



BANCO CENTRAL DE RESERVA DEL PERÚ

Macprudential Policies in Peru: The effects of Dynamics Provisioning and Conditional Reserve Requirements

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Abstract

In the last decade, the banking credit has grown significantly in Peru, a partial dollarized economy. That imposed some challenges to the financial regulators to mitigate the risks derived from both excessive economic growth and currency mismatches of banks' debtors. This document assesses the effectiveness of two macroprudential measures implemented by the financial regulators: dynamic provisioning and conditional reserve requirements. By using a credit register data, there is evidence that dynamic provisioning has a dampening impact on commercial credit growth. Moreover, mortgage dollarization has declined more rapidly after the implementation of the Conditional Reserve Requirement scheme, but there is no clear evidence about its impact on banks' assets quality. In the case of dynamic provisioning, its effect over non-performing loans is asymmetric¹.

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1 Introduction

This article assesses the effects of macroprudential tools in a partially dollarized economy. In the case of Peru, banks can grant loans in both domestic and foreign currency. However, a highly dollarized banking system is very vulnerable to an abrupt increase of the exchange rate, since there are important currency mismatches in the debtors' flow of incomes and expenses as well as in the assets and liabilities. In fact, a sharp increase of the exchange rate leads to higher payments of both the principal and the interests of a debtor, who has his flow of incomes and assets denominated mainly in local currency. This effect is known as balance sheet effect. In the Peruvian case, high levels of growth of credit have come accompanied with flexible bank lending standards, which could lead to deteriorations of banks' asset quality. For example, the total growth of credit was 39% in October 2008, more than five times the growth of gross domestic product. In that context, macroprudential policies were set up in Peru aimed to reduce the procyclicality of credit and the level of credit dollarization.

In this regard, [Jimenez, Ongena, Peydró and Saurina (2008)] explored the effects of overnight interest rates and the stance of monetary policy on credit risk-taking behavior. Their findings suggest that lower short-term interest rates previous to loan origination caused a relaxation on bank lending standards as banks grant loans to riskier clients (with a high default probability). In this context, macroprudential policies aim to limit excessive borrowing and balance sheet expansion in order to preserve financial stability. Hence macroprudential policies can complement monetary policy. For instance, dynamic provisioning is one of the instruments of macroprudential policy implemented one year before the Central Reserve Bank of Peru reduced its interest rate policy to a very low level (1% in 2009). In addition, the central bank implemented a macroprudential instrument called conditional reserve requirements to curb excessive credit growth in foreign currency, given low interest rates in international markets.

Many Latin American countries have established different instruments of macroprudential policy (see Tables 1, 2, and 3). For example, Colombia introduced a countercyclical reserve requirements during 2007-2008 to limit liquidity risk, marginal reserve requirements and a dynamic provisioning scheme in order to stabilize credit growth in late 2007. Colombian authorities also established liquidity ratios restrictions in 2009 to limit liquidity risk (this measure was tightened in the end of 2011). In the case of Mexico, dynamic provisioning was established in 2011, additional limits on exchange rate credit risk were established in 1997, and limits to banks' derivatives position in 2001.

In despite of the impressive advances in policy application of several macroprudential instruments and its rationalization, there is not ample empirical research about the effects of macroprudential instruments on credit dynamics.

In this document the effects of dynamic provisioning and conditional reserve requirements on credit growth, credit dollarization, and banks' assets quality are evaluated. To do that, a novel credit register data is employed, which covers a long period of time (2004-2014) and contains information about outstanding loans at bank-debtor level. By using panel data techniques, it is

found that dynamic provisioning decelerates the growth of commercial loans (the credit growth rate is 1.4% lower than normal if dynamic provisioning tool is activated). In a related research, Saurina *et al.* (2013) find a coefficient of -2% for the growth of committed lending, given the implementation of a dynamic provisioning scheme. Regarding conditional Reserve Requirements on FX mortgage loans, there is statistically significant evidence that this macroprudential policy reduces dollarization. Although, in the case of the non-performing loans, the evidence presents mix results.

This article is organized as follows: section 2 presents a brief literature review; section 3 shows stylized fact in credit dynamics; section 4 describes the data set and variables used; section 5 documents the empirical strategy and its results; and, finally, section 6 presents a brief summary of the findings and points out a future research agenda.

2 Literature Review

The 2008' Financial Crisis in highlighted the need to change the financial regulatory framework on the research agenda, from one oriented to monitor bank's solvency to another orientated to a macroprudential perspective, to reinforce a sound and safe banking system (See [Hanson, Kashyap and Stein (2011); Brunnermeier, Crockett, Goodhart, Persuad and Shin (2009); French, *et al.* (2010)]).

Similarly, [Hanson, Kashyap and Stein (2010)] show that a micro-prudential regulation seeks to restore individual tier capital ratio (when a adverse shock dampens it), and it is not concerned about how bank achieve it. One stylized fact during the last Financial Crisis shows that shrinking balance sheet (sell assets) is easier than issuing equity in order to meet tier capital requirements.

Shin (2010) states that in tranquil times, asset prices tend to rise, leading to an increment on credit risk. Thus, banks want to attract both domestic and foreign funding. This provokes a jump in the banking leverage ratio, and banks tend to rely on non-core liabilities, causing both currency and maturity mismatches. Therefore, banks contract their balance sheet dramatically, sparking off a spiral process of reduction of asset prices and net worth when foreign funding becomes scarce.

In an applied work, [Claessens, Ghosh and Mihet (2014)] explores how macroprudential policies have been effective in emerging and developed economies. Using a panel data set, which covers 48 countries and 2 800 banks from 2000 to 2010, and controlling for endogeneity². The authors find that macroprudential measures aimed to restrain borrowers' risk taking behavior and limiting banking balance sheet growth such as Loan to Value (LTV), Debt to Income (DTI) or Reserve Requirements (RRs) restrictions have a curbing effect on the growth of risky assets. On the contrary, the set of measures that encourage banks to build-up liquidity buffers, such

²A country could adopt measures in addition to macro-prudential policies to deal with systemic risk.

as dynamic provisioning, exhibit slight effects. The results are similar if the sample is split between advanced and emerging economies, but in advanced economies measures oriented to limit borrowing are more effective at reducing asset growth than measures aimed to reduce available funds.

In line with this work, [Cerutti, Claessens and Laeven (2015)] report a recent IMF survey about usage of macroprudential policies and their effects among 119 countries over the 2000-2013 period. They conclude that macroprudential policies are used more in emerging countries, especially foreign exchange related policies, but borrower-based policies are preferred in advanced economies. Also, the effects of borrower-based measures are higher than other macroprudential policies. Dynamic provisioning, used almost exclusively in emerging economies, and countercyclical requirements decelerate credit growth. Additionally, they find evidence of asymmetric effects of macroprudential policies: these measures are more effective on boom periods than during bust phases.

On the other hand, [Drehmann and Gambacorta (2012)] explored the effects of Basel III countercyclical capital buffers requirements through a counterfactual exercise, using information from 772 European banks between 1998 and 2009. The methodology computes additional capital requirements as if the Basel III regime would have been placed since 1986. Then, that additional requirements are put on a lending equation, controlling for macroeconomic factors and banking characteristics. They find that additional capital buffers requirements could moderate credit growth during boom periods (the cumulative reduction in the supply of credit over the period 1986 to 2007 would have been around 18 percent).

For emerging markets, [Bruno and Shim (2014)] analyze the effects of macroprudential and capital flow policies on credit growth across 12 Asia-Pacific countries between 2004 and 2013. They examined 177 domestic macroprudential policies, such as LTV or DTI restrictions, and 152 capital flow management policies. The authors find that macroprudential and capital flow policies reduce both banking and bond inflows. Additionally, they find some evidence about spillover effects of these policies (for instance, bank inflow controls tend to increase international debt securities before 2007, and bond inflow controls tend to increase cross-border bank lending and domestic bank credit after 2009). Regarding the interaction between monetary and macroprudential policies, the authors suggest that macroprudential measures have a stronger effect if such policies are reinforced by the stance of monetary policy.

The research made by [Jimenez, Ongena, Peydró and Saurina (2012)] analyze the impact of the Spanish Dynamic Provisioning scheme on credit supply, using a Credit Register database provided by the Bank of Spain, particularly commercial and industrial loans (80 percent of total loans) granted to more than 100 000 non-financial companies by 175 banks in any given year. In the case of Spain, countercyclical provision is based on the comparison of the average of specific provisions along the last lending cycle with the current specific provision, so in good (bad) times, when non-performing loans are low (high), specific provisions are low (high) with respect to the average of the cycle provisions producing (drawing down) the dynamic provision funds, together with floor and ceiling values set for general loan loss provisions. The results suggest

that dynamic provisions help to smooth credit supply cycles and in bad times have positive effects on firm credit availability, assets, employment and probability of survival.

