Deposit Dollarization in Emerging Markets: Efficient Risk Sharing or Prescription for Disaster?"

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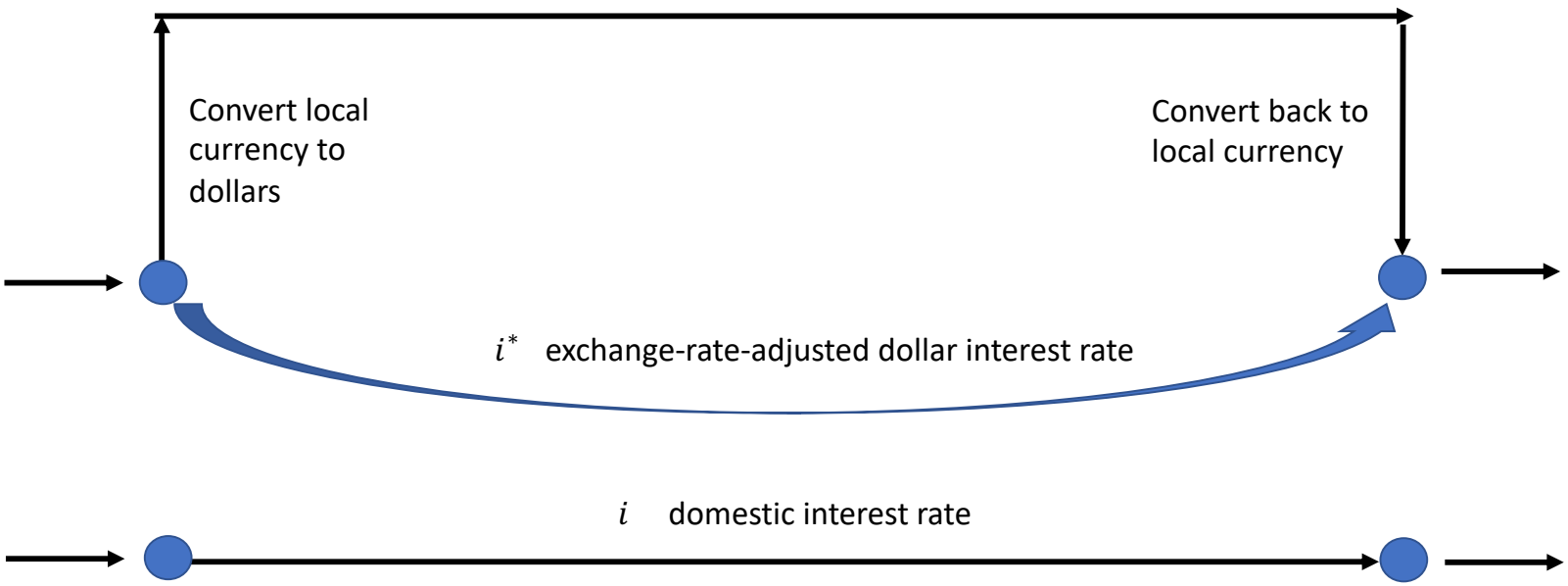
Outline

- Some facts (and definitions) about deposit dollarization.
- Where do the facts take us?
  - ... to a simple risk sharing story (Dalgic's thesis).
- But, is there a dark side to deposit dollarization?
  - Could deposit dollarization lead to financial instability?
  - Evidence for this view is surprisingly weak.
- Some policy implications.

Figure: Local Currency and Dollar Deposits



Deposit Dollarization

- Measure of deposit dollarization for a particular country:

$$\frac{\text{value of dollar deposits held by domestic residents}}{\text{total deposits held by domestic residents}}$$

- Dollarization data:
  - expand the coverage of Levy-Yeyati, 2006, 'Financial Dollarization: Evaluating the Consequences', *Economic Policy*.

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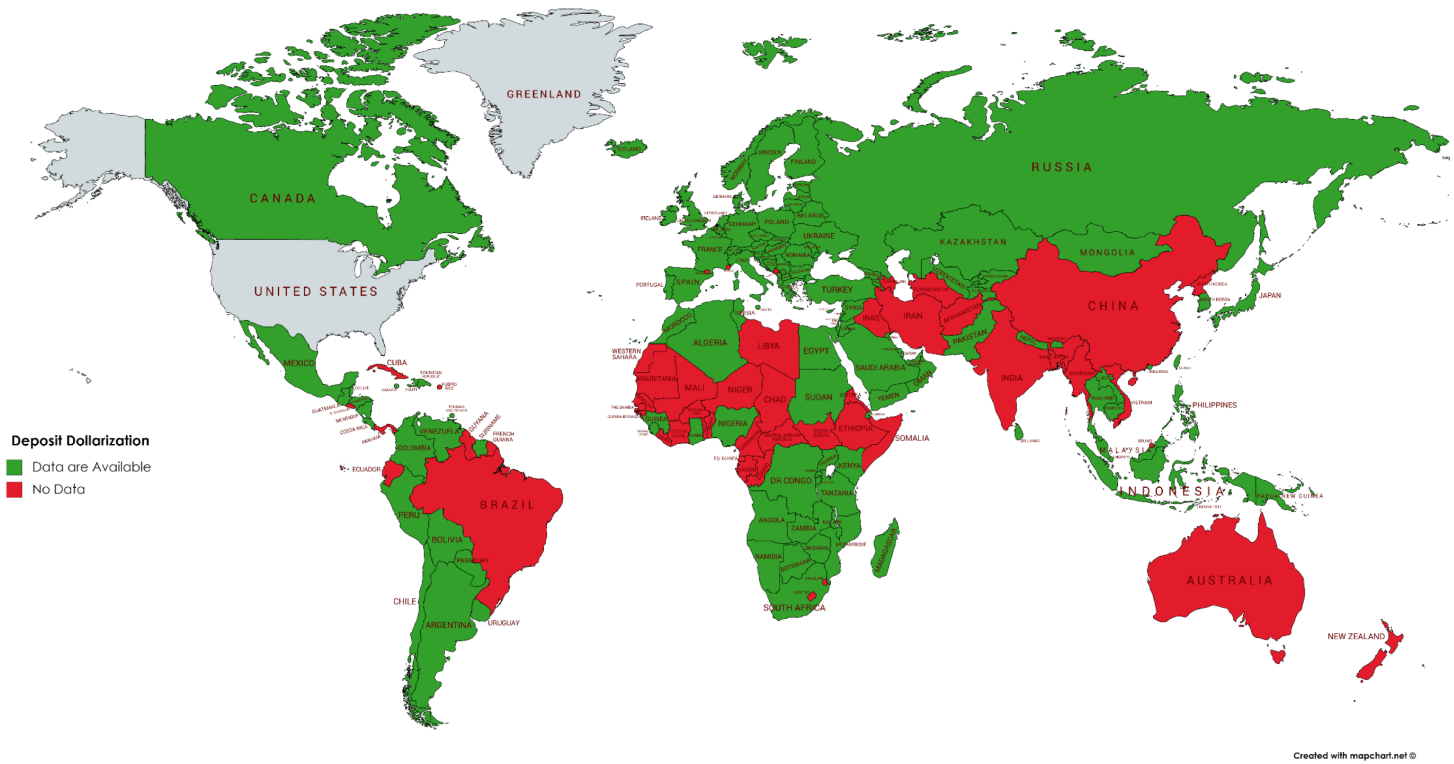
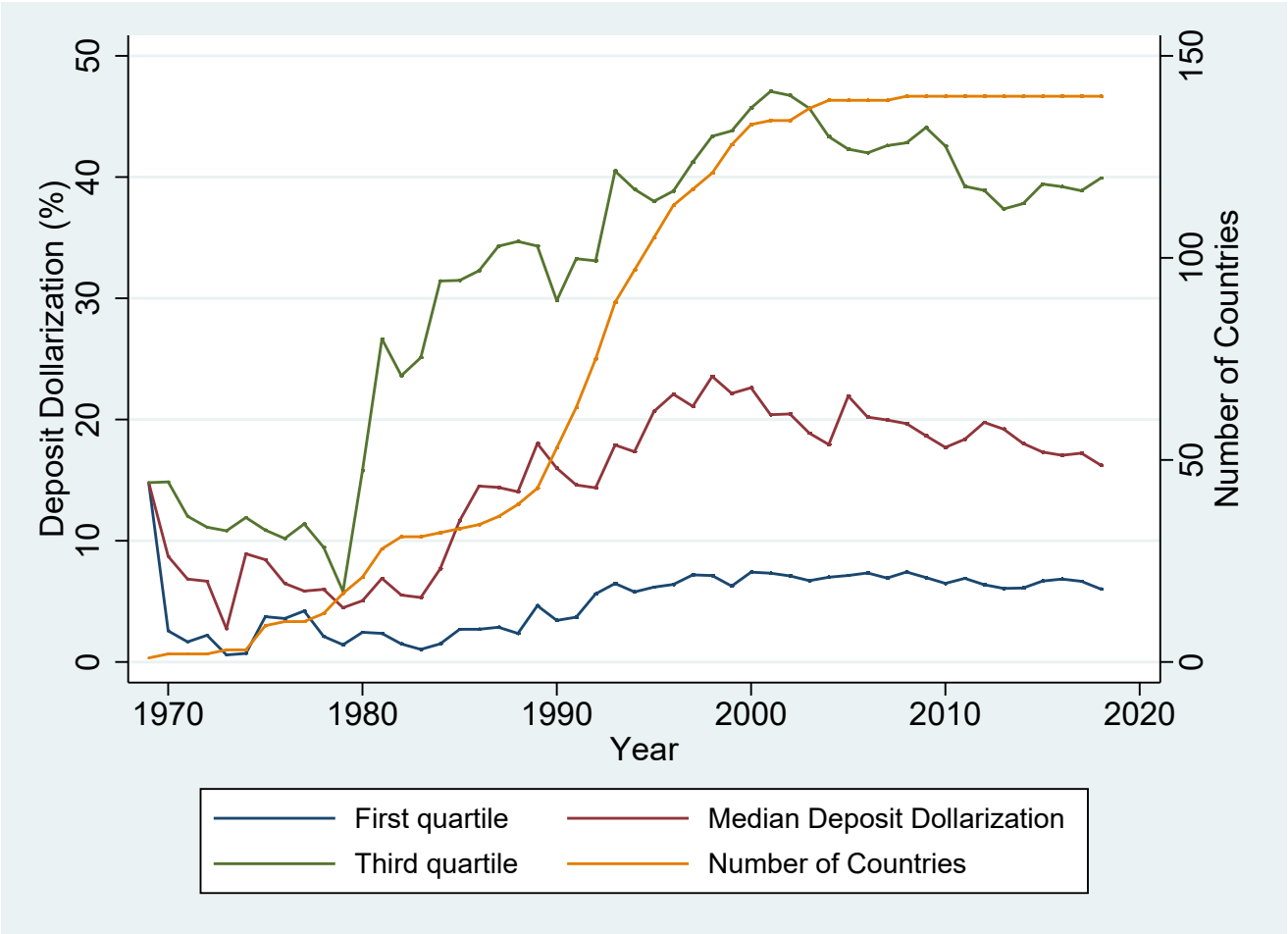
- Dollarization data:
  - expand the coverage of Levy-Yeyati, 2006, 'Financial Dollarization: Evaluating the Consequences', *Economic Policy*.
  - We extend number of countries from 124 to 140 and extend to 2018.

