THIRD BIS CCA RESEARCH CONFERENCE
Financial Stability, Financial Regulation and Monetary Policy
26-27 April 2012 • Rio de Janeiro • Brazil

The relationship between banking market competition and risk-taking: Do size and capitalization matter?

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BANCO CENTRAL DO BRASIL
BANK FOR INTERNATIONAL SETTLEMENTS

Summary of the Presentation

- Introduction and Motivation
- Methodology
  - The estimation of competition.
  - Competition-stability relationship.
- Data
- Main Results
- Final Remarks

Motivation

- Due to the recent financial crisis, there is an ongoing debate in the banking regulation literature on whether market power undermines stability.
- There is a consensus that there must be harsher bank capital restrictions specially for those which are considered as too-big-to-fail (Basel III).
- Will this set of regulations be effective in reducing systemic risk in worldwide banking sectors? If yes, in which conditions?

- With this background, we propose to empirically analyze how competition in the loans market affects financial stability in 10 Latin American banking sectors.
- We also evaluate how the result above varies for banks of different sizes and capital ratios.
    - Do large and/or well capitalized banks have a distinct risk-taking behavior? The answer to this question may, in fact, depend on the competitive conditions of the market.

- As in several other economic problems, there is no consensus in the literature about this topic
- There are two opposed theories:
  - Concentration-stability view: affirms that the lack of competition permits larger banks to obtain oligopoly premium profits, which constitute a "buffer" in time of crisis (Hellman et al. 2000)
  - Concentration-fragility view: defends that the borrower-bank side should also be taken into account. The higher interest rates banks charge under collusion may result in a increase in default and therefore undermine financial stability (Boyd and Nicoló, 2005).
- Are these opposite theories or is it possible to verify them simultaneously (Berger et al. 2009)? Are these hypothesis true for Latin American banking sectors?

Methodology - The estimation of competition

- Since competition is a non-observable variable, the most common procedure is to estimate it;
- Among several available measures, we use the method known as the Boone (2008) indicator (already employed by Schaeck and Cihák, 2010 and Leuvensteijin et al., 2011);
- The basic model to estimate this indicator for the each banking system separately is as follows:

$$ln\left(MS_{ilt}\right) = \alpha + \beta\ ln\left(MC_{ilt}\right) + D_t + e_{ilt}. \qquad (1)$$

where MS and MC are the loans' (I) market share and marginal cost of bank i at time t; D_t are the time dummies.

- β *is the Boone indicator.*

- This indicator considers that competition enhances performance (in this case via market share) of efficient banks (those with lower marginal costs).
- It is expected that $\beta < 0$. The more negative β is, the more competition there is in a specific market.
- In order to estimate the Boone indicator by year t (β_t), we use the following equation:

$$ln\left(MS_{ilt}\right) = \alpha + \sum_{t=2001,\ldots,2008} \beta_t \; D_t \; ln\left(MC_{ilt}\right) + D_t + e_{ilt}. \quad (2)$$

where we interact the time dummies variable with the marginal costs.

Competition-stability relationship

- As a stability variable, we use the Z-score, an already popular stability measure in the literature (Mercieca et al., 2007; Laeven and Levine, 2009; Demirguc-Kunt and Huizinga, 2010b). The Z-score is calculated as:

$$\text{Z-score} = \frac{\overline{ROA} + \overline{CapitalRatio}}{\sigma_{ROA}}. \tag{3}$$

- In line with Fang et al. (2011), we use this score as the dependent variable of a stochastic frontier specification
  - the idea is to consider the distance of each bank from the potential stability given by the overall conditions from where they operate (i.e. a measure of "stability inefficiency").

- The stability stochastic frontier function is estimated as follows:

$$\begin{aligned} \ln(\text{Z-score})_{iht} &= f[y_{iht}, w_{1iht}, w_{2iht}] + (MacroVariables)_h \\ &+ \nu_{iht} - \upsilon_{iht}, \end{aligned} \tag{4}$$

where f is a translog function; ν_{iht} is the random term and $\nu_{iht} \overset{iid}{\sim} N(0, \sigma_\nu^2)$; υ_{iht} is the stability inefficiency; $\upsilon_{iht} \sim N^+(\mu_{iht}, \sigma_\upsilon^2)$ and the subindex h refers to the country where bank i at time t is operating.

