
Brazil

Interest Rates and Intermediation Spreads

Why so high?



Augusto de la Torre
with Federico Filippini
Office of the Chief Economist
Latin America & the Caribbean
The World Bank

Based on:

Brazil Interest Rates and Intermediation Spreads. July 2006. World Bank Report No. 36628-BR

By a team led by Augusto de la Torre and Stijn Claessens

Team members: Roberto Rigobón, Marcio Garcia, Marcio Nakane, Miguel Kiguel, Alvaro Vivanco, Yaye Seynabou Sakho

Structure of Presentation

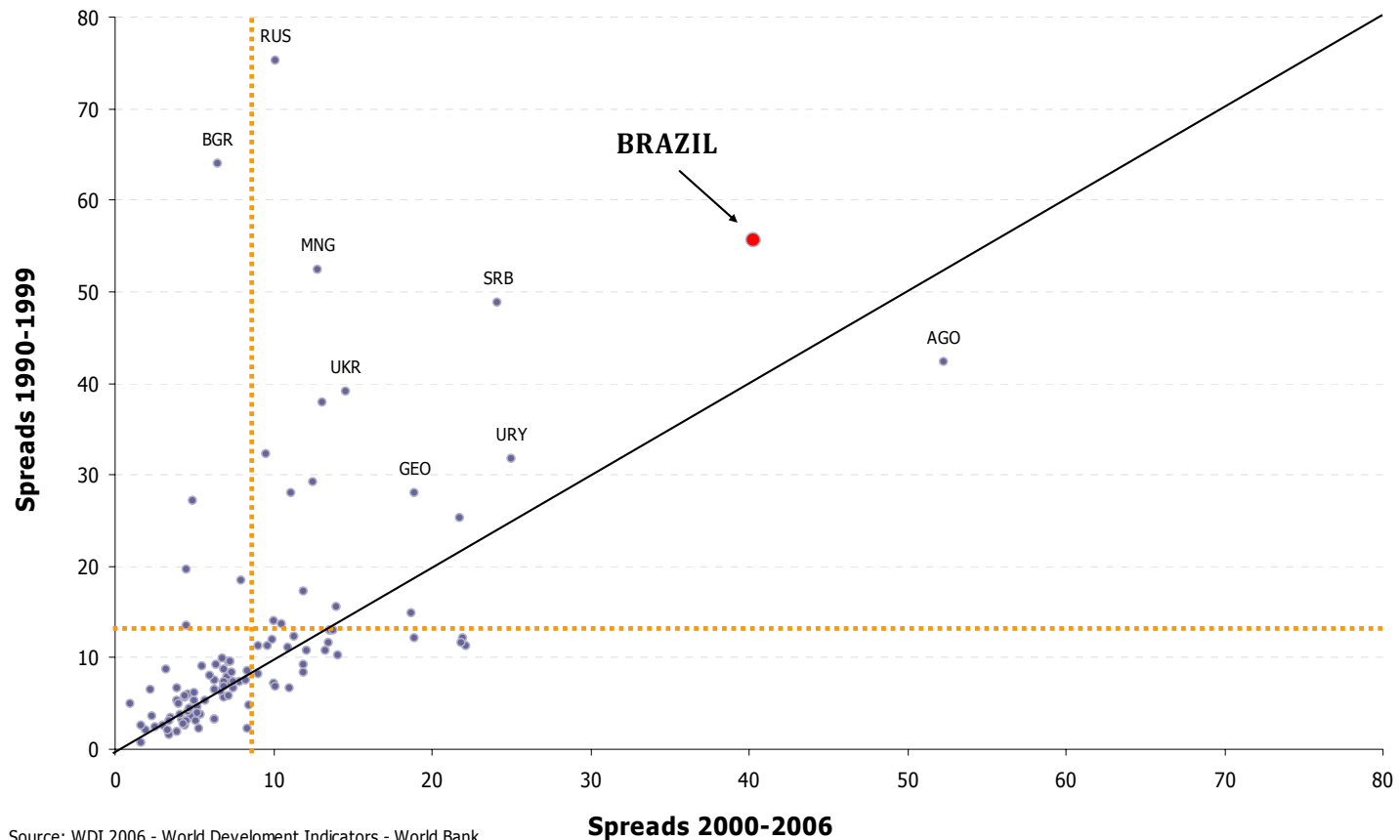
- What are the stylized facts and why worry?
- Links between the Selic and intermediation spreads
- Why has the Selic been so high?
- Microeconomic aspects of intermediation spreads
- Final thoughts

Stylized facts and why worry

- Brazil's intermediation spreads are international outlier
 - ✓ No matter how measured
- But abnormally high spreads coexist with some “normal” (relevant) characteristics
- High spreads mean high and volatile lending rates, leading to a high cost of capital, reduced investment and a bias toward short-term high-risk investment
- Shortage of affordable finance is binding constraint to growth (Hausmann, Rodrik and Velasco, 2005)

Brazil is a major outlier in width of interest spreads

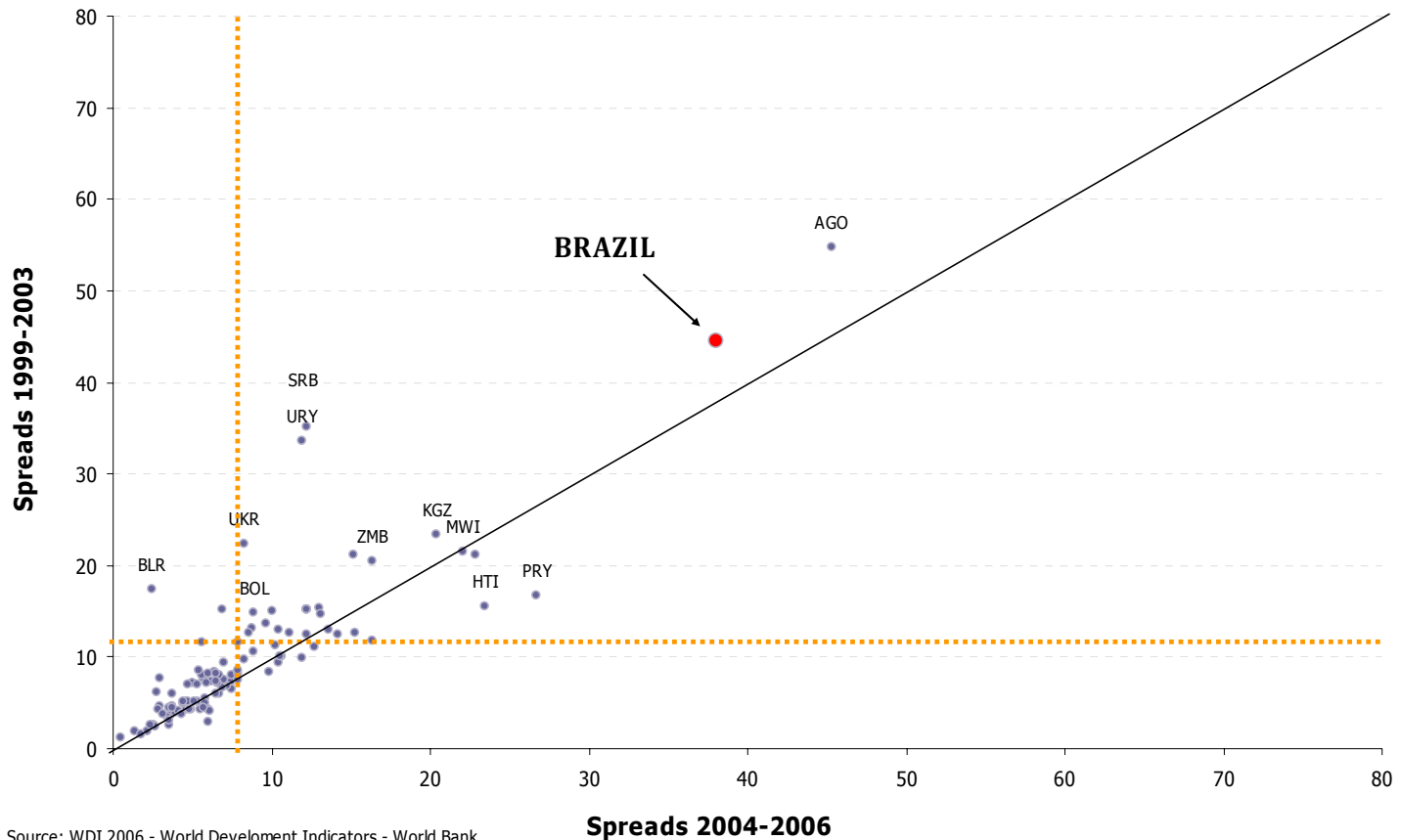
Average Banking Spreads Across Countries
average periods: 1990-1999 & 2000-2006



