Credit Growth in Latin America:

Financial Development or Credit Boom ?

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Preliminary draft for discussion

Agenda

Background and Motivation

The Anatomy of the Credit Expansion in Latin America

Is Credit "Excessive" in Latin America (growth and level) ?

Conclusions

Rapid Credit Growth in Latin America 2004-2011

• 11 percent annual average real credit growth between 2004 and 2011 (20 percent in some countries)

• Three observed periods of credit growth: 2004-2007 (rapid); 2007-2009 (slowdown); 2010-now (pick up).

• Low initial credit-to-GDP levels (depth of credit) *vis-à-vis* other middle-income countries.

Background and Motivation, 1

**Real Banking Credit: Growth by Regions**
(Percent)
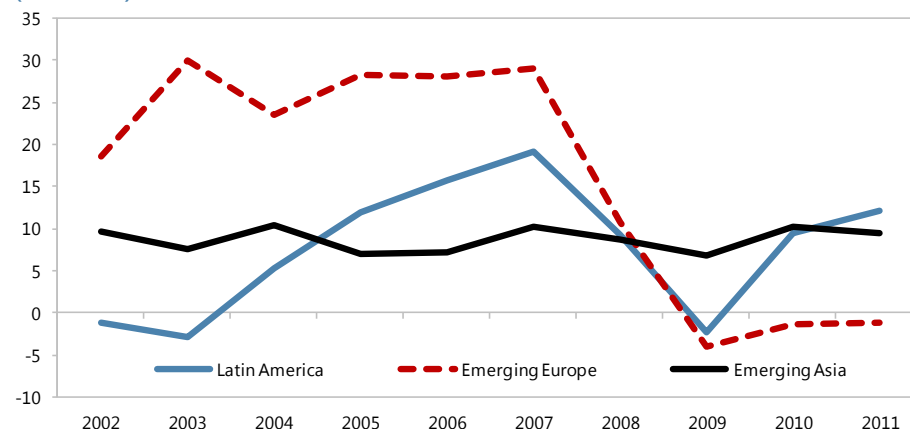
Notes: Claims of other depository cooperations on the private sector. Unweighted averages of countries in Latin America, Emerging Europe and Emerging Asia, respectively. Emerging Europe is Bulgaria, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania and Czech Republic. Emerging Asia is China (mainland), India, Indonesia, Malaysia, Phillipines, Korea, and Thailand. Deflation is done using CPI.

Banking credit to private sector to GDP and PPP-adjusted income per capita, average 2004
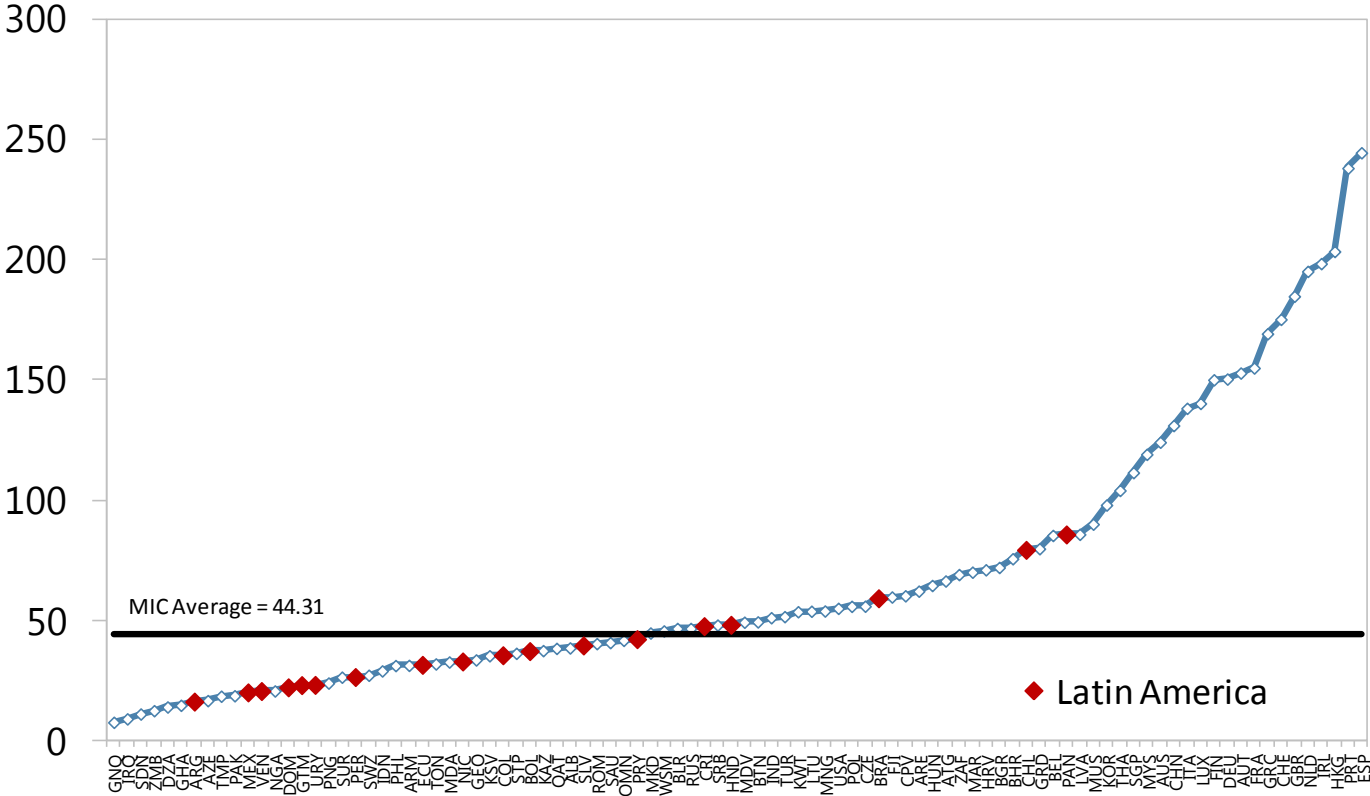(Percent of GDP)

Notes: R2 is 0.4067
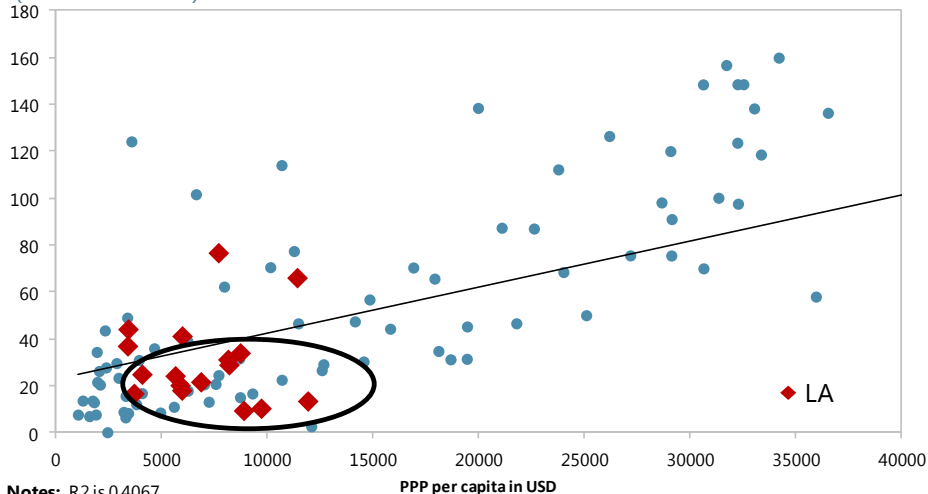
Source: IFTS; WEO

The level of credit-to-GDP in Latin America in 2011 remains relatively low compared to other middle-income countries - even after the period of high growth.

