



# What is Driving Financial De-dollarization in Latin America?

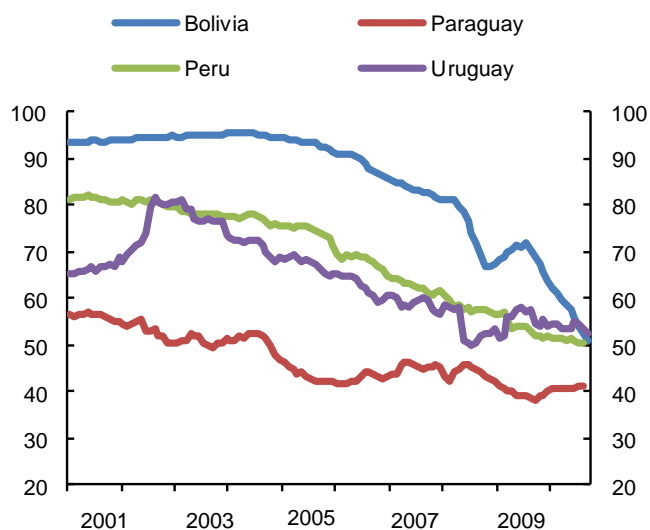
**Mercedes García-Escribano and Sebastián Sosa**

**WHD-IMF**

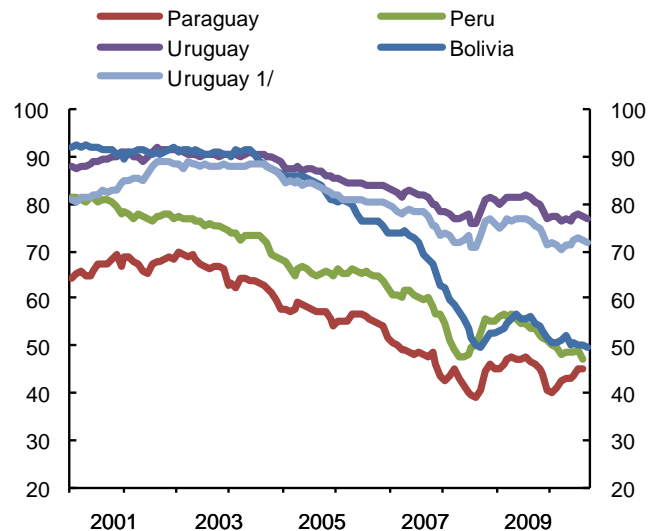
*November 17, 2010*

# I. Introduction

a. Dollarization of Credit  
(Percent of total credit outstanding)



b. Dollarization of Deposits  
(Percent of total deposits)



1/ Excludes foreign currency deposits for nonresidents.

- Financial dollarization has been a feature of many LA countries, consequence of a history of severe economic crisis and high inflation.
- Since early 2000s: gradual and sustained market-driven de-dollarization.
- **What have been the drivers of de-dollarization?**

# Literature on de-dollarization--limited

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- Extensive literature on causes of dollarization but...**literature on determinants of de-dollarization is scant.**
  - Reinhart, Rogoff, and Savastano (2003); Galindo and Leiderman (2005); Erasmus et al. (2009); Kokenyne et al. (2010): **review international experience** with de-dollarization
    - Dollarization not easily reversed, even after removing causes.
    - Forced de-dollarization (Bolivia and Peru in 1980s): high macroeconomic costs and returns.
    - Successful cases are market-based and combined macroeconomic stability with other policies (such as financial sector development in local currency).
  - Kokenyne et al. (2010): exchange rate volatility coupled with stable inflation.
  - Garcia-Escribano (2010): Peru de-dollarization driven by macroeconomic stability, introduction of prudential measures, and development of capital market in soles.

## This paper...

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- Explores the factors that explain de-dollarization in Bolivia, Paraguay, Peru, and Uruguay.
- Standard unrestricted VAR:
  - changes in dollarization of deposits and credits
  - 3 groups of factors:
    - **macroeconomic variables**
    - **prudential regulations**
    - **development of the capital market in domestic currency**

# This paper...

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## Finds:

- **Drivers of deposit de-dollarization** are different from those of credit de-dollarization
- **appreciation** trends key for deposit de-dollarization
- active management of **reserve requirements** contributed to credit de-dollarization
- **other prudential measures** also discouraged lending in foreign currency
- **extension of the domestic currency yield curve** facilitated de-dollarization of credit
- **de-dollarization of deposits** also contributed to credit de-dollarization
- **exchange rate volatility**, associated to appreciation, helped credit de-dollarization in Peru

# Outline

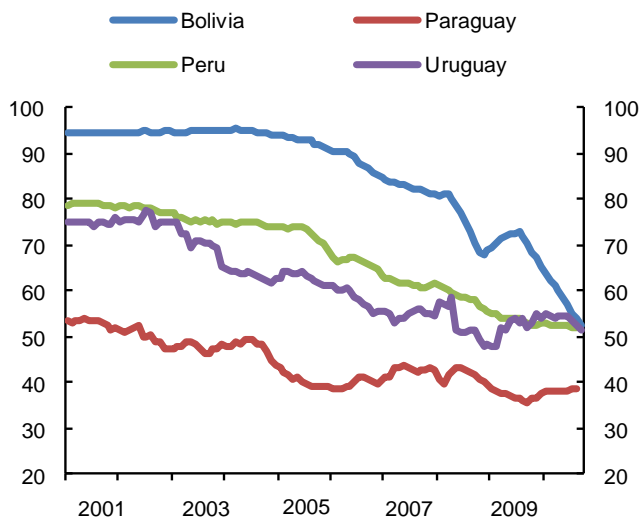
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- *I. INTRODUCTION*
- *II. DE-DOLLARIZATION—STYLIZED FACTS*
- *III. EXPLAINING DE-DOLLARIZATION: EMPIRICAL APPROACH*
- *IV. EXPLAINING DE-DOLLARIZATION: MAIN RESULTS*
- *V. CONCLUDING REMARKS*

## II. De-dollarization—stylized facts

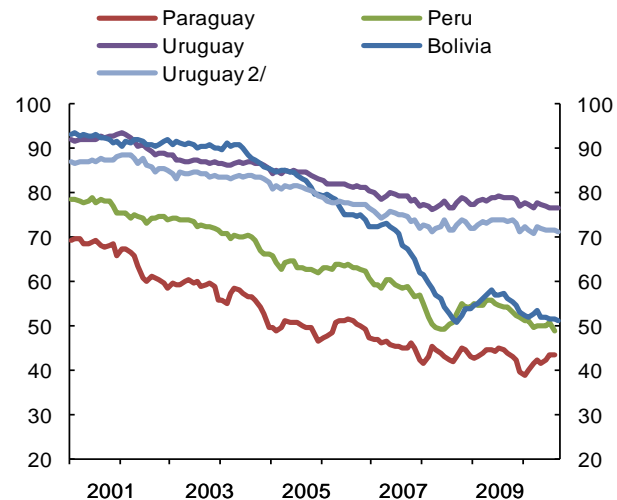
- De-dollarization: gradual; period of macroeconomic stability; do not reflect valuation effect
- Deposit de-dollarization (Bolivia, Peru) reversed following Lehman Brothers, but quickly reserved thereafter.

a. Dollarization of Credit 1/  
(Percent of total credit outstanding)



1/ Foreign currency credit evaluated at constant

b. Dollarization of Deposits 1/  
(Percent of total deposits)



1/ Foreign currency deposits evaluated at constant exchange rate.