Source: WDI 2006 - World Development Indicators - World Bank

... even after the post-2003 decline

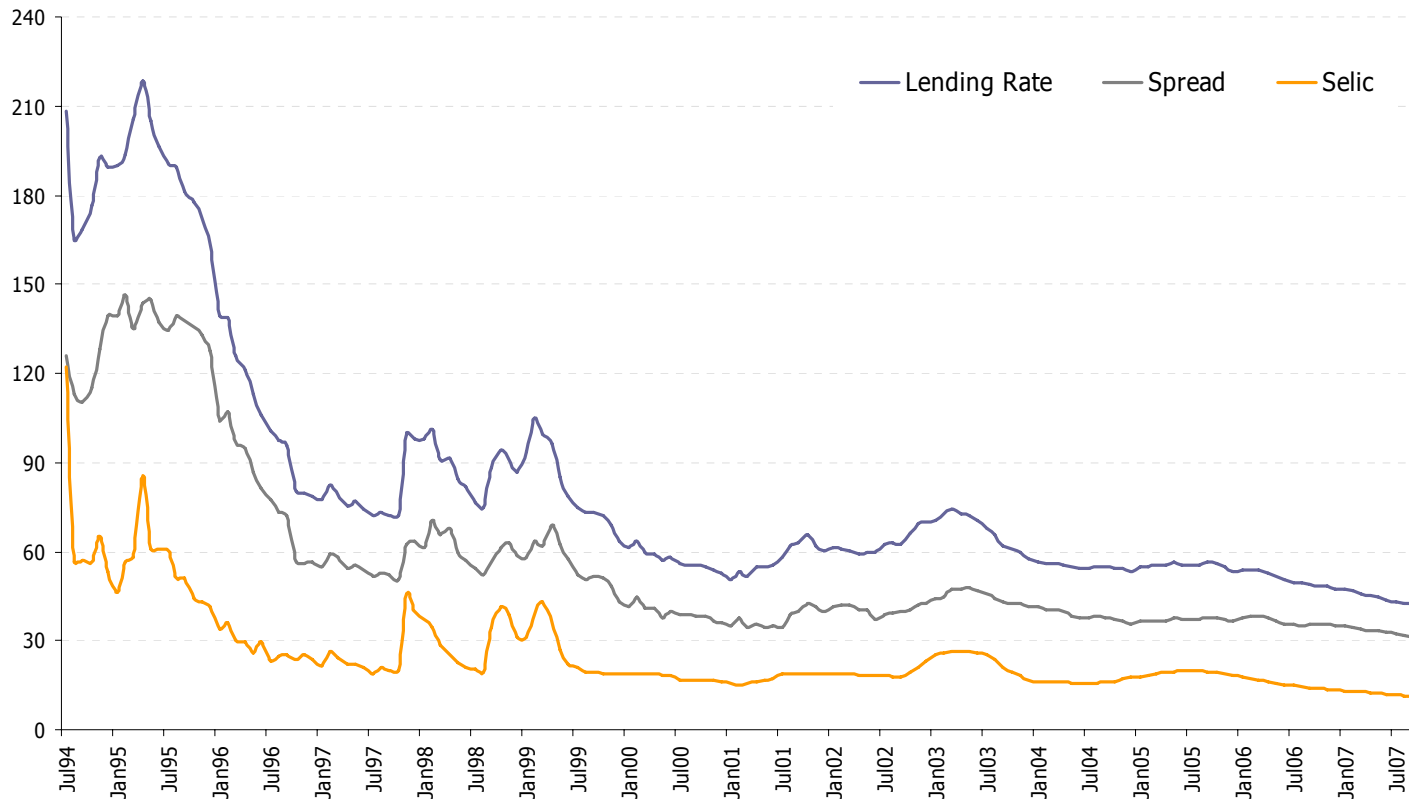
Average Banking Spreads Across Countries
average periods: 1990-1999 & 2000-2006