- Simultaneously with the frontier estimation, we also evaluate the inefficiency correlates by the Battese and Coelli (1995) specification.

$$\mu_{iht} = \delta_0 + \sum_n \delta_{niht} z_{niht} \tag{5}$$

where z is a vector of n explanatory variables, i.e.:
$z =$
$(\beta_t, \beta_t^2, LLR, SIZE, Liquidity, Capital\ Ratio, Private, Foreign)$

- We also consider 4 different specifications: (i) is the above mentioned; (ii) the same as before plus interactions of β_t (and β_t^2) with SIZE; (iii) same as the first plus interactions of β_t (and β_t^2) with Capital Ratio; (iv) plus all possible interactions among β_t (and β_t^2), SIZE and Capital Ratio.

Data

- We take our database from BankScope and Central Banks of Latin America.
- The data consists in 376 banks from 10 Latin American countries during the years of 2001 to 2008 (unbalanced panel).
  - Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Mexico, Panama, Peru, Venezuela.
  - The total number of observations is 2243.
- When we estimate the competition-stability relationship the time period becomes the years of 2003 to 2008, and the total number of observations is 1491.

Results - The estimation of competition

Table: Boone Indicators for LA banking sectors

	2001	2002	2003	2004	2005	2006	2007	2008
ARG	0.323*	-0.580	-0.429***	-0.590***	-0.262*	-0.363***	-0.346***	-0.471***
BRA	-0.554***	-0.366***	-0.504***	-0.511***	-0.363***	-0.461***	-0.496***	-0.383***
CHI	-0.221	-0.252	-0.275	-0.285	-0.279	-0.279	-0.250*	-0.219
COL	-0.697***	-0.620***	-0.710***	-0.916***	-0.979***	-1.167***	-1.141***	-0.731***
COR	-0.257***	-0.216**	-0.285**	-0.298***	-0.282***	-0.228**	-0.262**	-0.166
DOM	0.597***	0.286	0.292	-0.624***	-0.606***	-0.975***	-1.591***	-1.366***
MEX	-0.218	-0.600***	-0.551***	-0.517***	-0.461***	-0.466***	-0.405***	-0.639***
PAN	-0.445**	-0.677***	-0.700***	-0.751**	-0.585***	-0.286**	-0.286	-0.353
PER	-	-1.232***	-1.303***	-1.304***	-1.192***	-1.230***	-1.283***	-1.242***
VEN	-0.242	-0.866***	-0.596***	-0.680***	-0.202	-0.158	-0.140	0.957***

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

Results - Competition-stability relationship

- Banks operating under both high and low competition appear to be more stable than the ones under average competition (inverse U-shaped relationship).
- This result may explain why there are still inconclusive (and often contradictory) results in the literature.
- Secondary results:
  - Latin American private and foreign-owned banks are more stable than state-owned ones;
  - Capital ratio is positively related to stability
  - According to Bordeleau and Graham (2010), a supra-optimal fraction of liquid assets in a bank's balance sheet can in fact weakens stability. This may be the case of LA banks, since we find this negative relationship between liquidity and stability.
- We also evaluate the channels in which low, high and average competition affect stability.