2/ Excludes foreign currency deposits for nonresidents.

## II. De-dollarization—stylized facts

Table 1. De-dollarization (in percent), 2001-2010 1/

		Dollarization		De-dollarization
		2001:Q1	2010:Q3	2001-2010
Peru	deposits	78.5	49.7	-28.7
	credit	78.9	52.1	-26.8
Paraguay	deposits	69.7	43.5	-26.1
	credit	53.3	38.6	-14.7
Uruguay	deposits 2/	87.0	76.6	-10.4
	credit	75.1	52.5	-22.6
Bolivia	deposits	93.2	51.4	-41.8
	credit	94.4	53.8	-40.7
Average	deposits	82.1	55.3	-26.8
	credit	75.4	49.2	-26.2

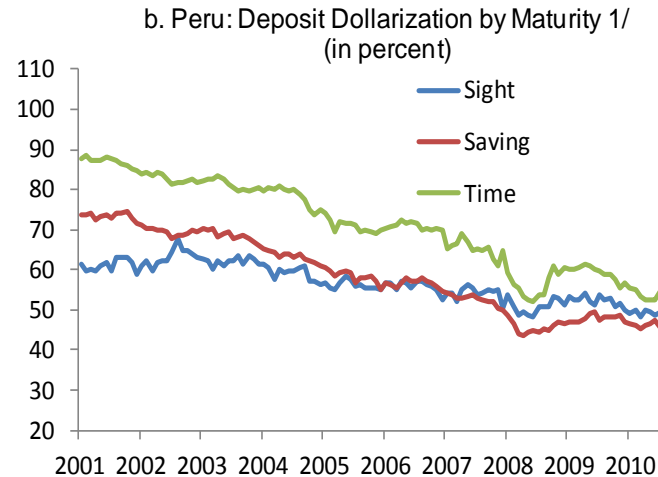
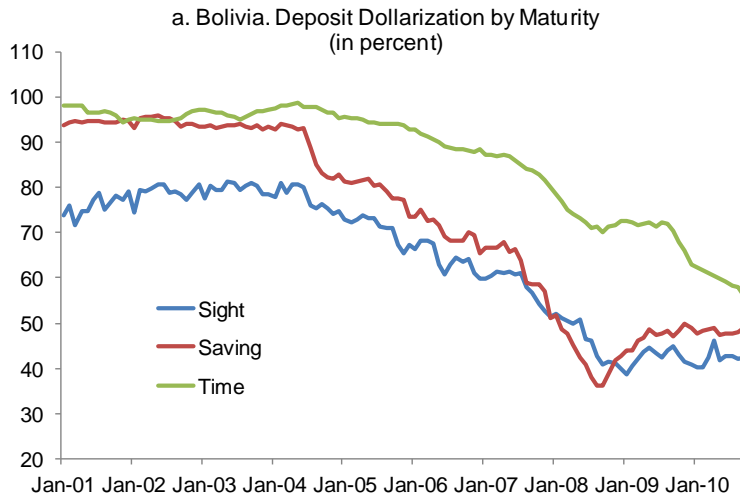
1/ Foreign currency deposits and credit evaluated at constant exchange rate.

2/ Excludes foreign currency deposits for nonresidents.



## II. De-dollarization—stylized facts

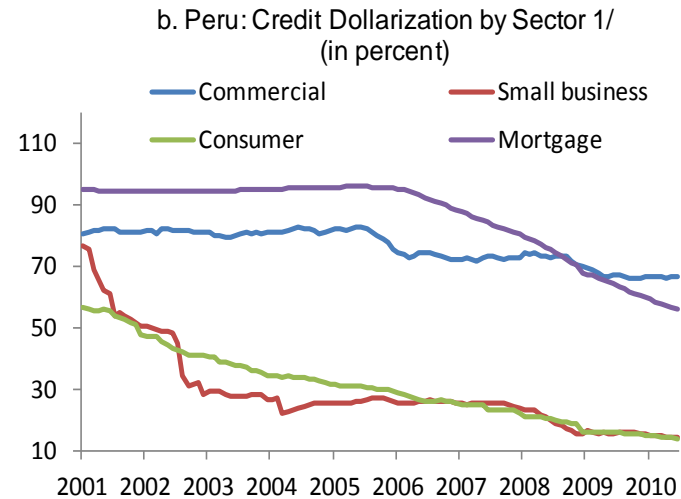
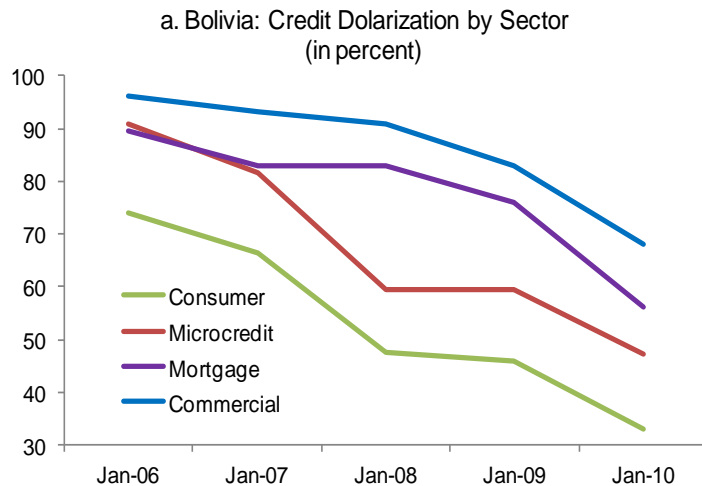
- Dollarization declined for all types of deposits
- Dollarization continues to be higher for less liquid deposits



1/ Foreign currency deposits evaluated at constant exchange rate.

## II. De-dollarization—stylized facts

- Dollarization declined for all credit sectors
- Dollarization continues to be higher for loans with longer maturity (mortgages and commercial credit)



1/ Foreign currency credit evaluated at constant exchange rate.