Source: WDI 2006 - World Development Indicators - World Bank

Spreads fell with disinflation but then hit a plateau

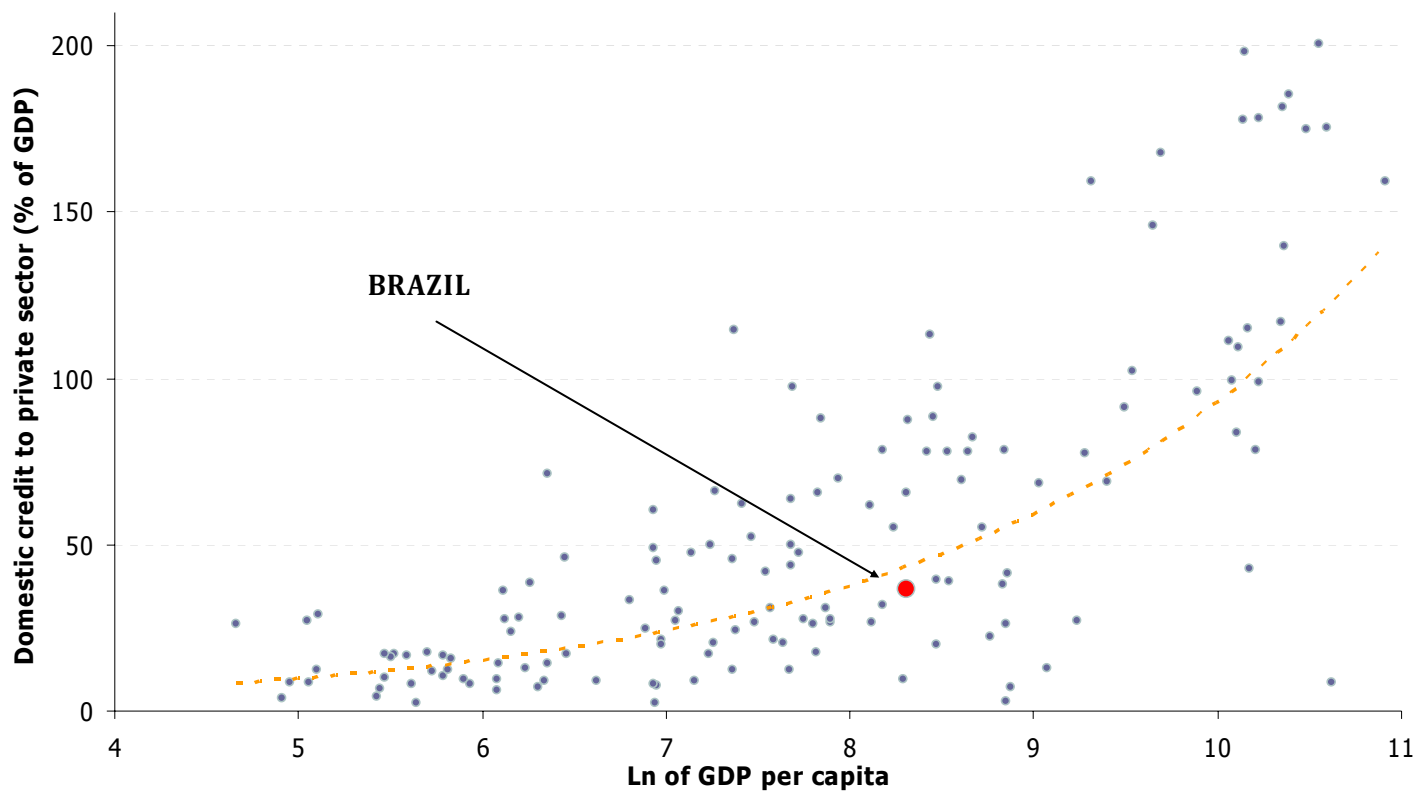
Bank Interest Rates & Intermediation Spreads
in %



Source: Central Bank of Brazil

Brazil is not an outlier in credit depth measures...

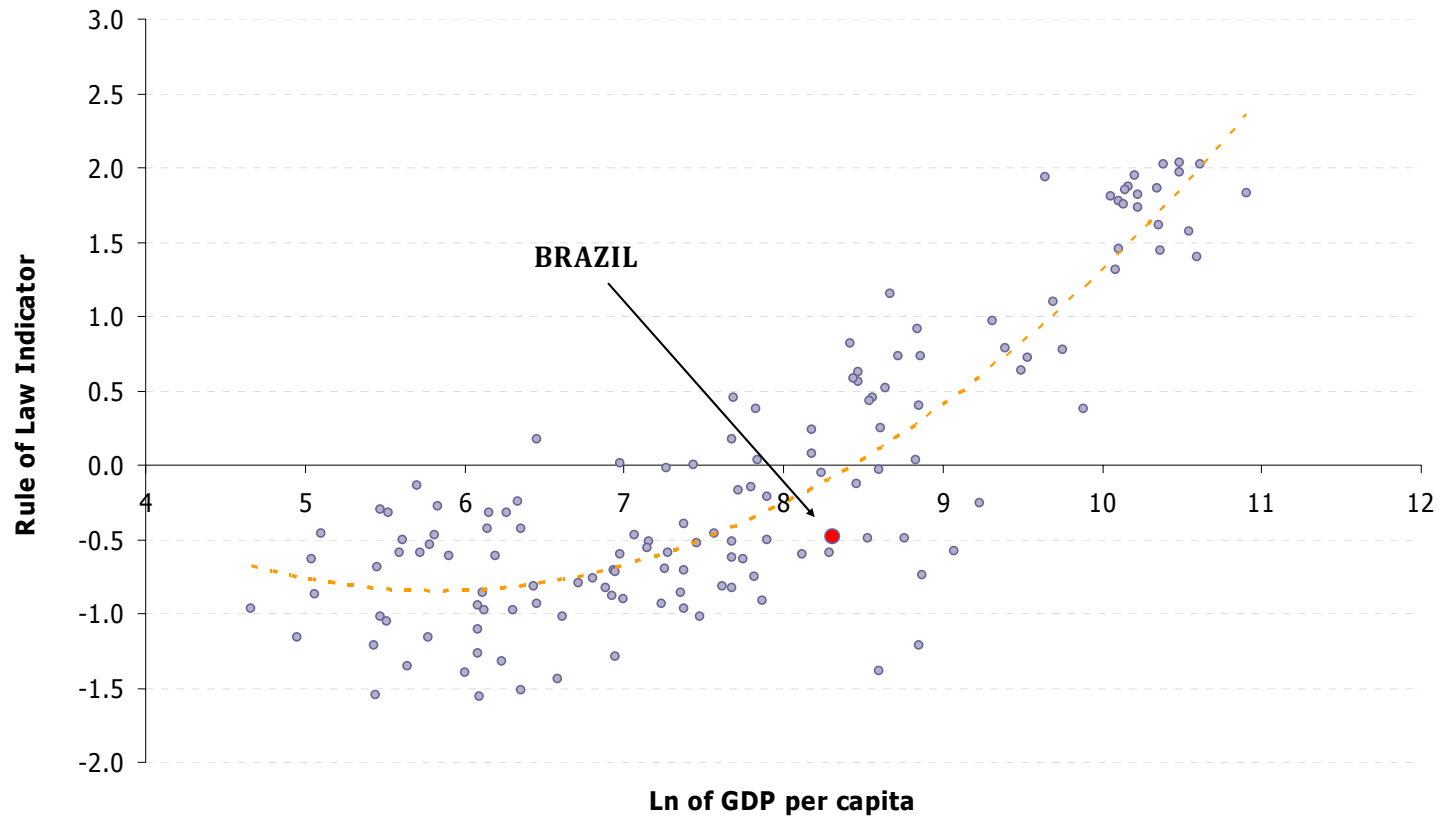
Domestic credit to Private Sector
for 2006



