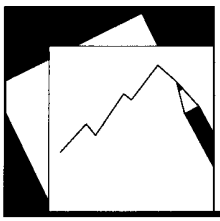
WP/13/251



IMF Working Paper

Monetary Transmission in Brazil—Has the Credit Channel Changed?

Mercedes Garcia-Escribano

INTERNATIONAL MONETARY FUND

 WP/13/251

IMF Working Paper

Western Hemisphere Department

Monetary Transmission in Brazil—Has the Credit Channel Changed?

Prepared by Mercedes Garcia-Escribano[1]

Authorized for distribution by Martin Kaufman

December 2013

Abstract

This paper investigates the transmission of monetary policy by private banks in Brazil during the recent easing cycle. The analysis presented uses a panel dataset with information on lending by private banks in Brazil and concludes that monetary transmission through lending volumes was not impaired. Instead, the observed diminished lending appears to be related to supply and demand factors, as well as to the rapid expansion of public banks' lending.

JEL Classification Numbers: E40, E43, E51, G21

Keywords: monetary transmission, monetary policy, credit growth

Author's E-Mail Address: mgarciaescribano@imf.org

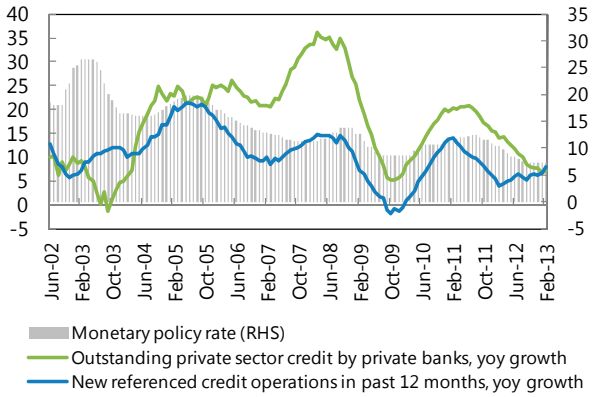
[1] The author would like to thank Martin Kaufman and the Brazil Central Bank for their feedback and extensive discussions.

Contents Page

I. INTRODUCTION

During the past two years, private banks' credit seems to have been less responsive to monetary policy changes than in previous loosening cycles. In August 2011, the Brazilian central bank started an easing cycle. Since then and until the start of the tightening cycle in April 2013, the policy rate was cut by 525 bps to 7.25 percent, a decade's low. Despite the substantial monetary stimulus in place, credit growth by private banks continued to decline, partly reflecting that new lending operations were recovering only very gradually.

Figure 1. Brazil. Credit Growth and Monetary Policy
(In percent)



Sources: Central Bank of Brazil; and Fund staff calculations.

Several factors could help explain the apparently diminished monetary transmission. The surge in NPLs that private banks experienced since late-2011 could explain the more cautious and limited supply of credit. On the demand side, weak consumer and business confidence, coupled with elevated household indebtedness and relatively high debt service ratios could have also been holding back demand for credit by corporates and individuals. Another factor that could have played a role in explaining the dynamics of private banks' credit is the expansion of credit by public banks, which in recent years have been growing at sizable rates and may be competing with private credit.

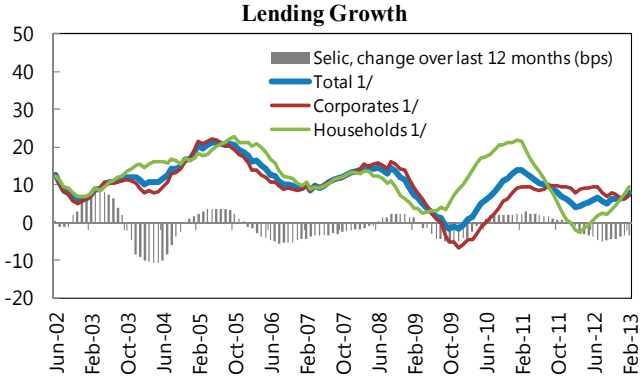
This paper explores why monetary transmission to lending volumes has been lower than in the past. The paper examines if the diminished monetary transmission has been due to a weakening of the credit channel or if, shifts in underlying supply and/or demand factors could help explain the delay in transmission. The paper also analyzes if during the recent monetary easing cycle, there were differences in the monetary transmission across banks depending on their ownership (private domestic or foreign banks). The impact of the expansion of public bank lending on lending by private banks is also analyzed; in particular, we test if competition between private and public banks has changed.

II. STYLIZED FACTS

Has monetary transmission via the lending channel changed? Figure 1 shows the negative co-movements of cumulative changes in monetary policy and new credit growth. The negative correlation between Selic changes and credit growth seems to have weakened in the recent monetary easing cycle, particularly for bank lending to corporates.

The delayed monetary transmission to credit does not appear to have affected lending rates as the pass-through of the policy rate to loan rates has been complete. In contrast with the previous easing cycle, the interest rate pass-though during the last easing cycle was initially delayed, but eventually, private banks fully passed the policy cuts to lending rates for firms and individuals, with even a tightening of the spreads for some loan segments.

Figure 2. Brazil: By Borrower, Changes in Selic and Lending Growth



1/ New interest rate referenced credit over last 12 months, growth yoy, in percent.

Sources: Central Bank of Brazil; and Fund staff calculations.