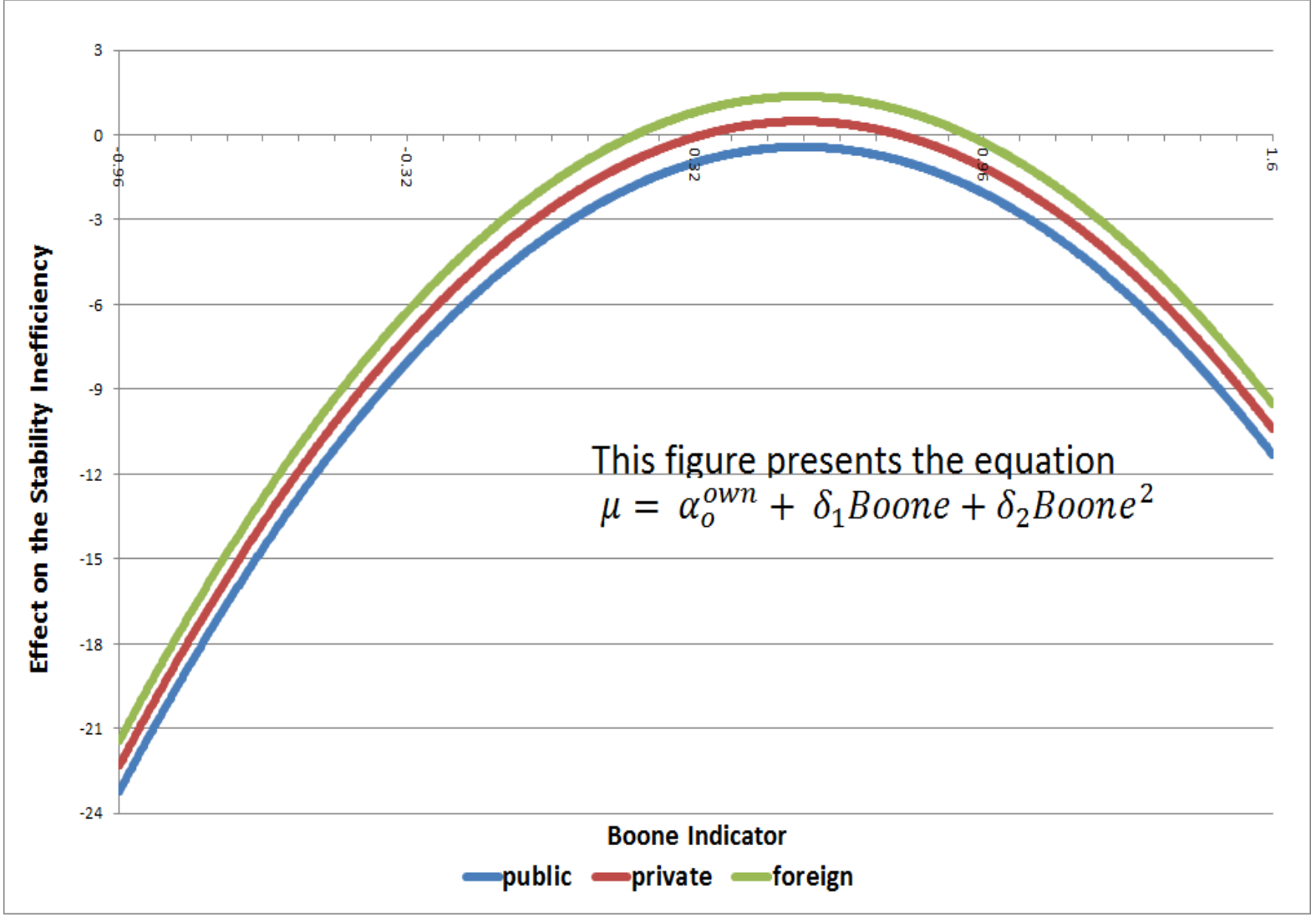

Figure: Effect of the Boone Indicator on the Stability Inefficiency for different bank ownership types [Specification (i)]

- **High Competition** enhances stability of larger banks, and specially those that are more capitalized in relation to their assets.
    - Larger banks appear not to need to incur in riskier activities, maybe because their scale already gives these banks a competitive advantage over the others.
- The negative effect of **Average Competition** on stability is not explained by both assets and capital ratio. In fact, we do find a significant positive effect of avg. competition for large capitalized banks (as in High competition)
- **Low competition** is advantageous for banks with a higher capital ratio. Banks with market power are more cautious in their loan operations when their own capital is at risk.