In the case of Latin American economies, [Chan-Lau (2012)] explored the impact of Dynamic Provisioning on bank solvency and credit procyclicality, using information of 14 large Chilean banks for the 2004-2010 period. The author analyzes the solvency of those banks under two scenarios: (i) Chilean provisioning scheme of 2011; (ii) dynamic provisioning as detailed in the work of Saurina (2009). The main conclusion is that the dynamic provisioning scheme builds-up more capital buffers in order to cover loan losses than the current Chilean scheme. Additionally, she shows that credit and output lead the evolution of credit provisioning; therefore, credit provisioning could not have any effect on credit evolution.

For the Uruguayan case, [Dassatti and Peydró (2015)] studied the effects of a change of reserve and liquidity requirements on bank risk-taking behavior. Using a credit register database and a difference-in-difference approach, they find that increases in reserve and liquidity requirements for distinct funding sources (deposits, short-term funding and others) reduce loan supply to the non-financial sector. This effect is asymmetric, larger banks are more capable to mitigate the effects of the lending channel. At firm level, higher reserve requirements increase their real costs, although the effect is also asymmetric: firms with better credit rating or with a better network with larger banks are able to reduce those costs.

Many emerging economies under Inflation Targeting regime have left out the use of reserve requirements (RR) as a monetary policy instrument. However, these economies have actively used RRs on banking and non-banking liabilities to handle systemic risk. [Tovar, García-Escribano and Vera (2012)] remark the variety of purposes that RRs can achieve. First, RRs can be used for managing the credit cycle countercyclically. Second, they can be employed to improve the funding structure of banking system. For instance, Peruvian scheme of RRs on foreign liabilities with short-term maturity has limited the exposure of banking system to short-term debt. Third, they can substitute for traditional monetary policy in order to preserve financial stability. For example, many emerging economies raised their policy rate in a context of large capital inflows, this policy response (whose goal was to increase the cost of credit) could lead to more capital inflows (because the yield of domestic assets could be higher than international) and foster the expansion of loans; thus, RRs can substitute traditional monetary policy instruments. Their results suggest imitated effects of RRs, specifically on credit growth are *'modest and short-lived'*. Therefore, RRs should be reexamined regularly in order to preserve their effects on credit dynamic.

Table 1: Capital based instruments

	Dynamic visioning	Pro- visioning	Limits on div- idend distribu- tion	Other capital-based tools
Argentina	No		Yes (2010, 2012)	Changes in risk weights for specific operations
Brazil	No		No	Change of risk weights for some types of loans
Chile	No		No	No
Colombia	Yes (2007)		Yes (2008)	Higher LGD for some consumer loans in 2011
Mexico	Yes (2011)		No	No
Peru	Yes (2008)		No	Yes (on specific operations 2010, 2012)

Note: The number in brackets indicates the year of modification or use of macroprudential instrument.
Source: BIS

Table 2: Asset based instruments

	LTV and DTI limits	Limits on ex- change rate risk	Limits on derivatives
Argentina	Yes (LTV for mortgages)	Yes	Yes
Brazil	Yes (LTV for mortgages)	Yes (2007)	Yes (2011)
Chile	No	Yes	No
Colombia	Yes (1999)	Yes (2005)	Yes (2007)
Mexico	No	Yes (1997)	Yes (2001)
Peru	Yes	Yes (2010-2011)	Yes (2011)

Note: The number in brackets indicates the year of modification or use of macroprudential instrument.
Source: BIS

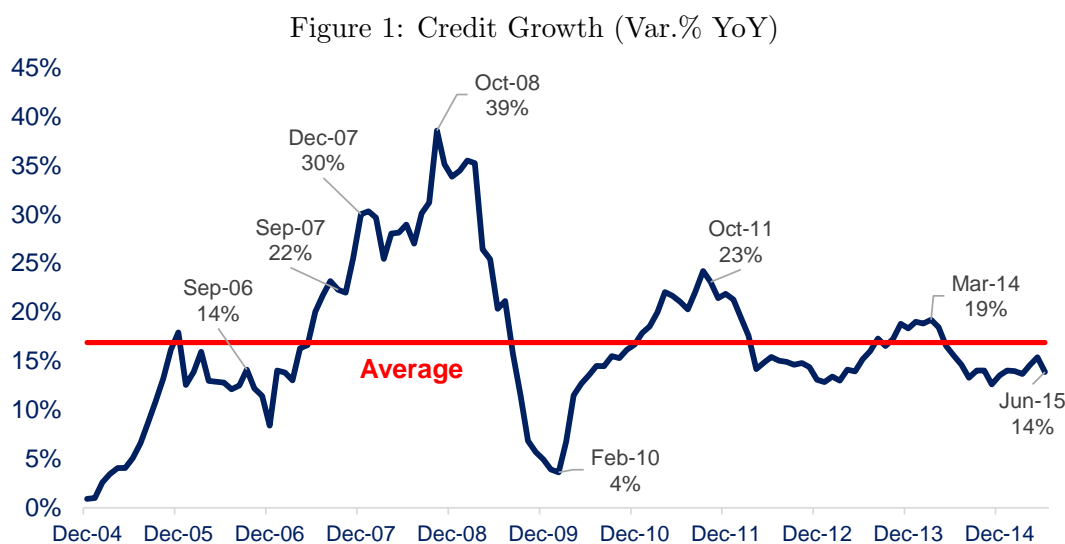
Table 3: Liquidity based instruments

	Countercyclical reserve requirements	Liquidity ratios
Argentina	Yes (but not countercyclical)	Yes (2008)
Brazil	Yes (2008, 2009, 2011, 2012)	Yes. Liquidity measures and taxes on capital flows
Chile	No	Yes
Colombia	Yes (2007)	Yes (2008)
Mexico	No	Yes
Peru	Yes. (2010, 2011)	Yes (1997, 2012)

Note: The number in brackets indicates the year of modification or use of macroprudential instrument.
Source: BIS

3 Credit Dynamics and the Peruvian Macro-Prudential Toolkit

In the last decade, the credit to the private sector has grown steadily in Peru. The average rate of credit growth between 2004 and 2014 is around 15 percent, with a highest growth rate of 39 percent at the end of 2008, given vigorous growth of economic activity (the average growth rate of GDP was around 6 percent) and abundant international liquidity. In fact, international interest rates near to the zero provoked a great capital inflow to emerging markets. In this environment, Peruvian authorities took different macroprudential measures aimed to preserve financial stability.



According to Chang and Choy (2014), Peru has implemented some macroprudential policies to mitigate the following critical issues: the procyclicality of credit, the exchange rate credit risk, and the exposure to short-run capital inflows. The main measures adopted are the following:

(i) The SBS established procyclical provisioning (see the Dynamic provisioning scheme table); higher requirements of tier capital for loan in the segments of consumption and mortgages, and an additional requirement for FX mortgages; tier capital requirements for exposition to exchange rate credit risk; limits to FX exposition of the financial institutions; limits to FX negotiation by pension fund companies.

(ii) On its behalf, the central bank introduced higher reserves requirements; reserves requirements differentiated by currency; additional reserves requirements for FX mortgages and automobile loans; additional reserves requirements for deposits of foreigners and for short-term external debt.

Dynamic provisioning depends of the type of loan. Before July 2010, loans granted to firms were classified as commercial and microbusiness (firm's debt lower than US\$ 30 000). In July 2010, the SBS established an accounting change creating more categories of firm loans: corporate, large companies, medium-size companies, small business and microbusiness (firm's debt lower than US\$ 6 000). This accounting change and other limitations This issue and other limitations about microbusinesses database present a challenge in the study of the impact of this macro-prudential tool. Therefore, we chose to analyze only the commercial loans with a minimum outstanding debt of one million soles (around US\$ 300 000), which represent at least in one quarter of the sample (covering around 80% of total commercial loans).

Table 4: Provisioning Requirements (general and dynamic) for normal portfolio of credits to businesses 1/ (%)

a) Applicable from December 2008 until June 2010			
Business loans by type	General provisions	Dynamic or pro-cyclical provisions rate	
		Unsecured loans	Loans with selfliquidating collateral
Commercial loans	0.70	0.45	0.30
Microbusinesses	1.00	0.50	0.00

b) Applicable from July 2010 until now			
Business loans by type	General provisions	Dynamic or pro-cyclical provisions rate	
		Unsecured loans	Loans with selfliquidating collateral
Corporate	0.70	0.40	0.30
Large companies	0.70	0.45	0.30
Medium-size enterprises	1.00	0.30	0.00
Small business	1.00	0.50	0.00
Microbusinesses	1.00	0.50	0.00

1/ Debtors that presents a liquid and strong financial position, with low debt and a good ability to generate profits. Cash flow is not susceptible to a significant worsening.