Figure: Constructed for 140 countries using data from Central Bank Websites

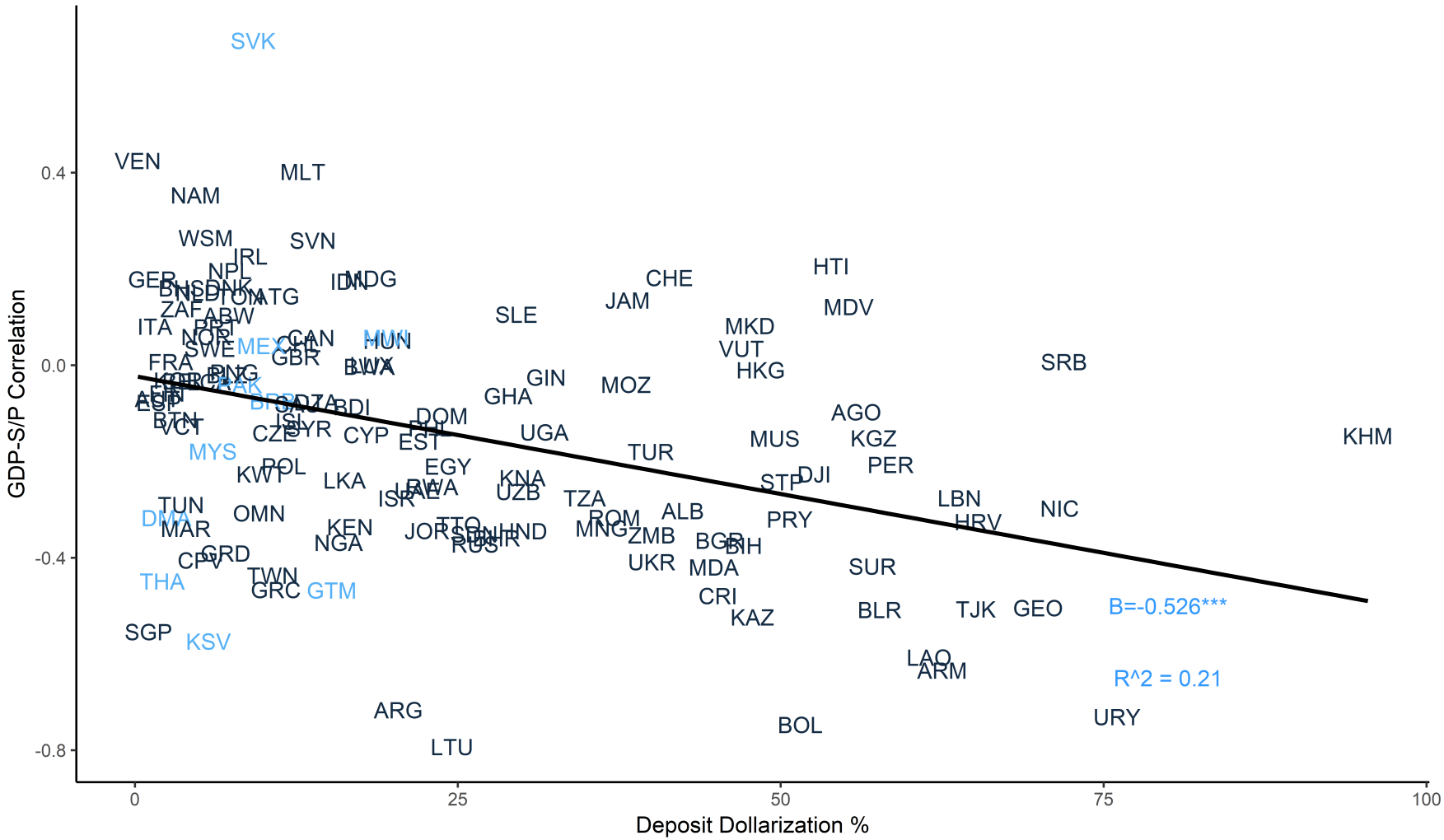


Deposit Dollarization Still Important



Note: (i) sharp rise in deposit dollarization in 1980s and 1990s; (ii) after 2000, only slight downward trend.

Deposit Dollarization versus How Much S_t/P_t Jumps in Recession: 2000-2018



Interpretation

- Hypothesis: variation across countries in deposit dollarization reflects variation in demand for (income?) insurance.
  - Demand for insurance depends on how much currency depreciates in recession.
  - What shocks would make demand high i.e., make covariance between GDP & S/P very negative?
    - ★ Standard: Disturbances to export demand, government irresponsibility, US crises (Gourinchas, Rey, Govillot (2017)). ▸ More
    - ★ Sunspots: fear of financial crisis motivates deposit dollarization, which then causes anticipated crisis (will show evidence against this hypothesis).
  - i^* jumps in a recession, exactly when households have low income.

- Implication: in a country with high demand for income insurance
  - Shortage of local currency in loan market $\rightarrow$ i high (implicit assumption that foreigners reluctant to supply local currency). ▸ More
  - Relative abundance of dollar deposits $\rightarrow$ i^* low.
  - Interest rate spread, $i - i^*$, high.

Implicit tax for Dollar Deposits

- Earnings on local deposits:

$$i^* \overbrace{d^*}^{\text{dollar deposits in local currency units}} + i \overbrace{d}^{\text{local deposits}}$$

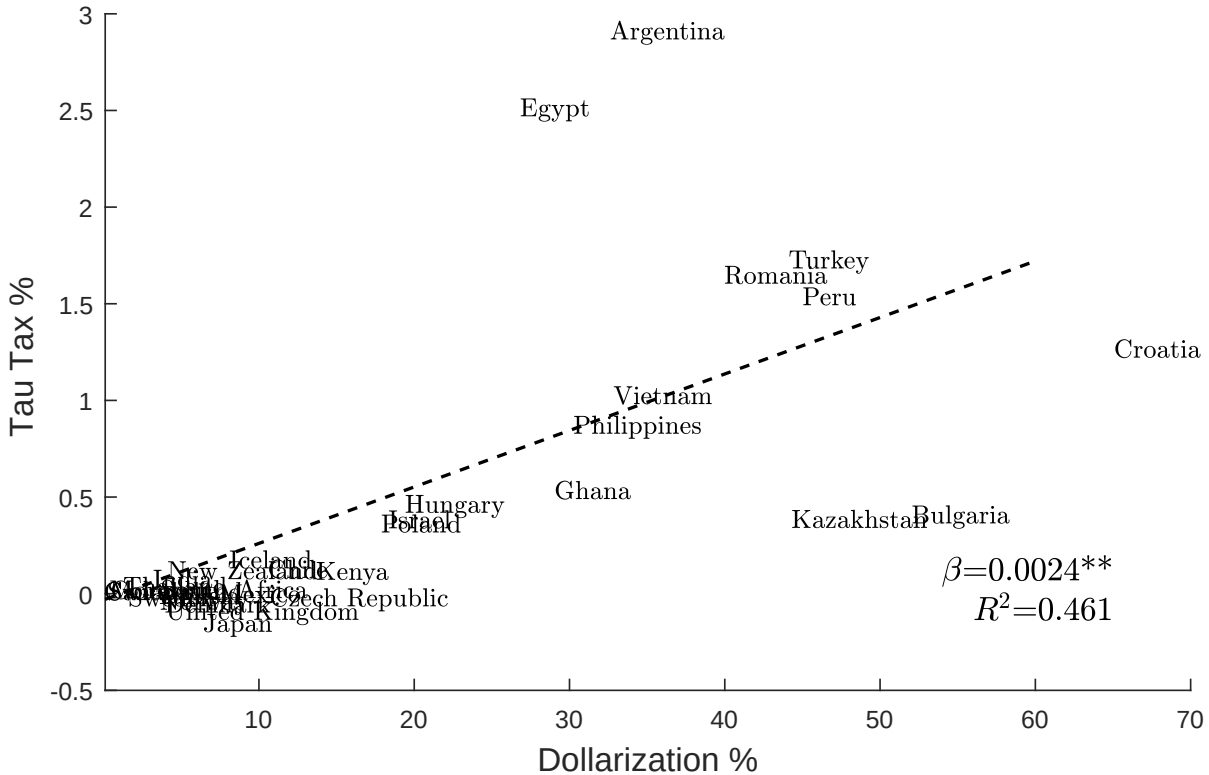
- Pay an implicit tax, τ, to obtain income insurance:

$$(d^* + d)\, i\, (1 - \tau) = d^* i^* + di,$$

solving:

$$\tau = \frac{(i - i^*)\, d^*}{i\, (d^* + d)}.$$

How Much is the Implicit Tax Paid by People that hold Dollar Deposits?

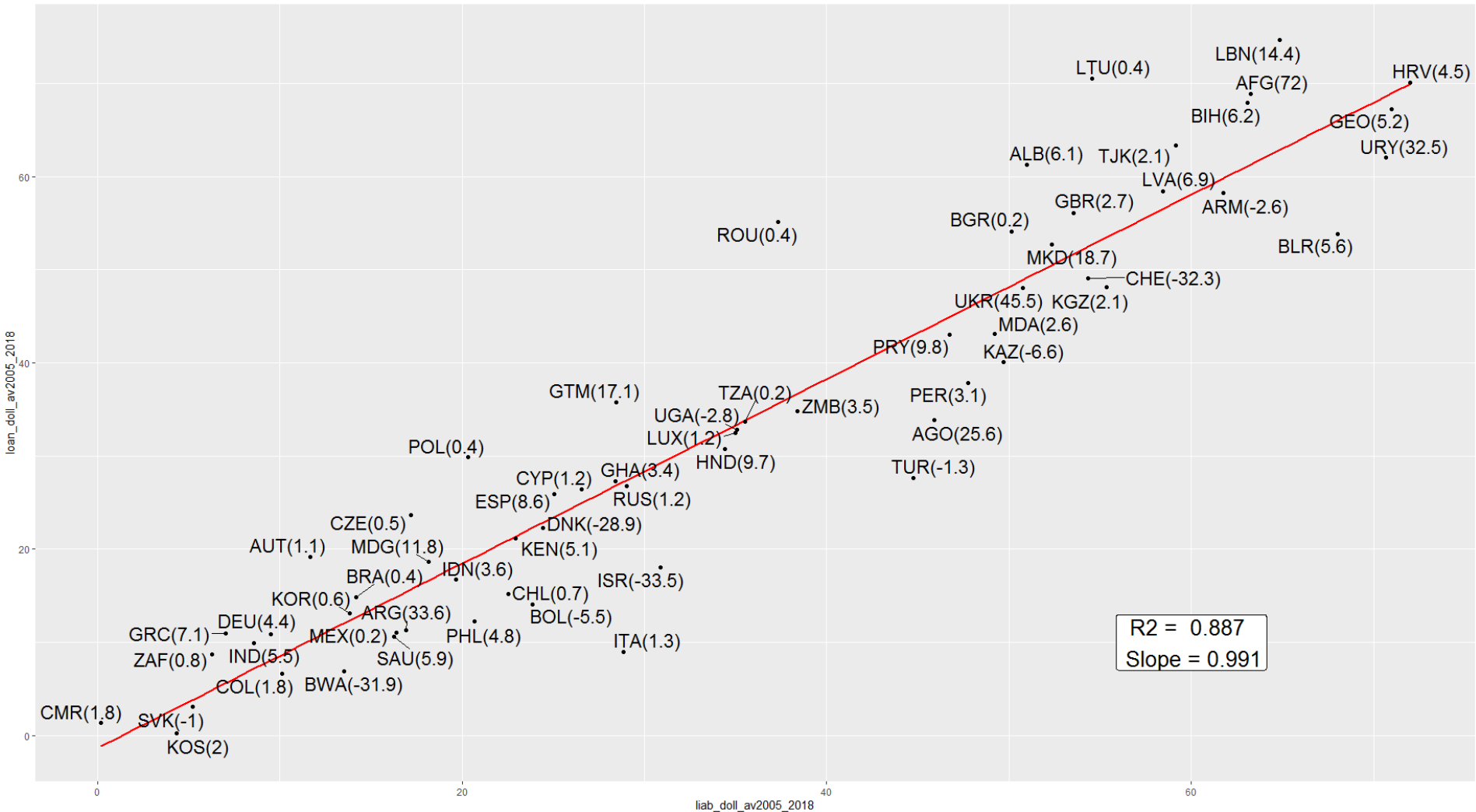


People in countries with high dollarization are paying 0.5 - 1.5 percent on their deposits for income insurance. That's close to what hedge funds make in management fees.

Who is Providing the Insurance to Dollar Depositors?

- Answer depends on whether and where currency mismatch appears.
- Since crises of 1980s and 1990s regulators seem to have been averse to currency mismatch in banks.

Little Currency Mismatch in Banks, 2005-2018



Deposit Dollarization as Insurance Arrangement

- Some people (ordinary households?), by putting dollar deposits in banks, in effect receive business cycle insurance from others (the households that own non-financial firms?).

- Dollarization of financial markets looks like many other markets (e.g., commodity futures) in which risk is reallocated among people.

Is Deposit Dollarization Destabilizing?

- For example, when a depreciation occurs in a recession (i.e., i^* is high), then
  - firms owe banks a lot of money just when they don't have very much.
  - if the banks have some currency mismatch, then they are directly in trouble.
- This could destabilize the financial system.
- Let's look at the facts....