Table 1. Brazil: Monetary Transmission Through Lending Rates

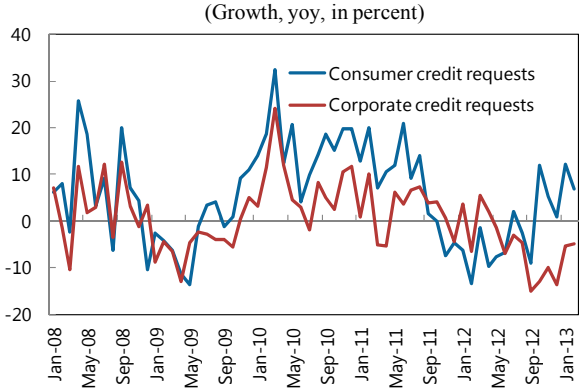
	Interest Rate Changes (bps) since December 2008						Interest Rate Changes (bps) since August 2011					
	Policy Rate	Discount	Working Capital	Payroll Loans	Personal Credit	Vehicles Loans	Policy Rate	Discount	Working Capital	Payroll Loans	Personal Credit	Vehicles Loans
t+1	-1.00	-1.4	-0.8	0.0	-3.9	-1.9	-0.50	-0.9	0.7	0.2	0.1	-1.1
t+5	-3.50	-2.1	-4.9	-2.2	-13.8	-7.4	-2.00	-0.8	-0.8	-0.3	0.3	-1.9
t+10	-5.00	-3.7	-6.9	-3.6	-14.7	-11.0	-4.00	-5.2	-5.4	-3.2	-6.3	-7.1
t+14	-5.00	-6.5	-8.0	-3.5	-16.6	-12.4	-5.25	-9.2	-6.6	-4.1	-6.8	-6.9

Sources: Central Bank of Brazil; and Fund staff calculations.

Other factors affecting credit supply or demand may help understand credit dynamics. Elevated household indebtedness and the surge in NPLs may have prompted banks to be more cautious and selective in their lending practices. Uncertain global and domestic economic conditions—reflected in weakened consumer and business confidence—as well as elevated household indebtedness may have lowered demand for credit by consumers and corporates. The indicator of credit requests by Serasa shows that demand for credit by consumers was relatively weak during 2012 and picked up in early 2013. In contrast, corporates' demand for credit that had also weakened since end-2011 continued to be soft.

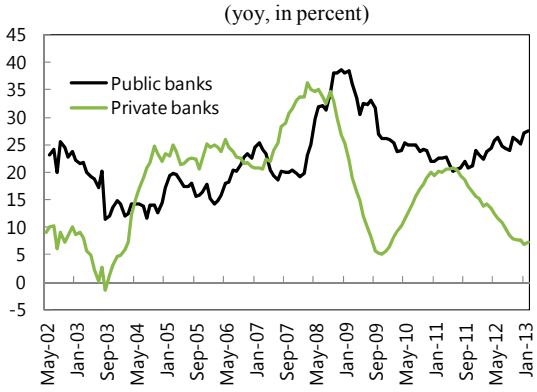
Increased lending by public banks may have also played a role. Public banks' credit expanded at an annual rate of nearly 25 percent during 2011–12, resulting in an increase in their share of total credit to 48 percent (compared to 42 percent by end-2010). Heightened competition from public banks during this period may also help explain the lower sensitivity of private banks' credit growth to Selic changes.

Figure 3. Brazil: Serasa Indicator of Credit Requests
(Growth, yoy, in percent)



Sources: Serasa Experian Brazil; and Fund staff calculations.

Figure 4. Brazil: Credit Growth by Bank Ownership
(yoy, in percent)



Sources: Central Bank of Brazil; and Fund staff calculations.

III. METHODOLOGY AND DATA DESCRIPTION

A panel dataset with quarterly data comprising 37 private banks (19 domestic and 18 foreign) is used to explain the credit channel of the monetary transmission mechanism. During the sample period that extends from the first quarter of 2005 to the fourth quarter of 2012, monetary conditions were eased and tightened in several occasions. The observed volume of new loans by private banks reflects the equilibrium between credit supply and credit demand. The empirical specification presented in this paper explains the growth in new lending as a function of supply and demand factors, including changes in the Selic rate, bank characteristics, proxies for corporate and individual demand for credit, and new lending extended by public banks.

The empirical specification is as follows:

$$\Delta lnx_{ijt} = \beta_0 + \beta_1 \Delta Selic_t + \beta_2 \Delta lnpublic_{it} + \beta_2 k_{it} + \beta_3 A_{ijt} + \beta_4 Z_{jt} + \upsilon_{ij} + \varepsilon_{ijt}$$

where x_{ijt} stands for new loans to sector i, either a corporate or an individual, by private bank j at time t; *Selic* is the policy rate of the Brazil Central Bank; $public_{it}$ represents new loans extended by public banks to sector i; k_{it} is a variable representing the demand for credit by sector i (proxied by confidence index, expectations index, or the Serasa credit request indicator); A_{ijt} includes factors that could affect private banks' perception for credit risk (some factors may be bank and sector specific, such as the non-performing loan ratio, while other factors are common to all banks, such as VIX, EMBI, the Bovespa stockprice index or the level of household debt service); Z_{jt} are factors that limit bank's lending capacity (some could be bank specific like bank capitalization or liquidity, or common to all banks, like reserve requirements); υ_{ij} is the bank specific fixed effect when lending to sector i; and ε_{ijt} is the error term.

A dummy variable δ_t that takes the value of 1 during 2012Q1-2012Q4 will allow identifying if the growth of private banks' new credit was lower during the last monetary easing cycle than during the rest of the sample period. The interaction of δ_t with a few of the other explanatory variables—such as the change in the Selic—will allow examining if the sensitivity of credit growth to any of these variables changed recently.

Tables 2.a and 2.b present the definition of the variables and the descriptive statistics. Figure 5 shows the time evolution of these variables.

IV. RESULTS

This section summarizes the main results. Table 3 explores the presence of changes in monetary transmission during the recent easing cycle. Table 4 tests the role of the Selic as well as demand and supply factors in explaining changes in lending growth during the sample period. Table 5 focuses on understanding the lower lending growth during the recent cycle, in particular, if the sensitivity of lending growth to either of the explanatory variables has changed recently. Table 6 assesses if public bank lending has any impact on private banks' credit.