Source: WDI 2007, World Bank

... nor is it a major outlier in “rule of law” measures

Institutional Stability: Rule of Law Indicator
for 2006

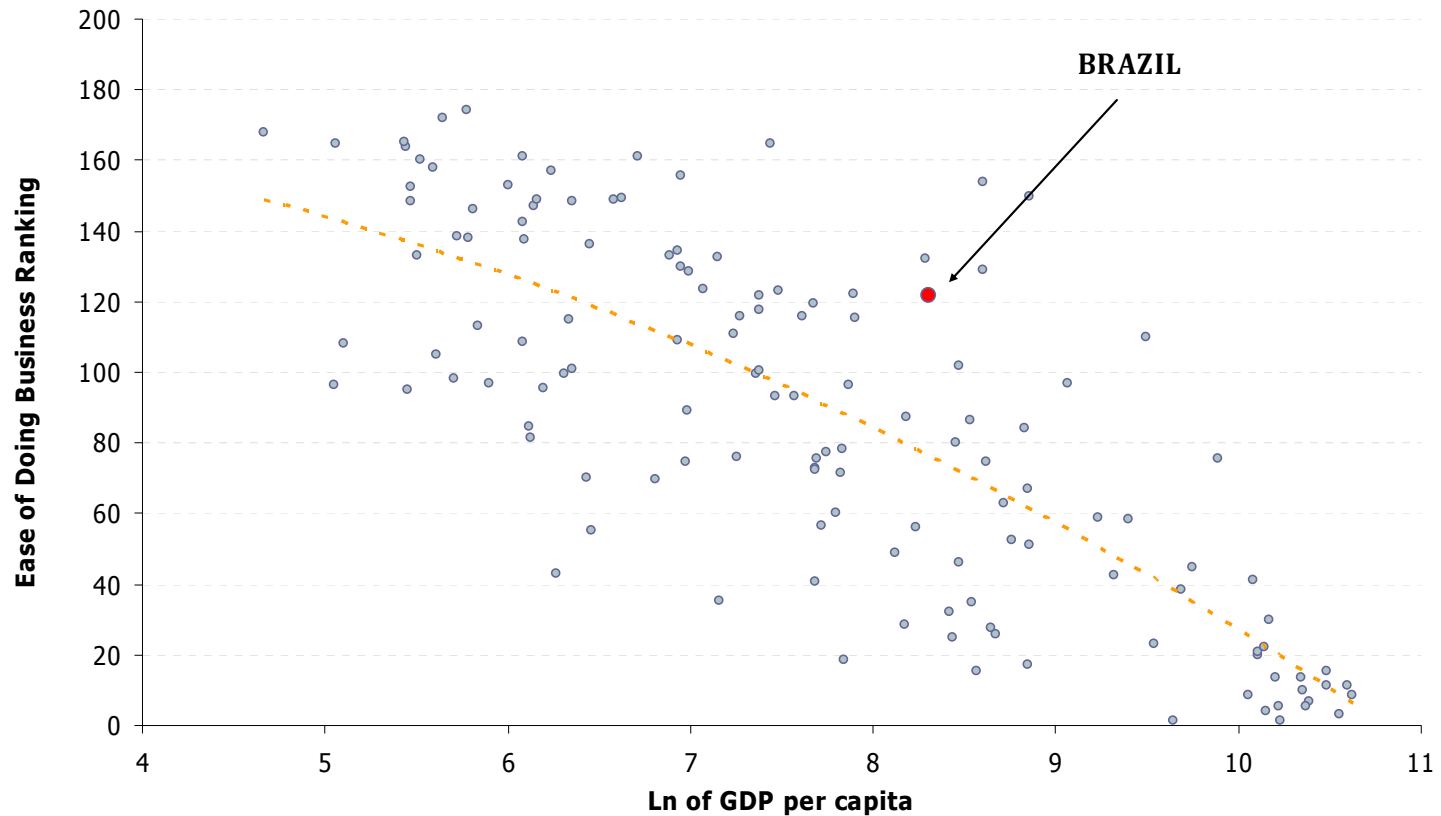


Source: WDI 2007 & Governance Indicators 2007 - World Bank

But Brazil is an outlier in “costs of doing business”

Ease of Doing Business index

(1=most business-friendly regulations) - average 2005-06

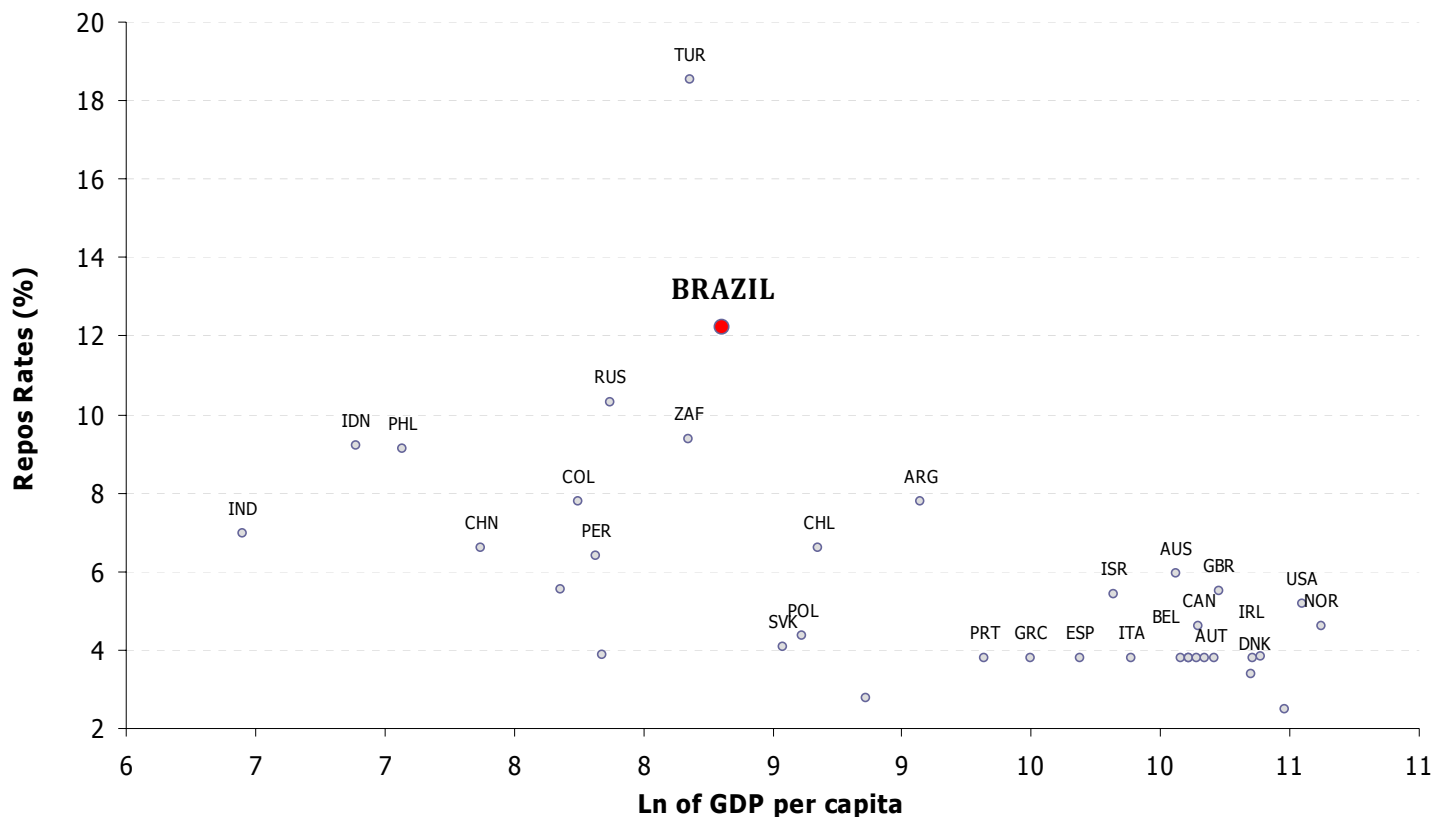


Source: WDI 2007- World Bank

... and is also an outlier in marginal cost of funds

Funding Rates

GDP for 2006 - average interest rate for 2007



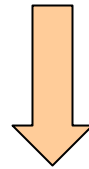
Source: WDI 2007 & Global Economic Monitor - World Bank