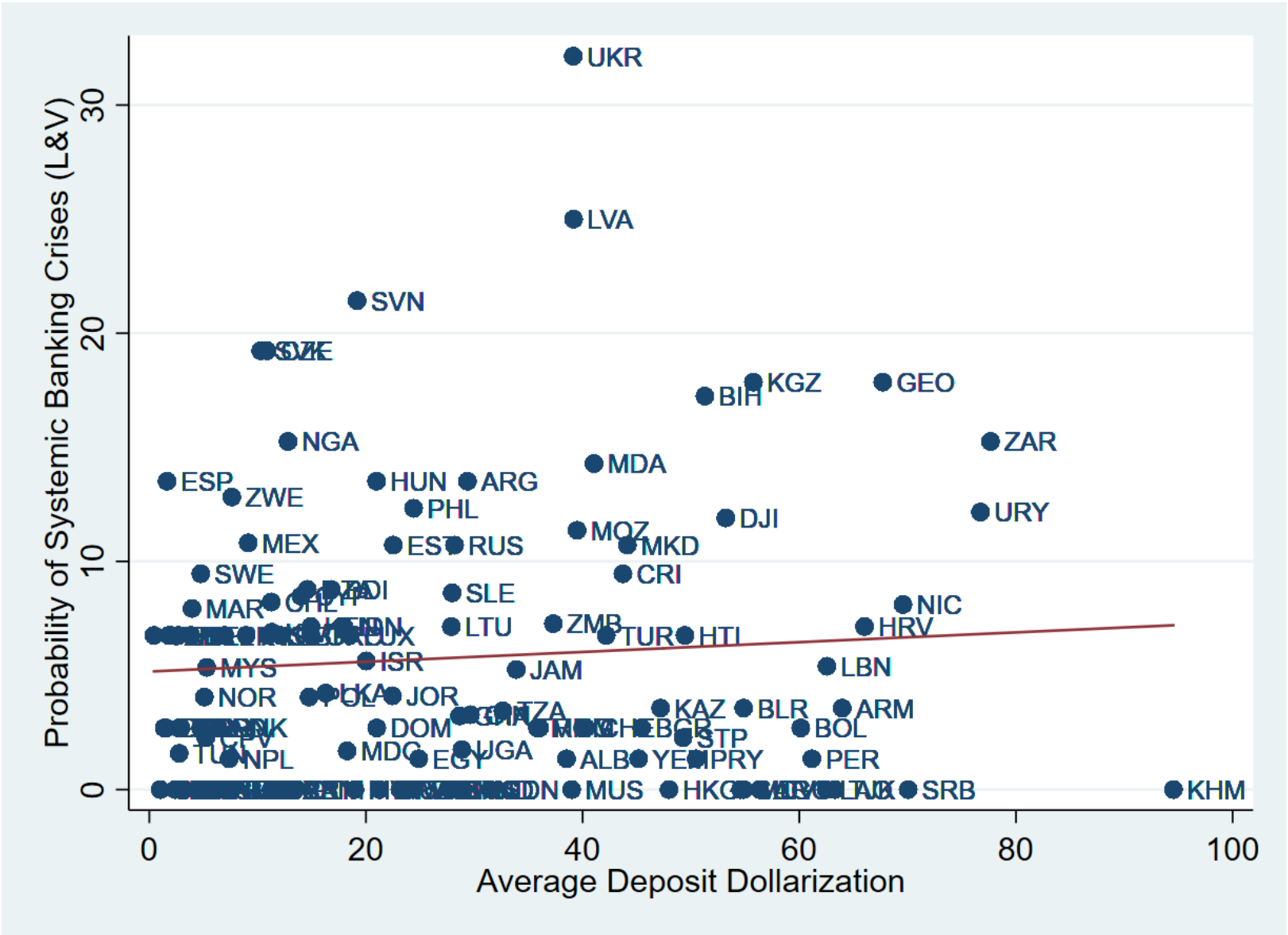
Data

- Data on systemic banking crises taken from Laeven & Valencia, 2018, 'Systemic Banking Crises Revisited'
  - '1' in crisis, '0', not in crisis.
  - Crisis:
    - Significant signs of financial distress in the banking system (as indicated by significant bank runs, losses in the banking system, and/or bank liquidations).
    - Significant banking policy intervention measures in response to significant losses in the banking system.
- Data on Sudden Stops from Reinhart and Rogoff (2009).
- Data on cost of crisis: GDP growth from IMF.

Two Questions

- What is relation between deposit dollarization and *frequency* of crisis?
- What is relation between deposit dollarization and *intensity* of crisis when it happens?

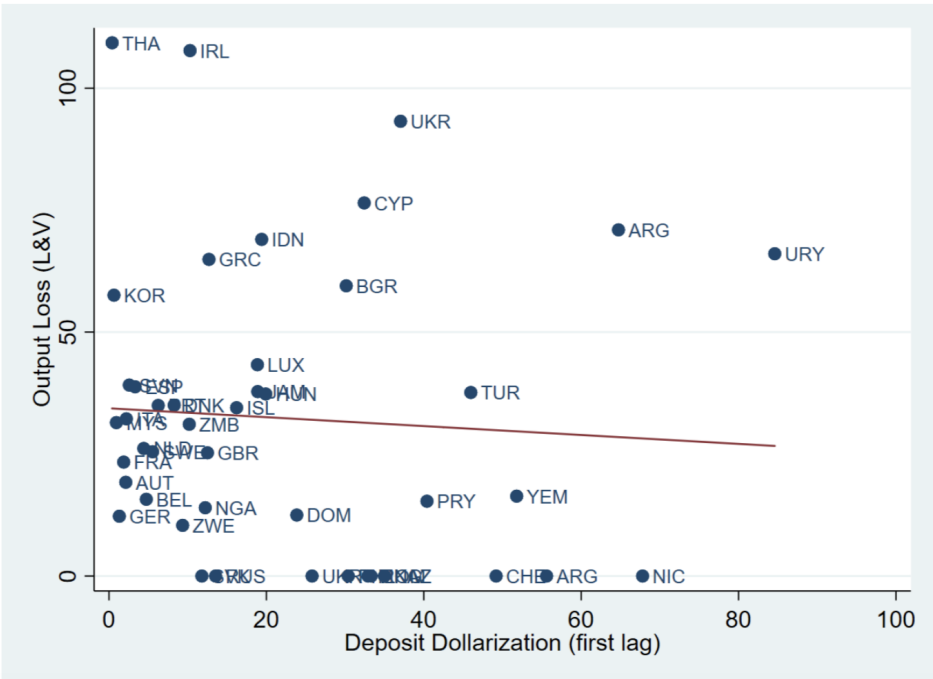
Probability of a Banking Crisis versus Deposit Dollarization



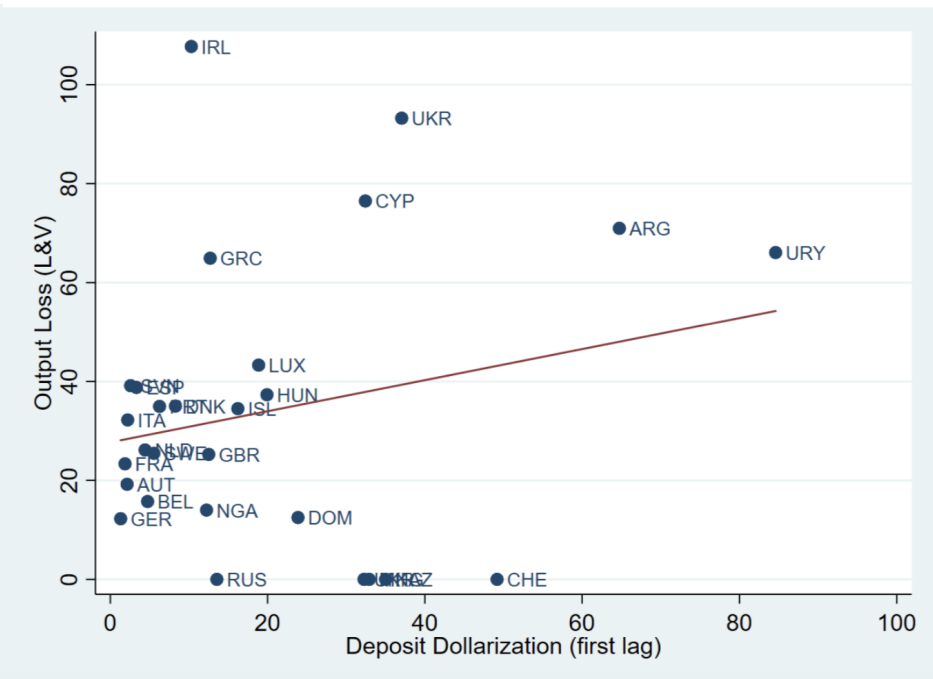
Note: 1994-2018

Loss of Output In a Banking Crisis versus Deposit Dollarization

1994-2018



2000-2018



Is Likelihood of Crisis Higher if Currency Depreciates in an Economy with Dollarized Deposits?

- Currency depreciation:
  - *Expenditure switching channel* - stimulates economy and improves balance sheets.
  - *Financial Channel* - hurts firms with unhedged dollar liabilities, who may put a drag on the economy by cutting back on investment.
- Levy-Yeyati (Econ Policy, 2006) argues that financial channel dominates expenditure switching channel, when deposit dollarization is above 10 percent.
  - Eduardo kindly provide us with his own data, but we find that his results are fragile. details
- Using our data, we do not find that an exchange rate depreciation is significantly more likely to lead to crisis if the economy has dollarized deposits.
  - Main predictor of crisis is interest on foreign debt/GDP.
  - Too much external borrowing leads to crisis, not deposit dollarization. finding

Dollarization: Another Possible Pitfall

- Even if dollarization does not lead to *crisis*,
  - Financial channel may inefficiently reduce investment after an exchange rate depreciation.

- Not a lot of evidence that financial channel very big.
  - Bleakly and Cowan (RESTAT2008), report for 450 firms in 5 Latin American Countries in 1990s, that "firms holding more dollar debt do not invest less than their peso-indebted counterparts following a depreciation."
  - We are looking more closely at non-financial firms in individual countries, such as Armenia, Turkey, Peru and others.