Banking Credit to Private Sector, Ultimo 2011

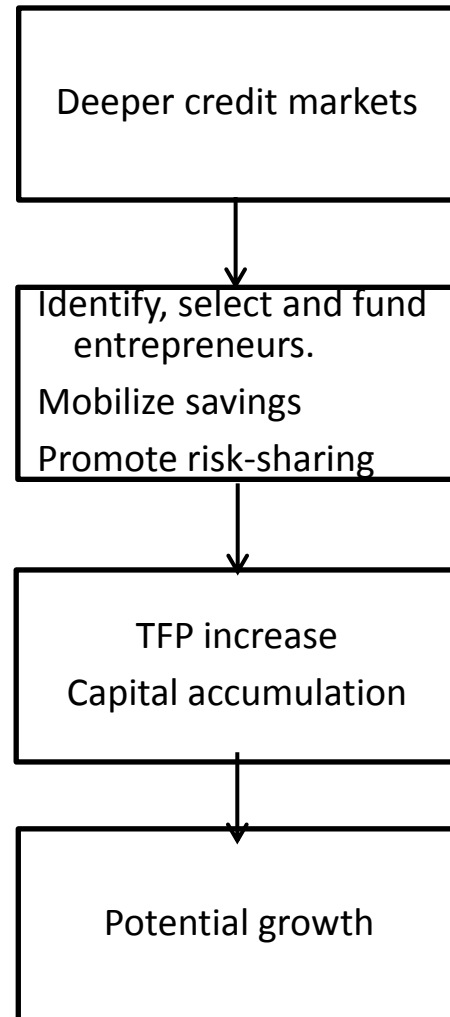(Middle and High Income Countries, Percent of GDP)

MIC Average = 44.31

◆ Latin America

Notes: Claims of other depository cooperations on the private sector. Middle and High Income Countries.
Sources: IFTS, WEO.

Background and Motivation, 2

Fast Credit Growth: Opportunities or Risks?

On the one hand, credit growth can boost potential economic growth in the region…

•… by inducing <u>technological innovation</u> (*e.g.* Schumpeter, 1911; Levine, 1997).

•… and speeding up <u>capital-accumulation</u> (*e.g.* Acemoglu and Zillibotti, 1997).

•… which is the supported by an empirical literature (King and Levine, 1993; Favara, 2003; Arcand *et al.*, 2012; Demetriades and Law, 2006; Rosseau and Wachtel, 2002).