Links between the Selic and intermediation spreads

The width of spread: a simple framework

$$(i_c - t)C - G = i_d D$$

$$C = (1 - e)D$$



$$\underbrace{i_c - i_d}_{\text{spread}} = \frac{e}{1 - e} i_d + t + \frac{g}{1 - e}$$

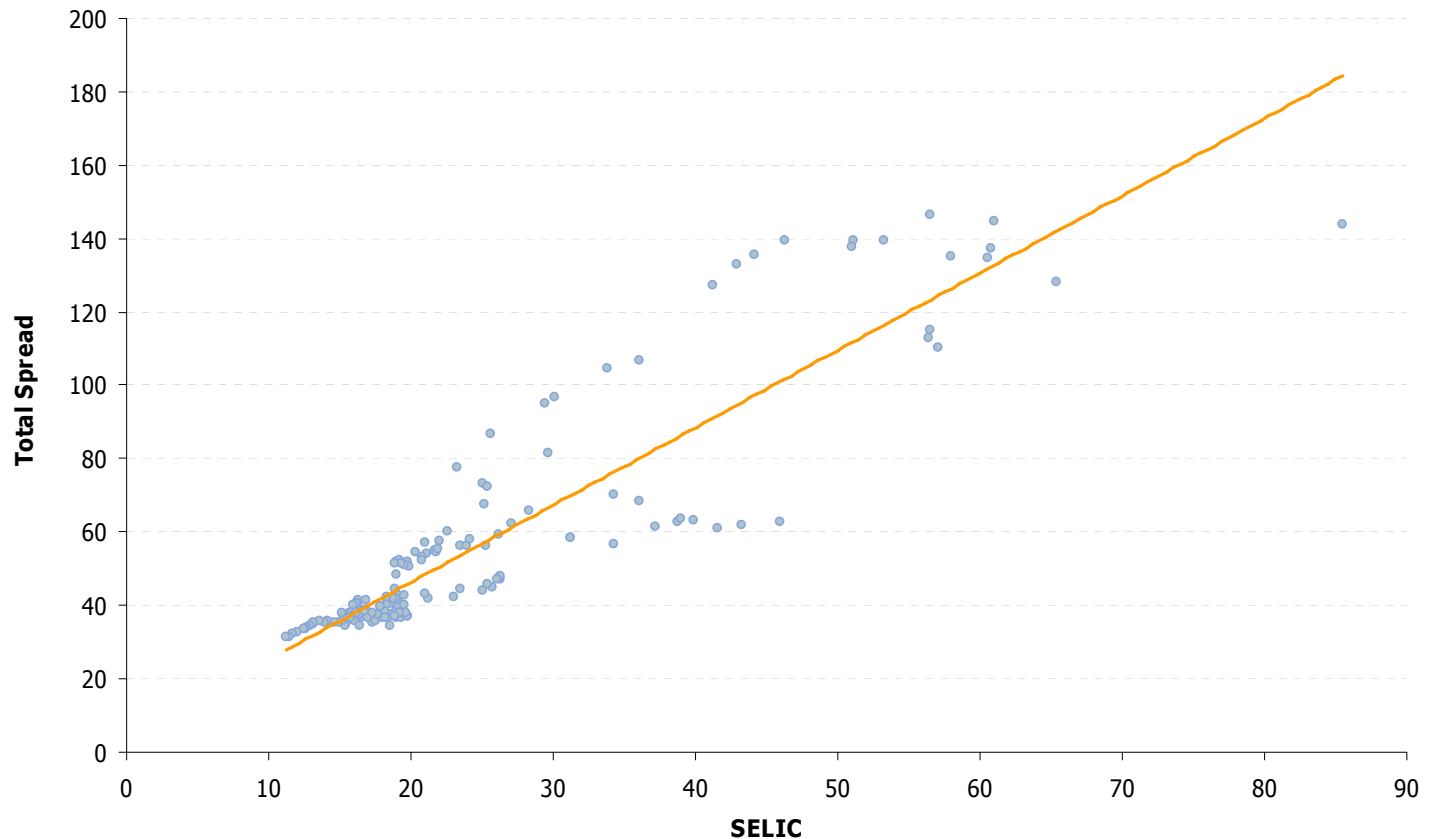
Key implications

- Spreads are proportional to marginal cost of funds, with factor of proportionality rising with “taxes”
 - ✓ A high marginal cost of funds dominates the width of spread as long as “taxes” (LRR, directed credit, etc.) are high
 - ✓ A high cost of funds reflects systemic risk and can further widen spread through a high idiosyncratic risk premium
- As marginal cost of funds and/or “taxes” fall, costs & idiosyncratic risks bind, putting a floor on width of absolute spread

Selic level and width of spreads have co-moved

Bank Intermediation Spreads and the Level of the Interest Rate

Aug.1994 - Sep.2007



Source: Central Bank of Brazil

Absolute vs. proportional spreads: empirical test

Absolute Model

$$r_i - r = \alpha + \underbrace{\beta \cdot r}_{\text{proportional}} + \text{other factors} + u$$

Null hypothesis: $\beta = 0$ (complete pass-through)



Note that $\beta > 0$ is also consistent with a proportional version

Absolute vs. proportional spreads: empirical test

Proportional Model

$$\frac{r_i}{r} = \gamma + \textit{other factors} + v$$

Null hypothesis: $\gamma = 1$ (complete pass-through)



$\beta > 0$ from eq. (1) can imply more-than-complete pass-through under the additive model, or complete pass-through under the proportional model

Absolute vs. proportional spread: empirical test

Proportional Model

$$\frac{r_i}{r} = \gamma + \delta \cdot \frac{1}{r} + \textit{other factors} + v$$



In order to discriminate the cases



9 possible cases

Absolute vs. proportional spread: empirical test

	$\beta < 0$	$\beta = 0$	$\beta > 0$
$\delta < 0$	Inconsistent	Inconsistent	More than Complete Pass-Through
$\delta = 0$	Inconsistent	Complete Pass-Through	Proportional Model
$\delta > 0$	Incomplete Pass-Through	Absolute Model	Inconsistent