Table 3 confirms that lending growth was weaker since end-2011. Changes on the Selic have a negative and statistically significant impact on credit growth. Lending growth during the past cycle has been significantly lower than during the rest of the sample period, as shown by the negative coefficient on the dummy variable δ_t in Column I. The coefficient for the interaction between Selic changes and δ_t in Column II is positive and statistically significant indicating that monetary transmission has been weaker during the recent cycle. However, the coefficient sign reverts and is statistically significant when the dummy δ_t is included in the regression (Column III), implying that when controlling for other factors contributing to the lower credit growth in the past cycle, the reductions in the Selic did have a positive impact on loan disbursements; thus, it is not possible to conclude that the lower lending growth recently observed was due to limited or impaired monetary transmission mechanism. Similar results are obtained when the sample includes only lending to individuals (Columns V–VI) or to corporates (Columns VII–VIII). Column IV explores if lending from foreign banks differs from domestic private banks during the past cycle; the coefficient on the interaction term is not statistically significant and thus, suggests this is not the case.

Demand and supply factors are main determinants of lending growth. Table 4 shows the estimates for a range of demand and supply factors using the total sample. Three different of variables—confidence index, expectations index and Serasa credit requests—are tested as proxies for demand for credit. The three of them have a positive and significant impact on credit growth. Perception of changes in credit risk matters for credit supply. Heightened market risk (proxied with either increases in the EMBI or VIX, or declines in the Bovespa stockprice index) has a negative impact on credit growth. Similarly, a deterioration in the credit portfolio (captured in an increase in the NPL or decrease in the ROA) leads to lower supply of credit by banks. Table 4 also displays the impact of bank's balance sheet variables related to the bank's lending capacity on credit growth. Increases in reserve requirements should limit bank's funding, but the coefficient sign is instead positive indicating the presence of endogeneity (i.e. the central bank increases reserve requirements in response to excesses in credit growth). Bank capitalization and liquidity have the expected sign and are statistically significant.

The lending channel was not weakened during the last monetary easing cycle. Column I in Table 4.c displays the regression results when including the full set of explanatory variables. Column II adds the dummy variable δ_t in the set of regressors; the coefficient is negative and

statistically significant, confirming that the behavior of credit growth during the past year was different than during the rest of the sample period. Column IV displays the results when interacting the change in the Selic with the dummy δ_t. The negative sign on the Selic indicates not only that the lending channel was not impaired, but that after controlling for the rest of the factors that weakened lending growth, the lending channel was more effective than during the rest of the sample. The results are similar when the sample is limited to lending to individuals (Column VII) or lending to corporates (Column X) in the sense that the interaction term is not statistically significant, suggesting that the monetary transmission mechanism during the recent cycle was working similarly as during the rest of the sample period.

Recently, banks have become more cautious in their lending practices. Banks became more sensitive in their lending to changes in monetary policy during the past easing cycle (as shown by the negative and significant coefficient on the interaction of the dummy δ_t and the Selic change in Table 5), and also to macroeconomic or global environments, captured by the EMBI (Column III). The coefficient on the interaction of the EMBI and δ_t is negative and statistically significant; further, when the interaction term is added in the regression, the coefficient on the dummy δ_t reverts its sign, indicating that the weaker monetary transmission during the past year is explained by the heightened sensitivity of banks to the Selic changes and to the EMBI. Other coefficients on the interaction terms with δ_t are not statistically significant (as the one for non-performing loans), but the signs are as expected, providing further evidence of the increased caution of banks in their lending practices.

Public banks compete with private banks in some credit segments, but the competition did not intensify recently. Coefficient results on the variable lending growth by public banks, *dlnpublic*, displayed in Columns I–IV in Table 6 indicate that when lending to individuals, public banks' lending moves in tandem with private banks' lending, suggesting differences regarding lending products or type of borrower. However, there seems to be competition between private and public banks when lending to corporates (Columns V–VIII). The interaction of *dlnpublic* with δ_t is negative but not statistically significant, thus, providing no strong evidence of increased competition in the recent period in the sense of public banks targeting more similar customers or offering more similar products to those by private banks than during the rest of the sample. Columns IX–XIII display similar results when the sample is limited by lending product.

V. CONCLUSIONS

The transmission of monetary policy has worked efficiently during the last monetary easing cycle. This paper has provided evidence that though private bank lending has been weaker since end-2011 despite the substantial monetary policy cuts, the monetary transmission neither through lending rates or volumes was impaired, but instead, the sensitivity of lending to Selic changes seems to have increased.

The observed diminished lending appears to be related to supply and demand factors. Shifts in the demand for credit have led to a weaker lending growth. In addition, loan supply was impacted by tighter banks' profitability and level of capitalization. Banks have also exhibited

an increased caution in their lending practices given their recent experience with the surge in non-performing loans and heightened market risk.

Public banks lending seems to have also contributed to the weaker lending by private banks. While public banks' lending have traditionally moved in tandem with private banks' lending when extending loans to individuals, there seems to be competition/substitution effect in other lending areas. Though this paper does not find evidence that the competition has increased, to the extent that public banks' credit has expanded rapidly, public banks may have contributed to the diminished impact of monetary policy on private banks' lending.

VI. References

Arena, M., Reinhart, C. and F. Vazquez 2007, "The Lending Channel in Emerging Economies: Are Foreign Banks Different?" IMF Working Paper 07/48 (Washington: International Monetary Fund).

Coelho, C., De Mello, J. M. P., and M. Garcia, 2010, "Identifying the Bank Lending Channel in Brazil Through Data Frequency" Departamento de Economia PUC-Rio Working Paper No. 574.

Castro, P, and J. M. P. De Mello, 2010, "Há assimetria no repasse dos juros bancários de variações na taxa Selic?" Departamento de Economia PUC-Rio Working Paper No. 580.