To evaluate the effect of the dynamic provisioning scheme in Peru, first we describe how this tool has been activated and deactivated since 2008, year in which this scheme was introduced. The SBS activated the dynamic provision scheme since December 2008 in a context of a high GDP growth rate (at 9.1% that year) and a rapid increase of the rate growth of credit (at 39% annual in October 2008).

Therefore, this scheme was activated following the second rule of activation which states an average GDP growth rate YoY of the last 30 months higher than 5% (8.7% in October 2008), and the average GDP growth rate YoY of the last 12 months higher by 2% to this same indicator a year earlier (2.5% in October 2008). This dynamic provision scheme was present until September 2009 (ten months), when it was deactivated, given the international financial crisis. In June 2009, the average GDP growth rate YoY of the last 12 months was lower by 5.7% to this same indicator calculated a year earlier meeting the second rule of deactivation.

In 2010, Peruvian economy recovered after the international financial crisis allowing the activation of the dynamic provisions since October 2010 until November 2014 (50 months). This activation met the second rule of activation which states an average GDP growth rate YoY of the last 30 months higher than 5% (5.86% in July 2010), and the average GDP growth rate YoY of the last 12 months higher by 2% to this same indicator a year earlier (2.04% in July 2010). As can be noticed, the GDP growth rate has a lag of two months, given delay in the official publication of this indicator.

Table 5: Dynamic Provisioning Scheme in Peru

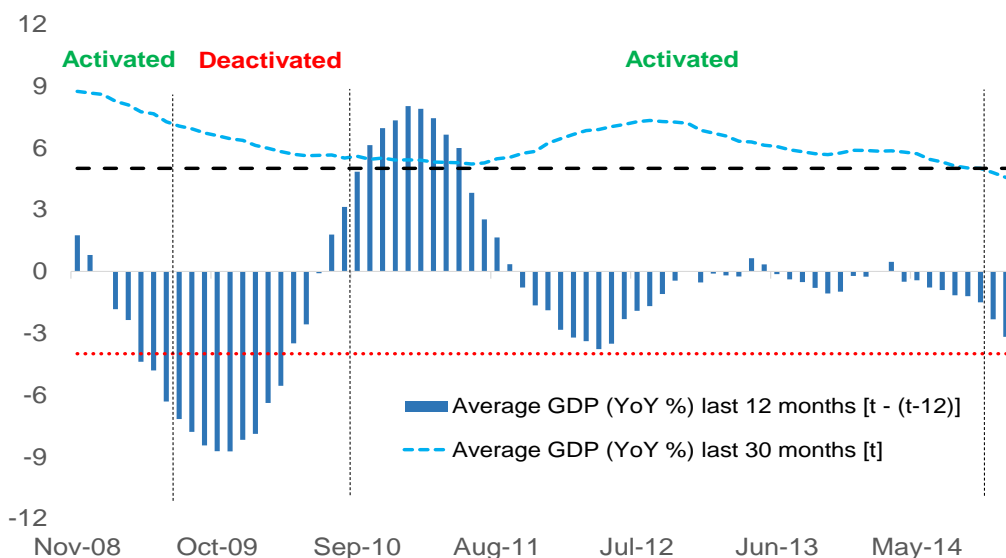
Activation Rule	Desactivation Rule
1. The average GDP growth rate YoY of the last 30 months passes from less than 5% to 5% or more	1. The average GDP growth rate YoY of the last 30 months passes from a level equal or greater than 5% to one less than this threshold.
2. When the average GDP growth rate YoY of the last 30 months is over 5%, and the average GDP growth rate YoY of the last 12 months is higher by 2% to this same indicator calculated a year earlier	2. The average GDP growth rate YoY of the last 12 months is lower by 4% to this same indicator calculated a year earlier
3. When the average GDP growth rate YoY of the last 30 months is over 5%, and 18 months had elapsed since the pro-cyclical rule was deactivated	

Note: "YoY" is year over year
Source: Chang and Choy (2014)

On the other hand, the SBS has established stricter and higher capital requirements for consumption loans and mortgages in order to cope with higher foreign capital inflows since January 2013. In turn, Central Reserve Bank of Peru established in 2008 a marginal reserve requirement for non-resident deposits in the banking system. This last measure required an additional reserve requirement of 120% for liabilities with foreign financial entities, which exceeds the maximum between the average amount of liabilities plus S/ 100 million and 1% of bank net worth. This policy disincentives banks to take foreign short-run funding, which proved to revert rapidly in response to external volatility³. This led to an abrupt jump of the interest rates and the exchange rate. Besides, it prevented an accelerated currency appreciation and, therefore, an

³In 1998, the banking system was overexposed to short-run funding. When the international risk aversion went up, the capital outflow was around US\$ 1 484 million (2.5% of GDP)

Figure 2: Activation and Deactivation Rule of Dynamic Provisioning



increase of credit dollarization⁴.

Regarding exchange rate credit risk, the Central Bank has implemented some macroprudential tools to address exchange rate credit risk, given high levels of credit dollarization. The De-Dollarization encourages credit dollarization, through additional reserve requirements in foreign currency conditional to credit evolution. At the beginning, the scheme was conditional on credit growth. There were three limits (10%, 15% and 20%) to total credit growth in foreign currency⁵, if banks exceeded these limits, they faced additional requirements of 1.5%, 3% and 5%, respectively. In the case of automobile loans and mortgages, the limits to growth were 10% and 20%, and the associated additional reserve requirements were 0.75% and 1.5%, respectively⁶. In the end of 2014, this scheme was adjusted and limits to credit outstanding were set up. This new approach demanded a contraction not lower than 10% of total credit stock at September 2013 for total credit outstanding in foreign currency⁷ at the end of 2015; in the case of automobile loans and mortgages, the reduction was set to not lower than 15% of these credits at February 2013. If banks did not meet this conditions, they would face additional reserve requirements proportional to their total liabilities in foreign currency (in Figure.4 it is shown the rules for

⁴Castillo, P., Barco D. "Crisis Financiera y Manejo de Reservas", Revista de Estudios Económicos, N 17, June 2009.

⁵Loans to foreign trade operations were excluded.

⁶In both cases, the reserve requirements were applied on deposits in foreign currency.

⁷Excluding loans for foreign trade operations and loans with maturity higher than 3 years and bigger than US\$ 10 million.

conditional reserve requirements scheme)⁸.

Figure 3: Conditional Reserve Requirements in Foreign Currency

Previous Measure: From March 2013 to May 2015						
	Targets of Credit Growth*			Additional RR		
	I	II	III	I	II	III
Total Credit excluding foreign trade loans (C_t) (Sep.13=100)	5,0%	10,0%	15,0%	1,50%	3,0%	5,0%
Mortgage and Car Loans (CHV_t) (Feb.13=100)	10,0%	20,0%		0,75%	1,50%	
Since June 2015						
	Required Stock*		Additional RR			
Total Credit ^{1/} (Set.13=100)	0,95 times (reduction of 5%)		$0,3 \times \left(\frac{C_t}{C_{s13}} - 0,95 \right) \times TLiab$			
Mortgage and Car Loans (Feb.13=100)	0,90 times (reduction of 10%)		$0,15 \times \left(\frac{CHV_t}{CHV_{f13}} - 0,90 \right) \times TLiab$			
Since December 2015						
	Required Stock*		Additional RR			
Total Credit ^{1/} (Set.13=100)	0,90 times (reduction of 10%)		$0,3 \times \left(\frac{C_t}{C_{s13}} - 0,90 \right) \times TLiab$			
Mortgage and Car Loans (Feb.13=100)	0,85 times (reduction of 15%)		$0,15 \times \left(\frac{CHV_t}{CHV_{f13}} - 0,85 \right) \times TLiab$			

*These targets do not apply if total credit stock in foreign currency is lesser than bank net worth, and if mortgages and car loans are lesser than a fifth of bank net worth.

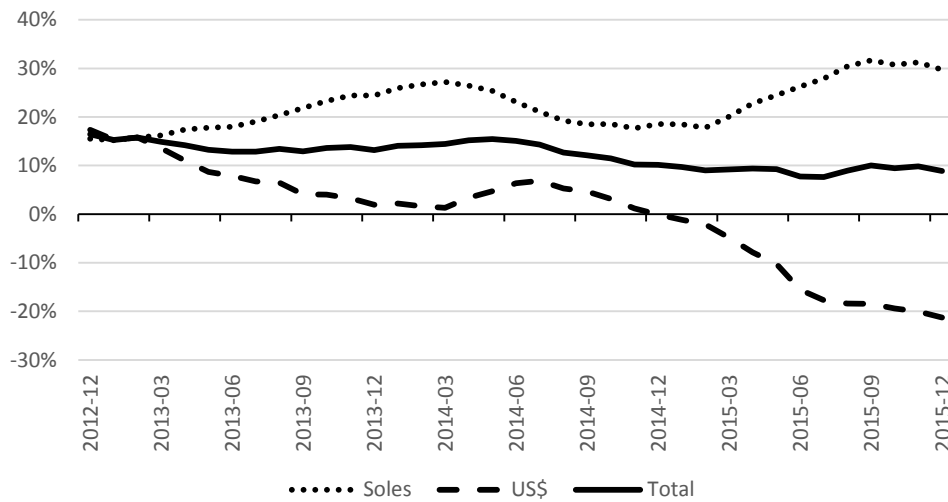
1/ Excludes foreign trade loans, and credits whose maturity exceeds 3 years and volume is higher than USD 10 millions.