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┌─────────────────────────┐
│   Deeper credit markets  │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│ Identify, select and fund│
│      entrepreneurs.      │
│   Mobilize savings       │
│   Promote risk-sharing   │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│      TFP increase        │
│   Capital accumulation   │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│    Potential growth      │
└─────────────────────────┘
```

On the other hand, rapid credit growth entails risks

• … as rapid credit growth has historically been associated with a higher probability of <u>banking crises</u> (Kaminsky and Reinhart, 1999; Borio and Lowe, 2002; Mendoza and Terrones, 2008)

• … and macroeconomic "overheating".

• Specifically, up to the recent global crisis LA had a history of banking crises in the wake of rapid credit growth

Average Number of Banking Crisis
From 1945 or independence up to 2008
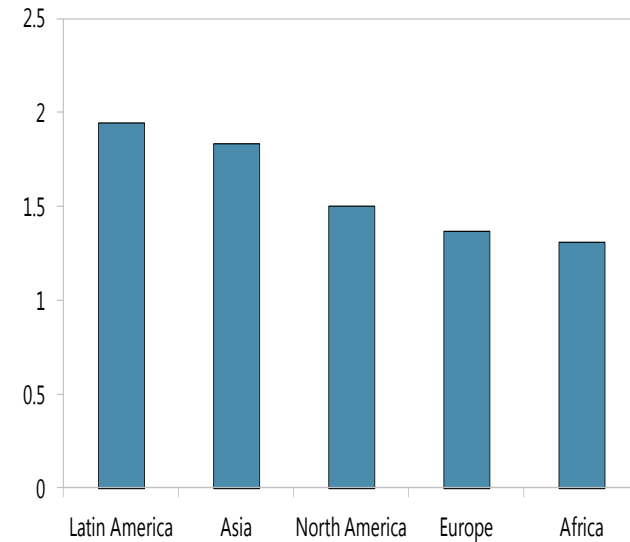
Source: Reinhart and Rogoff (2009), page 151.

Goal of the Paper:
Identify Opportunities vs. Risks in Credit Expansion in LA by means of:

1. Analyzing Credit Composition
by segments, sectors, currencies, maturities and bank origin

2. Assessing whether credit –to-GDP levels are in line with their long-run levels warranted by fundamentals or excessive using a co-integration approach.

3. Assessing whether credit growth rates are excessive by means of estimated equations for credit growth using a error-correction approach.

Preliminary Findings:

• Credit growth in LA has in broad strokes been strongest for mortgage and consumption credit rather for corporate credit. Within corporate credit growth was strongest within construction.

• Credit has de-dollarized and there are some evidence that maturities have been lengthened.

• Domestic banks have been the main drivers of the credit growth, although foreign banks posted the highest lending growth up to 2008.

• Credit-to-GDP levels in 2011 were elevated, but not significantly above, their estimated equilibrium level.

• Credit growth rates since 2004 have in some countries been above what can be explained by the fundamentals.

Three Main Approaches based on the Literature to Analyze Credit

- A first step is to analyze the anatomy of the credit growth (Hilbers *et al.*, 2005)

- … which can be augmented with two technical approaches to identify credit booms *ex ante…*

- … one approach is statistical and relies on deviations from long-run trend in credit.*

- … the other approach is econometric and relies on deviations from an estimated equilibrium level for credit.

- But scarce knowledge on composition of credit growth in LA, and latest assessment of equilibrium credit in LA is from 2007.

Recent studies on *ex ante* identification of credit booms

	Statistical approach	Econometric approach
Emerging Europe	Coudert and Pouvelle (2010)	Cottarelli *et al.* (2005), Coudert and Pouvelle (2010), Kiss-Marton and Vonnak (2006), Egert et al. (2006), Boissay et al. (2007)
Africa, Middle East and Central Asia		Iossifov and Khamis (2009); Crowley (2008)
Latin America	Cubeddu, Tovar and Tsounta (2012)* Sulla (2012)**	IMF(2007) Sulla (2012)**

*: Studies mortgage credit in Brazil, Colombia and Peru as well as a number of Asian countries.
**: Studies Bolivia.

*: As described by Gourinchas et al. (2001) and Mendoza and Terrones (2008).

Data and Definitions

Latin America: Argentina, Brazil, Colombia, Mexico, Peru, Venezuela, Uruguay, Bolivia, Dominican Republic, Guatemala, Ecuador, Nicaragua, El Salvador, Paraguay, Costa Rica, Honduras, Panama.

Variable	Definition	Sources
Total credit	Claims of banks on the non-financial private sector.	IFTS and MBRF2
Real credit	Total credit deflated by CPI	IFTS, MBRF2 and WEO
Credit by market segment	Mortgages, credit to other consumption and commercial credit, respectively.	Haver, national sources and desks