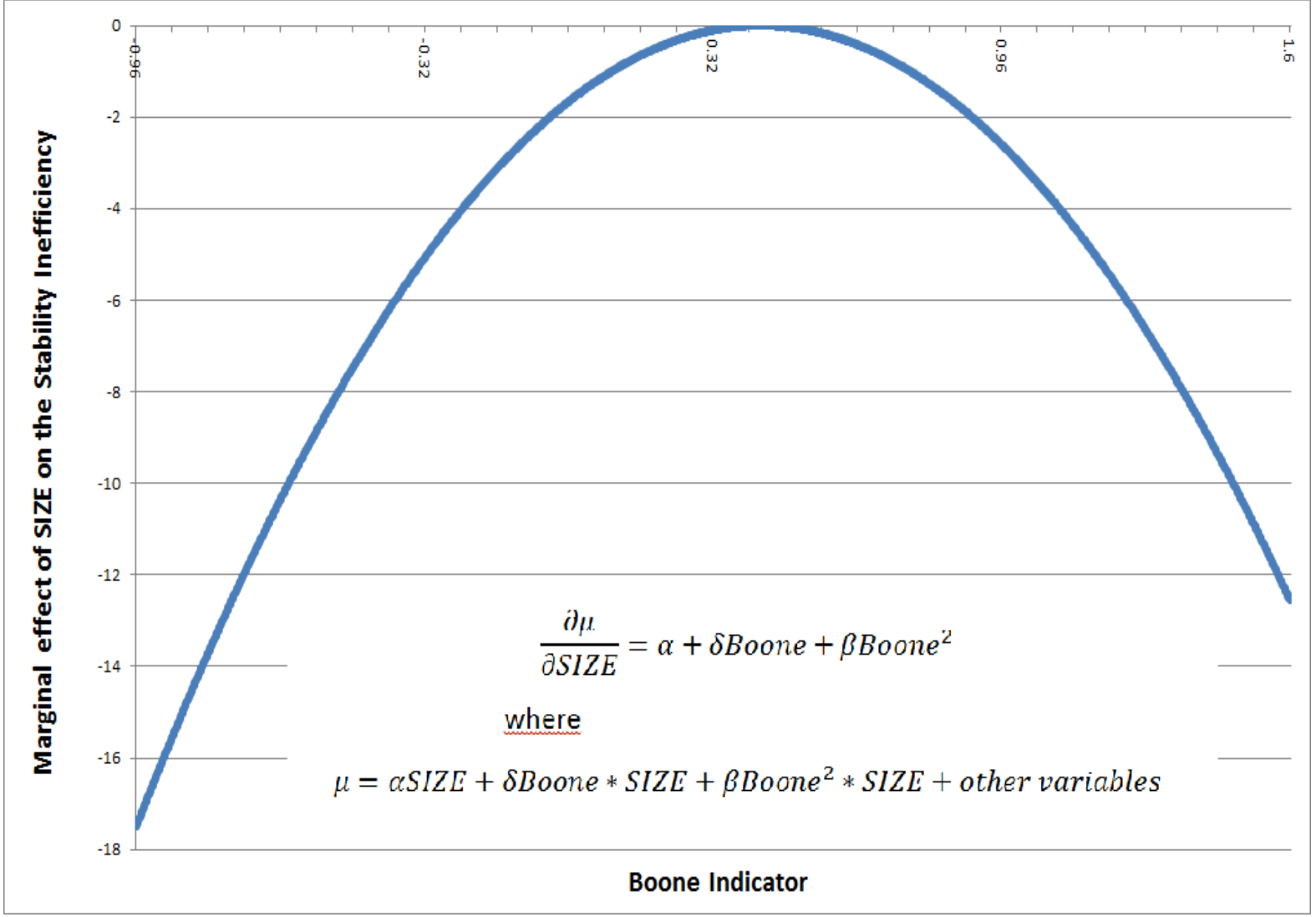

Figure: Marginal effect of SIZE on the Stability Inefficiency for different levels of the Boone Indicator [Specification (ii)]