TLiab: Total Liabilities in foreign currency (includes Deposits, debt and bons).

⁸Includes deposits, bonds and external liabilities.

Figure 5 shows the evolution of credit growth by currency. The overall growth rate of credit to the private sector was 9.2%, which was lower than the growth rate registered at the end of 2014 (10.4%). By currency, loans denominated in Soles accelerated their growth at the end of (28.0% annual). On the other hand, credit in foreign currency decreased, closing the year with a contraction of 21.0% annual. This evolution was partially associated with the implementation of the De-Dollarization Program and the depreciation of domestic currency.

Figure 4: Credit to the Private Sector (Var.% YoY)



4 Data

The Credit Register database, provided by the SBS, contains information at a very disaggregate level of loans outstanding in both domestic and foreign currencies. Specifically, commercial loans from 2004:Q2 to 2014:Q4 are analyzed to estimate the impact of macroprudential instruments on financial system's indicators. There are two different accounting systems for businesses loans before and after July 2010. Therefore, only commercial loans with a minimum outstanding debt of one million soles (around US\$ 300 000) are chosen, those are at least one quarter of the sample (covering around 80% of total commercial loans).

In addition, macroeconomic indicators such as the interbank interest rate and the exchange rate are used as control variables. The sample (2004:Q2 – 2014:Q4) contains information about 19 639 debtors whose loans were granted by 9 banks. The number of bank-debtor relationships was on average 6 611 (with a maximum of 14 892 and a minimum of 568).

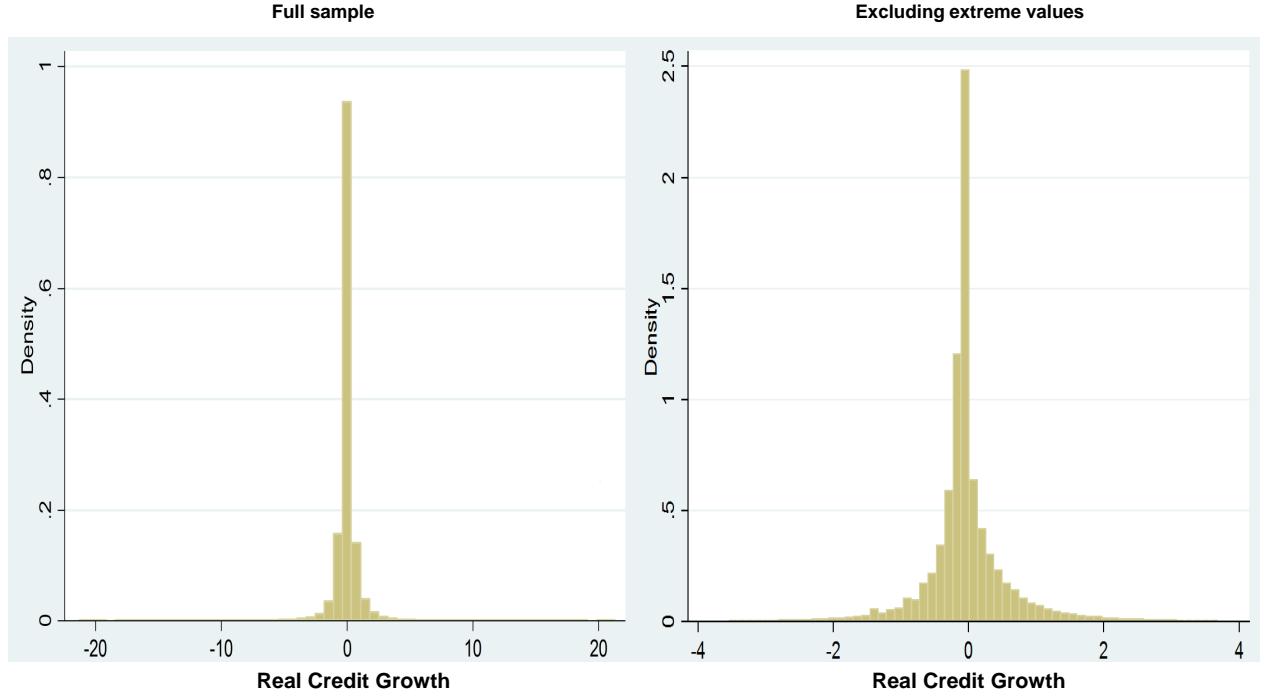
Regarding the sample for evaluation of conditional reserve requirements for banks that grant mortgages loans, the time dimension is expanded up to the third quarter of 2015 to have additional observations where RRs was active. For the lender based regression, there are forty two banks. In the case of lender-debtor based regressions, the numbers of banks is twelve, 136 900 debtors, and the number of bank-debtor relationship is 12 118, on average (with a maximum of 46 251 and a minimum of 125). Loans granted to big companies are excluded from the analysis, because some firms are exporters and others have incomes indexed to the exchange rate, so those can handle the exchange rate credit risk.

The dependent variables are the real quarterly credit growth (calculated as the first difference of the natural logarithm of outstanding loans), the dollarization ratio of mortgage loans, and the non-performing loans rate for mortgages. The total credit stock is deflated using the Consumer Price Index (CPI). Control variables are divided into two groups: banking controls and macroeconomic controls. Banking controls are: size (measured by total assets), leverage ratio, liquidity ratio (loan to deposits). Macroeconomic controls are: the quarterly change of interbank interest rate, the quarterly nominal depreciation, the annualized change of the current account and the annualized change of GDP. Additionally, we control for reserve requirements for each bank in both currencies. To avoid extreme values, observations higher than the ninety percentile threshold and lower than the ten percentile thresholds are drop out. The empirical distribution of credit growth is showed in the Figure 6.

Table 6: Summary of statistics of main variables

	Mean	Median	Std. Dev.	10 Percentile	90 Percentile
Levels					
Bank Assets (Mill. S/)	28 699	22 852	23 732	3 113	62 413
Capital Ratio (%)	13.09	12.87	1.52	11.29	15.00
Deposits to Liabilities (%)	76.38	75.71	6.13	69.98	83.53
Liquidity Ratio (%)	39.57	36.62	16.48	20.35	64.40
RR in Domestic Currency (%)	10.13	7.65	5.02	6.00	17.41
RR in Foreign Currency (%)	29.65	27.84	6.56	24.35	41.40
Growth Rates					
Credit (%)	-2.66	-5.21	66.23	-56.65	59.79

Figure 5: Empirical Distribution of Credit Growth



5 Empirical Strategy and Results

In this section the methodology to evaluate the effectiveness of the two macroprudential tools is presented.

Dynamic Provisioning Effects

In order to quantify the effects of dynamic provisioning on credit growth⁹, the following base regression equation is performed:

$$Y_{i,b,t} = \sum_{j=0}^3 X'_{t-j} \times \beta^j + \sum_{j=0}^3 Z'_{b,t-j} \times \theta^j + \sum_{j=0}^3 MP_{t-j} \times \gamma^j + u_{i,b,t} \quad (1)$$

Where i , b and t represent debtor, bank and time indexes, respectively.

$Y_{i,b,t}$ is the real credit growth of debtor- i in bank- b at time t . X_{t-j} stands for the vector of macro control variables; $Z_{b,t-j}$ is the matrix of bank controls; and, MP_{t-j} expresses the dy-

⁹The methodology was proposed in the BIS CCA CGDFS Working Group Workshop.

dynamic provisioning scheme at time $t-j$. Moreover, the dynamic provisioning is encoded as:

$$MP_t = \begin{cases} 1, & \text{if dynamic provisioning is "activated".} \\ -1, & \text{if dynamic provisioning is "deactivated".} \\ 0, & \text{otherwise.} \end{cases} \quad (2)$$

As panel data estimation methods usually do, the idiosyncratic error ($u_{i,b,t}$) is:

$$u_{i,b,t} = \alpha_{i,b} + \varepsilon_{i,b,t} \quad (3)$$

Where $\alpha_{i,b}$ is the non-observable heterogeneity, and $\varepsilon_{i,b,t}$ represents an independent, identically distributed, random disturbance. Also, it is assumed that $\alpha_{i,b}$ is uncorrelated with $\varepsilon_{i,b,t}$.