Credit by commercial sectors	Credit to services, commerce, construction and "productive sectors", respectively. "Productive sectors" are defined as agriculture and other rural industries, manufacturing, mining and energy supply. For Argentina, Mexico and Bolivia "Real Estate Services" is included in "Construction".	Haver, national sources and desks
Credit by currency	Loans of other depository corporations to the non-financial sector, other residents and non-residents divided on foreign and domestic currency, respectively.	MBRF2
Credit by maturities	Loans of banks divided on maturities below and above one year, respectively.	National sources
Credit by bank origin	Loans by foreign and domestic banks. A bank is defined as foreign if more than 50% of its share are owned by foreigners.	Classens and van Horen (2012)

*: we are grateful to desks for assisting with the data collection.

Timing of aggregate credit growth

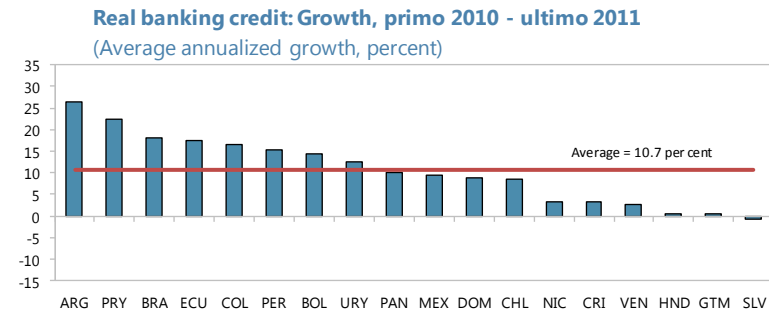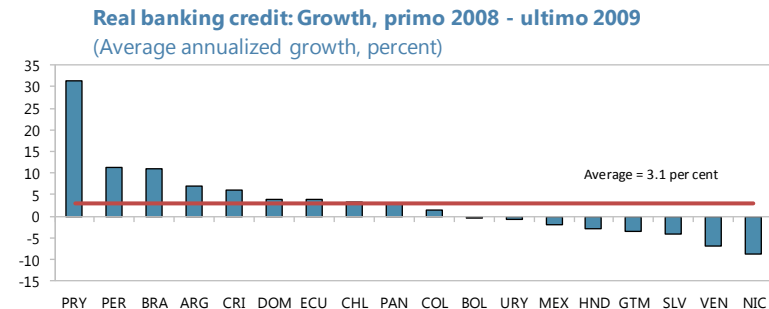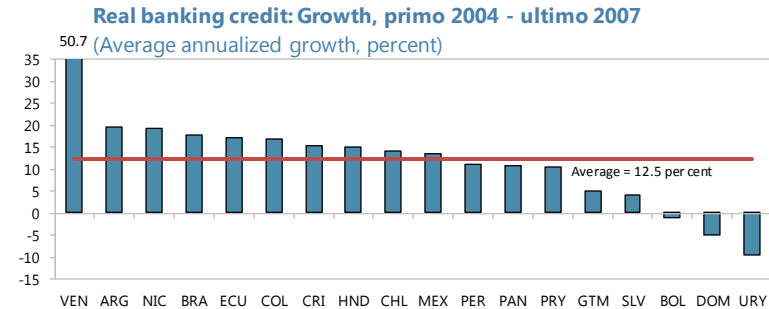- **Three phases can be identified for credit in LA since primo 2004:**

- **…high growth in 2004-07. Guatemala, El Salvador, Bolivia, Dominican Republic and Uruguay are notable exceptions.**

- **…interrupted by a slow-down, 2008-09. But no slowdown in Brazil and acceleration in Paraguay and Peru.**

- **…followed by a pickup to near pre-crisis levels, 2010-11. Especially pronounced in Bolivia and Uruguay.**

Real banking credit, growth. Before, during and after crisis.

Real banking credit: Growth, primo 2004 - ultimo 2007
(Average annualized growth, percent)

Average = 12.5 per cent

VEN ARG NIC BRA ECU COL CRI HND CHL MEX PER PAN PRY GTM SLV BOL DOM URY

Real banking credit: Growth, primo 2008 - ultimo 2009
(Average annualized growth, percent)

Average = 3.1 per cent

PRY PER BRA ARG CRI DOM ECU CHL PAN COL BOL URY MEX HND GTM SLV VEN NIC

Real banking credit: Growth, primo 2010 - ultimo 2011
(Average annualized growth, percent)

Average = 10.7 per cent

ARG PRY BRA ECU COL PER BOL URY PAN MEX DOM CHL NIC CRI VEN HND GTM SLV

Notes: Claims of other depository cooperations on the private sector.
Sources: IFTS, MBRF2.

Stylized facts, 1

Aggregate credit growth across countries

- **The credit expansion has not been homogenous across LA…**

- **… while real credit expanded rapidly in Paraguay, Argentina, Brazil and Venezuela (15-20% per year)…**
- **… it was much more muted (<6%) in Honduras, Bolivia, Guatemala, Dominican Republic and Uruguay.**

- **Overall, countries with low initial credit depth have posted the highest growth rates.** *I.e.* **some signs of convergence within LA.**
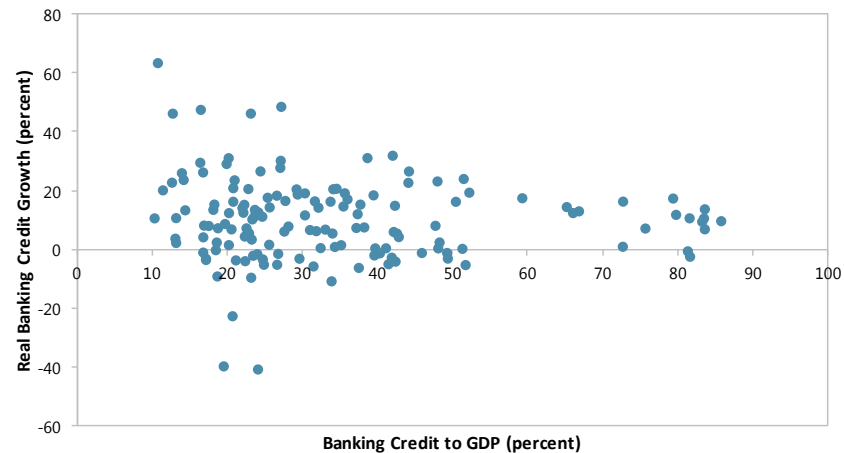
Real Banking Credit: Growth, primo 2004 - ultimo 2011
(Average annualized growth, percent)

Average = 10.9 percent

VEN PRY ARG BRA ECU COL PER CRI CHL PAN MEX NIC HND BOL GTM SLV DOM URY
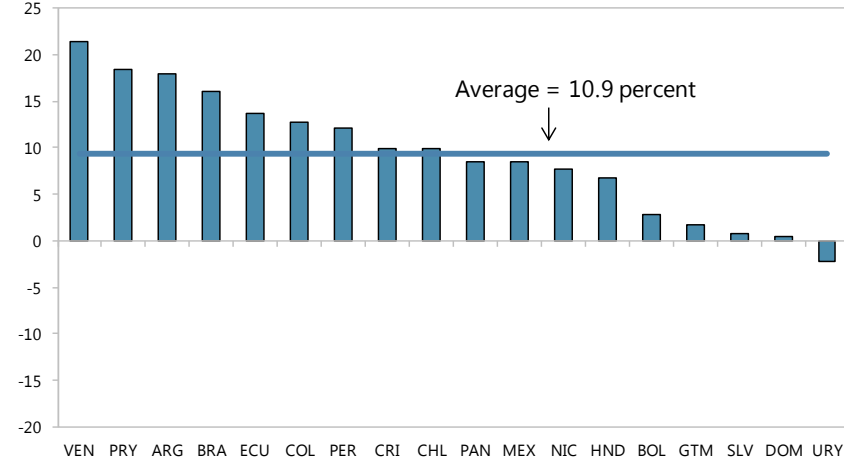
Source: IFTS.

Banking Credit Level and Banking Credit Growth, 2004-2011

Real Banking Credit Growth (percent)

Banking Credit to GDP (percent)

Note: Each observation is an annual growth rate for a country in LA.

Sources: IFTS; WEO.

Credit growth across market segments

- **All market segments have benefited from the credit expansion…**

- **… but on average growth rates for <u>mortgages</u> and <u>consumption credit</u> have been most significant…**

- **… which reflects the pictures in most countries. (Exceptions are Guatemala, Costa Rica, Mexico and Panama)…**

- **… but credit composition in LA remains dominated by corporate credit. (Exceptions are Costa Rica, Honduras and Dominican Republic)**

Real Banking Credit by Market Segment
(2005=100)
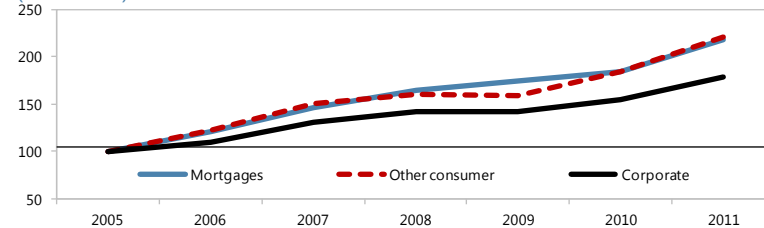
Notes: Simple average of Argentina, Brazil, Chile (Ex. 2011), Mexico, Bolivia, DR (Ex. 2010-11), Guatemala (Ex. 2011), El Salvador, CR and Honduras. Panama. Deflation is done using the CPI index.
Source: WEO and national sources.

Real Mortgages: Growth, 2005-11
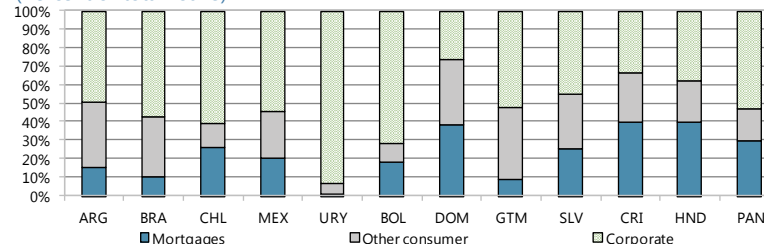(Average annualized growth, percent)
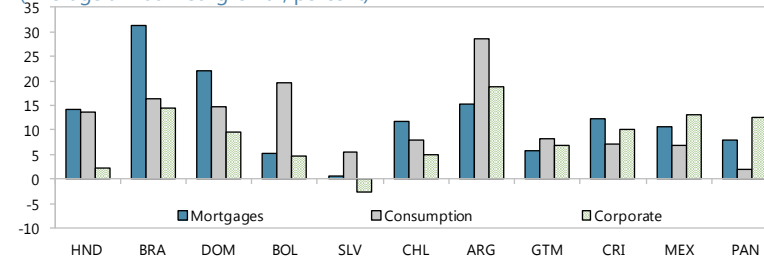
Notes: Dominican Republic is computed using 2004-2009. Credit is deflated using CPI.
Source: WEO and national sources.