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# III. EXPLAINING DE-DOLLARIZATION: EMPIRICAL APPROACH

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- **Standard unrestricted VAR**
- **Examine the drivers of short-term variations in both deposit and credit dollarization**
- **VAR also include 3 sets of variables:**
  - macro-variables
  - introduction of prudential measures
  - development of the capital market in local currency
- **Choleski decomposition** (results robust to different ordering)
- **The model is estimated with three lags**
- **Data:** monthly for the period 2001-2010 (starting in 2003 and 2004 for Bolivia and Uruguay due to financial crises)

# III. EXPLAINING DE-DOLLARIZATION: EMPIRICAL APPROACH

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## ■ **Macro-variables**

- inflation (cumulative over two months)
- percentage change of the nominal exchange rate (cumulative over two months)
- volatility of daily change of the nominal exchange rate over 90-days
- change of the EMBI spread

## ■ **Prudential variables**

- change of the spread between RR rate in foreign to domestic currency
- dummy=1 (for three months) after the introduction of other prudential measures

## ■ **Development of local currency bond market**

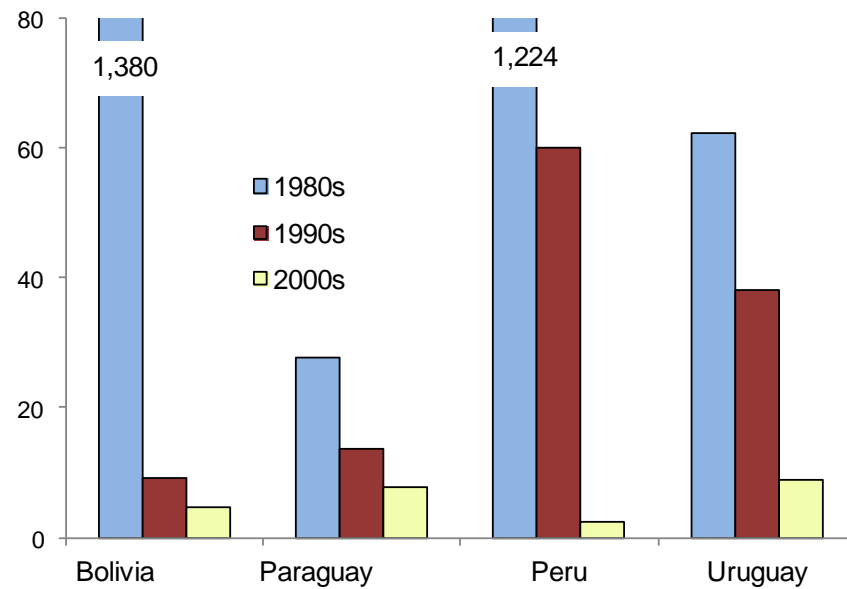
- dummy=1 if medium-to-long-term bonds were issued (between 10-30 years, depending of the country)

## ■ **Financial dollarization**

- change in deposit dollarization
- change in credit dollarization

# Macroeconomic Stability: Inflation

Figure 5. Evolution of Inflation  
(average annual inflation, in percent)



# Introduction of Prudential Measures

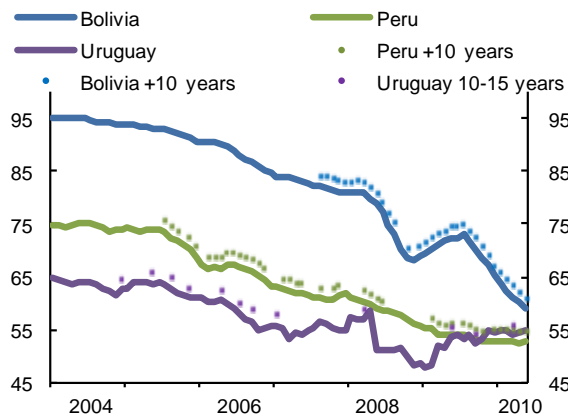
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- Effective management of the ratio of foreign-to-local currency RR rates.
- Raised **provisions for foreign currency loans**.
  - Bolivia (early-2009): additional provision of up to 1.5 percent for foreign currency denominated loans classified as “A” (best quality).
  - Peru (mid-2006): carry out a routine evaluation of currency risks, or set up an additional reserve ranging from 0.25 to 1 percent for credit in foreign currency not evaluated.
- Tightened capital requirements against **open foreign exchange positions**.
  - Bolivia (late 2009): reduced long open position to 60 percent, from 70 percent.
  - Paraguay (mid-2007): introduced a net open position limit of 50 percent of capital and (in late-2008) reduced the long position to 30 percent.
  - Peru (early-2010): changed the long (short) open position to 75 (15) percent of capital in, from 100 (10) percent of capital.
  - Uruguay (late-2003): set a net open position limit of 150 percent of minimum required regulatory capital.
- Uruguay (mid-2006): **differentiated capital risk weights on foreign currency loans**.
- Bolivia (mid-2006): **FTT** on foreign currency loans and credits, while exempted transactions in Bolivianos.

# Issuance of Local Currency Long-term Bonds

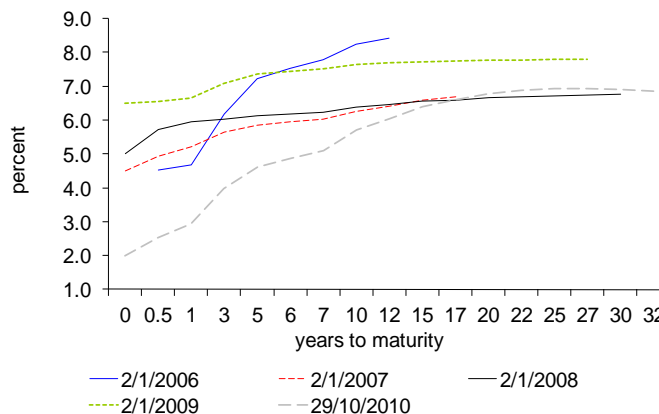
- Bolivia, Peru and Uruguay issued public bonds in domestic currency with maturities exceeding 10 years
- Facilitating bank funding and pricing of long-term loans in domestic currency.
- The longest maturity of government paper in domestic currency
  - In Peru: 32 years (5 years in 2003)
  - In Bolivia: 30 years
  - In Uruguay: 15 years

a. Credit dollarization and issuances of long term public debt in domestic currency



1/ Foreign currency credit evaluated at constant exchange rate.

