning that firms with large cash holdings see an increase in the CDS spread following a local depreciation.

Finally, instead of running separate estimations between USD issuers and non-USD issuers, column 6 interacts a dummy variable *USD Bond* (*Non USD Bond*) equal to 1 for those firms with at least one USD denominated bond issuance (No USD bond issuances), and 0 otherwise, with *Depreciation* and *Cash*. Only the triple-interaction term *Depreciation*Cash*USD Bond* is statistically significant, confirming that the negative effect of higher cash savings on price following a depreciation of the domestic currency is driven by the sample of USD bond issuers (column 6).

Table 17: **Depreciation and Bond Issues: Robustness Tests.** This table shows panel regressions where the dependent variable is the monthly change in stock prices during the period June 2014 to January 2016, except: in column 5, it is the monthly change in credit default swap (CDS) spread. Depreciation is the monthly exchange rate percentage change of the local currency against the US dollar, except: in column 2 it is the trade-weighted effective exchange rate. Cash is the increase or decrease in cash holdings during the period 2009 to 2014. USD Bond (Non-USD Bond) is a dummy equal to 1 if a firm issued (did not issue) at least one USD denominated bond during the period 2009-2014, and 0 otherwise. In columns 1 to 5, the sample consists of EME firms that issued at least one USD denominated bond during the period 2009 to 2014. In column 6, the sample consists of firms from 18 emerging economies that issued at least one bond during the period 2009 to 2014. Standard errors corrected for clustering of observations at the country level are reported in brackets, except: in column 1, they are corrected for clustering at the firm-level. ***, **, and * indicate statistical significance at 1, 5, and 10 percent, respectively.

Specification	(1) Firm s.e. clustered	(2) Trade Wgh Exch Rate	(3) Big firms excluded	(4) Oil&Gas excluded	(5) CDS	(6) USD dummy
Depreciation*Cash	-0.2026***	0.1083	-0.2210***	-0.1576**	2.5527**	
	[0.0740]	[0.0665]	[0.0774]	[0.0687]	[0.6662]	
Depreciation					1.5961***	
					[0.3684]	
Depreciation*Cash*non-USD Bond						-0.0406
						[0.0638]
Depreciation*Cash*USD Bond						-0.1648*
						[0.0816]
Constant	0.0093	0.0099	0.0246**	0.0043	-0.0061	-0.0268***
	[0.0088]	[0.0088]	[0.0107]	[0.0088]	[0.0393]	[0.0006]
Observations	3,801	3,787	2,899	3,435	271	15,914
R-squared	0.284	0.280	0.279	0.285	0.517	0.323
Number of firms	200	199	154	181	16	838
Firm fixed effects	Y	Y	Y	Y	Y	Y
Country-month fixed effects	Y	Y	Y	Y	-	Y
Month fixed effects	-	-	-	-	Y	-
Sample	USD Issuers	USD Issuers	USD Issuers	USD Issuers	USD Issuers	All Issuers

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