Results of empirical test

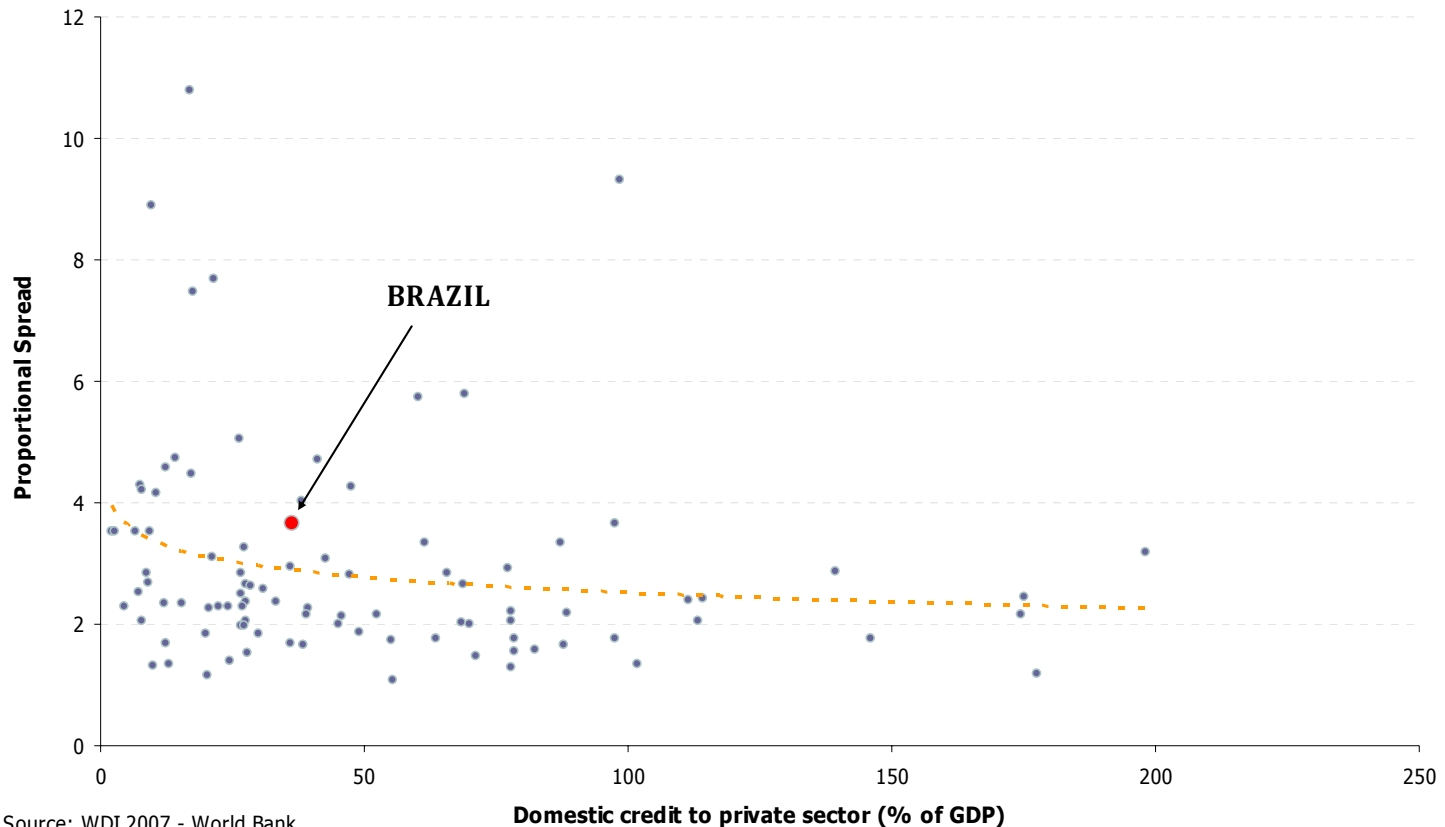
- Proportional relationship at work in credit markets characterized by high price competition
- Results inconsistent in credit markets with less price competition
- No regression supported the absolute spread model ($\beta = 0; \delta > 0$)

Table 2.2 Results of test after controlling for other factors

	$\beta > 0$
$\delta = 0$	Total (0.13,0.00), Corporate (0.67,0.00), Working cap. (0.29,0.00), Overdraft corp (0.62,0.00), Acquisition goods corp. (1.00,0.00), Vendor (0.93,0.00), Acquisition goods personal (0.66,0.00)
$\delta > 0$	Personal sector (0.030,0.00), Overnight (0.027,0.000), Receivables disc. (0.025,0.00), Promissory disc. (0.039,0.00), Overdraft personal (0.00,0.00), Personal loans (0.004,0.00)

Brazil not a major outlier when intermediation spreads are defined as a proportion of cost of funds

Domestic credit to Private Sector & Proportional Spread
credit for 2006 - proportional spread: lending rate over deposit rate

