Financial stability under Balance of Payment Dominance: Evidence from Latin American banks, 2003-2014

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CBDSS Conference on Banking Development, Stability and Sustainability

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Financial stability under Balance of Payment Dominance: Evidence from Latin American banks, 2003-2014

1. Introduction

2. Literature Review

3. Methodology

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External sector has been a source of business cycles and financial crises. Latin America is an emblematic case of study about the incidence of external shocks on financial crises

Since the eighties, emerging economies have experienced a **sustained growth of international trade and a faster and deeper integration of their financial markets**

Source: IMF, 2016

Capital inflows to emerging World (1983=100)

1117

514

236

100

1983   1993   2003   2013

Source: Ahmed & Zlate, 2014

Openness rate of emerging World

54

25

1986   2013
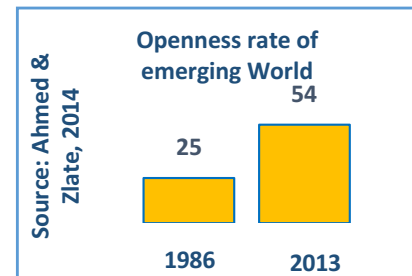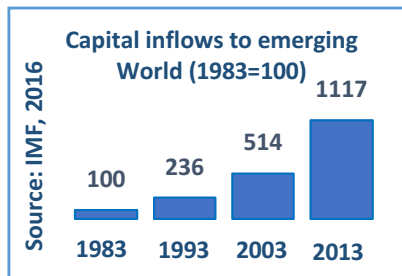
As the share of external sector in developing economies increased, **external shocks became a more important source of their business cycles**

Calvo, Leiderman and Reinhart (1996) and Calvo (2005)

Financial crises in emerging economies turned out to be increasingly **determined by external reasons**

Kaminsky, Reinhart & Vegh (2005) and Reinhart & Rogoff (2008)

There exists a consensus that **Latin American financial crises in both 80s and 90s were mainly determined by external shocks,** even though economic conditions and financial regulatory frameworks were very different in those decades.

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The 80s: From <u>financial repression</u> to <u>financial liberalization</u>...

External shocks...	**... led the "Latin American lost decade"**	**The crises of public debt came with:**	**LATAM ended the 80s with:**
• Increase in oil prices (late 70s) • Appreciation in developed countries (early 80s)	• High inflation rates • Large fiscal deficits • Crises of public debt	• Many **financial crisis** (Birdsall and Lozada, 1996) • **Financial repression** as defined by McKinnon (1973) and Shaw (1973).	• Inefficient banking systems • Scarcity of capital.

Financial liberalization was a fundamental piece of the structural reforms and stabilization programs adopted by LATAM in late 80s and early 90s

The 90s: From <u>financial liberalization</u> to <u>macroprudential policy</u>…

The quick win…	… with "unexpected consequences"	New external shocks came…	…and led to:
• Rapid increase in private loans, FDI and portfolio investment • **Accelerated growth** in the first half of the 90s	CA deficit went from 0.25% of the GDP in 1990 to 4.48% of the GDP in 1998	• Financial crises of Asia and Russia • Sudden stops in international financial markets	**the most intense financial crises in the history of LATAM** (Izquierdo & Galindo, 2003).

- The regulatory framework should be oriented to keeping macroeconomic and financial stability in open financial markets.

- This issue became one of the cornerstones of a wider set of recommendations called **macroprudential policy,** adopted by the most of large Latin American economies

- In terms of macroeconomic policy, some countries in Latin America have adopted inflation targeting schemes, flexible exchange rates, fiscal policy rules and harder financial regulation.

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A harder financial regulation was fundamental piece of macroprudential policy

		Country				
		Brazil	Mexico	Chile	Colombia	Basel III
Capital	**Capital requirements**	Basel III Since Jan-16	Basel III Since Jan-16	Solvency ratio 8%	Solvency ratio 9%	CET1 (4.5% and 7%) + Buffers
	Computable capital	Basel III Since Jan-13	Basel III Since Jan-13	Basel I	Toward Basel III	Definition of capital
	Credit Risk	Basel III Since Jan-17	Basel III Since Jan-17	Basel I	Basel I	SA - CCR
	Market Risk	Basel III (IMA) Since 2007	Basel III (SA) Since 2007	Basel I	Basel II Internal Models	IMA / SA
	Operational Risk	Basel III (AMA) Since 2009	Basel III (BIA) Since 2009	No	No	BIA / SA / AMA
Others	**Liquidity Risk**	Basel III Since Jan-15	Basel III Since Jan-15	No	Basel III proxy Since Jan-12	LCR
	Leverage	Basel III Since Jan-15	Basel III Since Jan-15	No	No	TIER 1 leverage ratio 3%
	Stress testing	ICAAP + Supervisor exercises	Supervisor exercises	Supervisor exercises	Supervisor exercises	ICAAP / Supervisor exercises