Loans by Banking Sector by Segments, 2011
(Percent of total loans)

Notes: Chile and Guatemala are from 2010, while Dominican Republic is from 2009.
Source: National sources.

Stylized facts, 3

Credit growth across corporate sectors

• **Within the corporate sector all industries absorbed more credit …**

•**… with the <u>construction</u> accounting for the largest growth rates (pre- and post-crisis)**

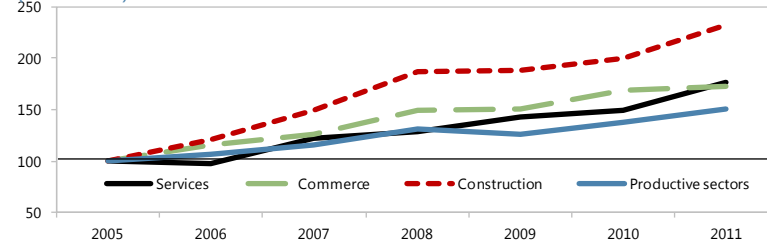•**…followed by the <u>service</u> and <u>commerce</u> sector …**

•**… while credit to the <u>productive</u> sectors* has been least buoyant.**

•**But for most countries (except Bolivia, Dominican Republic and Panama) construction accounts for less that 30% of corporate credit.**

Real Commercial Credit by Sector
(2005=100)

Legend: Services, Commerce, Construction, Productive sectors

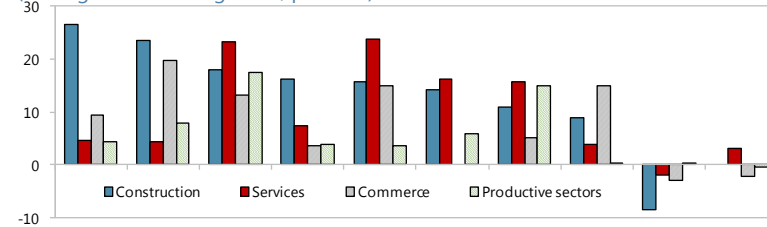**Notes:** Simple average of Argentina, Mexico, Uruguay, Bolivia, Dominican Republic (ex. 2010-11), Guatemala (Ex. 2011), El Salvador, Costa Rica, Honduras, Panama.

Real Credit by Sector: Growth, 2005-2011
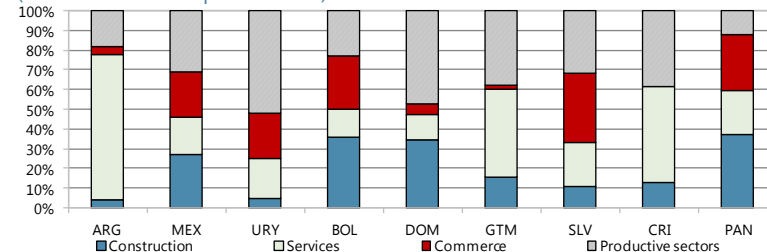(Average annualized growth, per cent)

Legend: Construction, Services, Commerce, Productive sectors
Categories: MEX, URY, ARG, GTM, DOM, CRI, PAN, BOL, SLV, HND

Notes: Dominican Republic and Guatemala are computed using 2004-09 and 2005-10, respectively.
Sources: WEO and national sources.

Corporate Credit from Banks by Sector, 2011
(Percent of total corporate loans)

Legend: Construction, Services, Commerce, Productive sectors
Categories: ARG, MEX, URY, BOL, DOM, GTM, SLV, CRI, PAN

Notes: DR and Guatemala are from 2009 and 2010, respectively.

Notes: "Productive sectors" is defined as Agriculture and other Rural Industries, Manufacturing, Mining and Energy Supply. For Argentina, Mexico and Bolivia "Real Estate Services" is included in "Construction". Credit is deflated using CPI.
Sources: WEO and national sources.

*: **"Productive sectors " is defined as Agriculture, Other Rural Industries, Manufacturing, Mining and Energy Supply**
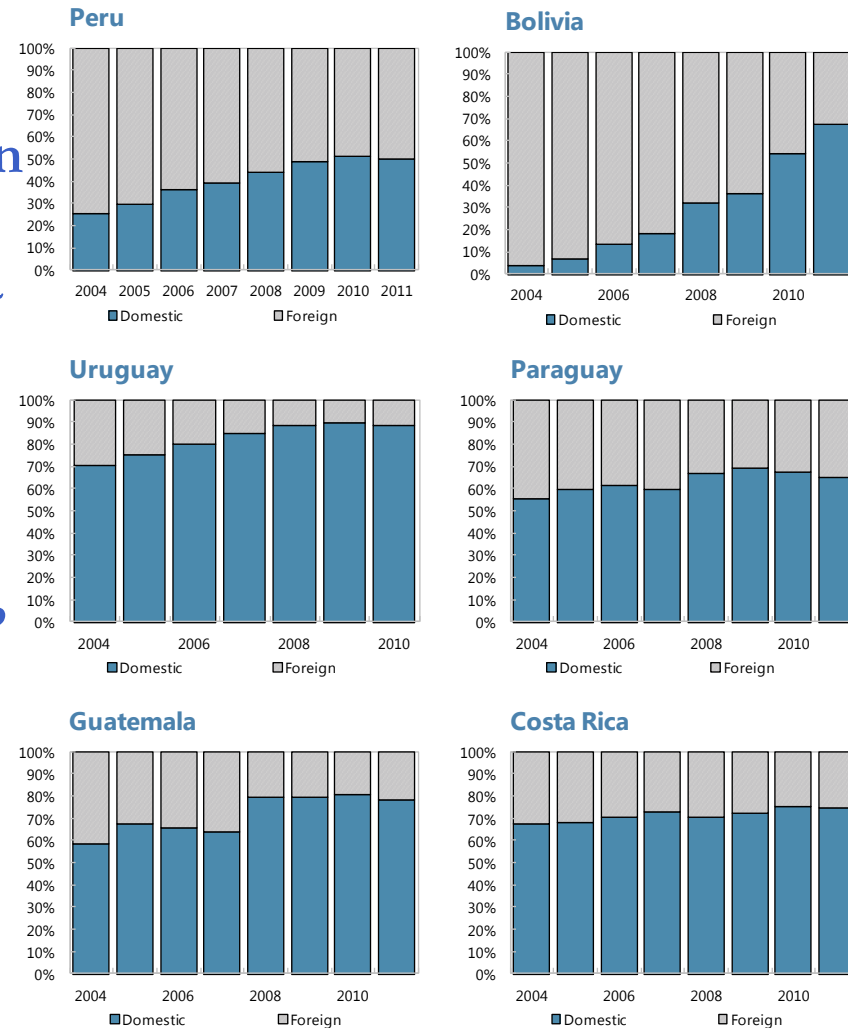
Credit growth by currencies

• The credit expansion during 2004-11 has biased the distribution of loans towards national currency …

• … which has contributed to a significant "de-dollarization" of the stock of credit in Peru, Bolivia, Uruguay and to a lesser extend in Paraguay, Guatemala and Costa Rica.

• … while the share of credit in FX has remained limited and roughly constant (<10%) in Chile, Brazil, Mexico, Ecuador, Argentina, Dominican Republic, Colombia, Honduras and El Salvador…

• … and credit remains dollarized in Panama and Nicaragua.

Loans by Banking Sector to Private Sector by Currency
(Percent of total loans, ultimo stock)

Notes: Loans of Other Depository Corporations to the Non-Financial Sector, Other Resident Sectors and Non-Residents divided on foreign and domestic currency.
Source: MBRF2

Credit growth across maturities

- Some lengthening in maturities occurred from 2003 to 2011…

- … significant lengthening of maturities in Brazil and Chile and to some degree in Bolivia….

- … and maturities have remained roughly constant and relatively long (<30% shorter than one year) in Guatemala and El Salvador…

- …. while maturities remain short in Mexico…

- … but poor data coverage precludes us from analysis of remaining countries.

Loans by Banking Sector by Maturity
(Percent of total loans, ultimo stock)
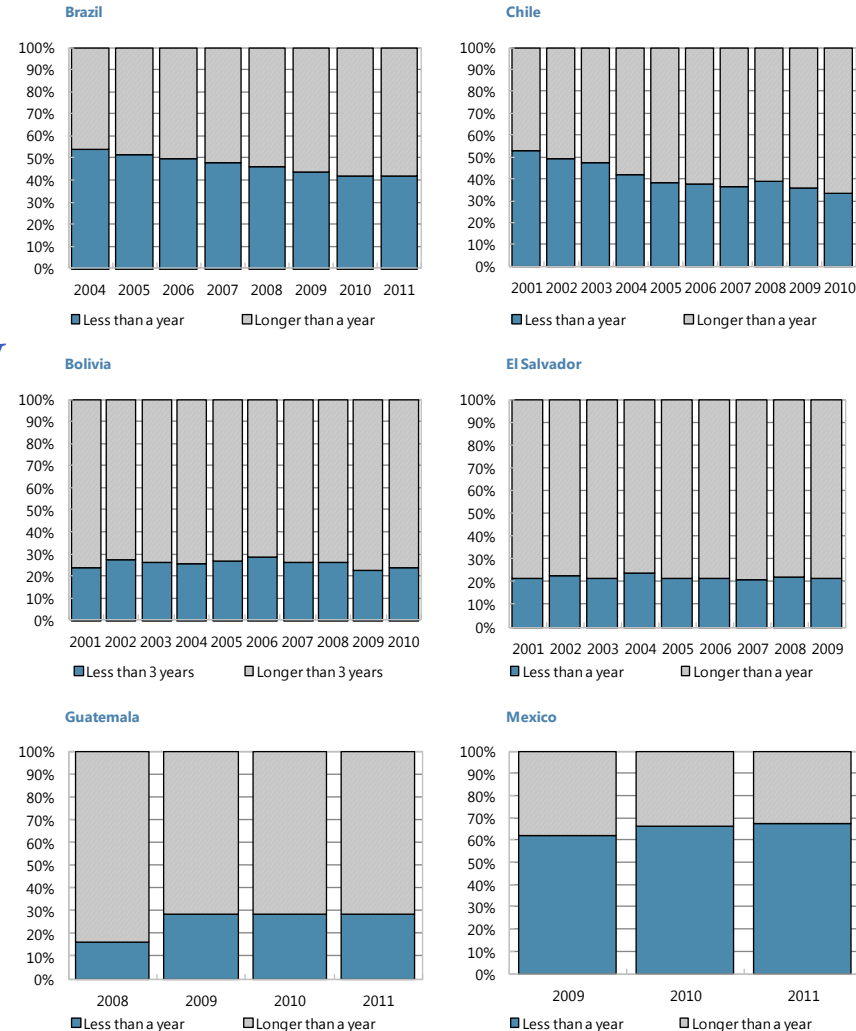
Source: Banco Central de Chile; Autoridad de Supervision del Sistema Financiero (Bolivia); Banco Central de Reserva de El Salvador; Superintendencia de Bancos (Guatemala); Banco Central Do Brasil (Brazil); Comision Nacional Bancaria y de Valores (Mexico).

Stylized facts, 6

Credit growth across banks origin

• **Foreign owned banks* have been important for expanding credit in LA, but domestic banks have been the main drivers.**

• **In most countries, foreign banks displayed faster lending growth *vis-à-vis* domestic banks in the run-up to 2008 ….**