According to Greene (2014), if the non-observable heterogeneity is uncorrelated with observable regressors, then the random effects estimator (a feasible GLS estimator) is both efficient and consistent. However, our base equation regression does not take into account individual control, such as debtor wealth or income and other characteristics, so it is difficult to believe that this omitted information is not correlated with macro-controls or bank controls. Thus, we choose to estimate the models using fixed effects methodology (within estimator), which is not an efficient but a consistent estimator.

Within estimator (fixed effects methodology) consists in transform the dataset. The time average can be removed from (1). Then, it is possible to re-write it as:

$$Y_{i,b,t} - \bar{Y}_{i,b} = \sum_{j=0}^3 [X_{t-j} - \bar{X}_{i,b}]' \times \beta^j + \sum_{j=0}^3 [Z_{b,t-j} - \bar{Z}_{i,b}]' \times \theta^j + \sum_{j=0}^3 [MP_{t-j} - \bar{MP}_{i,b}] \times \gamma^1 + \tilde{u}_{i,b,t} \quad (4)$$

Also, some dummy variables are added to control some time-invariant effects (τ_t), such as seasonality (for instance, after the Christmas campaign, many firms diminish their production, therefore they require less funding), and bank-specific effects (γ_b). Additionally, the presence of heteroscedasticity is corrected, and then the variance-covariance matrix was estimated by debtor (cluster). With this in mind, the equation is:

$$\tilde{Y}_{i,b,t} = \gamma_b + \tau_t + \sum_{j=0}^3 \tilde{X}'_{t-j} \beta^j + \sum_{j=0}^3 \tilde{Z}'_{b,t-j} \theta^j + \sum_{j=0}^3 \psi^j MP_{t-j} + \tilde{u}_{i,b,t} \quad (5)$$

The results (see Tables A1 and A2 in the Appendix) show that dynamic provisioning tends to reduce the procyclicality of commercial loans for a restricted estimation. So, if the dynamic provisioning scheme was tightened on the previous period, the real credit growth is expected to diminish in 1,4% percent in the current period. Moreover, as can be noticed in Table 2, the cumulated effect of dynamic provisioning is also significant and greater than the first-lag effect. Regarding macroeconomic controls, the estimated coefficient for the exchange rate is significant and negative, reflecting that a depreciation of domestic currency reduces the growth of commercial loans. However, a significant and positive relationship between the change of the

interbank rate and the growth of commercial loans is founded, an unusual and counterintuitive result, inasmuch as a tightening in monetary conditions tends to increase borrowing costs and corporate firms can substitute bank loans.

Furthermore, there is an inverse relationship between bank-size and credit growth. It might be that small banks (which possess lower assets) tend to expand their balance sheets more than larger ones because the former are in their expansionary phase. Additionally, regarding to liquidity bank characteristics, there are mixed evidence but not significant at all. In this line, [Claessens, *et al.*] find that banks with less deposits are riskier than others. Small banks are willing to expand their balance sheets, but this fact could restrain them to do it as well.

Then, the impact of the dynamic provisioning scheme is evaluated, splitting tightening periods from easing periods, on the credit growth of commercial loans (Figure 3) according with the following equation:

$$\tilde{Y}_{i,b,t} = \gamma_b + \tau_t + \sum_{j=0}^3 \tilde{X}'_{t-j} \beta^j + \sum_{j=0}^3 \tilde{Z}'_{b,t-j} \theta^j + \sum_{j=0}^3 \psi^j_{tight} Tightening_{t-j} + \sum_{j=0}^3 \psi^j_{ease} Easing_{t-j} + \tilde{u}_{i,b,t} \quad (6)$$

Throughout the analysis of alternative estimations (see Appendix, Table A3 and A4), it is found similar results in the sign of coefficients and significance for macroeconomic and bank controls. Regarding the main variable (dynamic provisioning), a tightening position in the macroprudential tool tends to reduce credit growth, and an easing position tends to increase credit growth, although the latter effect is not statistical significant. A similar effect is found when the cumulative effect of tightening and easing position of our macro-prudential tool is analyzed. This suggests that dynamic provisioning tends to reduce the procyclicality of credit.

A third equation was estimated (see Appendix, Tables A5 and A6) to include interactions between the macro-prudential variable and the bank characteristic variables.

$$\tilde{Y}_{i,b,t} = \gamma_b + \tau_t + \sum_{j=0}^3 \tilde{X}'_{t-j} \beta^j + \sum_{j=0}^3 \tilde{Z}'_{b,t-j} \theta^j + \sum_{j=0}^3 \psi^j MP_{t-j} + \sum_{j=0}^3 [\tilde{Z}'_{b,t-j} \times MP_{t-j}] \phi^j + \tilde{u}_{i,b,t} \quad (7)$$

Regarding the macroeconomic controls, similar results are found. Additionally, the coefficients of interactions show that when dynamic provisioning is activated: well capitalized banks (with higher tier capital ratio) reduce the growth to commercial loans, and bigger banks (with higher total assets) reduce more the growth of commercial loans. The last result suggests that dynamic provisions tend to reduce growth of commercial loans.

A final set of equations are estimated (see Appendix, Table A7), adding interactions between the macro-prudential dummy variable and the monetary policy stance (interbank interest rate).

$$\tilde{Y}_{i,b,t} = \gamma_b + \tau_t + \sum_{j=0}^3 \tilde{X}'_{t-j} \beta^j + \sum_{j=0}^3 \tilde{Z}'_{b,t-j} \theta^j + \sum_{j=0}^3 \psi^j MP_{t-j} + \sum_{j=0}^3 [\tilde{X}'_{t-j} \times MP_{t-j}] \nu^j + \tilde{u}_{i,b,t} \quad (8)$$

Dynamic provisioning decelerates credit growth. Also, interactions between dynamic provisioning and policy rate are mixed.

Now, since there are some shocks, like the 2008' financial crisis, that affects the identification of macro and firm-fixed effects. In this case, it is quite useful to employ the bank cross-section information (Jimenez *et al.* 2016). For instance, Chang and Choy (2014) state that different rate of provisions are used depending on the type of credit, thus provisioning effect will depend on loan structure that a bank can have in their portfolio. Thus, it is used the interaction between loan structure of commercial credits and the macroprudential tool. Besides, instead of using our current definition for the macroprudential tool it is employed a sort of cumulative index, 1 when the countercyclical rule is active, 0 otherwise. Additionally, the first lag term for macro and bank-characteristics is used. The results are showed in the following table.

There is a relevant effect of dynamic provisioning on deceleration of credit growth remains, and the interaction of that macroprudential tool and the loan structure does not have significant effects.

Conditional Reserve Requirements Effects

For Conditional Reserve Requirements, the dummy variables are encoded as following:

$$PdDollar_t = \begin{cases} 1, & \text{if } De - \text{Dollarization Program is active.} \\ 0, & \text{otherwise.} \end{cases} \quad (9)$$

The dependent variables analyzed are: (i) the change in mortgage dollarization rate; and (ii) the change of the mortgage non-performing loans rate. The mortgage non-performing loan rate was calculated considering only clients that have loans in foreign currency.

There is a inverse contemporaneous effect of conditional reserve requirements on dollarization rate, yet non-significant (See Table A10 and A11). Domestic currency depreciation shows a positive and non-significant relation with the change of dollarization, which is unexpected since a depreciation of domestic currency would lead to a substitution between loans denominated in dollars by credit in local currency. Besides, an increase of the monetary policy rate leads to a rise on mortgage dollarization, followed by a substitution between loans granted in soles for credit in dollars. The higher reserve requirement for foreign currency does not affect the dollarization

Table 7: Dependent variable: credit growth

	Coefficient	Std. Err.	t-statistic	P-value
<i>Macroeconomic Controls</i>				
Δ Interbank Rate ($t-1$)	0.013***	0.001	9.13	0.000
Δ Exchange Rate ($t-1$)	-0.079***	0.029	-2.74	0.006
Δ Current Account ($t-1$)	0.000	0.000	1.64	0.101
RR in Domestic Currency ($t-1$)	0.004***	0.001	5.94	0.000
RR in Foreign Currency ($t-1$)	-0.001***	0.001	-2.84	0.005
<i>Bank Controls</i>				
Capital Ratio ($t-1$)	0.002***	0.001	2.86	0.004
Liquidity Ratio ($t-1$)	0.000	0.000	-0.56	0.574
log of Assets ($t-1$)	-0.102***	0.004	-27.26	0.000
Deposits to Liabilities ($t-1$)	0.000	0.000	0.9	0.369
<i>Macroprudential Tool</i>				
Dinamyc Provisions (Cummulative Index)	-0.040***	0.013	-3.17	0.002
Dynamic Provisions*Loan Structure	0.000*	0.000	1.83	0.067
Constant	0.988***	0.046	21.46	0.000
Seasonal Effects				Yes
Bank Fixed Effects				Yes
Observations				862 461

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

rate. Finally, positive dynamic in economic activity lead to a decrease of dollarization. Besides, bigger banks have lower dollarization rates.