Table 2.a. Descriptive statistics

	All Sample				Sample 2012Q1-2012Q4			
	Mean	Standard Deviation	Min.	Max.	Mean	Standard Deviation	Min.	Max.
dlnx	0.03	0.41	-1.89	1.84	0.00	0.45	-1.83	1.81
Selic	10.60	1.72	7.25	13.75	8.43	1.15	7.25	10.25
Δ Selic	-0.26	0.94	-2.33	1.33	-1.02	0.42	-1.58	-0.42
confidence	85.9	28.6	47.4	126.4	88.6	32.6	55.1	126.4
Δ confidence	0.3	4.0	-13.2	8.8	0.5	3.4	-5.1	7.1
expectations	85.2	23.7	53.1	116.7	86.4	25.9	59.4	116.7
Δ expectations	0.0	3.9	-13.6	9.3	0.8	3.5	-3.2	8.3
Serasa	104.9	10.6	87.0	129.7	109.6	11.9	88.7	125.7
Δ Serasa	0.7	7.0	-15.1	18.1	-0.7	6.9	-15.1	8.3
Reserve requirements	29.3	5.6	20.2	37.1	31.8	2.5	28.6	35.4
Δ reserve requirements	0.0	2.7	-9.2	6.3	-2.1	0.4	-2.7	-1.7
Capital to RWA	16.4	3.6	12.0	29.8	15.9	3.2	12.4	29.8
Δ Capital to RWA	-0.1	1.8	-9.4	15.7	-0.1	1.1	-3.5	5.8
Liquidity to assets	21.0	8.5	6.0	44.7	21.5	8.4	6.0	44.7
Δ Liquidity to assets	0.0	3.6	-15.8	15.7	0.3	3.0	-6.9	13.5
Liquidity to SR liabilities	84.4	50.1	26.4	264.0	88.5	49.8	27.3	248.6
Δ Liquidity to SR liabilities	1.9	26.0	-97.1	141.1	-1.1	23.7	-75.8	86.1
embi	229.4	72.7	151.0	455.3	184.7	23.6	151.0	213.3
Δ embi	-3.8	55.1	-107.3	189.7	-18.5	19.4	-36.7	14.3
vix	24.7	8.6	14.5	51.7	18.0	0.8	17.4	19.4
Δ vix	-0.1	8.2	-14.5	24.1	-2.3	4.1	-9.3	1.6
bovespa	59,070	8,334	37,203	69,849	59,571	2,678	57,628	64,265
Δ bovespa	765	6,707	-18,068	10,056	472	4,949	-6,138	7,874
hhserv	19.8	1.7	17.7	22.7	22.5	0.4	21.8	22.7
Δ hhserv	0.2	0.5	-0.9	1.5	-0.2	0.4	-0.9	0.1
npl	3.9	3.5	0.0	15.0	4.2	3.4	0.0	12.9
Δ npl	0.0	1.2	-8.2	9.5	0.1	1.3	-7.0	9.0
roa	2.2	2.8	-12.8	13.2	1.0	2.6	-9.0	6.5
Δ roa	-0.1	1.0	-11.0	10.1	-0.2	0.6	-2.9	1.4
dlnpublic	0.06	0.25	-0.62	0.64	0.14	0.22	-0.12	0.50
δ_t	0.2	0.4	0.0	1.0	1.0	0.0	1.0	1.0

	Sample of Lending to Individuals				Sample of Lending to Corporates			
	Mean	Std. Dev.	Min.	Max.	Mean	Std. Dev.	Min.	Max.
dlnx	0.03	0.46	-1.89	1.84	0.03	0.37	-1.47	1.57
confidence	114.6	7.4	96.2	126.4	58.8	5.0	47.4	67.8
Δ confidence	0.6	4.5	-13.2	7.6	0.0	3.5	-5.6	8.8
expectations	109.0	5.2	94.1	116.7	62.7	4.3	53.1	71.1
Δ expectations	0.1	4.6	-13.6	9.3	-0.1	3.1	-8.2	6.0
Serasa	109.7	12.4	87.0	129.7	100.2	5.7	88.7	112.2
Δ Serasa	1.8	7.1	-11.7	18.1	-0.3	6.6	-15.1	8.9
npl	5.9	3.7	0.0	15.0	2.0	1.7	0.0	10.2
Δ npl	0.0	1.6	-8.2	9.5	0.0	0.8	-7.8	3.5
dlnpublic	0.08	0.17	-0.27	0.42	0.05	0.31	-0.62	0.64

Source: Fund staff calculations.

Table 2.b. Definition of Variables

$dlnx_{ijt}$	First-difference of the log of real new credit concessions. New credit concessions are deflated by CPI.
$Selic_t$	Brazil Central Bank monetary policy rate (average for period t)
$confidence_{it}$	Consumer or business confidence index
$expectations_{it}$	Consumer or business expectations index
$Serasa_{it}$	Serasa index for credit demand (2008 = 100)
$Reserve\ requirements_t$	Total reserve requirements of deposit financial institutions to total deposits of financial institutions
$Capital\ to\ RWA_{jt}$	Regulatory capital to risk-weighted assets
$Liquidity\ to\ assets_{jt}$	Total liquidity to total assets
$Liquidity\ to\ SR\ liabilities_{jt}$	Total liquidity to short-term liabilities
$embi_t$	EMBI Brazil
vix_t	VIX
$bovespa_t$	Bovespa Stockprice index (average)
$hhserv_t$	Household debt as percentage of disposable income
npl_{ijt}	Non-performing loans to total loans
roa_{jt}	Return on assets
$dlnpublic_{it}$	First difference of the log of real new credit concessions by public banks. New credit concessions by public banks are deflated by CPI.
δ_t	Dummy taking the value of 1 during 2012Q1-2012Q4

Source: The Brazil Central Bank provided a dataset containing time series information on new credit concessions, non-performing loans, loans, total regulatory capital, risk-weighted assets, total assets, liquid assets, short-term liabilities, and ROA for each of the private banks included in the sample. The dataset also included information on new credit concessions by public banks. The rest of the sources are Haver and Serasa Experian Brazil.