• **… however the largest contributions to credit growth in most countries came from domestic banks owing to larger market shares…**
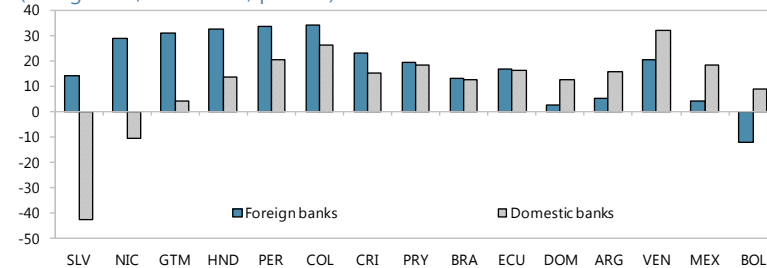
• **… and while foreign banks curtailed their lending post Lehman…**

• **… lending from domestic banks held up better.**

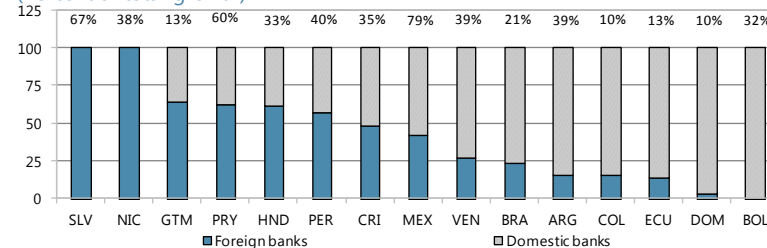***: data is kindly provided by Claessen and van Horen (2012)**

Total loans by bank origin, 2004-2008
(Real growth, annualised, percent)
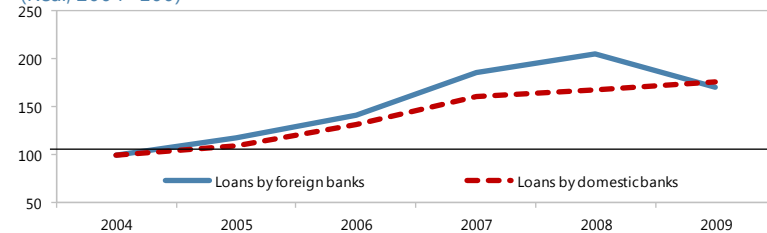
Contributions to Growth in Real Credit, 2004-08
(Percent of total growth)

Notes: Contributions have been truncated at 0 and 100 percent. Numbers denote the market share of foreign banks.

Total Loans by Bank Origin, 2004-09
(Real, 2004=100)

Notes: Simple average of Argentina, Brazil (Ex. 2009), Colombia, Mexico, Peru, Venezuela (Ex. 2009), Bolivia, DR, Guatemala, Ecuador, Nicaragua, El Salvador, CR, Honduras.

Notes: A bank is defined as foreign if more than 50 percent of its shares are owned by foreigners. Deflation is done using the CPI index.
**Source:** Classens and van Horen (2012); WEO.

Summarizing Stylized Facts

Tentative stylized facts about the credit expansion in LA, primo 2004 - ultimo 2011:

1. Credit to the non-financial private sector has increased from 31 percent of GDP in 2004 to 38.5 percent in 2011 on average.

2. Three phases in the credit expansion: (i) Real credit expanded rapidly 2004-2007, (ii) this was interrupted by a slowdown 2008-09 (iii) followed by a pick-up in growth rates to near pre-crisis levels 2010-11.

3. The expansion happened from low initial levels *vis-à-vis* other emerging markets and other countries with similar income levels.

4. The expansion in LA has been slower than what was observed in Emerging Europe up to 2008.

5. The credit expansion was fastest for mortgages and consumption credit.

6. Within the corporate sector credit growth was highest in construction and least in the productive sectors.

7. Credit is increasingly "de-dollarized" due to a relative rise in national currency loans .

8. Foreign banks expanded their loan portfolio faster than domestic banks in the run-up to 2008, but domestic banks accounted for the largest growth contribution.

9. Some tendency to maturity lengthening, but more data is needed to validate that tendency is general across LA.

Stylized facts, 8

Is Credit Excessive ?

- Credit can be "excessive" in dimensions (Kiss-Marton and Vonnak, 2006):

- First, the level of credit can be beyond what is sustainable in the long-run (Boom #1)…

- Second, the growth of credit can be too rapid (Boom #2).

Credit

Boom #1

Equilibrium

Convergence path

Boom #2

Time
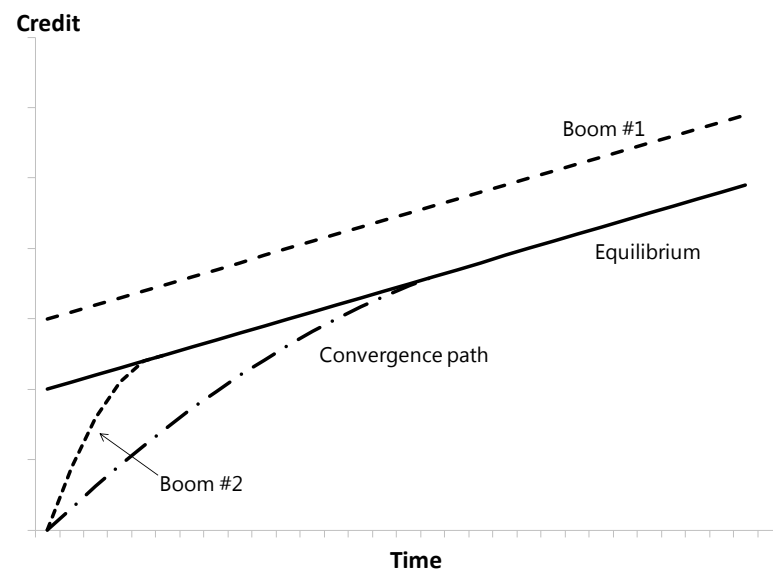
Is Credit Excessive ? An Econometric Approach

- Two-stage approach. First, estimate a long-run relationship between the level of credit-to-gdp and fundamentals (1). Second, estimate short-run dynamics of <u>credit growth</u> (2).

$$y_{it} = \beta_0 + \beta_1 x_{1,it} + ... + \beta_n x_{h,it} + \varepsilon_{it} \tag{1}$$

$$\Delta y_{it} = \alpha_0 + \alpha_1 ecm_{i,t-1} + \alpha_1 z_{1,it} + ... + \alpha_n z_{n,it} + \sum_{j=1}^{k} \alpha_{n+j} \Delta y_{it} + \sum_{g=1}^{h} \sum_{j=0}^{k} \alpha_{n+g+j} \Delta x_{j,it} + \varepsilon_{it} \tag{2}$$

- In (1), we use economic fundamentals that are found to co-integrate with the credit-to-gdp level.

- In (2), the error-correction to the estimated LR-level is included along with fundamentals that can affect credit growth in the short run.

- Use these relationships to predict a long-run credit level of credit and the growth rates for each LA country.

Is Credit Excessive ? Level

- We identify a LR-relationship between credit-to-gdp and deposits-to-gdp.

- Estimation window is chosen to be 1970Q1-2003Q1, so as to exclude the recent boom period, which risks creating an upwards bias in our estimates.

- To allow for non-linearities across income levels we estimate separate relationships for Middle Income Countries and High Income Countries, respectively.

- Stability of the relationships is confirmed through recursive estimation and through recursive country exclusions…