Source: Own elaboration

ICAAP: Internal Capital Adequacy Assessment Process
CET1: Common Equity Tier 1
AMA: Advance Measure Approach
IRB: Internal Ratings-Based Approach

SA: Revised Standardized Approach
BIA: Basic Indicator Approach
LCR: liquidity Coverage Ratio
CCR: Counterparty credit risk

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The late 2000s: this time is different.

The deepest external shock…

- Subprime crisis in US led to the largest demand shock since 1929.

- Financial sector was the origin of the crisis

… with the lowest incidence

The good performance of Latin American financial system during 2008-2010 seems to reveal that Basel's recommendation were enough to shield financial stability not only from domestic shocks, but from external

… Is it a happy end?

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… No. The region is still vulnerable to financial crisis, in a context of Balance of Payment Dominance

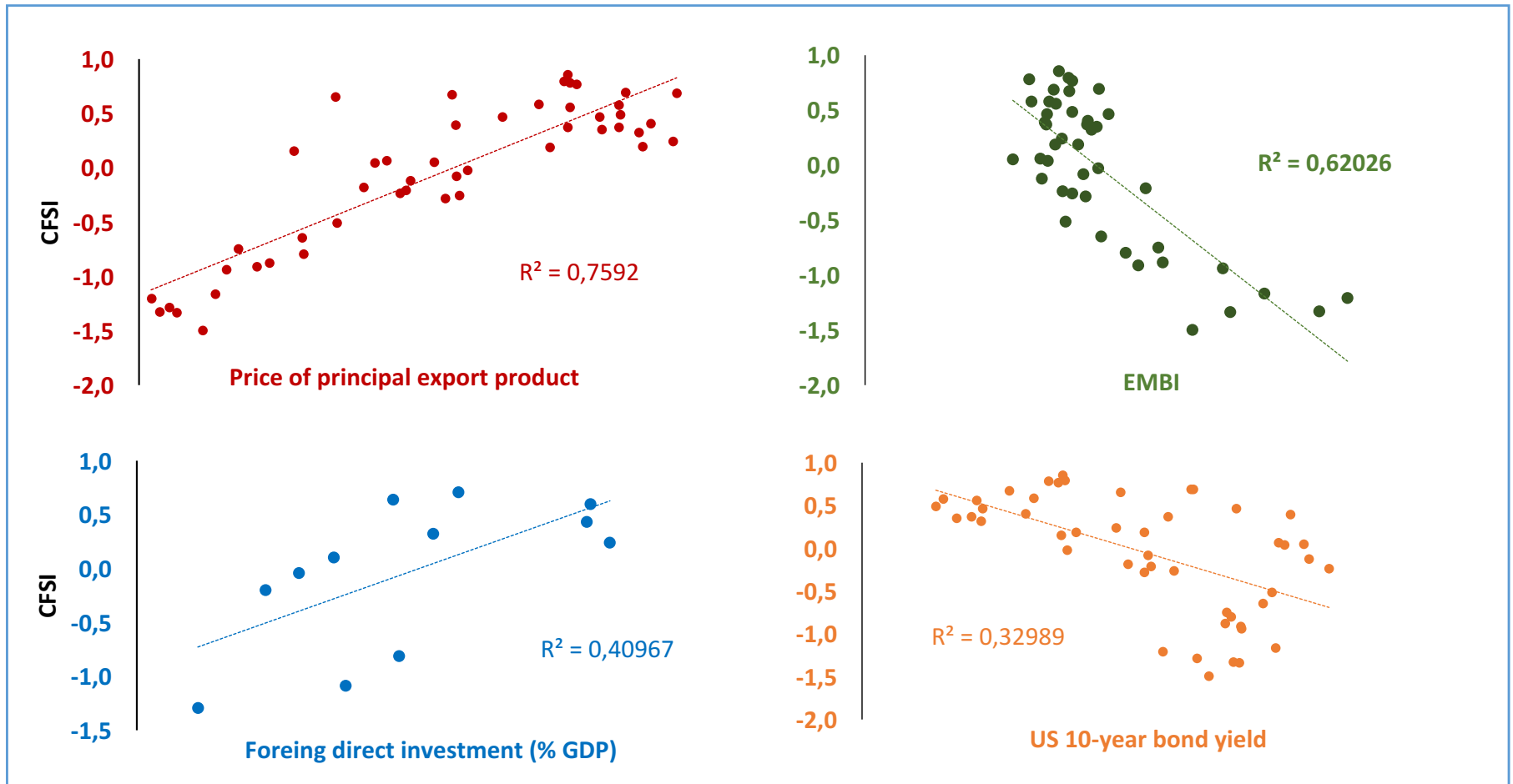| BoP Dominance…	… remains in 2012-2015…	… leading to contractionary policy responses….	… that end up in new financial crises:
Short-term macroeconomic dynamics is mainly determined by the external shocks, both positive and negative, that periodically hit these economies (Ocampo, 2011).	LATAM economies and their financial systems have shown **significant vulnerability** to the shock of the commodity prices **in 2012-2015**	Under **inflation targeting** and **fiscal rules**, external shocks motivate **pro-cyclical responses in monetary and fiscal policy** (Ocampo, 2013).	• Increasing nonperforming loans • Reducing banking solvency and profitability • Limiting the market liquidity