Figure 5. Description of the Variables

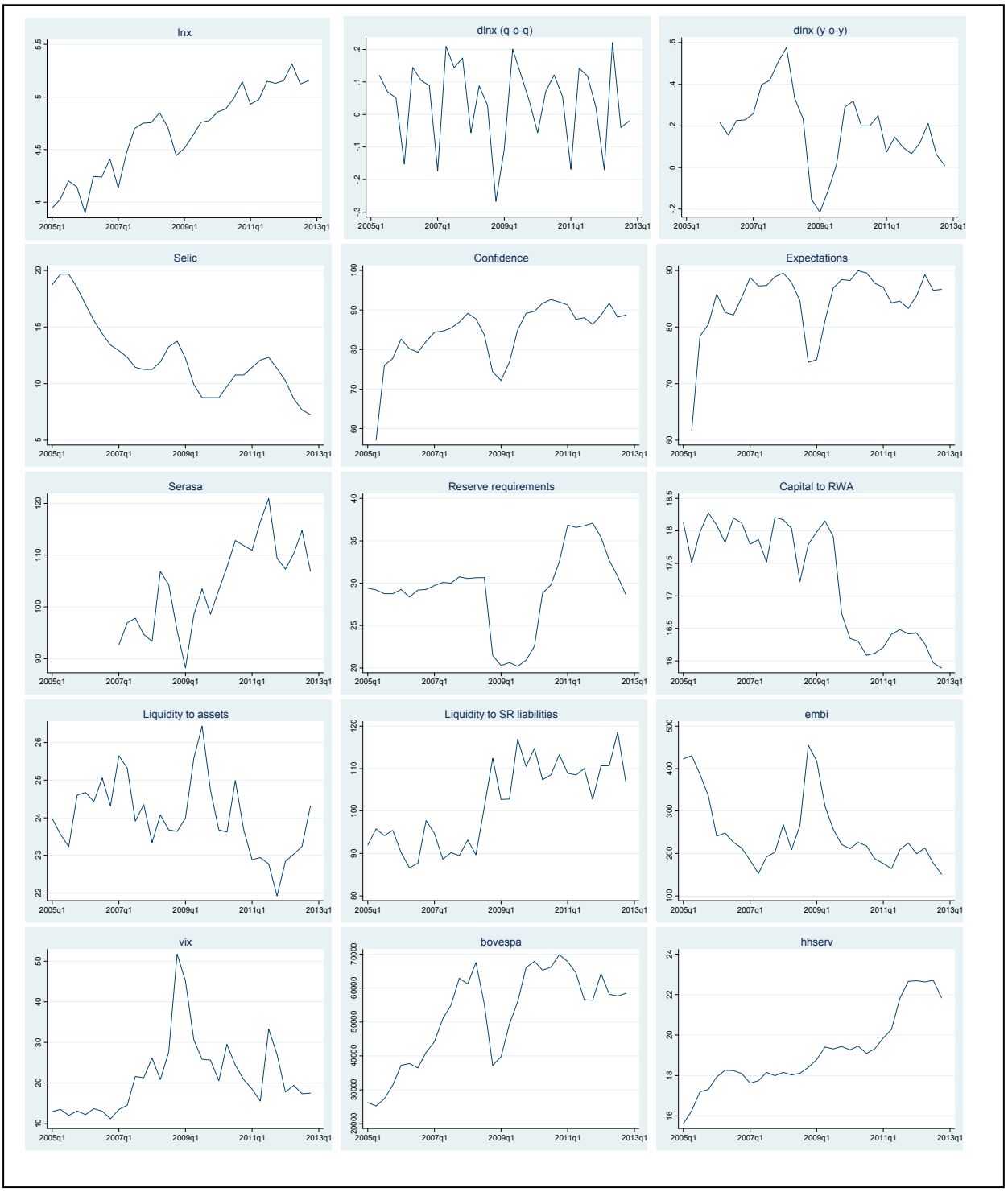
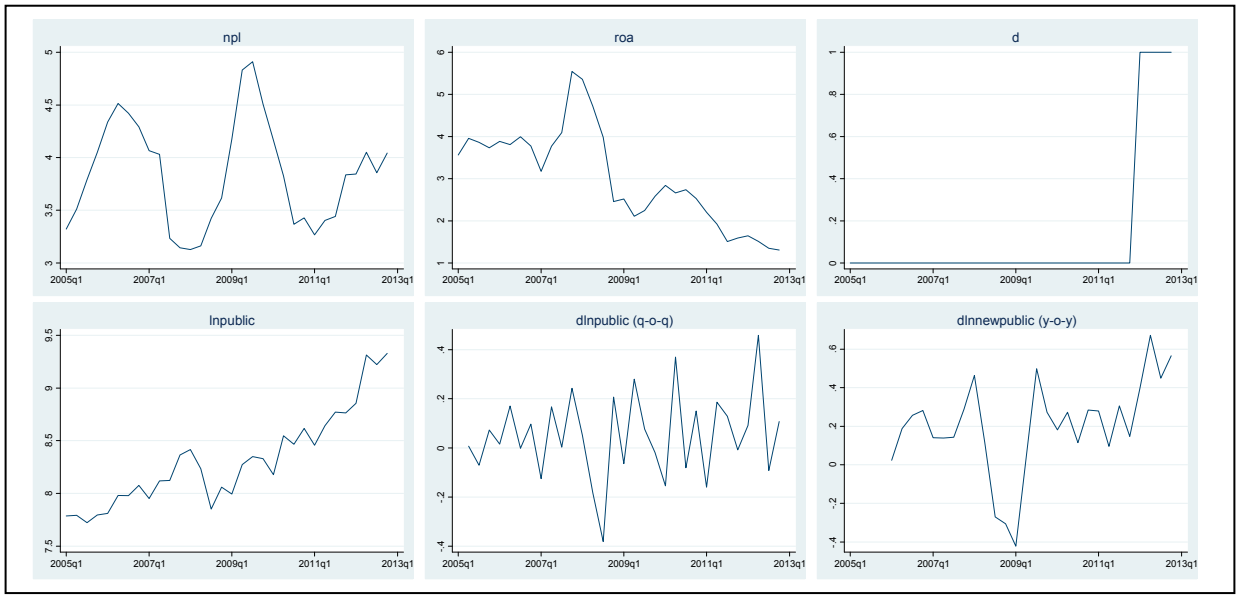