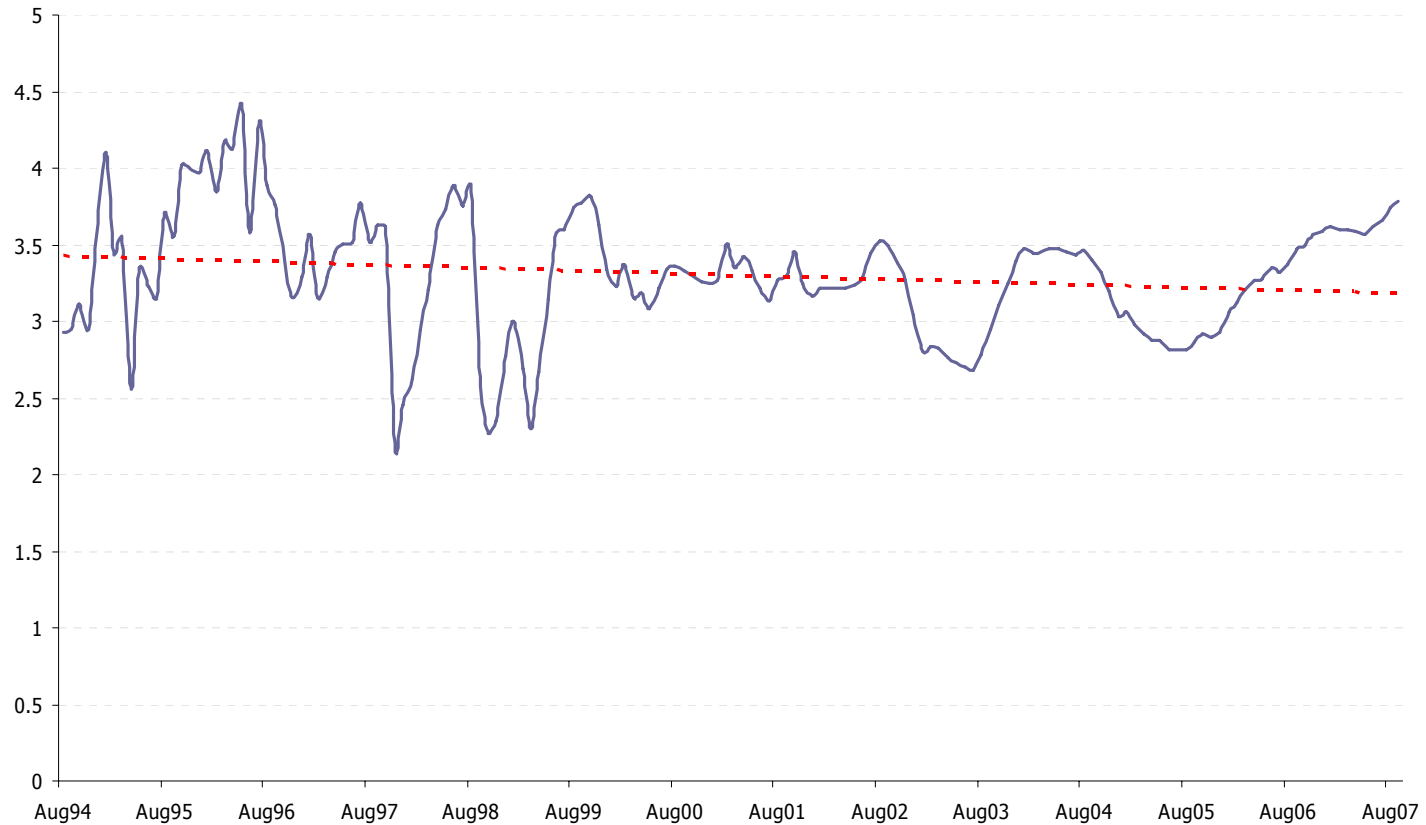


Source: WDI 2007 - World Bank

Relative stability of proportional spreads implies that spreads have been high because Selic has been high

Spreads: Proportional Perspective

ratio between lending and funding (SELIC) rates - Monthly average - General total



Source: Central Bank of Brazil

Why has the Selic been
so high?

Why the Selic so high?

- Three hypotheses

- ✓ Macro fundamentals – fiscal and debt vulnerability
- ✓ Multiple equilibria
- ✓ Jurisdictional uncertainty (Arida, Bacha and Lara-Resende, 2004)

Why the Selic so high? Empirical test

- “Multiple equilibria” and “jurisdictional uncertainty” imply the fixing macro fundamentals is not sufficient
- Econometrically, this implies a disconnection between fundamentals and LEVEL of the Selic



Captured in the constant of the regression

Why the Selic so high? Empirical test

■ The “usual” approach

$$\begin{aligned} \underline{\text{SELIC}} = & 0.09 * \text{Constant} + 0.01 * \text{Unemp.} - 1.61 * \text{GDP} + \\ & (2.05) \qquad (0.97) \qquad (3.41) \\ & + 2.01 * \text{Fiscal Deficit} - 0.07 * \text{CA Deficit} - 0.003 * \text{Inflation} \\ & (0.50) \qquad (-3.51) \qquad (-0.28) \\ & - 0.80 * \text{Share of foreign cur. debt}_{t-1} - 0.32 * \text{Debt to GDP (net)}_{t-1} \\ & (-0.58) \qquad (-0.32) \\ & + 0.11 * \text{RER} + 2.04 * \text{US interest rate} + 0.38 * \text{SELIC rate}_{t-1} \\ & (1.19) \qquad (1.38) \qquad (2.18) \end{aligned}$$

t-statistics in parentheses

R-squared = 0.80. Adjusted *R*-squared = 0.71

Sample (adjusted): 2002M01 to 2004M10

Newey-West HAC Standard Errors & Covariance (lag truncation = 3)

Why the Selic so high? Empirical test

- Value-At-Risk (V@R) Approach

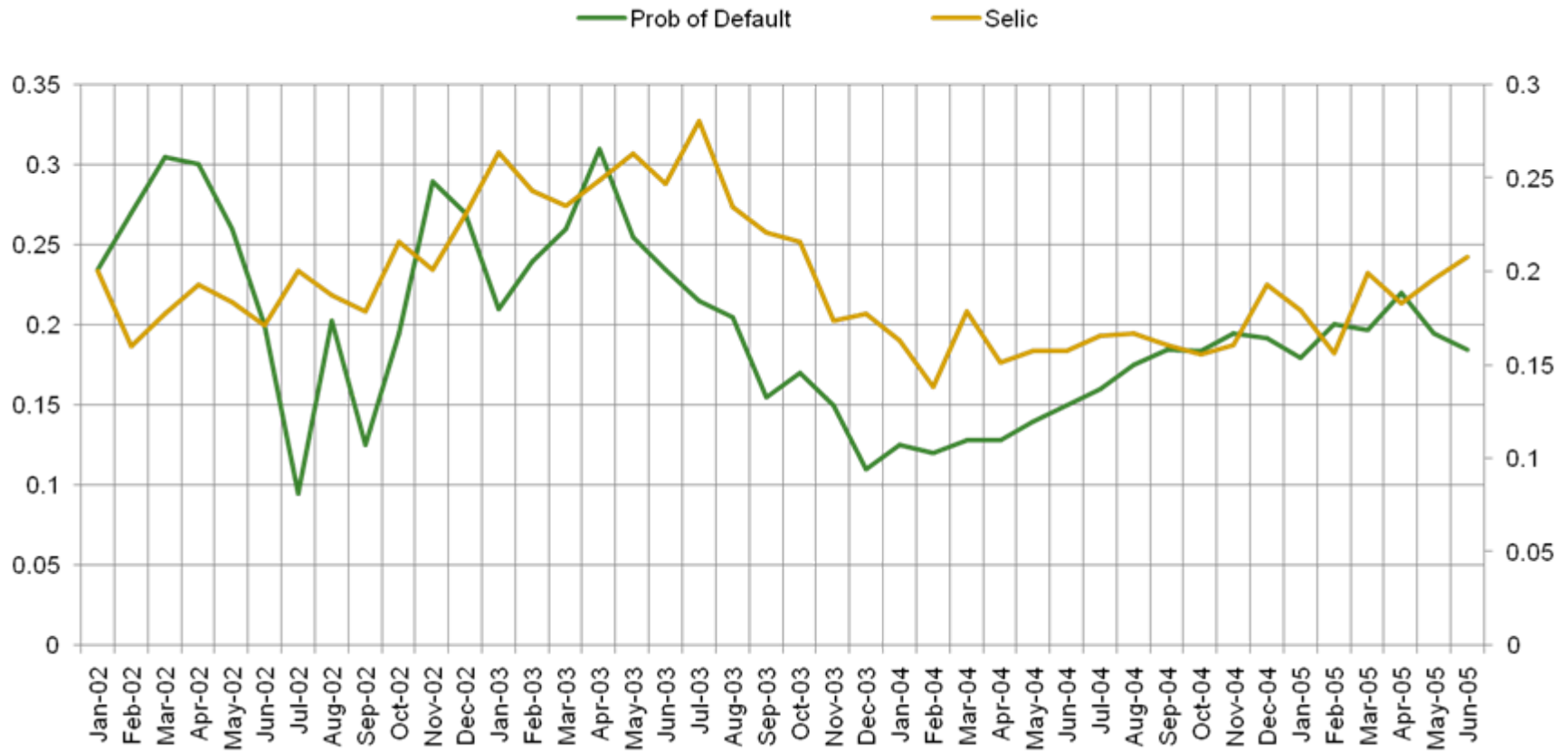
If default probability is a non-linear function of the macro fundamentals, the traditional linear specification fails to adequately identify default risk and *hides it* in the constant