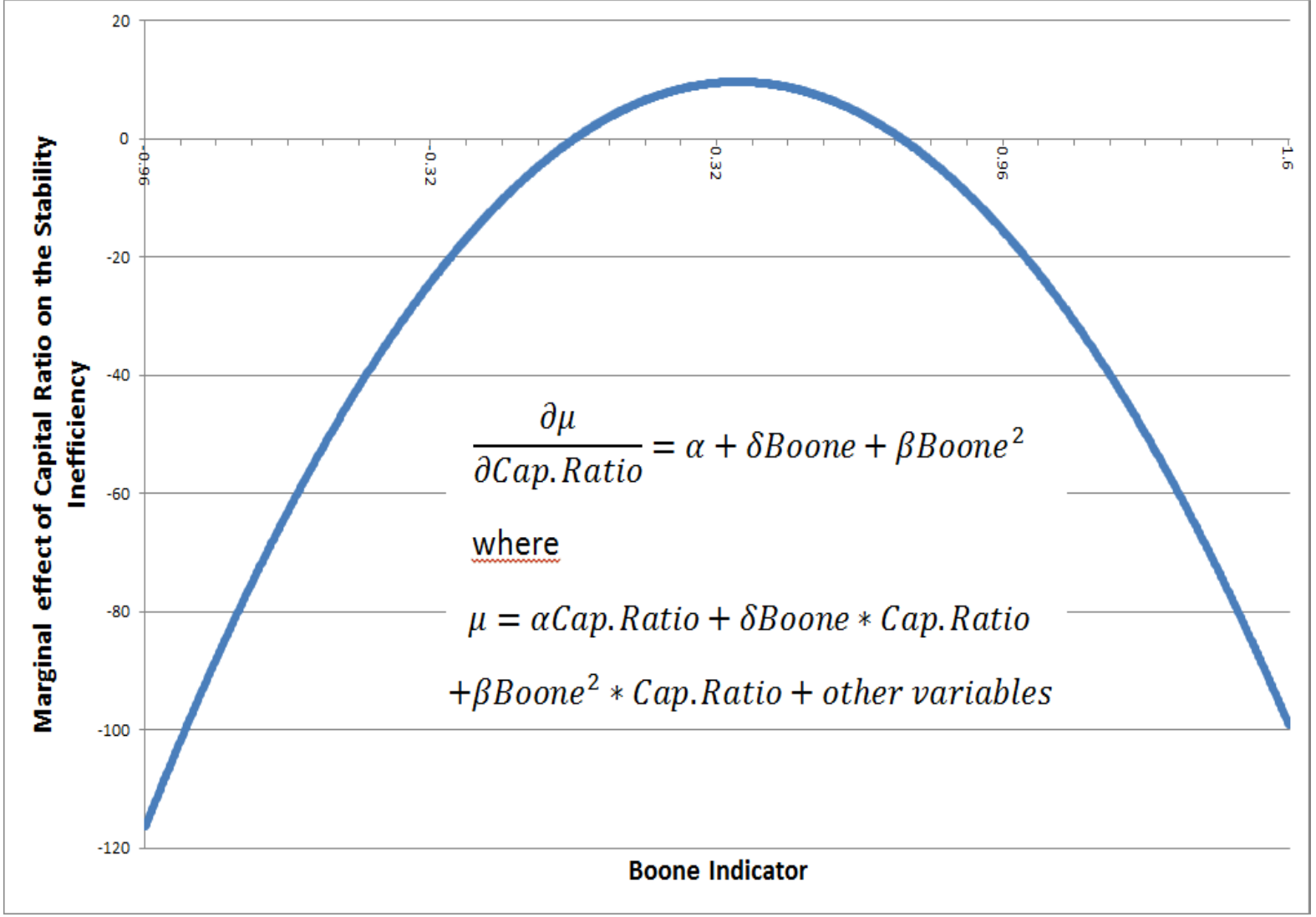

Figure: Marginal effect of Capital Ratio on the Stability Inefficiency for different levels of the Boone Indicator [Specification (iii)]