- … and the homogeneity assumption (within groups) is accepted.

Dep. variable: Ln(credit-to-gdp)			
		MIC	
Ln(deposits-to-gdp)		0.83*** (0.06)	
Cons		-0.05 (0.25)	
N		61	
T		1970Q1-2003Q4	
N*T		6232	

Notes: Standard errors in parenthesis. *,** and *** denotes significance on 1, 5 and 10 percent level, respectively. Estimated using the Mean Group estimator.

Is Credit Excessive ? Level

- A positive deviation from the estimated LR relationship means that the level of credit is high given the level of deposits and the historic relationship between credit and deposits…

- … and recent banking crisis in Emerging Europe did happen amid a background of positive and rising deviations.

- … as did the Asian crises in the 1990.

- … and some of the previous banking crises in LA. …

Actual less estimated credit - MIC estimates
Percent of GDP
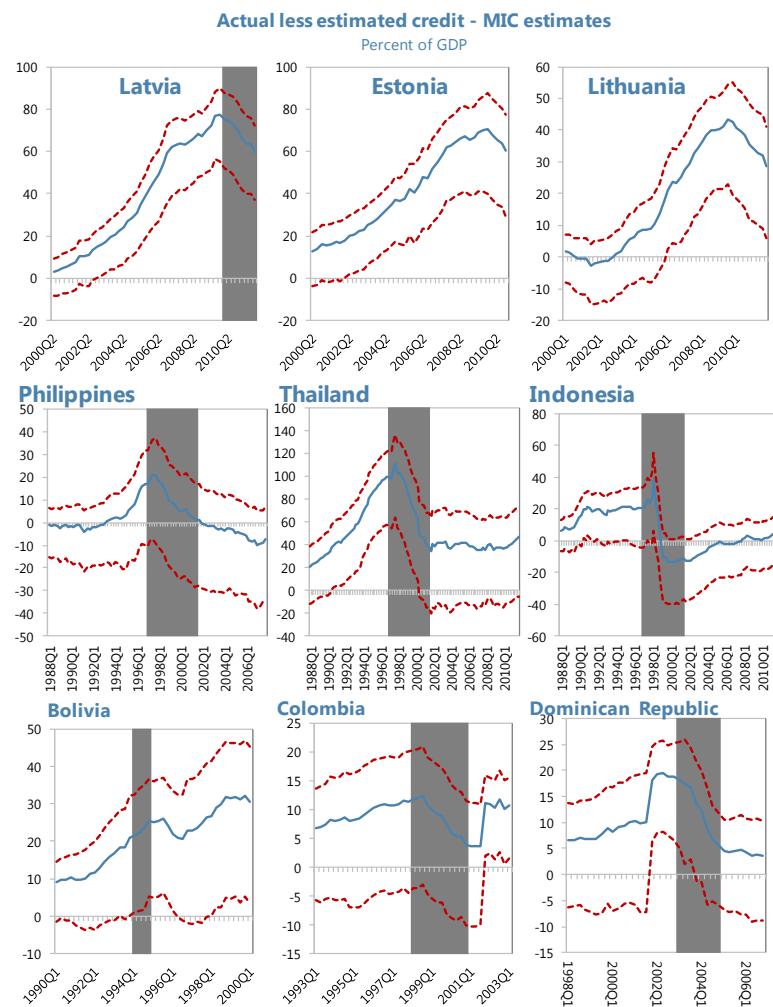
Notes: The differences of the actual credit level and the model prediction (Middle Income Countries. Dotted lines depicts the 95% prediction intervals. Shaded periods indicate the duration of banking crisis. Crisis dating is from Laeven and Valencia (2010). Source: IFTS, WEO, Leaven and Valencia (2010) and own calculations.
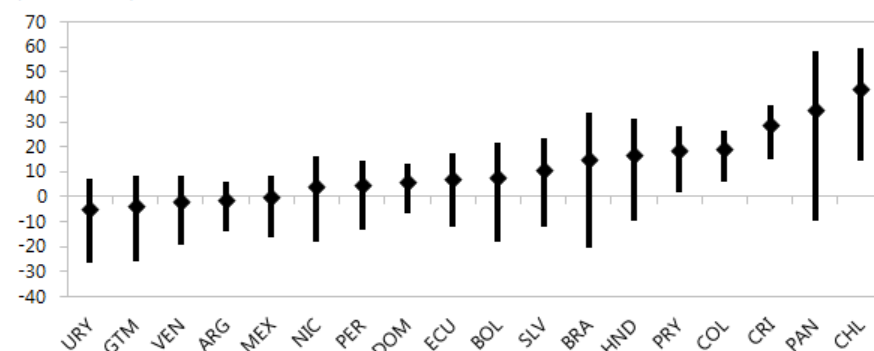
Is Credit Excessive ? Level

- **Using the estimated LR-relationships, we can assess whether the observed credit-to-gdp levels in LA are high *vis-à-vis* the predicted LR level.**

- **According to the estimated LR-relationship for MICs the LA credit levels in 2011 are elevated but within their long-run equilibrium. However, there are significant deviations in <u>Paraguay</u>, <u>Colombia</u> and <u>Costa Rica</u>.**

- **A similar conclusion arise if one uses the estimated LR-relationship for LA.**

- **However, the credit-to-gdp level in Chile historically appears to better explained by the LR relationship estimated for the HICs. According to this, Chile is within its equilibrium range.**

Actual less estimated credit, 2011 - MIC estimates
(Percent of GDP)

Notes: Estimated excessive credit denotes the difference between actual credit and the prediction of the models. The bands indicate the 95% prediction intervals.

Econometrics, 5

Is Credit Excessive ? Growth rates

•Using deviations from the estimated LR equilibrium and other stationary variables used in the literature, we now estimate the short-run dynamics of credit growth.

•The ECM-term is negative, which is supportive of cointegration.

•The real interest rate enters negative, which is consistent with demand driven credit. To account for potential reverse causality it is instrumented using its own lag.

•Government debt enters negatively, which could capture crowding out effects of private sector credit.

•Income per capita enters positively, as a higher level of economic development could increase the supply and demand of loans.

•Net capital inflows enters positively, which could capture that external funding can increase the supply of credits.

•Banking sector concentration enters (borderline) negative, which could reflect that increased competition increase the supply of credit.

Dep. var.: d.log(credit-to-gdp)	
	MIC
Constant	0.0210*** (0.0075)
ECM(t-1)	-0.0161*** (0.0033)
Real interest rate	-0.0008** (0.0004)
Government debt / GDP	-0.0002*** (0.0001)
d.log(GDP per capita, PPP-adjusted)	0.3120* (1.64)
Net capital flows /GDP	0.0009** (0.0004)
Banking sector concentration	-0.0146 (0.0092)
N	41
T	1970Q1-2003Q4
N*T	910

Notes: Standard errors in parenthesis. *,** and *** denotes significance on 1, 5 and 10 percent level, respectively. Lags of d.log(credit-to-gdp) and d.log(deposits-to-gdp) are included but not reported. The real interest rate is the deposit rate which is instrumented using its own lag. Estimation is done using GMM.

Is Credit Excessive ? Growth rates

- **Using the estimated short-run dynamics, and the fundamentals of LA, we can now benchmark the growth rates in LA *vis-à-vis* the model prediction.**
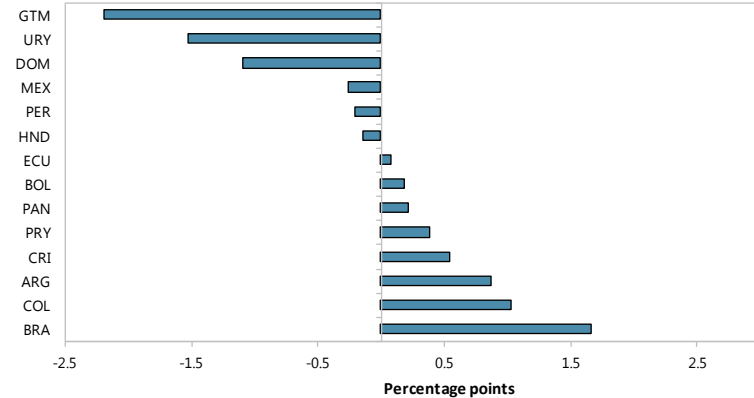