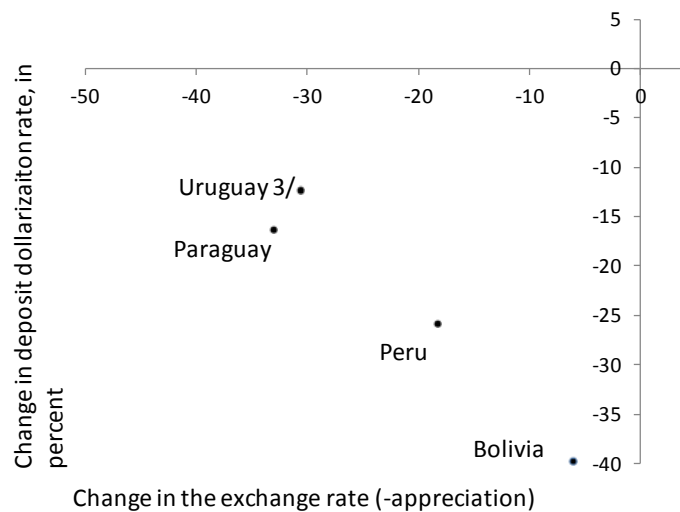
b. Peru: Domestic sovereign yield curve





# Exchange Rate Developments

## Changes in the Exchange Rate and Dollarization Ratios 2003-2010 1/ 2/



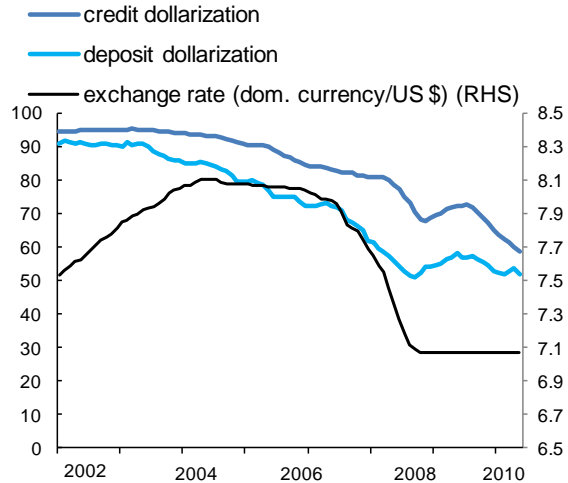
1/ Nominal exchange rate (domestic currency/US\$). Data extends till August 2010. Data for Uruguay starts in January 2004.

2/ Foreign currency deposits evaluated at constant exchange rate.

3/ Excludes foreign currency deposits for nonresidents.

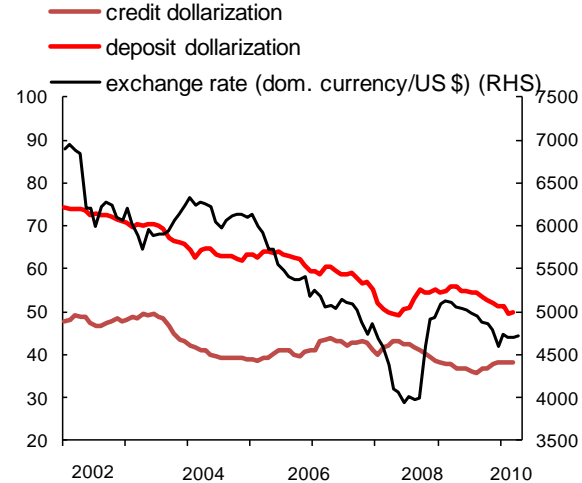
# Exchange Rate Developments

## Bolivia 1/



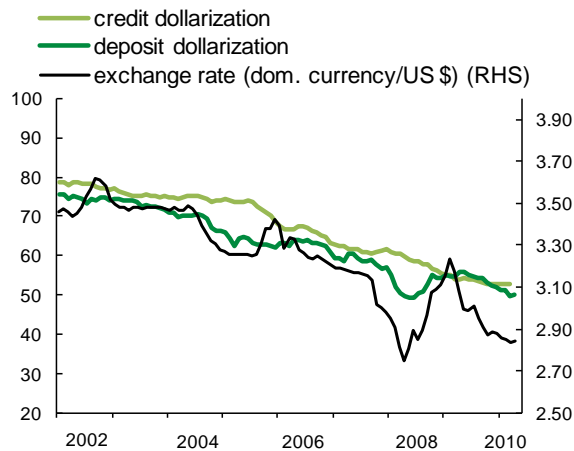
1/ Foreign currency credit evaluated at constant exchange rate.

## Paraguay 1/



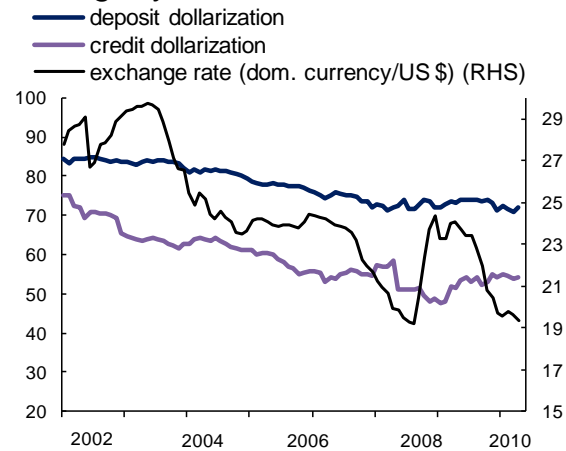
1/ Foreign currency credit evaluated at constant exchange rate.

## Peru 1/



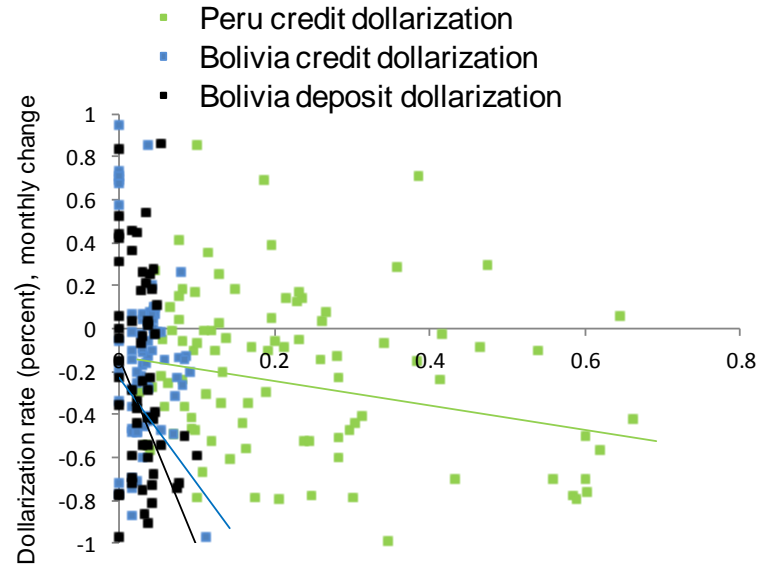
1/ Foreign currency credit evaluated at constant exchange rate.

## Uruguay 1/



1/ Foreign currency credit evaluated at constant exchange rate.

# Exchange Rate Volatility



Monthly standard deviation of daily percentage change of nominal exchange rate over past 90-days

1/ Foreign currency credit and deposits evaluated at constant exchange rate.