In fact, a Composed Financial Stability Index remains strongly associated to some of the major external variables during the last decade

Composed Financial Stability Index vs. External Variables in 8 LATAM Countries, 2003-2014

$R^2 = 0,7592$

Price of principal export product

$R^2 = 0,62026$

EMBI

$R^2 = 0,40967$

Foreing direct investment (% GDP)

$R^2 = 0,32989$

US 10-year bond yield

Source: Own calculations based on Bloomberg and World Bank.

Objective	Empirically testing the relationship between financial stability and the external shocks for Latin America, but: • At bank level • In a decade of Balance of Payment Dominance and Basel standards implementation (2003-2014).

Hypothesis	Financial systems of LATAM remain vulnerable to external shocks despite the adoption of macroprudential regulation. Countries with full Basel II implementation deal better with external shocks

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Conclusions

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Financial crisis origins: three approaches

Approach	Argument		Authors
1 **Market structure** *Archaya (2009); Arcand et al. (2015); Petersen and Rajan (1995); Cetorelli and Peretto (2000); Padoa-Schioppa (2001); Anginer, et al. (2016); Boyd & De Nicolo (2005); Feixas & Rochet (1997); Mishkin (1999); Stern & Feldman (2004); Reinhart & Rogoff (2009)*	Financial Deepening	**–**	Archaya (2009); Arcand et al. (2015)
	Concentration: firms entry and exit	**+**	Petersen and Rajan (1995); Cetorelli and Peretto (2000); Padoa-Schioppa (2001)
	Concentration: profit expectations	**–**	Anginer, et al. (2016); Boyd & De Nicolo (2005); Feixas & Rochet (1997)
	Concentration: too big to fail	**–**	Mishkin (1999); Stern & Feldman (2004); Reinhart & Rogoff (2009)
	Size of banks	**–**	Klomp & de Haan (2011)
2 **Institutional** *Fergusson (2006); Beck & Levine (2002); Demirgüç-Kunt & Detragiache (1998); La Porta et al. (20013; Dyck & Zingales (2004); La Porta et al. (1998)*	Strong institutions help to reduce adverse selection	**+**	Fergusson (2006)
	Unprotected property rights	**–**	Beck & Levine (2002); Demirgüç-Kunt & Detragiache (1998)
	French legal origins	**–**	La Porta et al. (20013; Dyck & Zingales (2004); La Porta et al. (1998)