Challenge: find an appropriate measure of default

Procedure to estimate the prob. of default

1. Choose variables representing macro fundamentals
2. Estimate VAR model on all variables to capture their endogenous relations and stochastic properties
3. Compute future paths for the macro variables via Monte Carlo simulations, with coefficients & covariance matrix estimated using rolling (60 month window) VAR regressions
4. Calculate debt paths using debt accumulation equation, given forecasted values of macro variables
5. Compute the frequency debt reaches a threshold
6. Compute the optimal threshold (51.1%)

Estimated probability of default tracks Selic well



Macro fundamentals explain much of the level of Selic *adjusted* for default probability

$$\text{Adjusted SELIC} = 0.02 * \text{Constant} + 0.02 * \text{Unemploy.} - 0.94 * \text{GDP} - 6.31 * \text{FD}$$

(0.80) (3.49) (-0.82) (-1.03)

$$- 0.04 * \text{CA Deficit} + 0.01 * \text{Inflat.} + 5.83 * \text{Share of foreign cur. debt}_{t-1}$$

(-0.73) (0.70) (2.33)

$$- 3.14 * \text{Debt to GDP (net)}_{t-1} - 0.40 * \text{RER} + 1.71 * \text{US interest rate}$$

(-2.57) (-1.78) (0.74)

$$+ 0.38 * \text{SELIC rate}_{t-1}$$

(1.38)

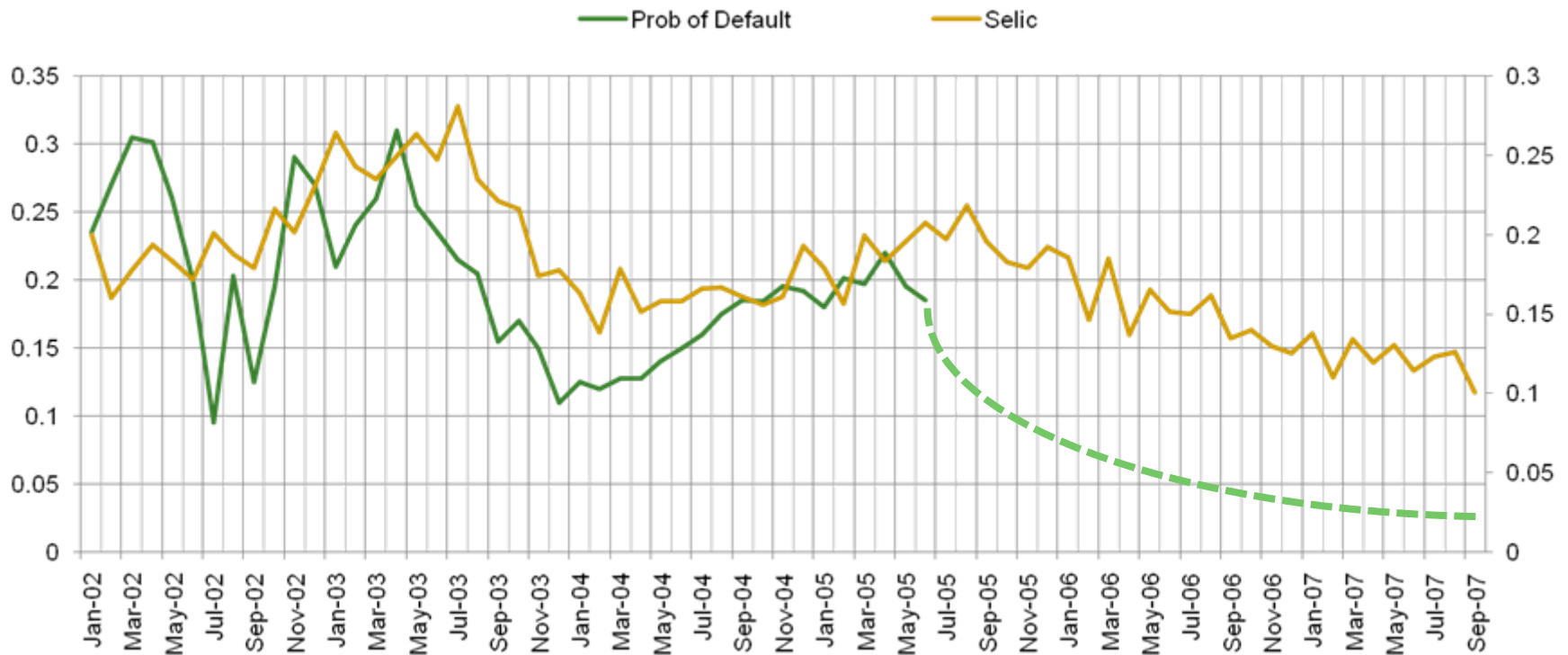
t-statistics in parentheses

R-squared = 0.86. Adjusted *R*-squared = 0.80

Sample (adjusted): 2002M02 to 2004M10

Newey-West HAC Standard Errors & Covariance (lag truncation = 3)

Updating the results to 2007 suggests a regime change



Microeconomic aspects of intermediation spreads

Some stylized micro facts

- While variance of lending spreads is wider than commonly believed...
- ... over 60% of actual loans are at rates in the lower segment of the range...
- ... with actual interest spreads much lower than quoted interest spreads
- Average lending spreads fall steadily with loan size
 - ✓ Average rates on loans above R\$1,000,000 are nearly twice those on loans below R\$10,000
- Interest rates on loans to large firms are about $\frac{2}{3}$ those for small firms and $\frac{1}{2}$ those for micro firms

The usual micro suspects

- Implicit and explicit taxes
 - ✓ Interact with Selic level to widen interest spread
 - ✓ Does directed lending require significant cross-subsidization?
- Weaknesses in contractual environment
 - ✓ Not an outlier in quality of formal legal framework, but credit contract enforcement processes are costly and protracted
- High administrative and operations costs
 - ✓ Comparatively high costs of doing banking business?
 - ✓ Inefficiency sustained by uncompetitive market structures?

The usual micro suspects (cont.)

■ Competition

- ✓ Aggregate evidence is inconclusive on whether contestability is sufficiently lacking to foster inefficiencies that would significantly contribute to the width of the spreads
 - Banking system does not behave as cartel nor is it perfectly competitive (Nakane, 2001; Belaish, 2003)
- ✓ But competition conditions and issues vary across different banking markets (Urdapilleta et al., 2007)

Final thoughts

- High interest spreads have been dominated by a high marginal cost of funds interacting with high “taxes”
- Until recently, default risk was the main explanation behind the high level of the Selic
- Usual micro suspects are of 2nd-order importance at high levels of the SELIC but “bite” as the Selic declines
- Further work:
 - ✓ Interactions between institutions and macro fundamentals
 - ✓ Impact of directed lending on interest spreads
 - ✓ Generate time-series panel data from Central de Risco