Peru: Fairly Big Depreciation Recently

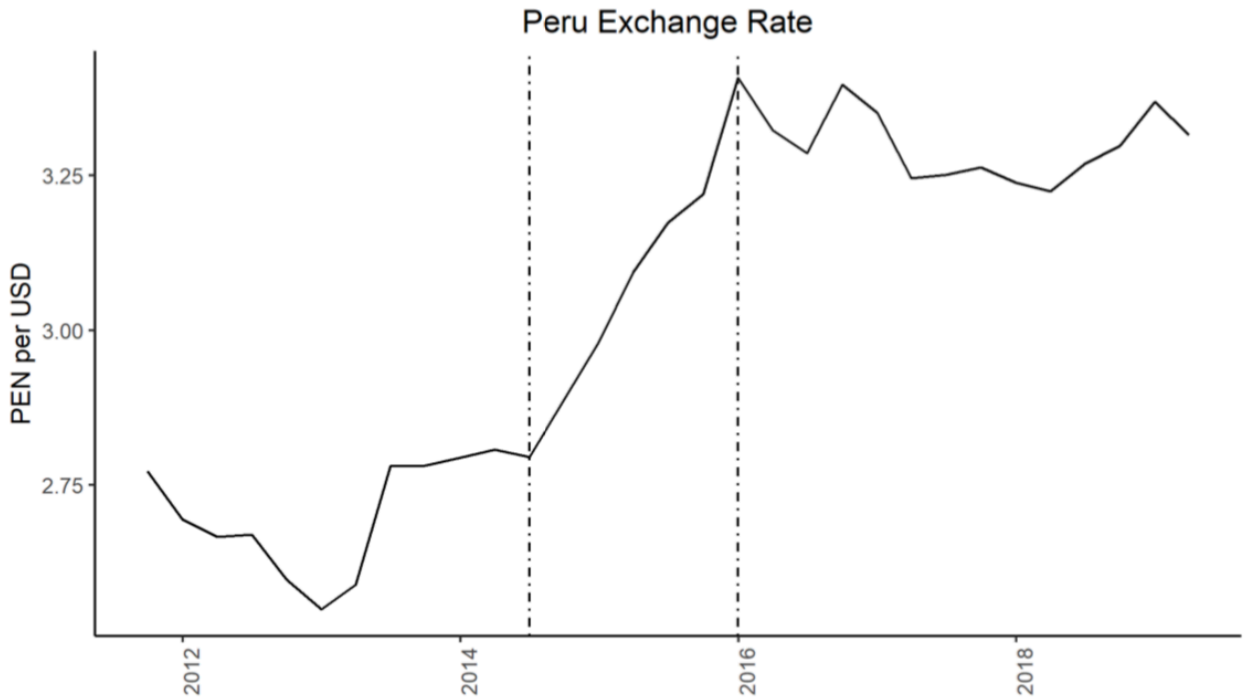
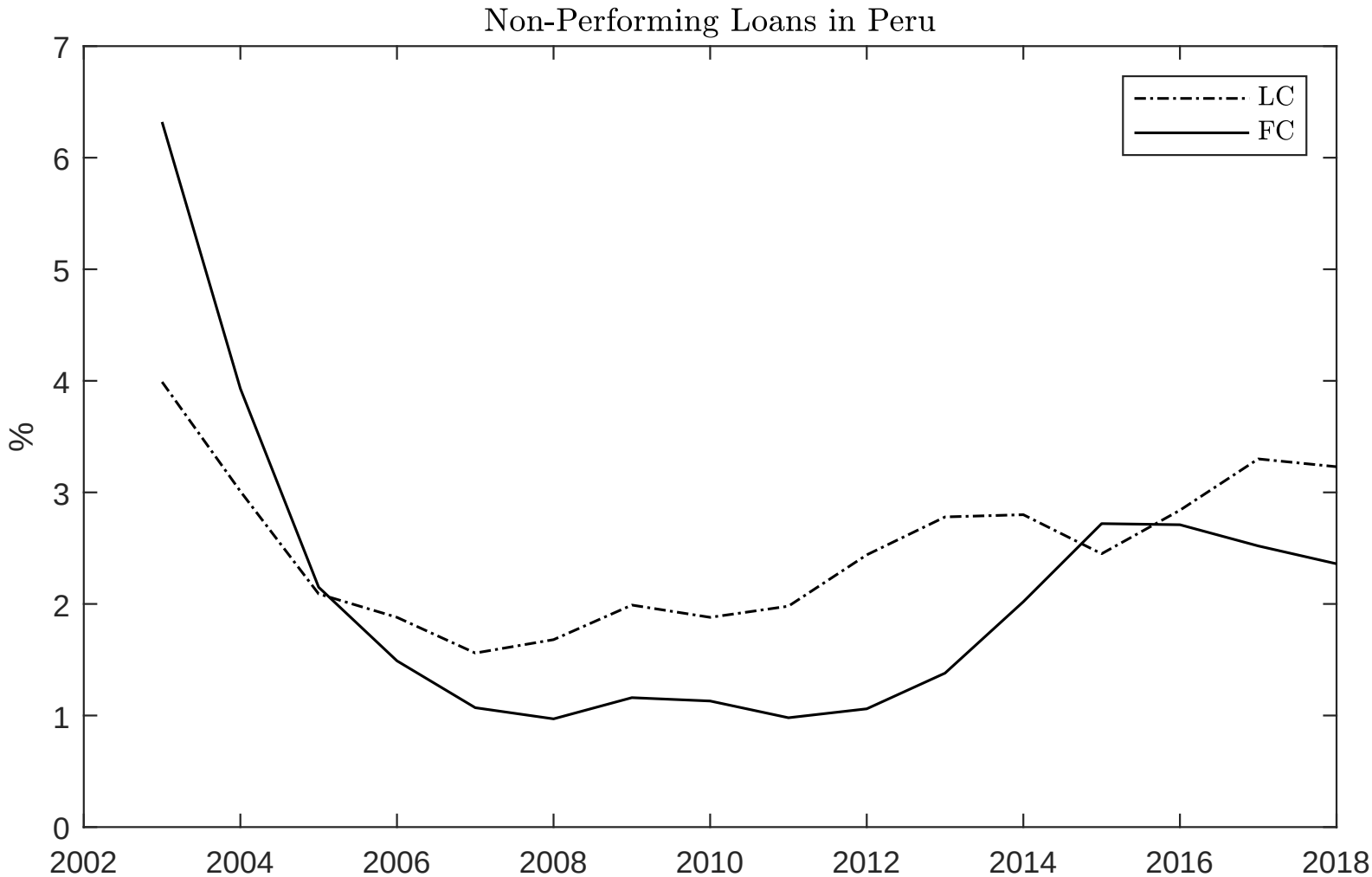


Figure 1: Nominal Exchange Rate in Peru

Peru: Non-performing Local Currency (LC) and Foreign Currency (FC) Loans



Note:

Peru: 28 Largest Firms in Recent Depreciation

- For each firm, have data on $Assets and $Liabilities, and S/ Assets and S/ Liabilities.
- Compute 'currency mismatch' for each firm, at start of 2014:

$$Currency\ Mismatch = \frac{\$Assets - \$Liabilities}{Total\ Assets}$$

- Compute, for 2014Q2-2017Q4 and as percent of firm equity
  - growth in total assets (proxy for investment)

GoPeru

Peru: 28 Largest Firms in Recent Depreciation

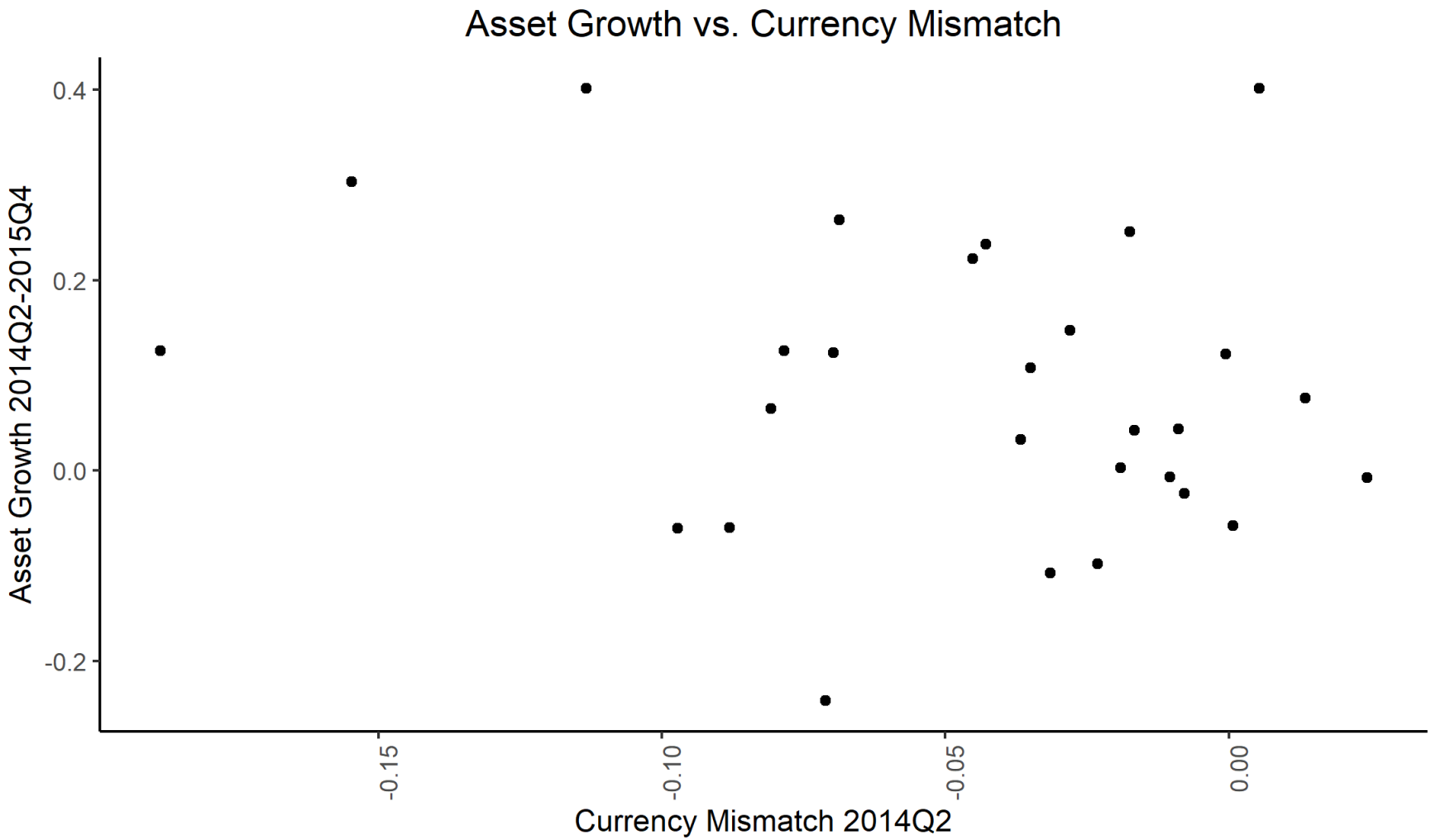


Figure: Credit Dollarization vs Asset Growth 2014Q2-2015Q4

GoToPeru

Conclusion

- Deposit dollarization may play a valuable risk-sharing role in EME's.
  - Allows some people (with different risk aversion, or different hedging requirements) to provide business cycle insurance to other people.
  - To understand better who is giving and receiving the insurance need to know better who is making deposits (households versus businesses).
  - Expect to gain access to data on Peru for this purpose, perhaps also Armenia and a small number of other countries.
- Concerns that deposit dollarization destabilizes,
  - overall, seems to get little support from the data.
  - can be minimized by:
    - ⋆ keeping currency mismatch out of banks (they are highly leveraged).
    - ⋆ ensure that banks assign proper risk weights in their capital requirements for dollar loans (that would in effect put a tax on dollarized deposits in countries where dollar loans are risky).
- All the usual reasons to regulate financial markets continue to apply.

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- All the usual reasons to regulate financial markets continue to apply.
  - Inability of government to commit to not bail out.
  - Various externalities.

Crisis: Message of Preceding Example

- The example is extreme.
  - In practice, firms borrow long-term and a crisis depreciation is partially reversed.
  - In the case of Korea: depreciation 110% from January 1997 to January 1998.
    - ⋆ Depreciation from January 1997 to January 1999 'only' 50%.
  - Dalgic, et al's 2017 study of Turkey suggests it is large firms and firms with exports that borrow the bulk of dollar credit.
    - ⋆ These firms are relatively resilient to exchange rate changes.
- Message:
  - Insist that banks have no currency mismatch.
  - Allow some mismatch in firms, which have lower leverage and can handle exchange rate shocks better.
  - In this case, dollarization may not be so dangerous.

Did We Get the Causality Backwards?

- We have argued that exchange rate depreciations in recessions drive the demand for deposit dollarization.
  - That in turn (due to regulations) drives credit dollarization.

- But, is it possible that causality goes the other way around?
  - Could it be that deposit dollarization is the *cause* of recessions accompanied by currency depreciation?
  - That possibility seems inconsistent with the evidence that deposit dollarization is uncorrelated with:
    - ⋆ frequency of sudden stops and financial crisis.
    - ⋆ the severity of recessions that follow a sudden stop and/or financial crisis.

- So, we are (cautiously) comfortable with the causality assumptions implicit in our analysis.

Levy-Yeyati Evidence

- Levy-Yeyati: with deposit dollarization, financial dominates expenditure switching channel.
- We find: Levy-Yeyati's results fragile.
  - not statistically significant using improved new econometric methods Mitchell Petersen (Review of Finance, 2009) used. ▸ SE
  - Very sensitive to exactly how 'deposit dollarization' is measured. ▸ DD
  - Point estimates reversed when post-2003 data are used. ▸ post
  - Interest on Foreign Debt/GDP included drives out dollarization, exchange depreciation, etc. .
    - ⋆ Message if you borrow a lot, you could get into trouble. ▸ return

Different Standard Errors

left hand variable: Crisis Dummy	*(1)*	*(2)*	*(3)*
	OLS SE	*Country Cluster*	*Country-Year Cluster*
Δer_1	*-0.829*	*-0.829*	*-0.829*
	(1.263)	*(0.706)*	*(0.799)*
FL/FA_1	*0.00348*	*0.00348***	*0.00348***
	(0.00303)	*(0.00139)*	*(0.00137)*
$dollar\_1$	*0.674***	*0.674**	*0.674*
	(0.333)	*(0.359)*	*(0.429)*
$FL/FA \times \Delta er\_1$	*0.0715*	*0.0715***	*0.0715***
	(0.0619)	*(0.0312)*	*(0.0313)*
$dollar \times \Delta er\_1$	*1.310*	*1.310**	*1.310*
	(1.250)	*(0.695)*	*(0.834)*

Standard errors in parentheses

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

Different Standard Errors

Notes on previous table.
These are logit regressions. Δer_{-1} log change in exchange rate (depreciation if positive), lagged one period.
FL/FA_{-1} ratio, foreign liabilities to foreign assets (whether to residents or non-residents) in domestic banking system.
$dollar_{-1}$ 1 if dollarization was greater than 10% in previous period; 0 otherwise
Sample period: 1975-2002
Column 2 exactly reproduces L-Y results (thanks to LY for sending us his code and data). Country Cluster standard errors assume dependence of error term over time within countries and independence across countries.
Column 1 computes standard errors assuming errors independent over time and across countries.
Column 3 implements Peterson's method which allows, in addition to dependence over time, dependence across countries for a given point in time. Crisis have a tendency to be correlated across countries.
If a crisis (i.e., '1') persists for more than one year, observations on subsequent years are dropped. The dropped data are treated as 'missing observations by STATA'. We follow L-Y in this procedure.