A similar result is found when the first lag of the macroprudential dummy variable employed. However the effect of conditional reserve requirements is statistically significant, the implementation of De-Dollarization Program leads a deceleration of dollarization by 1.02 percent points, on average. When contemporaneous and lagged effects (up to third lag) are included, the scheme of conditional reserve requirements provokes a significant deceleration of the change of dollarization rate by 1.02 percent points, on average.

Now, if we control for the proportion of dollarized mortgages with respect to the bank balance sheet employing the first-lag for the control variables, the macroprudential tool has no effect by it-self (Table A17). However the interaction with the proportion of dollarized mortgages is significant, meaning that more dollarized banks have greater incentives than the others to reduce dollarization of mortgages loans.

In the case of the non-performing loans rate, the evidence shows that depreciation of domestic currency diminishes the change of this indicator, but this effect is not statistically significant (at least up to second lag). This result is quite counter-intuitive theoretically, because depreciation in a dollarized economy triggers a adverse balance-sheet effect, which worsens the financial position of households with currency mismatches. Besides, an adjustment on monetary conditions has mixed effects on the change of the non-performing loans rate of mortgages in foreign currency, but those effects have no significance. On the contrary, the effect of GDP growth reduces NPL rate. On the side, the effects of reserve requirements in foreign currency is not significant.

As in the case of mortgage dollarization, using the proportion of dollarized mortgages respect to the balance-sheet, the joint effect of the Dollarization Program has a inverse effect on NPL rate, but non-significant, and the interaction is not statistically significant.

6 Conclusions

The majority of research studies assess the impact of macro-prudential policies with a theoretical analysis or using aggregate variables. Unlike those approaches, this paper uses micro registry data to analyze the impact of dynamic provisioning and conditional reserve requirements on commercial credit growth, mortgage dollarization and non-performing loans rate. The implementation of dynamic provisioning in Peru carried out a lot of academic debate about their impact on the banking system, and the De-Dollarization Program has not been analyzed in detail.

It is found that a tightening (easing) dynamic provisioning in Peru decelerated (accelerated) the growth in commercial loans, which indicates that implementation of this macroprudential instrument has contributed partially to reduce the pro-cyclicality of credit growth, thus reducing potential adverse effects of an excessive credit expansion on financial stability. At this point,

it is important to notice that banks with higher capital ratios has the ability to expand credit more than other banks, and mitigate the impact of dynamic provisioning. In the case of De-Dollarization Program, the evidence has shown that the program incentives banks to substitute dollar denominated loans and expand credit in domestic currency, especially in sectors with great exposure to exchange rate credit risk, such as mortgages loans. However, its effect on the change of the non-performing loans rate -an alternative measure of financial vulnerability- is not conclusive.

Additionally, it is found that a positive relationship between the interbank interest rate (a proxy of monetary policy interest rate) and credit growth, changed when interactions between monetary policy rate and dynamic provisioning is included. Therefore, there is room for a deeper and more advanced study on this point, since the main objective of this paper, as a first step, was to assess some macro-prudential tools on credit growth. Moreover, it is found that an increase of exchange rate rises significantly the non-performing loan denominated in dollars, due to the adverse impact of balance-sheet effect on financial position of debtors with currency mismatches.

Finally, more research studies are needed on the ample range of macro-prudential policies implemented in Peru, especially using a general equilibrium framework, because all trade-offs have to be take into account.

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8 Appendix

Table A1
Regression for two alternative models of Equations 5

	Equation 1		Equation 2	
	Coef.	p-value	Coef.	p-value
Macroeconomic controls				
Δ Exchange rate (t)	-0,065 *	0,10	-0,095 **	0,03
(t-1)	-0,203 ***	0,00	-0,204 ***	0,00
(t-2)	-0,148 ***	0,00	-0,099 *	0,07
(t-3)	0,146 ***	0,00	0,140 ***	0,01
Δ Interbank rate (t)	0,002	0,45	-0,001	0,81
(t-1)	0,004	0,14	0,009 **	0,02
(t-2)	0,009 ***	0,00	0,007 **	0,04
(t-3)	0,007 ***	0,00	0,017 ***	0,00
Δ Current Account (t)	-0,000007 ***	0,00	-0,000006 ***	0,00
(t-1)	0,000004 ***	0,01	0,000003 *	0,07
(t-2)	0,000004 **	0,02	0,000004 **	0,03
(t-3)	-0,000001	0,63	0,000000	0,83
Bank controls				
Capital Ratio (t)	0,001	0,51	0,001	0,60
(t-1)	-0,001	0,50	-0,001	0,67
(t-2)	0,005 ***	0,00	0,005 ***	0,00
(t-3)	-0,001	0,18	-0,001	0,28
Liquidity ratio (t)	0,000	0,24	0,000	0,12
(t-1)	0,000	0,41	0,000	0,69
(t-2)	0,000 ***	0,01	0,000 ***	0,01
(t-3)	0,000 **	0,02	0,000 **	0,02
Log (Total assets) (t)	-0,098 ***	0,00	-0,092 ***	0,00
(t-1)	0,090 ***	0,01	0,091 ***	0,01
(t-2)	-0,082 ***	0,01	-0,093 ***	0,00
(t-3)	-0,023	0,32	-0,008	0,73
Deposits to Liabilities (t)	0,000	0,35	0,000	0,43
(t-1)	0,002 ***	0,00	0,002 ***	0,00
(t-2)	-0,002 ***	0,00	-0,002 ***	0,00
(t-3)	0,001 ***	0,00	0,001 ***	0,00
Monetary conditions				
Reserve Requirement PEN (t)	-0,002 **	0,04	-0,003 ***	0,01
(t-1)	0,003 ***	0,01	0,003 ***	0,00
(t-2)	0,003 ***	0,01	0,003 ***	0,00
(t-3)	0,001	0,20	0,001	0,24
Reserve Requirement USD (t)	0,000	0,97	0,000	0,64
(t-1)	-0,002 ***	0,01	-0,002 **	0,03
(t-2)	-0,002 ***	0,01	-0,002 ***	0,00
(t-3)	0,002 ***	0,00	0,002 ***	0,00
Dynamic Provisions				
Prov (t)			-0,011 **	0,03
(t-1)	-0,014 ***	0,00	-0,009	0,06
(t-2)			-0,012 ***	0,01
(t-3)			0,010 ***	0,00
Others:				
Seasonal effects	Yes		Yes	
Constant	1,046 ***	0,00	0,938 ***	0
Number of banks	9		9	
Number of obs.	841 144		841 144	

Table A2
Alternative models of Equations 5 - Joint Significance Tests

	First Lag Effect		Contemporaneous and Lagged Effects	
	Coef.	p-value	Coef.	p-value
Macroeconomic controls				
Δ Exchange rate	-0.270 ***	0.00	-0.258 ***	0.00
Δ Interbank rate	0.022 **	0.02	0.032 **	0.04
Δ Current Account	0.000001	0.70	0.000001	0.66
Bank controls				
Capital Ratio	0.004 ***	0.00	0.004 ***	0.00
Liquidity ratio	0.000 ***	0.00	0.000 ***	0.00
Log (Total assets)	-0.113 ***	0.00	-0.103 ***	0.00
Deposits to Liabilities	0.001	0.11	0.001 *	0.06
Reserve Requirements				
Domestic Currency	0.005 ***	0.00	0.005 ***	0.00
Foreign Currency	-0.001	0.42	-0.002	0.30
Dynamic Provisions				
	-0.014 ***	0.00	-0.022 ***	0.00
Others:				
Seasonal effects	Yes		Yes	
Constant	1.046	0.00	0.938	0
Number of banks	9		9	
Number of obs.	841,144		841,144	