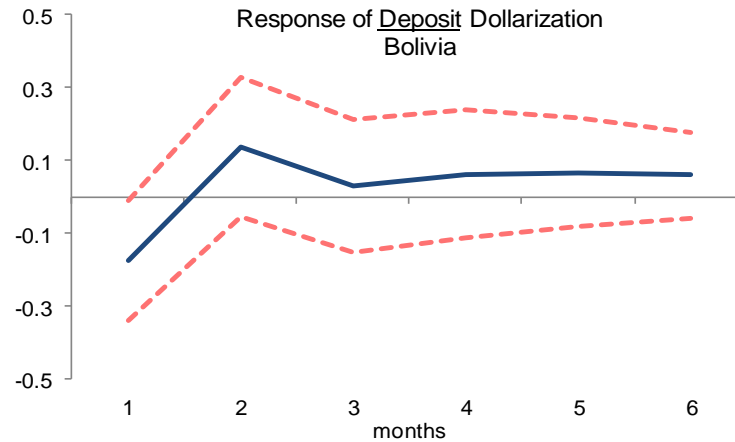
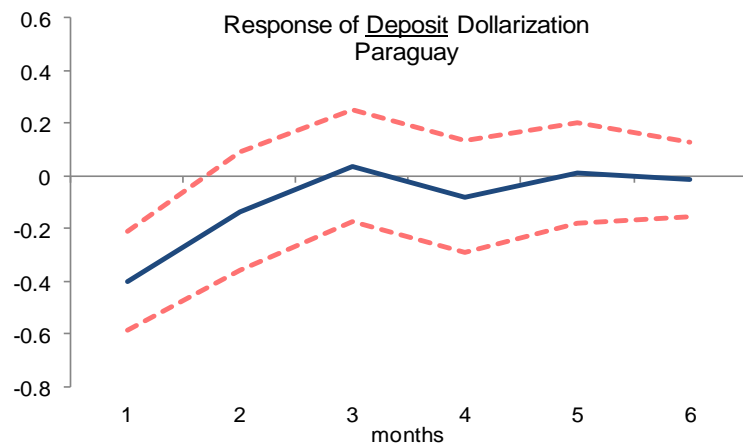
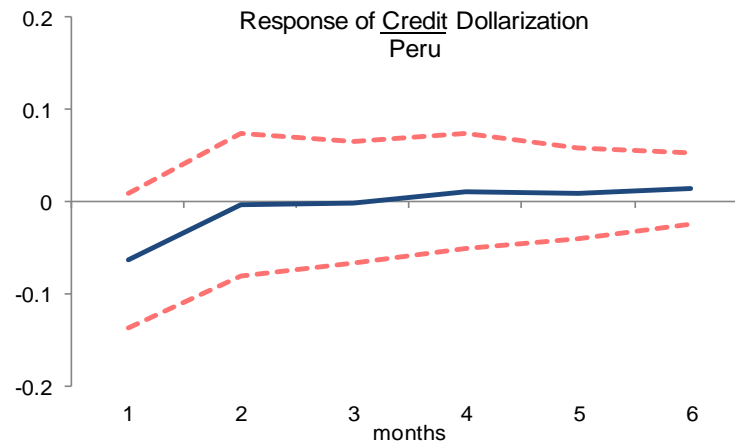
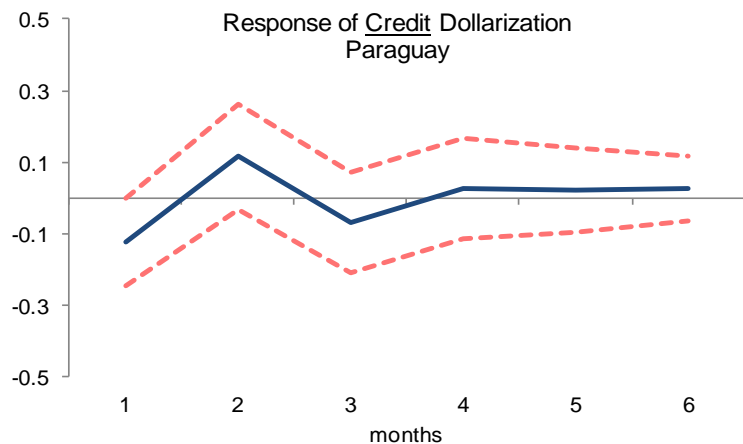
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# Response of Dollarization to a Shock to Differential Reserve Requirement Ratios 1/

Figure 10. Response of Dollarization to a Shock to Differential Reserve Requirement Ratios 1/

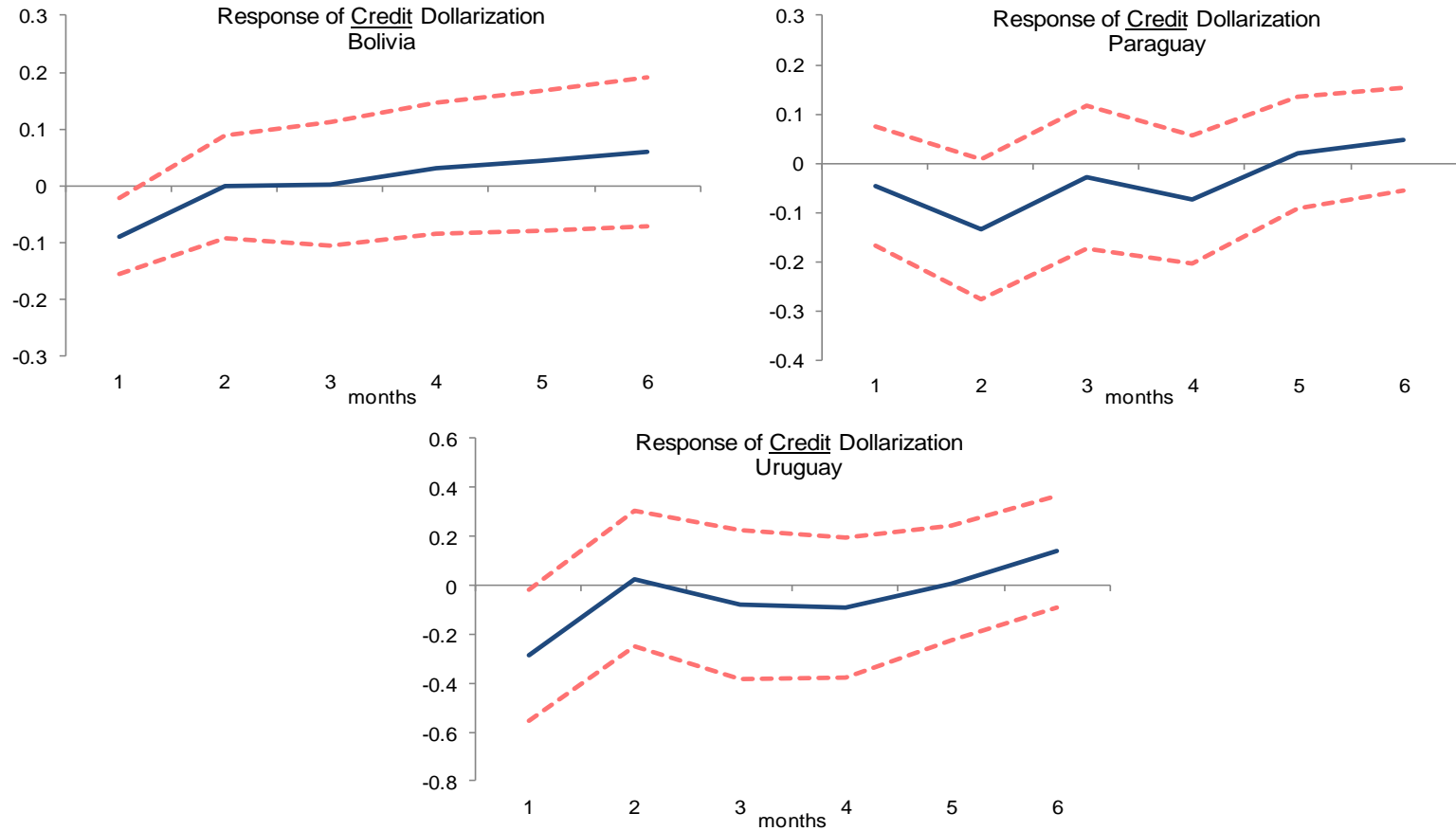


Source: authors' calculations.