Note sensitivity of results to method of computing standard errors. Arguably, Peterson's approach is more appealing in this setting because of the cross-country 'contagion' associated with crises. Go Back

Deposit Dollarization

Table: Different Measures of Deposit Dollarization in Levy-Yeyati's Table 5 Results

	10 Percent	*15 Percent*	*20 Percent*
Crisis Dummy			
Δer	*-0.829*	*0.0781*	*0.0364*
	(0.706)	*(0.371)*	*(0.356)*
FL/FA	*0.00348***	*0.00268****	*0.00259****
	(0.00139)	*(0.000568)*	*(0.000550)*
dollar	*0.674**	*0.569**	*0.335*
	(0.359)	*(0.333)*	*(0.321)*
*FL/FA*Δer*	*0.0715***	*0.0533****	*0.0517****
	(0.0312)	*(0.0136)*	*(0.0132)*
*dollar*Δer*	*1.310**	*0.433*	*0.503*
	(0.695)	*(0.460)*	*(0.451)*
Observations	*1104*	*1104*	*1104*

Deposit Dollarization

Notes on previous table:

First column reproduces Levy-Yeyati's second column in 'Different Standard Errors' table. The other two columns in this table define the 'dollarization dummy' as 1 when deposit dollarization exceeds 15 and 20 percent, respectively.

Levy-Yetati's results depend on using a dummy that is unity when deposit dollarization exceeds 10 percent.

Note that significance of produce of dummy and exchange rate depreciation sensitive to definition of dollarization. Go Back

Levy-Yeyati Analysis on Post-2003 Data

Table: Our Data: Levy-Yeyati Table 5, Column 2

	(1)	(2)	(3)	(4)
	Whole Sample	Without Armenia, 1994	2003 and Before	After 2003
LV Crisis Dummy				
$dollar\_1$	0.0954	0.141	0.547*	-0.408
	(0.334)	(0.332)	(0.314)	(0.530)
Δer_1	-0.795**	-0.795**	-1.075	-0.777***
	(0.366)	(0.366)	(1.920)	(0.293)
$dollar \times \Delta er\_1$	1.436***	0.923	1.632	-6.659**
	(0.420)	(0.660)	(2.046)	(2.659)
Constant	-4.001***	-4.001***	-4.007***	-3.989***
	(0.589)	(0.589)	(0.367)	(1.009)
Observations	2861	2860	1161	1700

Standard errors in parentheses

Levy-Yeyati Analysis on Post-2003 Data

Notes on previous table. Here, we use our data set, which we extended to 2018. Interestingly, when we extend L-Y's analysis to the end of our sample (column 1), we get his result. In particular, the coefficient on $dollar * \Delta er_{-1}$ is statistically significant and it is larger than the coefficient on Δer_{-1}. This means that an exchange rate depreciation in a country with above 10% deposit dollarization raises the probability of crisis by $1.436 - .795 > 0$. An exchange rate depreciation in a country without deposit dollarization reduces the probability of a crisis by 0.795, presumably because in the absence of dollarization only the expenditure switching channel works, so that an exchange rate depreciation improves the health of all economic entities, not just banks. We see from column 2, however, that the results are driven by one single data point, Armenia in 1994. In that period there was a gigantic change in the exchange rate associated with Armenian independence from the Soviet Union (that was actually formally declared on September 21, 1991). So, if we drop the one outlier data point, the whole sample completely reverses L-Y's results. We suspect that's because many of the crises in the pre-2003 period occurred in emerging markets where deposit dollarization tends to be relatively high while the post -2003 crises occurred in developed economies where deposit dollarization is low (see columns 3 and 4). This is why analysis using only the later period seems to indicate that deposit dollarization immunizes you from crisis. Our inference is that deposit dollarization actually has little to do with crisis.

Levy-Yeyati Analysis on Post-2003 Data

Table: Our Data: Levy-Yeyati Table 5, Column 2

	(1)	(2)	(3)
	Whole Sample	External Debt Available	External Debt Available
LV Crisis Dummy			
dollar	0.0954	0.694	0.675
	(0.334)	(0.429)	(0.439)
Δer_1	-0.795**	-0.0958	0.524
	(0.366)	(1.139)	(0.773)
$dollar \times \Delta er\_1$	1.436***	0.851	0.758
	(0.420)	(1.268)	(0.896)
Interest Paid on External Debt$_1$			0.252***
			(0.0745)
Interest Paid on External Debt $\times \Delta er\_1$			-0.578
			(0.357)

Levy-Yeyati Analysis on Post-2003 Data

Notes on previous table. The results in Table 2 do not include Levy-Yeyati's variable, FL/FA, because we have not yet been able to find that variable for the post 2003 period. The table attempts to shed (preliminary) light on whether the omission of FL/FA in our Table 2 biases our results against Levy-Yeyati's hypothesis: when deposit dollarization is high, the financial channel dominates the expenditure switching channel of an exchange rate change. The results in the previous table go against the hypothesis. The first column in the table of the previous page reproduces the first column of Table 2 (so, we include the 1994 observation on Armenia). We found a variable that is not the same as FL/FA but which may in practice carry the same information. It is "Interest payments on external debt (% of GNI)", obtained from the World Bank. A difficulty is that we could find this variable for only 60% of our sample (the variable is available for major developing countries, but not advanced economies or very small ones). Column 2 redoes the calculations in column 1 using only the countries for which we have data on 'Interest payments on external debt'. Note that the L-Y results (the coefficient on $dollar \times \Delta er_{-1}$) are less significant on this sample. Column 3 reports the same econometric analysis, but also includes the 'interest payments on external debt' variable. We see little difference between columns 2 and 3 in terms of the major parameter of interest, $dollar \times \Delta er_{-1}$. This is the basis for our preliminary conclusion that excluding FL/FA has not biased our results against L-Y's hypothesis.

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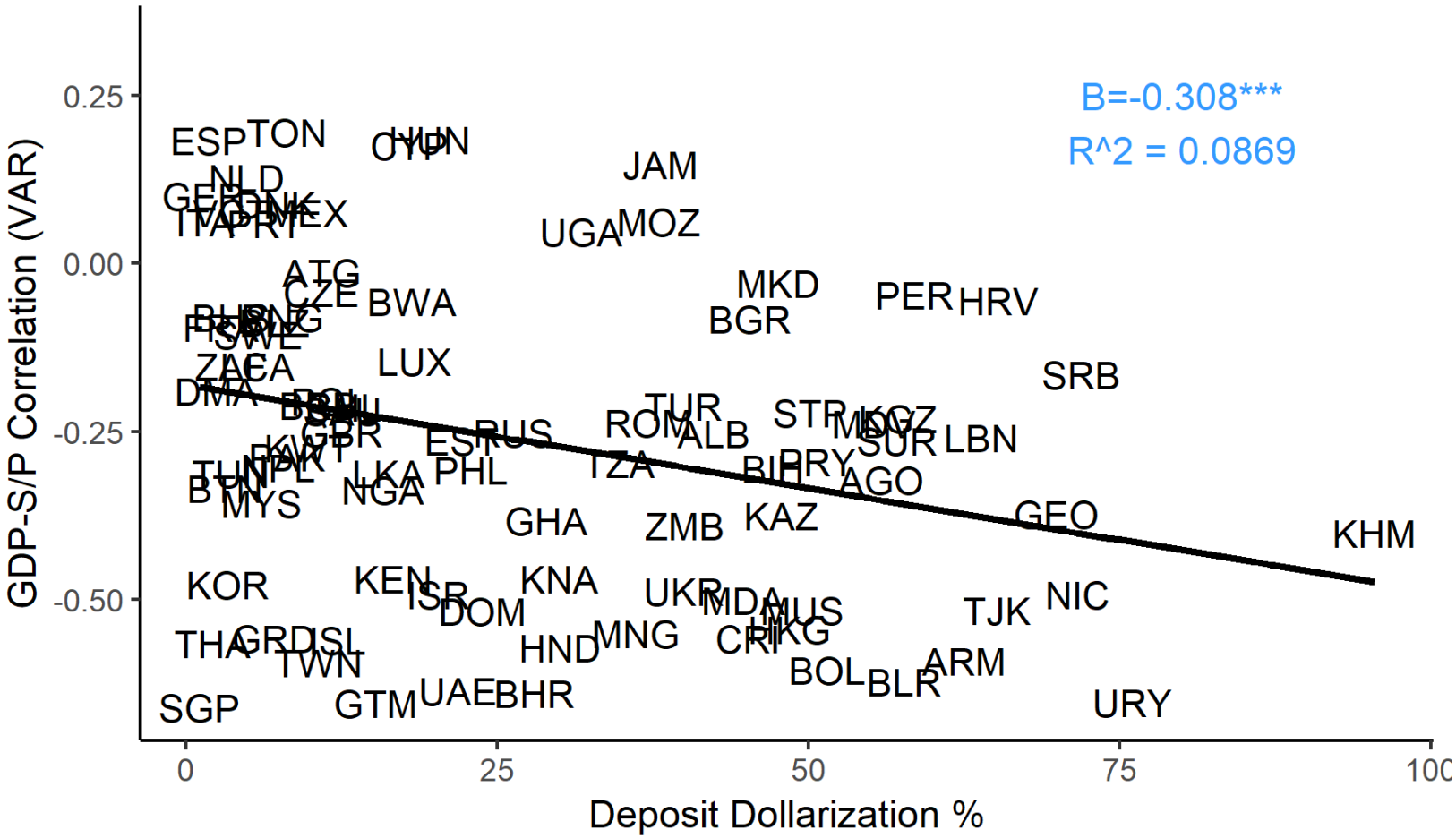
Deposit Dollarization versus How Much S_t/P_t Jumps in Recession: 2000-2018 (Bivariate one-lag VAR)