Table A3
Regression Results for two alternative models of Equations 6

	Equation 3		Equation 4	
	Coef.	p-value	Coef.	p-value
Macroeconomic controls				
Δ Exchange rate (t)	-0,069 *	0,08	-0,055	0,22
(t-1)	-0,124 **	0,02	-0,197 ***	0,00
(t-2)	-0,101 **	0,05	-0,095	0,12
(t-3)	0,227 ***	0,00	0,157 ***	0,01
Δ Interbank rate (t)	-0,001	0,82	-0,003	0,54
(t-1)	0,002	0,53	-0,002	0,67
(t-2)	0,010 ***	0,00	0,005	0,15
(t-3)	0,005 **	0,03	0,019 ***	0,00
Δ Current Account (t)	-0,000004 **	0,02	-0,000005 ***	0,01
(t-1)	0,000005 ***	0,00	0,000003 *	0,08
(t-2)	0,000005 ***	0,01	0,000005 ***	0,01
(t-3)	-0,000001	0,60	0,000002	0,31
Bank controls				
Capital Ratio (t)	0,001	0,62	0,001	0,46
(t-1)	0,000	0,88	0,000	0,90
(t-2)	0,005 ***	0,00	0,004 ***	0,01
(t-3)	-0,001	0,42	-0,001	0,39
Liquidity ratio (t)	0,000	0,25	0,000 **	0,02
(t-1)	0,000	0,24	0,000	0,23
(t-2)	0,000 **	0,04	0,000 **	0,02
(t-3)	0,000 *	0,06	0,000 ***	0,00
Log (Total assets) (t)	-0,101 ***	0,00	-0,093 ***	0,00
(t-1)	0,098 ***	0,00	0,099 ***	0,00
(t-2)	-0,080 ***	0,01	-0,075 **	0,02
(t-3)	-0,005	0,82	-0,012	0,64
Deposits to Liabilities (t)	0,000	0,42	-0,001	0,12
(t-1)	0,002 ***	0,00	0,002 ***	0,00
(t-2)	-0,002 ***	0,00	-0,002 ***	0,00
(t-3)	0,001 ***	0,00	0,001 ***	0,01
Monetary conditions				
Reserve Requirement PEN (t)	0,000	0,99	-0,002 *	0,10
(t-1)	0,003 ***	0,00	0,002	0,15
(t-2)	0,004 ***	0,00	0,005 ***	0,00
(t-3)	0,003 ***	0,01	0,004 ***	0,00
Reserve Requirement USD (t)	0,000	0,57	0,000	0,91
(t-1)	-0,002 ***	0,02	-0,001	0,20
(t-2)	-0,002 ***	0,02	-0,002 ***	0,00
(t-3)	0,002 ***	0,00	0,002 ***	0,00
Dynamic Provisions				
Tightening (t)			-0,036 ***	0,00
(t-1)	-0,040 ***	0,00	-0,029 **	0,05
(t-2)			0,004	0,80
(t-3)			0,009	0,58
Easing (t)			-0,032 ***	0,01
(t-1)	-0,005	0,41	0,001	0,97
(t-2)			0,046 ***	0,01
(t-3)			-0,010	0,58
Others:				
Seasonal effects	Yes		Yes	
Constant	0,798 ***	0	0,752 ***	0,00
Number of banks	9		9	
Number of obs.	841 144		841 144	

Table A4
Alternative models of Equations 6 - Joint Significance Tests

	First Lag Effect		Contemporaneous and Lagged Effects	
	Coef.	p-value	Coef.	p-value
Macroeconomic controls				
Δ Exchange rate	-0.067 ***	0.00	-0.190	0.16
Δ Interbank rate	0.016	0.61	0.018 ***	0.00
Δ Current Account	0.000005 **	0.05	0.000006 **	0.05
Bank controls				
Capital Ratio	0.004 ***	0.00	0.004 ***	0.00
Liquidity ratio	0.000 ***	0.00	0.000 ***	0.00
Log (Total assets)	-0.088 ***	0.00	-0.080 ***	0.00
Deposits to Liabilities	0.001 **	0.04	0.000	0.24
Reserve Requirements				
Domestic Currency	0.010 ***	0.00	0.009 ***	0.00
Foreign Currency	-0.001	0.72	-0.001	0.63
Dynamic Provisions				
Tightening	-0.040 ***	0.00	-0.052 ***	0.00
Easing	-0.005	0.41	0.005	0.61
Others:				
Seasonal effects	Yes		Yes	
Constant	0.798	0.00	0.752	0.00
Number of banks	9		9	
Number of obs.	841,144		841,144	

Table A5
Regression Results for Equations 7

	Equation 5		Equation 6	
	Coef.	p-value	Coef.	p-value
Macroeconomic controls				
Δ Exchange rate (t)	-0,072 *	0,08	-0,122 ***	0,01
(t-1)	-0,247 ***	0,00	-0,233 ***	0,00
(t-2)	-0,191 ***	0,00	-0,136 **	0,02
(t-3)	0,159 ***	0,00	0,155 ***	0,00
Δ Interbank rate (t)	0,002	0,59	0,001	0,79
(t-1)	0,005	0,27	0,006	0,16
(t-2)	0,005	0,17	0,005	0,12
(t-3)	0,013 ***	0,00	0,017 ***	0,00
Δ Current Account (t)	-0,000005 ***	0,01	-0,000004 **	0,02
(t-1)	0,000002	0,23	0,000002	0,27
(t-2)	0,000005 **	0,02	0,000004 **	0,05
(t-3)	0,000001	0,58	0,000001	0,64
Bank controls				
Capital Ratio (t)	0,003 **	0,03	0,002 *	0,06
(t-1)	-0,001	0,36	-0,001	0,49
(t-2)	0,006 ***	0,00	0,005 ***	0,00
(t-3)	-0,001	0,23	-0,001	0,32
Liquidity ratio (t)	0,000	0,21	0,000	0,14
(t-1)	0,000	0,36	0,000	0,61
(t-2)	0,000	0,13	0,000	0,25
(t-3)	0,000 ***	0,04	0,000	0,12
Log (Total assets) (t)	-0,089 ***	0,00	-0,084 ***	0,00
(t-1)	0,098 ***	0,00	0,104 ***	0,00
(t-2)	-0,107 ***	0,00	-0,117 ***	0,00
(t-3)	-0,014	0,56	-0,010	0,66
Deposits to Liabilities (t)	-0,001	0,19	0,000	0,55
(t-1)	0,002 ***	0,00	0,002 ***	0,00
(t-2)	-0,002 ***	0,00	-0,002 ***	0,00
(t-3)	0,001 ***	0,00	0,001 ***	0,00
Monetary conditions				
Reserve Requirement PEN (t)	-0,004 ***	0,00	-0,004 ***	0,00
(t-1)	0,003 ***	0,02	0,003 ***	0,00
(t-2)	0,004 ***	0,00	0,004 ***	0,00
(t-3)	0,001	0,55	0,000	0,78
Reserve Requirement USD (t)	0,000	0,75	0,000	0,65
(t-1)	-0,001 *	0,10	-0,001	0,21
(t-2)	-0,001 **	0,08	-0,001 *	0,06
(t-3)	0,003 ***	0,00	0,003 ***	0,00
Dynamic Provisions				
Prov (t)			0,037	0,46
(t-1)	-0,005	0,89	0,065	0,30
(t-2)			-0,152 ***	0,01
(t-3)			0,009 ***	0,01
Interactions between bank controls and macroprudential policy				
Prov (t) * Capital Ratio (t)	-0,005 ***	0,00	-0,005 ***	0,000
(t-1)	0,002	0,40	0,000	0,803
(t-2)	-0,003 **	0,05	-0,002	0,337
Prov (t) * Liquidity Ratio (t)	0,000	0,38	0,000	0,373
(t-1)	-0,001 ***	0,00	-0,001 ***	0,009
(t-2)	0,001 **	0,02	0,000 *	0,060
Prov (t) * Log (Total assets) (t)	0,003 *	0,06	0,002	0,360
(t-1)	0,000	0,89	-0,002	0,646
(t-2)	0,002	0,36	0,006 **	0,029
Prov (t) * Dep.to.Liabilities (t)	0,000	0,15	0,000	0,807
(t-1)	0,000	0,93	-0,001	0,315
(t-2)	0,000	0,78	0,001 **	0,047
Others:				
Seasonal effects	Yes		Yes	
Constant	1,01419 ***	0,000	0,965 ***	0,00
Number of banks	9		9	
Number of obs.	841 144		841 144	