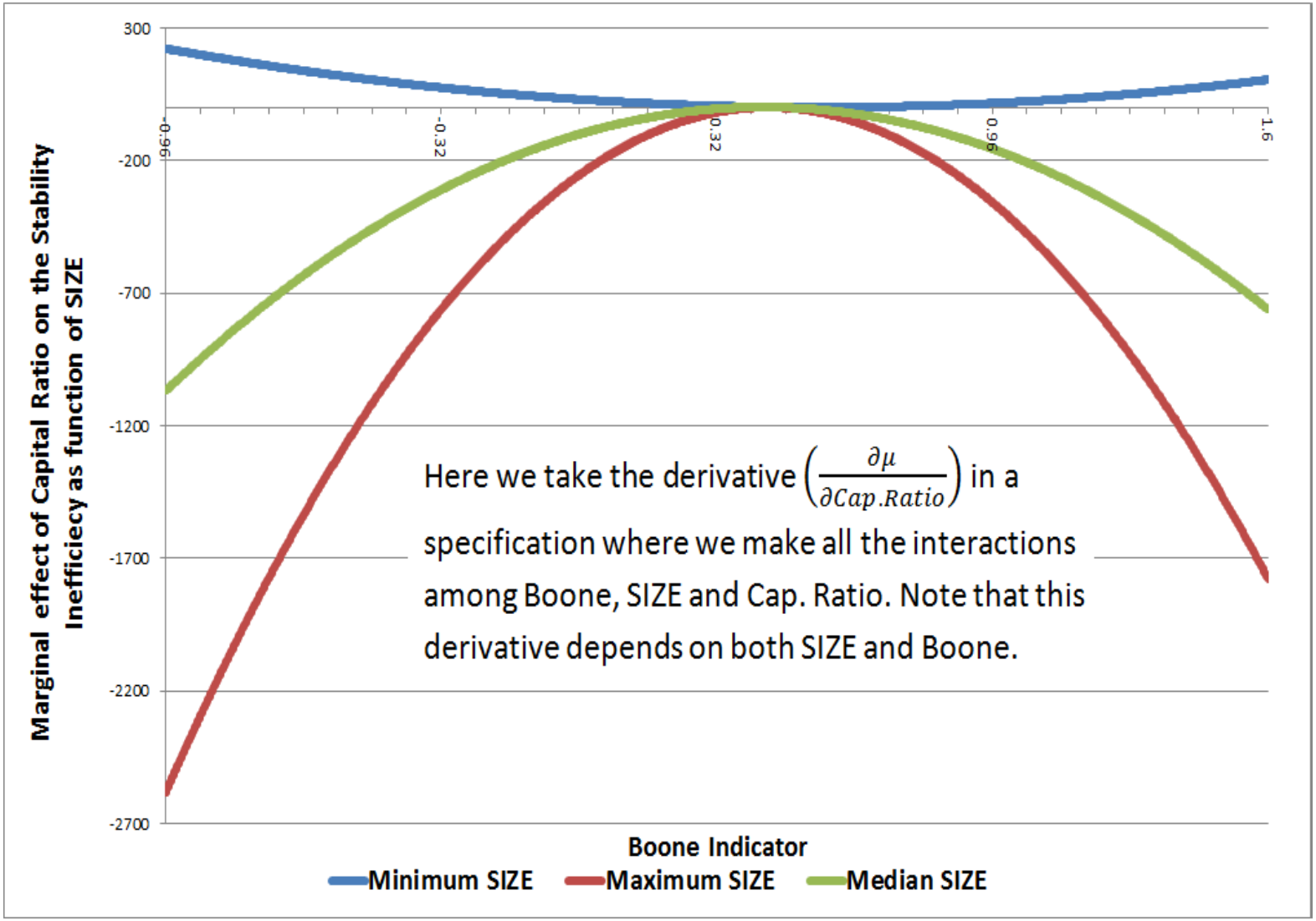

Figure: Marginal effect of Capital Ratio on the Stability Inefficiency for different levels of the Boone Indicator and of SIZE [Specification (iv)]

Conclusion

- Latin American banking markets are operating under moderate competition levels;
- Contrary to what was expected, both high and low competition decreases the probability of insolvency in general, while average levels of competition are harmful to stability.
- Increased size and capitalization are advantageous for high and low competition levels, respectively.
- Size and capitalization seem to be simultaneously positive under high and average competitions.

- There are relevant implications for Basel III in the Latin American region:
  - There is no evidence that large LA banks in collusive markets are more vulnerable to shocks;
  - harsher capital requirements increase stability for banks in general in collusive environments and for large banks in both high and average competition.
- Although we do only take into account the effect of market power on financial stability, its impact on social welfare is also of utmost importance so as regulators may minimize social loss (Beck et al. 2010). Future literature should also study and measure this effect.
- Further Research
  - Panel Quantile Regression Technique
  - Evluation of Interconnection of banks.