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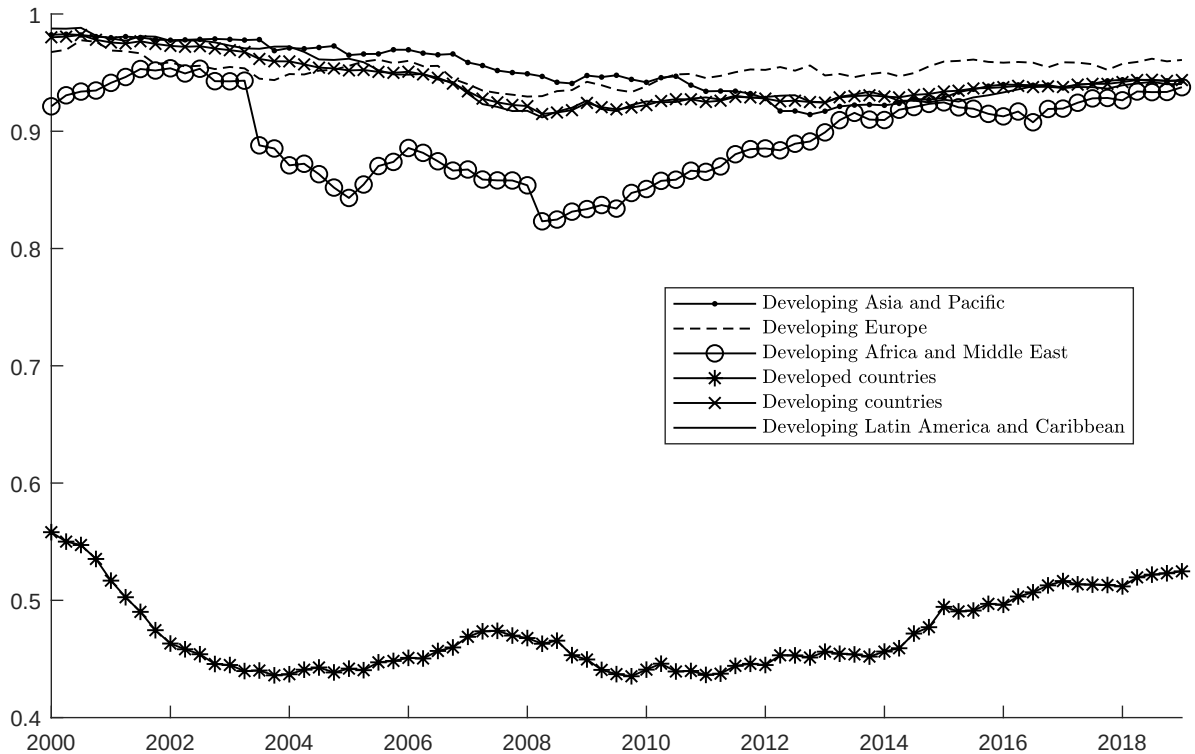
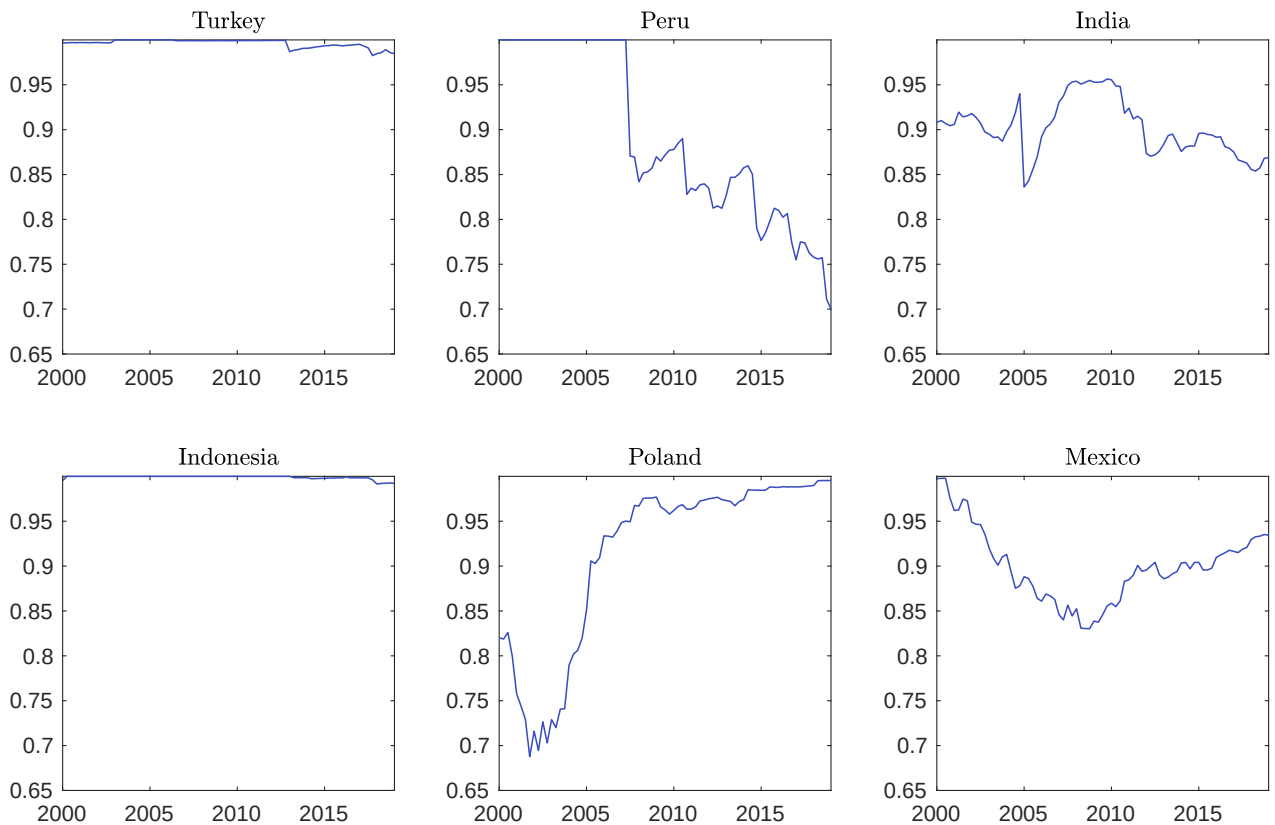
Foreigners Lend Little Domestic Currency into EME's



Note: foreign currency debt issued into international securities markets divided by total debt issuance (e.g., including debt denominated in domestic currency). Issuers include *all* entities of the given nationality. Debt is of all ratings, maturities, etc. Importance of measuring debt issuance by nationality rather than residence stressed in Hyun Shin, 'The Second Phase of Global Liquidity...', November, 2013). Data source: BIS.

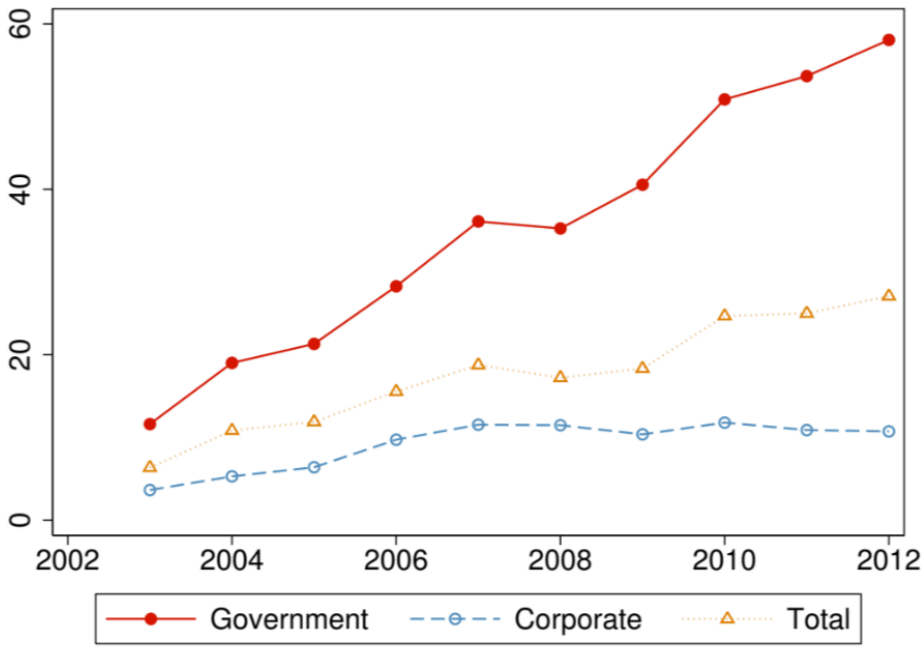
Share of Foreign Currency Borrowing By Selected Countries



Note: there is substantial variation in this share across countries. In two (Turkey and Indonesia) there is essentially no change.

Sov's and Non-Financial Firms (Du and Schreger 2017)

Figure 3: Share of External Debt in LC (Mean of 14 sample countries)



Notes: This figure plots the cross-country mean of the share of external debt by sector in LC. The cross-country mean gives each country in the sample an equal weight. Within each country, the share of total debt in LC is the weighted average of the share of sovereign and corporate debt in LC, weighted by the amount of each type of debt outstanding. The countries included in the sample are Brazil, Colombia, Hungary, Indonesia, Israel, Malaysia, Mexico, Peru, Poland, Russia, South Korea, South Africa, Thailand and Turkey.

Domestic currency share of sov'n debt growing. But, sovereigns don't borrow much in emerging countries.

Note that the although the total is rising, it reaches a rather low max of 20%.

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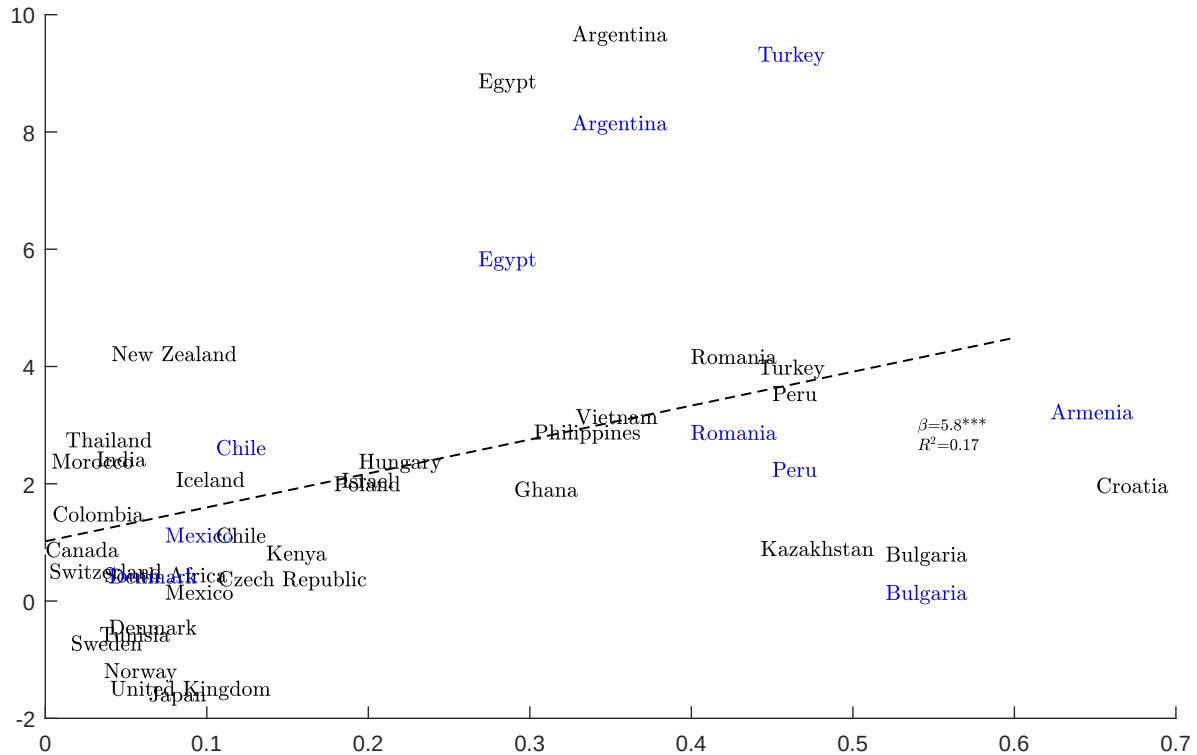
Computing $i - i^*$

- We use data for roughly 30 countries, on which we have observations from currency futures markets.
- For the foreign (risk-free) interest rate, we use the EURO for European Emerging markets and the US dollar for the others.
  - Foreign interest rate: $i^* = \frac{R^* S'}{S}$, S, S' denote current and next month's realized spot exchange rate; R^* foreign nominal rate (e.g., three month US gov't securities).
- For domestic risk-free interest rate we use Covered Interest Parity and Futures markets: $i = \frac{R^* F}{S}$
- So, the spread (APR) is: $i - i^* = 1200 \times \frac{R^*}{S} [F - S']$ we will only take averages for this object, so that S' is the expected exchange rate if forecast error in S' orthogonal to current variables.
- The only uncertainty in our measure of the spread is exchange rate uncertainty.

Computing $i - i^*$



$i - i^*$ Blue: i interest rates on domestic deposits (central bank websites), Black: i our constructed deposit rate.