Figure 5. Description of the Variables (Concluded)



Sources: Fund staff calculations.

Table 3. Monetary Transmission and Changes during the 2012 Easing Cycle (Dependent Variable: *dlnx*)

Sample	All				Individuals		Corporates	
	(I)	*(II)*	*(III)*	*(IV)*	*(V)*	*(VI)*	*(VII)*	*(VIII)*
$dlnx_{t-1}$	-0.18	-0.18	-0.18	-0.18	-0.13	-0.13	-0.24	-0.24
	(8.16)***	(8.15)***	(8.07)***	(8.17)***	(4.23)***	(4.17)***	(7.60)***	(7.57)***
ΔSelic	-0.02	-0.02	-0.02	-0.02	-0.05	-0.04	-0.00	0.00
	(2.20)**	(1.96)*	(1.82)*	(2.19)**	(2.79)***	(2.64)***	(0.20)	(0.21)
δ_t	-0.09		-0.22	-0.12	-0.05	-0.12	-0.13	-0.35
	(3.00)***		(3.11)***	(2.98)***	(1.19)	(1.11)	(3.21)***	(3.50)***
$\delta_t \cdot$ *ΔSelic*		0.05	-0.13			-0.06		-0.21
		(1.86)*	(2.04)**			(0.68)		(2.36)**
$\delta_t \cdot$ *Foreign bank dummy*				0.06				
				(1.10)				
Constant	0.05	0.05	0.05	0.05	0.04	0.04	0.06	0.07
	(4.49)***	(4.15)***	(4.59)***	(4.48)***	(2.33)**	(2.35)**	(4.14)***	(4.27)***
R^2	0.04	0.04	0.04	0.04	0.03	0.03	0.07	0.07
Observations	1,985	1,985	1,985	1,985	1,008	1,008	977	977

* p<0.1; ** p<0.05; *** p<0.01

Source: Fund staff estimates.

Table 4. Impact of Selected Factors on Lending Growth (Dependent Variable: *dlnx*)

a. All Sample: Controls for Demand for Credit			
	(I)	(II)	(III)
$dlnx_{t-1}$	-0.20	-0.19	-0.18
	(8.80)***	(8.59)***	(7.38)***
ΔSelic	0.01	0.01	-0.02
	(0.49)	(0.62)	(1.78)*
Δconfidence	0.01		
	(5.44)***		
Δexpectations		0.01	
		(4.42)***	
ΔSerasa			0.01
			(6.80)***
Constant	0.04	0.05	0.04
	(4.07)***	(4.31)***	(3.12)***
R2	0.05	0.05	0.07
Observations	1,953	1,953	1,535

Source: Fund staff estimates.

	b. All Sample: Controls for Bank's Lending Capacity and Perception for Credit Risk									
	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)	(XI)	(XII)	(XIII)
$dlnx_{t-1}$	-0.19	-0.19	-0.18	-0.13	-0.20	-0.19	-0.18	-0.18	-0.17	-0.20
	(8.37)***	(8.46)***	(8.12)***	(4.22)***	(8.22)***	(8.56)***	(8.27)***	(7.83)***	(6.90)***	(7.93)***
ΔSelic	-0.02	-0.01	-0.03	-0.04	-0.02	-0.02	-0.03	-0.02	-0.02	-0.01
	(2.06)**	(0.48)	(2.59)***	(2.56)**	(2.26)**	(1.40)	(2.74)***	(1.79)*	(1.72)*	(0.90)
embi	-0.00									
	(5.14)***									
vix		-0.01								
		(5.17)***								
bovespa			0.00							
			(2.80)***							
Δhhserv				0.00						
				(0.12)						
Δnpl					-0.05					
					(5.87)***					
Δroa						0.03				
						(3.84)***				
ΔReserve requirements							0.02			
							(5.99)***			
Capital to RWA_{t-1}								0.01		
								(2.51)**		
Liquidity to $assets_{t-1}$									0.01	
									(2.74)***	
Liquidity to $SRliabilities_{t-1}$										-0.00
										(0.56)
Constant	0.20	0.17	-0.10	0.03	0.04	0.05	0.04	-0.11	-0.08	0.06
	(6.12)***	(6.28)***	(1.95)*	(1.93)*	(3.77)***	(4.39)***	(3.35)***	(1.81)*	(1.77)*	(1.94)*
R2	0.05	0.05	0.04	0.03	0.06	0.05	0.05	0.04	0.03	0.04
N	1,985	1,985	1,985	1,008	1,655	1,952	1,985	1,779	1,698	1,504

Source: Fund staff estimates.