1/One standard deviation shock  $\pm$  2 s.e.

# Response of Dollarization to the Introduction of Prudential Measures 1/

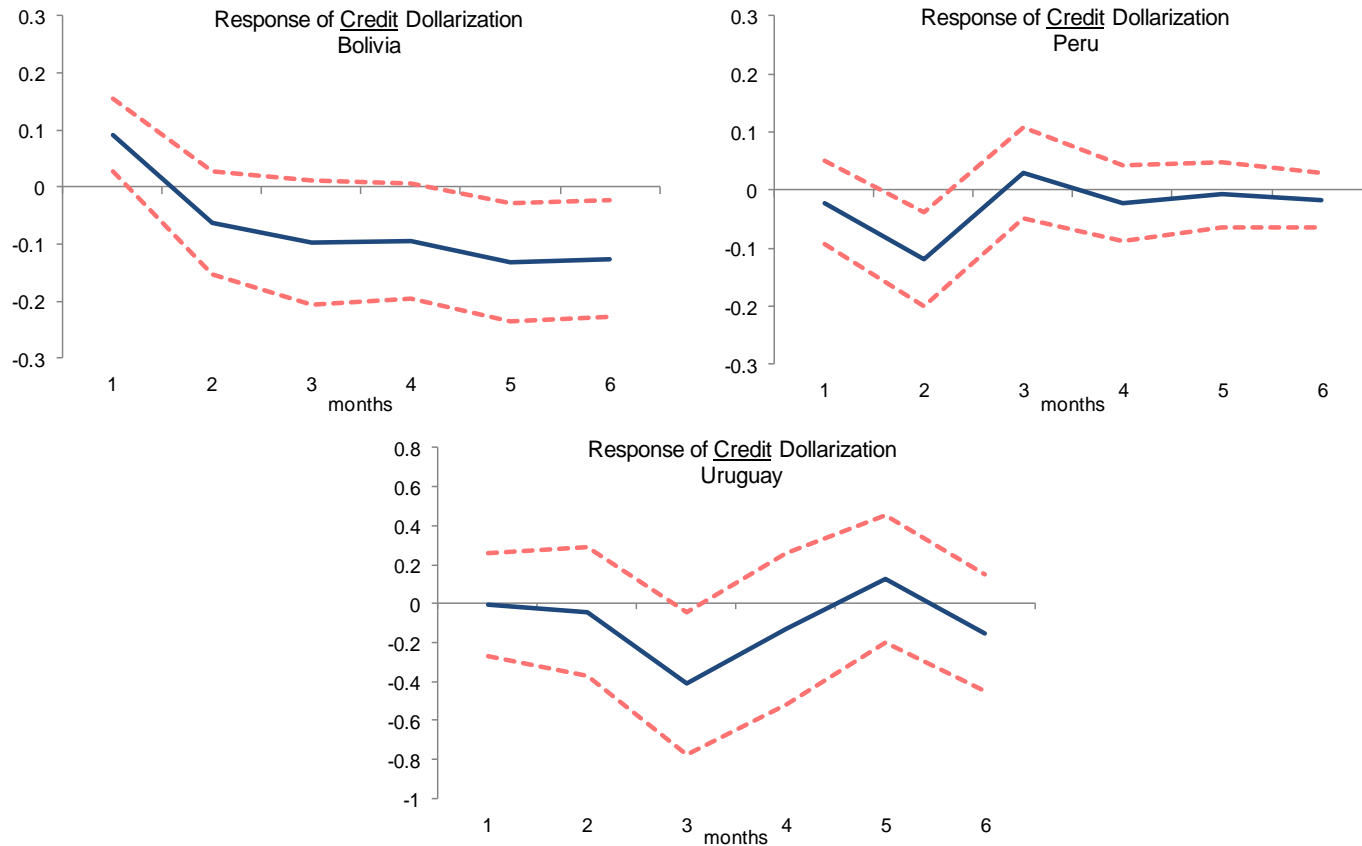
Figure 11. Response of Dollarization to the Introduction of Prudential Measures 1/



Source: authors' calculations.  
1/One standard deviation shock  $\pm$  2 s.e.

# Response of Dollarization to the Issuance of Local Currency Long-term Bonds 1/

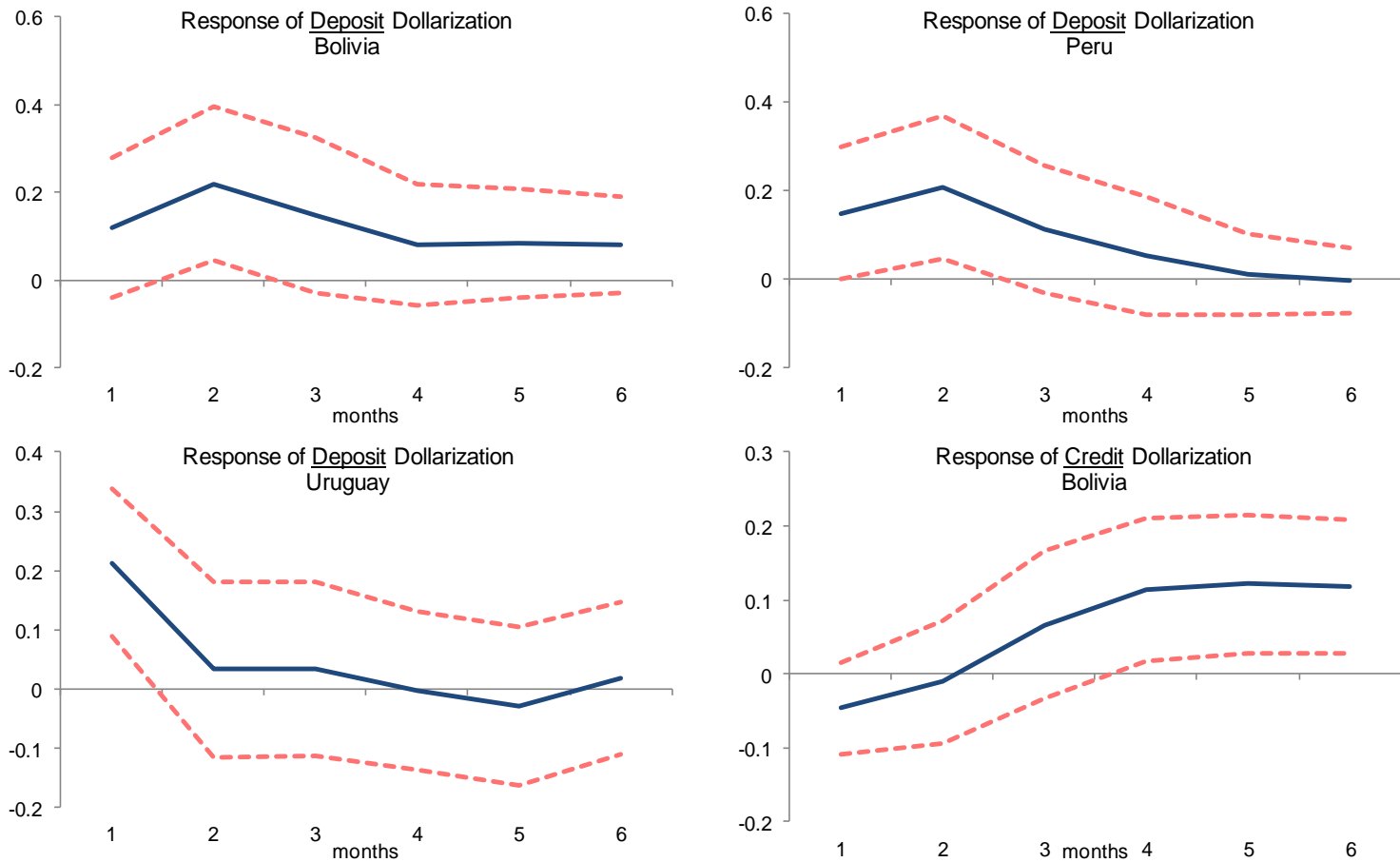
Figure 12. Response of Dollarization to the Issuance of Local Currency Long-term Bonds 1/