Financial crisis origins: three approaches

Approach	Argument		Authors
3 **Business Cycle** *Minsky (1975, 1992); Kindleberger (2005); Yellen (2011); Gavin & Hausmann (1996); Gourunchas et al (1999); Schularick & Taylor (2009); Reinhart & Reinhart (2010); Borio & Lowe (2002); Borio & White (2004); Calvo et al (1996); Kaminsky and Reinhart (1999) Reinhart and Rogoff (2008) Reinhart and Reinhart (2008); Tong & Wei (2009); Olaberría (2012); Demirgüç-Kunt et al. (2016); Demirgüc-Kunt & Maksimovic, (1998); La Porta et al. (1998); Levine et al. (2000); Beck & Levine (2002); and Levine (2004); Loayza & Rancière (2006).*	**Prices** — Asset prices bubbles	**-**	Minsky (1975, 1992); Kindleberger (2005); Yellen (2011)
	Monetary policy dilemma: credit booms + demand-driven inflation.	**-**	Gavin & Hausmann (1996); Gourunchas et al (1999); Schularick & Taylor (2009); Reinhart & Reinhart (2010); Borio & Lowe (2002); Borio & White (2004)
	External Factors — **Short run** — Procyclical capital flows	**-**	Calvo et al (1996); Kaminsky and Reinhart (1999) Reinhart and Rogoff (2008) Reinhart and Reinhart (2008)
	FDI preferred than portfolio investment	**+**	Tong & Wei (2009); Olaberría (2012); Demirgüç-Kunt et al. (2016)
	Long run — Liberalization – efficiency - stability	**+**	Demirgüc-Kunt & Maksimovic, (1998); La Porta et al. (1998); Levine et al. (2000); Beck & Levine (2002); and Levine (2004)
	Institutional learning	**+**	Loayza & Rancière (2006).

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3. **Methodology and data**

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For the panel data estimation, there are four different kind of variables:

Variable

A — Endogenous variables: **Financial stability**
- Assets quality (AQ): 1-NPL
- Capital adequacy (CA): regulatory capital to risk-weighted assets
- Market valuation: Stock market value (SMV)

B — Main exogenous variable (related to the hypothesis): **External Business Cycle**
- ECI
  - Terms of trade: price of main export product (Ocampo, 2011)
  - Risk: EMBI (Tovar and Jara, 2010)
  - Capital inflows: FDI as % of GDP (Ocampo, 2013)
  - Liquidity: 10y treasury bonds (Eichengreen and Rose, 1998)

C — Control variables related to **domestic business cycle**
- Output gap
- Financial depth

D — Control variables related to **market conditions**
- HHI
- Inflation
- Interest rate spread
- Regulation
- Bank size

E — Main exogenous variable (related to the hypothesis): **External Business Cycle**
- CFSI*
  - Non-performing loans
  - Regulatory capital to risk-weighted assets
  - Return over equity (ROE)
  - Liquidity index

*Excluding the endogenous variable

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Data were collected bank by bank…

Observations

- 1044 observations for the period 2003 to 2014

- 87 banks operating in 6 countries of the region (Brazil, Chile, Colombia, Ecuador, Mexico and Peru)

- More than 80% of the assets of banking systems (Annex 2).

- The frequency of the variables is annual.

Sources

- **AQ:** information about NPL
  - Bankscope database for Ecuador, Mexico and Peru
  - Brazil, Chile and Colombia from Central Bank of Brazil, Banking Superintendence of Chile and Financial Superintendence of Colombia.

- **CA:** information about solvency was extracted from the data published by financial authorities in each country.

- **SMV:** the value of shares traded in the stock market was collected from Bloomberg.

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Regulation variable (Basel II standards)

- For regulation, we construct two dummies that take values of one for countries that have adopted Basel II standards.

- In terms of asset quality (AQ), adoption of Basel II is understood as the adaptation of credit risk models proposed by the Basel Committee. According to BIS review, the countries that have adopted Basel II under this definition are Brazil, Chile, Mexico and Peru, while Colombia and Ecuador are still in Basel I. In addition, countries that adopted Basel II did it fully from 2010.

- In the case of capital adequacy (CA) and market value (SMV), Basel II means the adoption of the three pillars of the standards: i) capital requirements, ii) supervision and iii) market discipline. According to the Financial Stability Board (FSB, 2011a, b), Mexico in 2008, Brazil in 2007 and Peru in 2010 fully adopted the recommendations, in contrast to Chile, Colombia and Ecuador.

The specification of the panel:

- In this sample, there may be time-invariant unobserved effects (for all, but different) for each bank within the errors of the sample, influencing the consistency of estimators.

- This unobserved effects can be, for example, the French origin of the legal framework that has the countries studied (La Porta et al. 2003). In addition, the regulation of each country.

- The Breush-Pagan and Hausman test indicate that there is heterogeneity between individuals (panel effect) and that the unobserved effect is **fixed** to the extent that it is more consistent to random effects.