Table 4. Impact of Selected Factors on Lending Growth (Dependent Variable: *dlnx*) (Concluded)

c. All Controls for Demand and Supply for Credit										
Sample	All				Individuals			Corporates		
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)	(X)
$dlnx_{t-1}$	-0.24	-0.25	-0.25	-0.24	-0.21	-0.22	-0.21	-0.30	-0.30	-0.30
	(8.31)***	(8.42)***	(8.41)***	(8.35)***	(5.16)***	(5.23)***	(5.13)***	(7.20)***	(7.28)***	(7.26)***
Δselic	-0.04	-0.06	-0.05	-0.06	-0.06	-0.09	-0.08	-0.01	-0.03	-0.03
	(2.78)***	(4.17)***	(3.64)***	(3.85)***	(2.99)***	(3.90)***	(3.59)***	(0.72)	(1.86)*	(1.68)*
*Δ*Serasa	0.01	0.00	0.01	0.00	0.01	0.01	0.01	0.00	0.00	0.00
	(3.11)***	(2.38)**	(3.02)***	(1.81)*	(2.42)**	(2.12)**	(1.85)*	(1.61)	(0.86)	(0.34)
embi	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(5.25)***	(6.32)***	(5.78)***	(6.51)***	(4.19)***	(4.91)***	(5.06)***	(2.89)***	(3.76)***	(3.90)***
Δnpl	-0.04	-0.04	-0.04	-0.03	-0.03	-0.03	-0.03	-0.06	-0.06	-0.06
	(3.57)***	(3.51)***	(3.57)***	(3.45)***	(2.28)**	(2.29)**	(2.27)**	(3.04)***	(2.95)***	(2.85)***
Δroa	0.02	0.02	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.02
	(1.92)*	(1.56)	(1.66)*	(1.61)	(0.95)	(0.61)	(0.64)	(1.72)*	(1.52)	(1.56)
Capital to RWA_{t-1}	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01
	(2.68)***	(2.26)**	(2.41)**	(2.27)**	(2.10)**	(1.80)*	(1.79)*	(1.85)*	(1.56)	(1.58)
Liquidity to $assets_{t-1}$	0.00	0.00	0.00	0.00	0.00	-0.00	-0.00	0.00	0.00	0.00
	(0.71)	(0.48)	(0.55)	(0.51)	(0.03)	(0.13)	(0.10)	(0.86)	(0.69)	(0.70)
δ_t		-0.14		-0.26		-0.16	-0.32		-0.13	-0.24
		(3.64)***		(3.14)***		(2.66)***	(2.53)**		(2.64)***	(2.15)**
$\delta_t \cdot$ *Δselic*			0.08	-0.12			-0.16			-0.11
			(2.49)**	(1.68)*			(1.46)			(1.13)
Constant	0.01	0.14	0.08	0.15	0.04	0.18	0.20	-0.04	0.08	0.09
	(0.07)	(1.36)	(0.80)	(1.48)	(0.22)	(1.10)	(1.20)	(0.36)	(0.63)	(0.70)
R^2	0.13	0.14	0.13	0.14	0.14	0.15	0.15	0.14	0.15	0.15
N	1,052	1,052	1,052	1,052	510	510	510	542	542	542

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Source: Fund staff estimates.

Table 5. Testing for Changes in the Sensitivity of Lending Growth to Factors

	Dependent variable: *dlnx*							
All sample	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
$dlnx_{t-1}$	-0.24	-0.24	-0.24	-0.24	-0.24	-0.24	-0.24	-0.24
	(8.35)***	(8.26)***	(8.36)***	(8.34)***	(8.36)***	(8.35)***	(8.35)***	(8.23)***
ΔSelic	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06
	(3.85)***	(3.84)***	(3.85)***	(3.89)***	(3.86)***	(3.85)***	(3.86)***	(3.88)***
ΔSerasa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(1.81)*	(1.96)*	(1.59)	(1.85)*	(1.82)*	(1.81)*	(1.80)*	(2.01)**
embi	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(6.51)***	(6.37)***	(6.54)***	(6.41)***	(6.53)***	(6.51)***	(6.54)***	(6.24)***
Δnpl	-0.03	-0.04	-0.04	-0.04	-0.03	-0.04	-0.04	-0.04
	(3.45)***	(3.47)***	(3.47)***	(3.53)***	(3.42)***	(3.46)***	(3.48)***	(3.61)***
Δroa	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	(1.61)	(1.58)	(1.63)	(1.60)	(1.45)	(1.62)	(1.59)	(1.36)
Capital to RWA_{t-1}	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	(2.27)**	(2.25)**	(2.32)**	(2.28)**	(2.28)**	(2.24)**	(2.29)**	(2.31)**
Liquidity to $assets_{t-1}$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(0.51)	(0.53)	(0.42)	(0.44)	(0.49)	(0.51)	(0.29)	(0.18)
δ_t	-0.26	-0.30	0.68	-0.26	-0.26	-0.23	-0.32	0.89
	(3.14)***	(3.13)***	(1.20)	(3.06)***	(3.11)***	(1.36)	(2.70)***	(1.43)
$\delta_t \cdot$ *ΔSelic*	-0.12	-0.15	-0.53	-0.12	-0.13	-0.12	-0.13	-0.70
	(1.68)*	(1.83)*	(2.10)**	(1.57)	(1.71)*	(1.69)*	(1.72)*	(2.46)**
$\delta_t \cdot$ *ΔSerasa*		-0.00						-0.01
		(0.74)						(1.39)
$\delta_t \cdot$ embi			-0.01					-0.01
			(1.68)*					(2.02)**
$\delta_t \cdot$ *Δnpl*				0.02				0.03
				(1.02)				(1.12)
$\delta_t \cdot$ *Δroa*					0.03			0.04
					(0.61)			(0.69)
$\delta_t \cdot$ *Capital to* RWA_{t-1}						-0.00		-0.00
						(0.20)		(0.21)
$\delta_t \cdot$ *Liquidity to* $assets_{t-1}$							0.00	0.00
							(0.67)	(0.42)
Constant	0.15	0.14	0.15	0.15	0.15	0.15	0.16	0.15
	(1.48)	(1.43)	(1.50)	(1.47)	(1.49)	(1.41)	(1.57)	(1.39)
R^2	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.15
N	1,052	1,052	1,052	1,052	1,052	1,052	1,052	1,052

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Source: Fund staff estimates.