Source: authors' calculations.  
1/One standard deviation shock  $\pm$  2 s.e.

# Response of Dollarization to an Exchange Rate Shock 1/

Figure 13. Response of Dollarization to an Exchange Rate Shock 1/

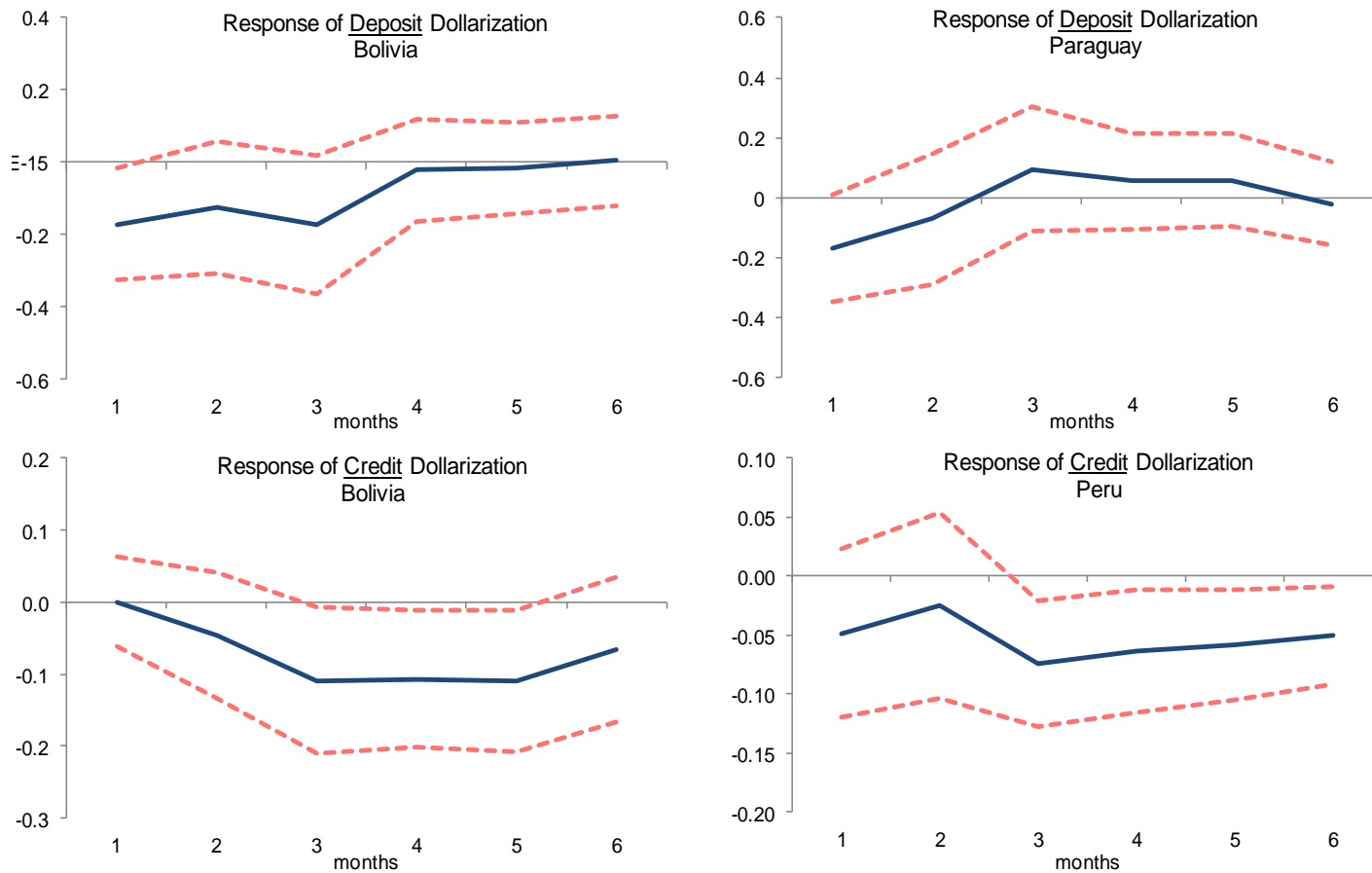


Source: authors' calculations.  
 1/One standard deviation shock  $\pm 2$  s.e.



# Response of Dollarization to an Exchange Rate Volatility Shock 1/

Figure 14. Response of Dollarization to an Exchange Rate Volatility Shock 1/



Source: authors' calculations.  
 1/ One standard deviation shock  $\pm 2$  s.e.