A balanced panel with fixed effects is used; estimating the parameters through generalized least squares (GLS) that correct heteroscedasticity

First specification: Financial stability as Asset Quality

$$AQ_{it} = \alpha_{it} + \alpha_1 ECI_{it} + \alpha_2 D_{Basel-credit} + \alpha_3 D_{Basel-credit} * ECI + \alpha_4 FD_{it} + \alpha_5 HHI_{it} + \alpha_6 CFSI_{it} + \alpha_7 \pi_{it} + \alpha_8 spread_{it} + \alpha_9 size_{it} + u_{it}$$

Second specification: Financial stability as Capital Sufficiency

$$CA_{it} = \alpha_{it} + \alpha_1 ECI_{it} + \alpha_2 D_{Basel-capital} + \alpha_3 D_{Basel-capital} * ECI + \alpha_4 FD_{it} + \alpha_5 HHI_{it} + \alpha_6 CFSI_{it} + \alpha_7 \pi_{it} + \alpha_7 spread_{it} + \alpha_8 size_{it} + + u_{it}$$

Third specification: Financial stability as Market Value

$$SMV_{it} = \alpha_{it} + \alpha_1 ECI_{it} + \alpha_2 D_{Basel-capital} + \alpha_3 D_{Basel-capital} * ECI + \alpha_4 FD_{it} + \alpha_5 HHI_{it} + \alpha_6 CFSI_{it} + \alpha_7 \pi_{it} + \alpha_8 Spread_{it} + \alpha_9 size_{it} + \alpha_{10} LSMI + u_{it}$$

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Results

	Financial stability		
	AQ	CA	SMV
ECI	+	+	+
D_Basel_capital*ECI	(grey)	-	-
D_Basel_Credit*ECI	-	(grey)	(grey)
D_Basel_Credit	-	(grey)	(grey)
D_Basel_capital	(grey)	-	-
LSMV	(grey)	(grey)	+

	Financial stability		
	AQ	CA	SMV
FD	-	-	+
CFSI	+	+	+
HHI	+	+	-
Inflation	+	-	-
Spread	-	-	-
Size	-	-	+

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Variables	AQ	CA	SMV
ECI	0.009*** (0.001) 7.32	0.012*** (0.002) 5.24	0.20*** (0.079) 2.52
D_Basel_Credit*ECI	-0.005*** (0.002) -2.92	-	-
D_Basel_Credit	-0.51*** (0.120) -4.26	-	-
D_Basel_capital*ECI	-	-0.023*** (0.004) -6.45	-0.34*** (0.079) -4.31
D_Basel_capital	-	-0.44** (0.22) -2.05	-11.11** (5.34) -2.07
LSMV	-	-	0.74*** (0.061) 12.17
FD	-0.012 (0.008) -1.408	-0.021 (0.014) -1.53	1.62*** (0.41) 3.97
CFSI	0.11*** (0.028) 4.10	0.21*** (0.053) 3.97	2.28* (1.28) 1.78
HHI	0.0002 (0.0002) 0.85	0.0003 (0.0003) 1.02	-0.027*** (0.010) -2.55
Inflation	0.042*** (0.015) 2.85	-0.07*** (0.024) -2.89	-2.66*** (0.74) -3.59
Spread	-0.066*** (0.017) -3.76	-0.020 (0.027) -0.74	-0.10 (0.74) -0.138
Size	-7.56*** (1.94) -3.879	-1.56 (3.58) -0.42	32.33 (63.20) 0.51
_cons	97.07*** (0.52) 185.5	16.17*** (0.88) 18.28	-1.39 (26.28) -0.05
R2-adjusted	0.71	0.72	0.89
Period	2003-2014	2003-2014	2003-2014
N	97	79	17

Regarding the main hypothesis

- ECI is significant at 1% and presents the expected positive sign, meaning that the financial stability of banks in Latin America is still sensitive to shocks from the external sector in a context of BoP dominance.

- The regulation interactive dummy is significant at 1% and has the expected negative sign. This result indicates that commercial banks in the countries that adopted Basel regulations are less vulnerable to external conditions

Regarding the control variables

The main conclusion is that the drivers for SMV are not the same that for capital adequacy or asset quality.

- Concentration has no impact on capital adequacy or non-performing loans, but there is a small but significant market prime for non-concentrated banking systems.
- Financial industry performance (CFSI) by country is not important for SMV, but significant for capital adequacy or asset quality
- Financial deepening has a negative and significant relationship with AQ and CA. Nevertheless, the market considers financial deepening as a positive sign of stability.

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