Table 6. Impact of Public Banks' Lending

a. Dependent variable: *dlnx*								
Sample	Individuals				Corporates			
	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)
$dlnx_{t-1}$	-0.24	-0.25	-0.24	-0.24	-0.30	-0.30	-0.30	-0.29
	(5.68)***	(5.80)***	(5.70)***	(5.68)***	(7.20)***	(7.19)***	(7.18)***	(7.00)***
ΔSelic	-0.03	-0.06	-0.06	-0.05	-0.02	-0.04	-0.04	-0.04
	(1.22)	(2.21)**	(2.11)**	(2.09)**	(0.92)	(2.05)**	(1.89)*	(1.88)*
*Δ*Serasa	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(1.99)**	(1.56)	(1.58)	(1.49)	(1.83)*	(1.08)	(0.57)	(1.27)
embi	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(4.05)***	(4.80)***	(4.82)***	(4.83)***	(3.29)***	(4.12)***	(4.23)***	(3.99)***
Δnpl	-0.03	-0.03	-0.03	-0.03	-0.06	-0.05	-0.05	-0.05
	(2.19)**	(2.19)**	(2.20)**	(2.23)**	(2.81)***	(2.71)***	(2.63)***	(2.68)***
Δroa	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02
	(0.89)	(0.49)	(0.48)	(0.47)	(1.84)*	(1.63)	(1.67)*	(1.61)
Capital to RWA_{t-1}	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	(2.02)**	(1.67)*	(1.65)*	(1.65)*	(1.93)*	(1.62)	(1.64)	(1.73)*
Liquidity to $assets_{t-1}$	-0.00	-0.00	-0.00	-0.00	0.00	0.00	0.00	0.00
	(0.02)	(0.20)	(0.18)	(0.21)	(0.91)	(0.74)	(0.75)	(0.62)
$dlnpublic_{t-1}$	0.36	0.40	0.40	0.41	-0.13	-0.12	-0.12	-0.14
	(2.71)***	(2.62)***	(2.60)***	(2.63)***	(2.57)**	(2.42)**	(2.40)**	(2.63)***
$\delta_t \cdot dlnpublic_{t-1}$		-0.02	-0.12	-0.28		-0.03	-0.01	-0.29
		(0.08)	(0.42)	(0.59)		(0.17)	(0.07)	(1.56)
δ_t		-0.17	-0.25	0.36		-0.13	-0.23	2.23
		(2.52)**	(1.88)*	(0.25)		(2.47)**	(1.98)**	(2.47)**
$\delta_t \cdot \Delta Selic$			-0.09	-0.41			-0.10	-1.07
			(0.69)	(0.54)			(0.99)	(2.91)***
$\delta_t \cdot$ embi				-0.00				-0.02
				(0.42)				(2.75)***
Constant	0.03	0.19	0.19	0.19	-0.02	0.09	0.10	0.09
	(0.17)	(1.14)	(1.15)	(1.17)	(0.22)	(0.77)	(0.84)	(0.73)
R^2	0.15	0.17	0.17	0.17	0.15	0.16	0.16	0.17
N	510	510	510	510	542	542	542	542

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Source: Fund staff estimates.

Table 6. Impact of Public Banks' Lending (Concluded)

b. Dependent variable: *dlnx*				
Sample	Individual consumption	Individual personal loan	Working capital	Goods
	(IX)	(X)	(XI)	(XII)
$dlnx_{t-1}$	-0.21	-0.01	-0.28	-0.27
	(4.37)***	(0.25)	(6.41)***	(6.50)***
ΔSelic	-0.05	-0.09	-0.04	-0.01
	(1.27)	(3.24)***	(1.69)*	(0.26)
ΔSerasa	0.00	0.00	0.00	0.02
	(0.58)	(1.25)	(0.84)	(4.13)***
embi	-0.00	-0.00	-0.00	-0.00
	(1.28)	(2.27)**	(2.50)**	(3.38)***
Δnpl	-0.00	-0.01	-0.03	-0.03
	(0.08)	(0.68)	(1.17)	(1.17)
Δroa	0.03	0.01	0.00	-0.00
	(0.60)	(0.48)	(0.22)	(0.01)
Capital to RWA_{t-1}	0.01	0.01	-0.00	0.02
	(1.48)	(1.76)*	(0.12)	(2.52)**
Liquidity to $assets_{t-1}$	-0.01	0.00	0.00	0.01
	(0.97)	(1.12)	(0.63)	(1.38)
$dlnpublic_{t-1}$	0.52	-0.09	-0.15	-0.11
	(2.46)**	(0.54)	(2.38)**	(1.59)
$\delta_t \cdot dlnpublic_{t-1}$	-0.54	-0.22	-0.21	-0.37
	(0.83)	(0.44)	(0.96)	(1.50)
δ_t	1.34	-1.36	3.26	2.65
	(0.67)	(0.90)	(3.05)***	(2.21)**
$\delta_t \cdot \Delta Selic$	-0.73	0.33	-1.30	-1.04
	(0.70)	(0.42)	(2.99)***	(2.12)**
$\delta_t \cdot$ embi	-0.01	0.01	-0.02	-0.02
	(0.74)	(0.75)	(3.14)***	(2.20)**
Constant	0.05	-0.13	0.18	-0.17
	(0.23)	(0.75)	(1.21)	(0.98)
R^2	0.10	0.09	0.12	0.16
N	398	376	534	522

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Sources: Fund staff estimates.