# Response of Dollarization to Exchange Rate Shocks

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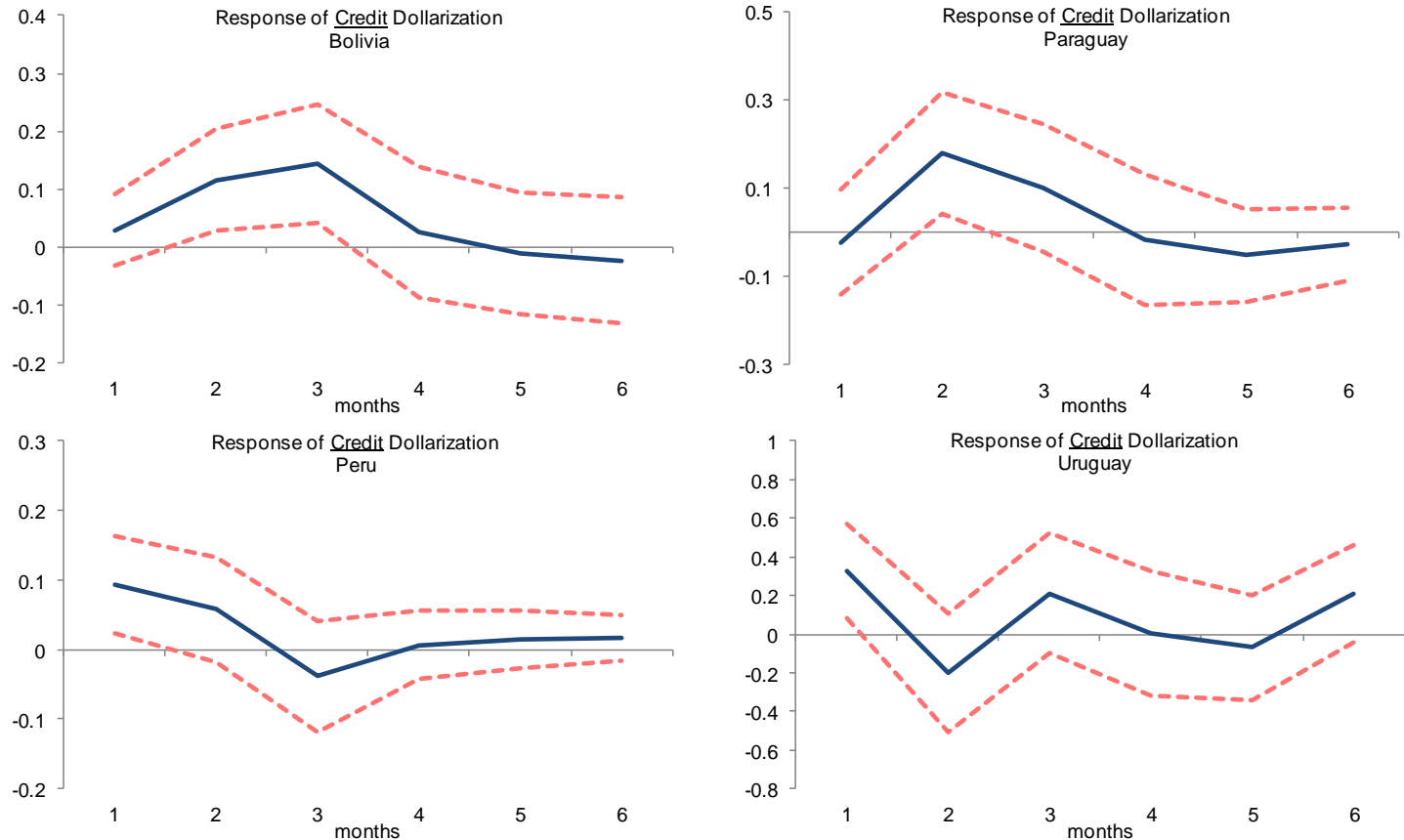
Size of the Shock 1/

	ER changes	ER volatility
Bolivia	0.21	0.01
Paraguay	2.56	0.14
Peru	1.31	0.08
Uruguay	2.06	0.16

1/ One st. dev. shock

# Response of Credit Dollarization to a Shock to Deposit Dollarization 1/

Figure 15. Response of Credit Dollarization to a Shock to Deposit Dollarization 1/



Source: authors' calculations.  
1/One standard deviation shock + - 2 s.e.

# Variance Decomposition of Changes in Credit Dollarization

Table 5. Variance Decomposition of Changes in Credit Dollarization

Contribution of shocks to prudential measure variables

Horizon (months)	Bolivia	Paraguay	Peru	Uruguay		Average
(in percent)						
1	7.9	4.0	3.7	5.8	▼	5.3
3	4.9	9.4	3.1	4.9	▼	5.6
6	8.4	10.6	3.1	6.8	▼	7.2

Source: authors' calculations

Contribution of shocks to local currency bond market development

Horizon (months)	Bolivia	Peru	Uruguay		Average
1	7.7	0.3	0.0	▼	2.7
3	8.8	8.1	8.3	▼	8.4
6	15.8	7.8	9.2	▼	10.9

Source: authors' calculations

Contribution of shocks to deposit dollarization

Horizon (months)	Bolivia	Paraguay	Peru	Uruguay		Average
(in percent)						
1	0.8	0.1	5.8	7.5	▼	3.6
3	14.3	7.4	7.0	9.4	▼	9.5
6	9.1	7.6	6.7	9.9	▼	8.3

Source: authors' calculations

# Variance Decomposition of Changes in Deposit Dollarization

Table 6. Variance Decomposition of Changes in Deposit Dollarization  
Contribution of shocks to exchange rate changes

Horizon (months)	Bolivia	Paraguay	Peru	Uruguay	Average
	(in percent)				
1	2.3	0.2	3.2	13.0	4.7
3	10.2	1.2	9.4	10.6	7.8
6	10.9	1.5	9.2	8.9	7.6

Source: authors' calculations

# What Drives De-dollarization?

Table 7. What Drives De-dollarization?  
Impulse Response Functions: Summary of Results

	D(RR)	Prudential	Issuance	D(ER)	Vol(ER)	D(infl)	D(EMBI)	D(DL)
<u>Deposit Dollarization</u>								
Bolivia	√	n.s.	n.s.	√	√	n.s.		n.s.
Paraguay	√	n.s.		n.s.	√	n.s.		n.s.
Peru	n.s.	n.s.	n.s.	√	n.s.	n.s.	n.s.	n.s.
Uruguay	n.s.	n.s.	n.s.	√	n.s.	n.s.	n.s.	n.s.
<u>Credit Dollarization</u>								
Bolivia	n.s.	√	√	√	√	n.s.		√
Para	√	√		n.s.	n.s.	n.s.		√
Peru	√	n.s.	√	n.s.	√	n.s.	n.s.	√
Uruguay	n.s.	√	√	n.s.	n.s.	n.s.	n.s.	√

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# V. Concluding Remarks

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- **The steady decline in FD in these countries has been remarkable, but dollarization levels are still high**
- **Challenge:** continue striving to lower FD
- **Policy implications**
  - Maintaining macroeconomic stability (especially low and stable inflation)
  - Prudential regulatory measures (including active management of RR) to ensure that currency risks are properly internalized by agents
  - Capital market in domestic currency in these countries is still narrow; its development would help enhancing de-dollarization (not only public but also private bonds)





# **What is Driving Financial De-dollarization in Latin America?**

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**WHD-IMF**

*November 17, 2010*