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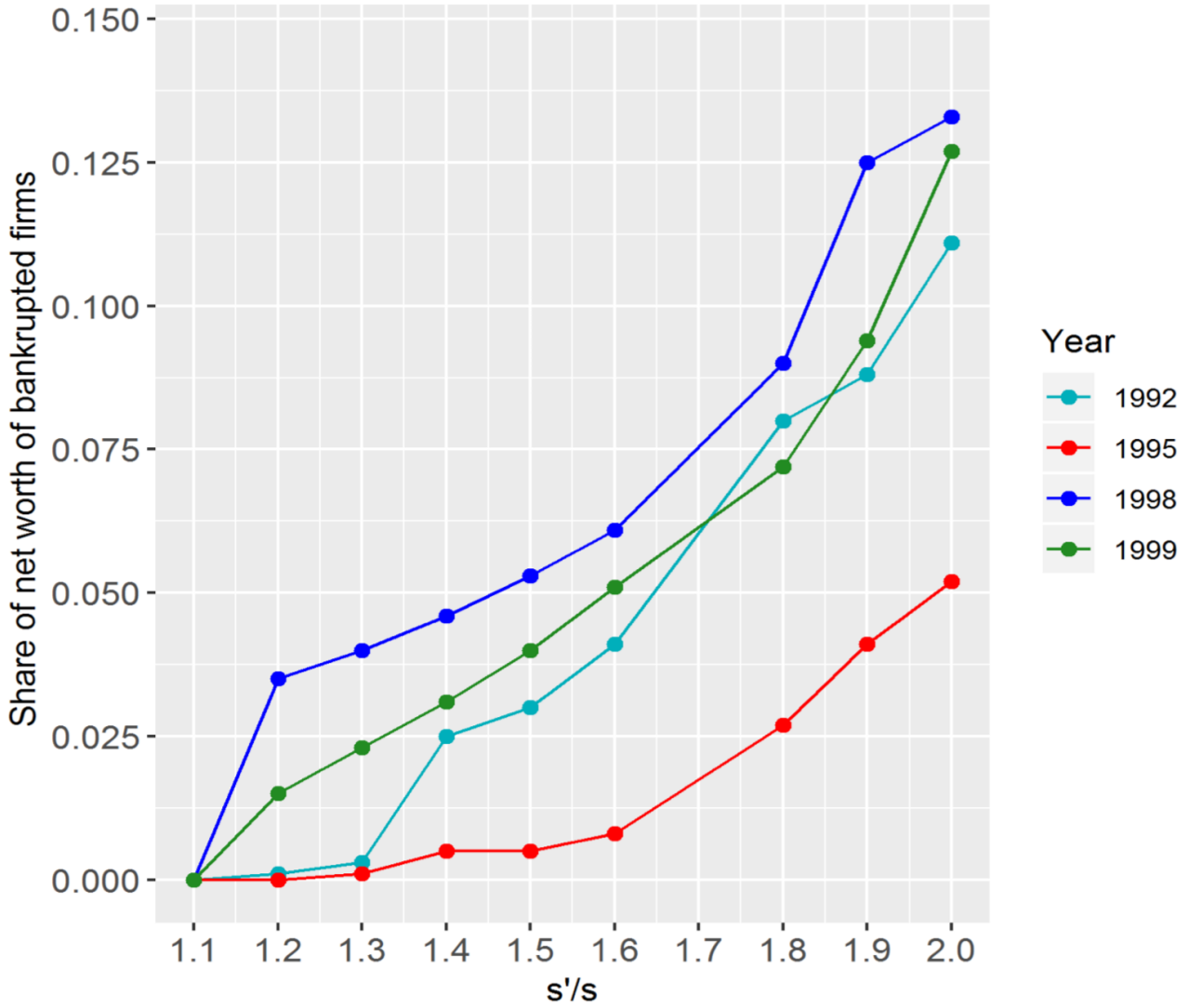
Peru: Stress Test for Exchange Rate Depreciation

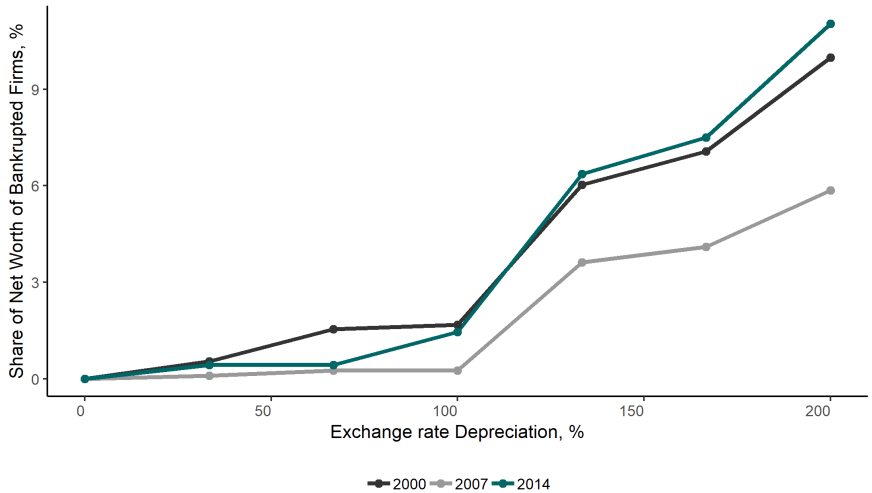
Figure 3. Share of net worth of bankrupted firms

Años: 1992, 1995, 1998 y 1999



Source: Estados financieros de empresas, Vademécum bursátil de la BVL

Peru: Firms in 2000s Much More Robust to Stress



Note: Data for unbalanced sample of Peruvian 80-100 firms covering the years 1999-2014 (the data were kindly passed on to us by Paul Castillo; they were constructed for the work in N. R. Ramírez-Rondán (*Empirical Economics*, May 2018)). Results are reported for the three indicated years. Vertical axis: net worth of all firms in the sample that are bankrupted by the (counterfactual) exchange rate depreciation on horizontal axis (50 means a 50 percent depreciation). Analysis uses data on local and foreign denominated assets and liabilities. According to the results, with a 100 percent depreciation the net worth of the bankrupted firms is less than 1.5 percent of total net worth. With a 200 percent depreciation, the net worth of bankrupted firms is less than 10 percent of total net worth.

Peru: 28 Largest Firms in Recent Depreciation

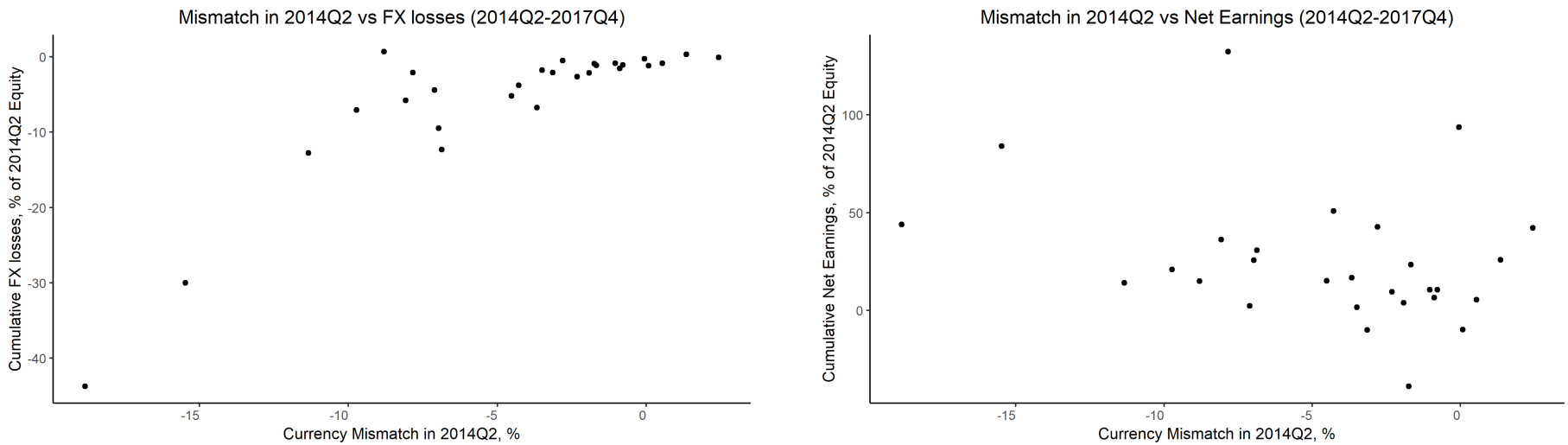


Figure: Cumulative FX losses and Net Earnings between 2014Q2 and 2017Q4

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Is Likelihood of Crisis Higher if Currency Depreciates in an Economy with Dollarized Deposits? Seemingly, not.

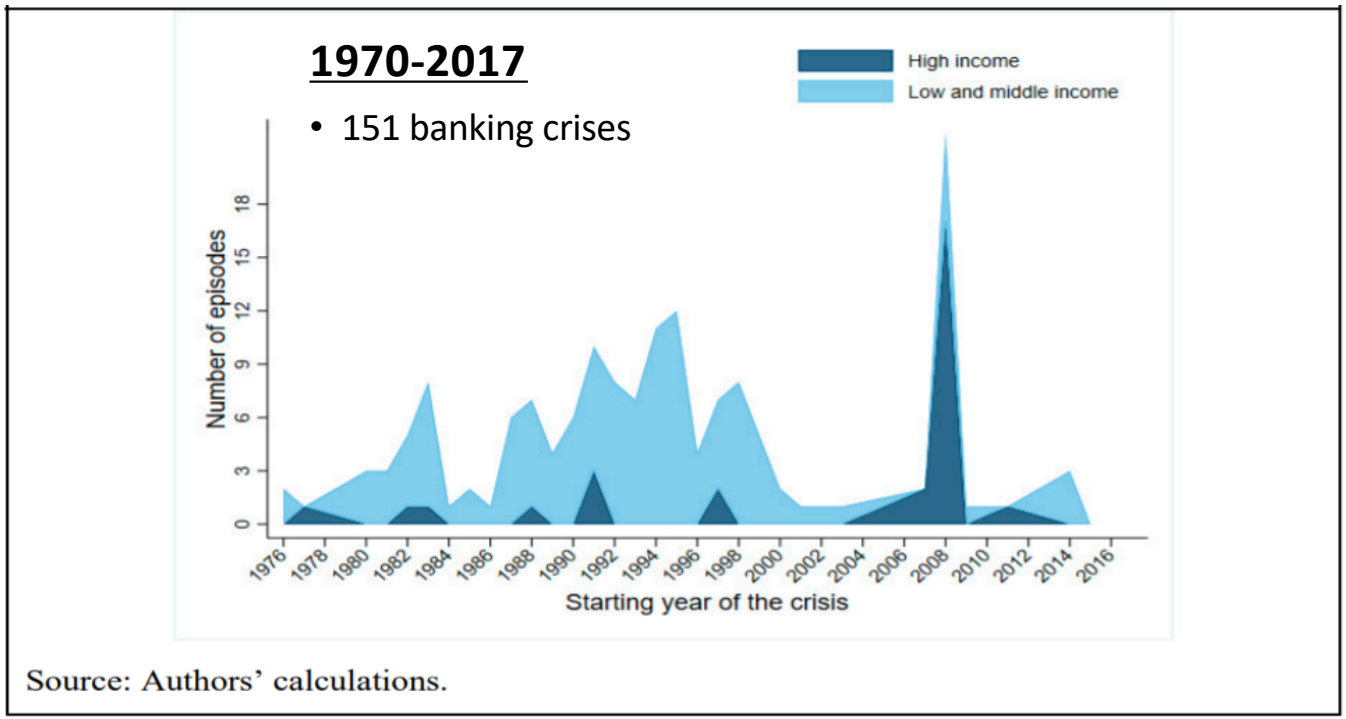
Table: Expenditure Switching versus Balance Sheet Effects: OLS

	Left Hand Variable, Probit regression: LV crisis dummy		
	Whole Data Set	2003 and Before	After 2003
$dollar_{-1}$	0.141	0.547*	-0.408
	(0.332)	(0.314)	(0.530)
Δer_{t-1}	-0.795**	-1.075	-0.777***
	(0.366)	(1.920)	(0.293)
$dollar_{t-1} * \Delta er_{t-1}$	0.923	1.632	-6.659**
	(0.660)	(2.046)	(2.659)
Observations	2860	1161	1700

Note: Annual data; standard errors in parentheses (robust to error correlation across years and across countries);

Δer_{t-1} is the lagged exchange rare change; 'dollar' $= 1 >$ 10%; constant term not displayed; * p$<$0.1, ** p$<$0.05, *** p$<$0.01

Systemic Banking Crises by Laeven & Valencia 2018



Source: L. Laeven & F. Valencia "Systemic Banking Crises Revisited" IMFWP 2018

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Our Table: Deposit Dollarization Does not Affect Probability of Crisis, External Debt Does

Table 1:

	Dependent variable:
1(5<Dollar<=20)	0.189
	(0.354)
1(5<Dollar<=20)ΔER	1.088
	(1.437)
1(20<Dollar<=50)	0.021
	(0.325)
1(20<Dollar<=50)ΔER	1.523
	(0.953)
1(Dollar>50)	−0.102
	(0.386)
1(Dollar>50)ΔER	0.022
	(1.266)
ΔER	−1.804**
	(0.815)
Real GDP Growth	−0.010
	(0.018)
Reserves/GDP	−1.700
	(1.264)
Imports/GDP	−0.0003
	(0.001)
Interest on External Debt/GDP	0.100**
	(0.046)
Constant	−1.849***
	(0.409)
Note:	*p<0.1; **p<0.05; ***p<0.01