- **Quarterly growth in the credit-to-gdp ratio has during 2004-11 on average been above the model prediction in Brazil, Colombia, Argentina, Costa Rica and Paraguay…**

- **… in most countries the deviations receded, or turned negative, during 2008-09 …**

- **… but since 2010 the deviations have picked up again. In 2011 Argentina, Costa Rica, Colombia, Panama, Bolivia, Peru and Brazil posting credit growth above the model prediction.**
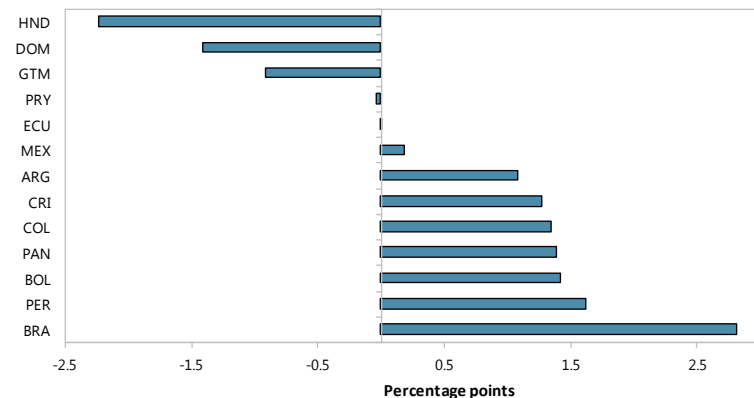
Actual less estimated credit growth, 2004-11
Average deviation in quarterly percentage change in private credit to GDP ratio

Actual less estimated credit growth, 2011
Average deviation in quarterly percentage change in private credit to GDP ratio

Notes: Average deviation between actual and estimated change in ln(credit/gdp) per quarter (Model for MIC).
Sources: IFTS; WEO; own calculations.

Is Credit Excessive ? Summary

- In sum, our econometric analysis suggests…

- **Credit-to-gdp levels** in Latin America appear elevated, but for most countries within their estimated LR equilibrium. Notable exemptions are **Paraguay, Costa Rica** and **Colombia**, where our analysis suggests that levels are significantly above the estimated equilibrium…

- **Credit growth** during 2004-11 has been above what can be explained by fundamentals in **Brazil, Colombia, Argentina, Costa Rica** and **Paraguay**.

Conclusions (tentative)

- Is the credit growth in LA reflecting financial development….

  - Depth of credit market is increasing from (and remains at) a low level

  - Credit is flowing to all segments and sectors

  - Credit has de-dollarized and some evidence of maturities lengthening

  - For most countries credit-to-gdp level are within their estimated long-run equilibrium

- … or is a credit boom ?

  - Credit is growing strongest for mortgage and consumption credit.

  - Within corporate credit construction is growing the fastest.

  - Credit levels and growth rate for some countries appear to be above what is warranted by fundamentals

Possible future analysis

- **How does composition of credit in LA compare to other regions?**

- **Testing the deviations from the estimated LR relationship as a leading indicator for financial crisis.**

- **Deepening the understanding of long-run credit relationship beyond deposit funding given availability of other funding sources. Robustness checks of the SR specification.**

- **Applying the statistical approach to identify credit boom as a robustness check.**

- **Country-by-country regressions.**

Thank you

Stylized facts 7: Financial indicators
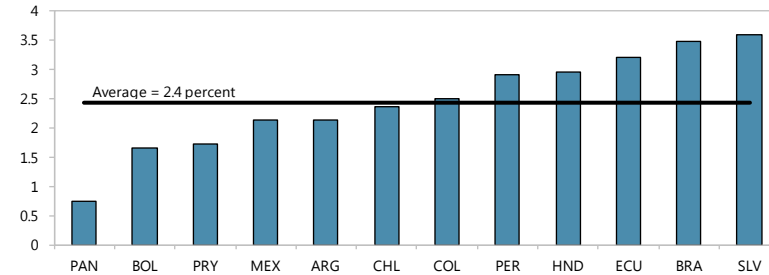
- Financial indicators in LA remain stable for now….

- …witnessed by a low share of non-performing loans

- … and high bank profitability …

- …but these are lagging indicators for problems in the financial sector, and might be biased during credit booms (Natalia and Deniz, 2008)…
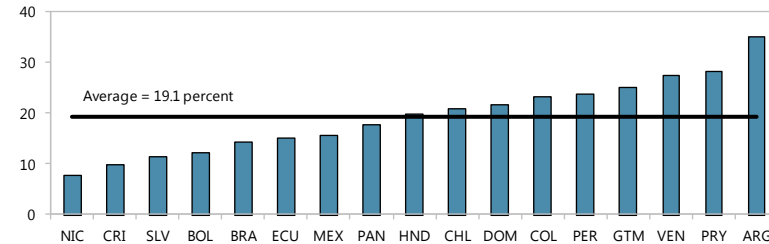
- … and it could be cause for concern that NPL provisions and capital buffers have *declined* in the countries with fastest credit growth.

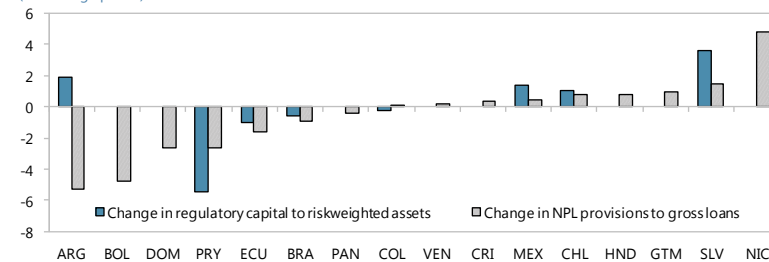**Banks: Nonperforming loans, 2011**
(Share of gross loans)

Average = 2.4 percent

PAN BOL PRY MEX ARG CHL COL PER HND ECU BRA SLV

Notes: Argentina is from 2010.

Banks: Return on Equity, 2011
(Ratio)

Average = 19.1 percent

NIC CRI SLV BOL BRA ECU MEX PAN HND CHL DOM COL PER GTM VEN PRY ARG

Notes: Argentina, Venezuela, Bolivia, Dominican Republic, Guatemala, Nicaragua and Costa Rica are from 2010.

Capital Buffers and NPL provisions, 2005-11
(Percentage points)

◼ Change in regulatory capital to riskweighted assets   ◻ Change in NPL provisions to gross loans

ARG BOL DOM PRY ECU BRA PAN COL VEN CRI MEX CHL HND GTM SLV NIC

Notes: For Argentina the change in the Regulatory Capital to Riskweighted Assets is from 2005 to 2010. .

Source: Financial Soundness Indicators; Bankscope.

Credit Growth in Latin America:

Financial Development or Credit Boom ?

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Preliminary draft for discussion