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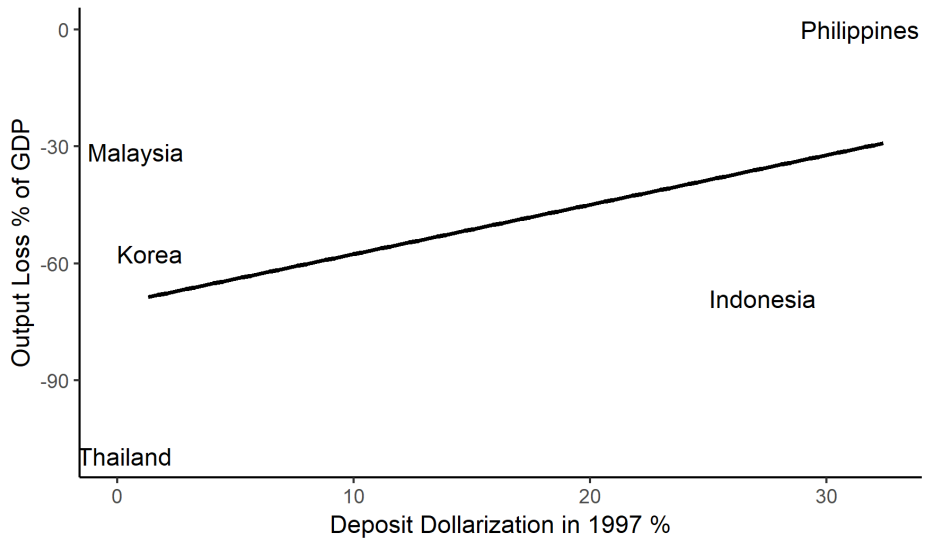
Selected Asian-Crisis Countries (Malaysia and Thailand do not allow Deposit Dollarization Now)



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Peru: 28 Largest Firms in Recent Depreciation

Table 1: Balance Sheet Effects

	(1) Investment	(2) Investment	(3) Investment	(4) Investment
Mismatch	-0.944	0.870	-1.327	-1.065
	(4.029)	(4.426)	(4.028)	(2.647)
Mismatch * ΔER	0.207	0.129	0.164	0.129
	(0.529)	(0.502)	(0.464)	(0.461)
log(Assets)		-8.793	2.459	-0.163
		(6.155)	(4.334)	(0.778)
Sales/Assets		18.06**	26.04***	5.756**
		(8.955)	(8.885)	(2.747)
ΔER			-0.214	-0.226
			(0.293)	(0.388)
GDP			1.346***	1.529***
			(0.395)	(0.520)
Inflation			0.980	1.744
			(0.969)	(1.247)
Export/Sales				-2.579
				(7.955)
Export/Sales * ΔER				-0.573
				(0.983)
Constant	4.835	117.2	-51.18	-5.143
	(4.278)	(92.76)	(72.20)	(9.246)
N	1401	1401	1401	1359
firm fe	yes	yes	yes	no
year fe	yes	yes	no	no

Standard errors in parentheses
* p<0.1, ** p<0.05, *** p<0.01

Note: Left hand variable: log change in assets ('investment'). Right hand variables: lags of indicated data, 1999-2014. Based on balance sheet data from 118 firms in Peru. Results suggest sales growth and GDP growth are main drivers of investment and currency mismatch does not seem to be related.

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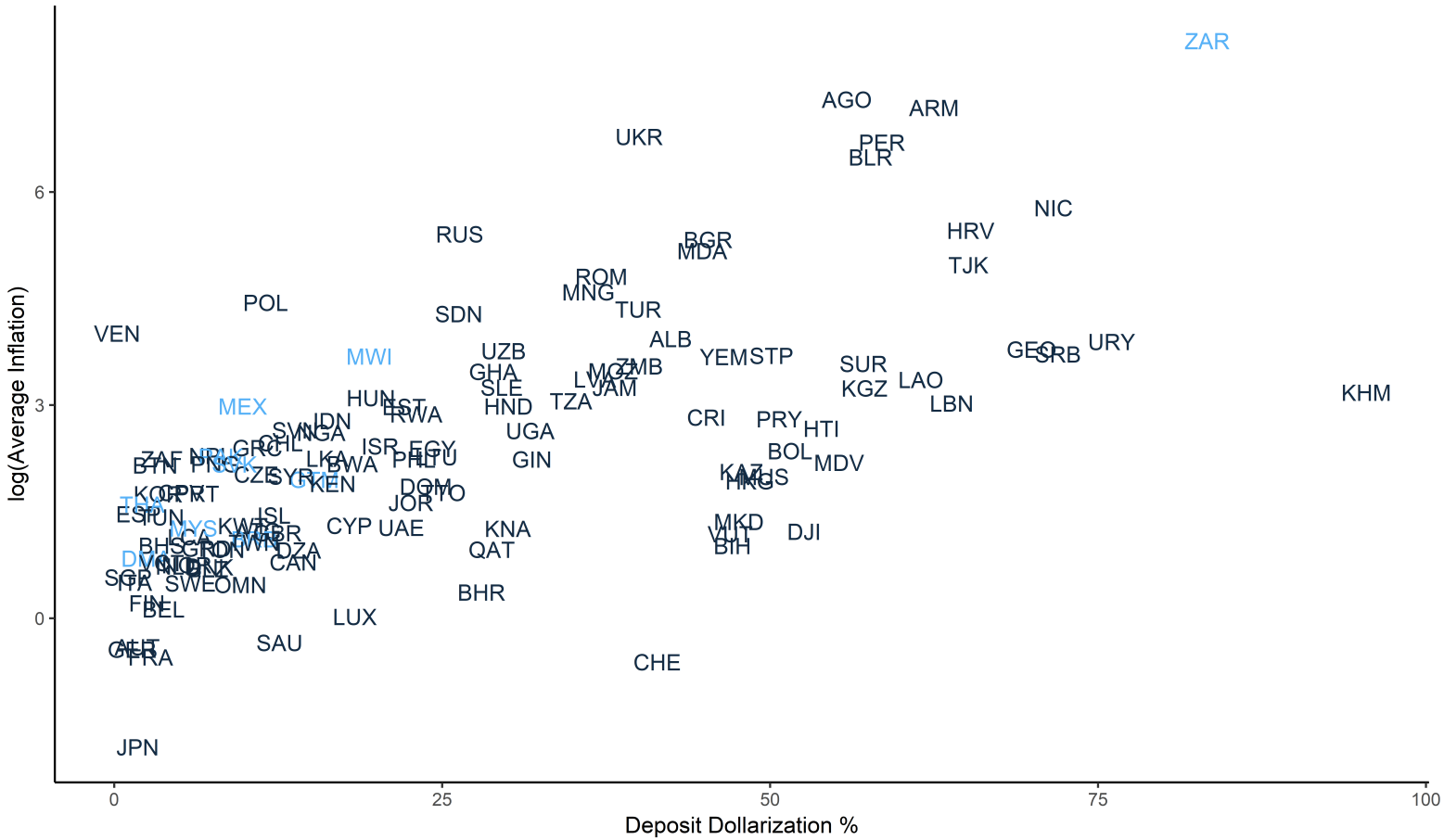
Inflation (in 1990s) Versus Dollarization (post 2000)



Note: strong positive correlation between inflation in 1990s and dollarization in 2000s.

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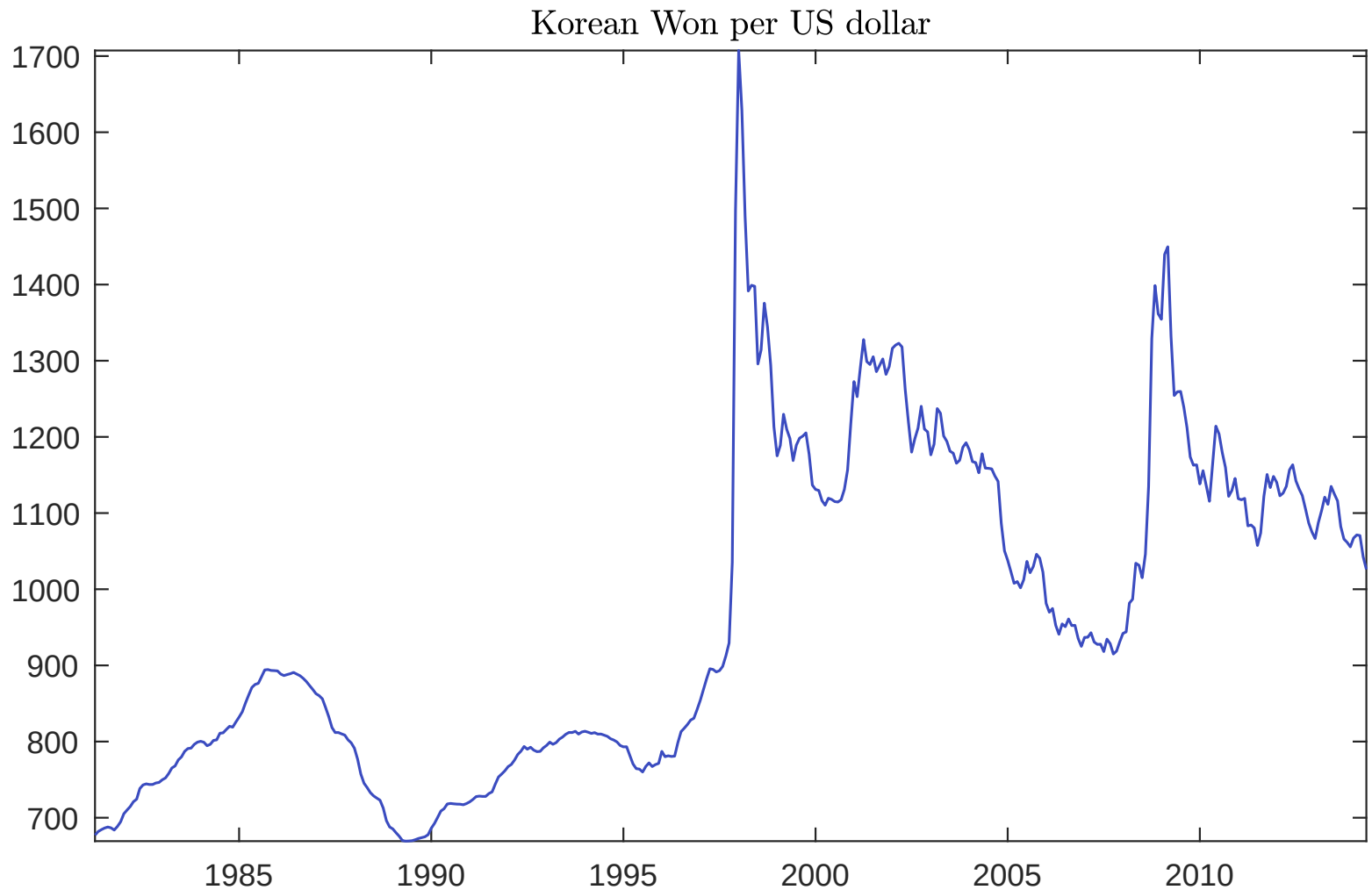

Note: in 1998 crisis, Won depreciated by a factor of 2. Later, depreciation partially offset.

Crisis When Currency Mismatch is Held by Firms

- Korean Won depreciated by a factor of 2.1 from 800 to 1,700 during Asian Financial Crisis.

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  - Credit dollarization is 50%.

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Table: Assets and Liabilities of a Firm (all numbers in Won)

Before Crisis		After Crisis	
Assets	Liabilities	Assets	Liabilities
200	50 local currency debt	200	50 local currency debt
	50 dollar debt		100 dollar debt
	100 equity		50 equity

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- The firm can weather this storm.

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- Banks have much higher leverage, maybe 10.
- Suppose bank has 50% dollar credit.

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Table: Assets and Liabilities of a Bank (all numbers in Won)

Before Crisis	
Assets	Liabilities
200	90 local currency debt
	90 dollar debt
	20 equity

After Crisis	
Assets	Liabilities
200	90 local currency debt
	180 dollar debt
	-70 equity

Crisis When Currency Mismatch is Held by Banks

- Banks have much higher leverage, maybe 10.
- Suppose bank has 50% dollar credit.

Table: Assets and Liabilities of a Bank (all numbers in Won)

Before Crisis		After Crisis	
Assets	Liabilities	Assets	Liabilities
200	90 local currency debt	200	90 local currency debt
	90 dollar debt		180 dollar debt
	20 equity		-70 equity

- This bank is now insolvent!