Table A6
Alternative models of Equations 7 - Joint Significance Tests

	First Lag Effect		Contemporaneous and Lagged Effects	
	Coef.	p-value	Coef.	p-value
Macroeconomic controls				
Δ Exchange rate	-0.351 ***	0.01	-0.336 **	0.01
Δ Interbank rate	0.024 ***	0.00	0.030 ***	0.00
Δ Current Account	0.000003	0.27	0.000002	0.30
Bank controls				
Capital Ratio	0.006 ***	0.00	0.006 ***	0.00
Liquidity ratio	0.000 **	0.04	0.000 *	0.07
Log (Total assets)	-0.111 ***	0.00	-0.107 ***	0.00
Deposits to Liabilities	0.000	0.25	0.001	0.18
Reserve Requirements				
Domestic Currency	0.003 *	0.09	0.004 **	0.04
Foreign Currency	0.000	0.81	0.001	0.58
Dynamic Provisions				
	-0.005	0.89	-0.040	0.41
Interactions between bank controls and macroprudential policy				
Prov (t) * Capital Ratio (t)	-0.005 ***	0.00	-0.005 ***	0.000
(t-1)	0.002	0.40	0.000	0.803
(t-2)	-0.003 **	0.05	-0.002	0.337
Prov (t) * Liquidity Ratio (t)	0.000	0.38	0.000	0.373
(t-1)	-0.001 ***	0.00	-0.001 ***	0.009
(t-2)	0.001 **	0.02	0.000 *	0.060
Prov (t) * Log (Total assets) (t)	0.003 *	0.06	0.002	0.360
(t-1)	0.000	0.89	-0.002	0.646
(t-2)	0.002	0.36	0.006 **	0.029
Prov (t) * Dep.to.Liabilities (t)	0.000	0.15	0.000	0.807
(t-1)	0.000	0.93	-0.001	0.315
(t-2)	0.000	0.78	0.001 **	0.047
Others:				
Seasonal effects	Yes		Yes	
Constant	1.01419	0.000	0.965	0.00
Number of banks	9		9	
Number of obs.	841,144		841,144	

Table A7
Regression Results for two alternative models of Equation 8

	Equation 7		Equation 8	
	Coef.	p-value	Coef.	p-value
Macroeconomic controls				
Δ Exchange rate (t)	-0,120 **	0,04	-0,122 **	0,04
(t-1)	-0,372 ***	0,00	-0,211 **	0,02
(t-2)	-0,312 ***	0,00	-0,224 **	0,02
(t-3)	0,210 **	0,02	0,366 ***	0,00
Δ Interbank rate (t)	0,011	0,20	-0,003	0,78
(t-1)	-0,016 *	0,10	-0,023 **	0,02
(t-2)	-0,012 **	0,06	-0,015 **	0,02
(t-3)	0,010 **	0,06	0,029 ***	0,00
Δ Current Account (t)	0,000000	1,00	0,000	0,20
(t-1)	0,000004	0,13	0,000 *	0,09
(t-2)	0,000002	0,49	0,000	0,23
(t-3)	-0,000004	0,24	0,000	0,62
Bank controls				
Capital Ratio (t)	0,000	0,78	0,001	0,59
(t-1)	0,000	0,96	0,000	0,98
(t-2)	0,004 ***	0,01	0,004 ***	0,01
(t-3)	-0,001	0,23	-0,001	0,37
Liquidity ratio (t)	0,000 **	0,02	0,000 ***	0,00
(t-1)	0,000 *	0,07	0,000 *	0,07
(t-2)	0,000 *	0,09	0,000	0,13
(t-3)	0,000 ***	0,00	0,000 ***	0,00
Log (Total assets) (t)	-0,104 ***	0,00	-0,110 ***	0,00
(t-1)	0,111 ***	0,00	0,128 ***	0,00
(t-2)	-0,095 ***	0,00	-0,088 ***	0,01
(t-3)	-0,026	0,29	-0,025	0,30
Deposits to Liabilities (t)	-0,001 *	0,09	-0,001	0,12
(t-1)	0,002 ***	0,00	0,001 ***	0,01
(t-2)	-0,002 ***	0,00	-0,001 ***	0,00
(t-3)	0,001 ***	0,01	0,001 ***	0,00
Monetary conditions				
Reserve Requirement PEN (t)	-0,004 **	0,02	-0,003 *	0,09
(t-1)	0,002	0,21	0,003 **	0,04
(t-2)	0,006 ***	0,00	0,007 ***	0,00
(t-3)	0,003 ***	0,01	0,003 **	0,03
Reserve Requirement USD (t)	0,000	0,52	-0,001	0,38
(t-1)	-0,001	0,13	-0,001 *	0,06
(t-2)	-0,002 **	0,02	-0,002 ***	0,01
(t-3)	0,002 ***	0,00	0,002 ***	0,00
Dynamic Provisions				
Prov (t)			0,039 ***	0,01
(t-1)	-0,020 **	0,02	-0,056 ***	0,01
(t-2)			-0,051 ***	0,00
(t-3)			0,026 ***	0,00
Interactions between monetary policy and macroprudential policy				
Prov (t) * Interbank rate (t)	-0,092 ***	0,01	0,037 ***	0,00
(t-1)	0,113 ***	0,00	omitted	
(t-2)	-0,025 ***	0,01	***	
Prov (t) * Interbank rate (t-1)	0,040	0,25	0,017	0,46
Prov (t) * Interbank rate (t-2)	0,019	0,80	-0,103	0,24
Prov (t-1) * Interbank rate (t-1)	-0,076 **	0,02	0,048 **	0,04
Prov (t-1) * Interbank rate (t-2)	-0,023	0,76	0,047	0,61
Prov (t-2) * Interbank rate (t)	0,040	0,12	-0,045 ***	0,00
Prov (t-2) * Interbank rate (t-2)	-0,011	0,47	0,026 ***	0,00
Others:				
Seasonal effects	Yes		Yes	
Constant	1,097 **	0,00	0,921 **	0,00
Number of banks	9		9	
Number of obs.	841 144		841 144	

Table A8
Alternative models of Equations 8 - Joint Significance Tests

	First Lag Effect		Contemporaneous and Lagged Effects	
	Coef.	p-value	Coef.	p-value
Macroeconomic controls				
Δ Exchange rate	-0.594 ***	0.01	-0.192	0.42
Δ Interbank rate	-0.007	0.51	-0.012	0.28
Δ Current Account	0.000002	0.38	0.000	0.42
Bank controls				
Capital Ratio	0.003 ***	0.00	0.004 ***	0.00
Liquidity ratio	0.000 ***	0.00	0.000 ***	0.00
Log (Total assets)	-0.113 ***	0.00	-0.095 ***	0.00
Deposits to Liabilities	0.000	0.52	0.000	0.42
Reserve Requirements				
Domestic Currency	0.008 ***	0.00	0.010 ***	0.00
Foreign Currency	-0.001	0.57	-0.001	0.41
Dynamic Provisions	-0.020 **	0.02	-0.042 ***	0.00
Interactions between monetary policy and macroprudential policy				
Prov (t) * Interbank rate (t)	-0.092 ***	0.01	0.037 ***	0.00
Prov (t) * Interbank rate (t-1)	0.040	0.25	0.017	0.46
Prov (t) * Interbank rate (t-2)	0.019	0.80	-0.103	0.24
Prov (t-1) * Interbank rate (t)	0.113 ***	0.00	omitted	
Prov (t-1) * Interbank rate (t-1)	-0.076 **	0.02	0.048 **	0.04
Prov (t-1) * Interbank rate (t-2)	-0.023	0.76	0.047	0.61
Prov (t-2) * Interbank rate (t)	-0.025 ***	0.01		
Prov (t-2) * Interbank rate (t-1)	0.040	0.12	-0.045 ***	0.00
Prov (t-2) * Interbank rate (t-2)	-0.011	0.47	0.026 ***	0.00
Others:				
Seasonal effects	Yes		Yes	
Constant	1.097 **	0.00	0.921 **	0.00
Number of banks	9		9	
Number of obs.	841,144		841,144	

Table A9
Regression Results for Mortgage Dollarization Rate

	Contemporaneous Effect		First Lag Effect		Contemporaneous and Lagged Effects	
	Coef.	P-value	Coef.	P-value	Coef.	P-value
Macroeconomic controls						
Δ Exchange rate (t)	5,885	0,327	7,530	0,135	6,172	0,279
(t-1)	9,132 *	0,082	11,621 **	0,020	8,972	0,108
(t-2)	-2,997	0,459	0,228	0,958	0,918	0,837
(t-2)	10,963 ***	0,001	13,388 ***	0,000	14,374 ***	0,000
Δ Interbank rate (t)	-0,304	0,343	-0,298	0,349	-0,269	0,382
(t-1)	1,290 ***	0,001	1,229 ***	0,001	1,238 ***	0,001
(t-2)	-0,014	0,909	-0,078	0,535	-0,015	0,923
(t-3)	1,253 ***	0,000	1,226 ***	0,000	1,174 ***	0,000
Δ Gross Domestic Product (t)	80,436 ***	0,004	73,872 ***	0,007	28,824	0,318
(t-1)	-120,534 ***	0,003	-108,405 ***	0,007	-69,581 **	0,045
(t-2)	8,243	0,773	21,697	0,442	8,376	0,818
(t-3)	-77,699 **	0,016	-80,796 **	0,019	-60,325 **	0,039
Δ Current Account (t)	0,000	0,619	0,000	0,608	0,000	0,748
(t-1)	0,000	0,426	0,000	0,128	0,000 **	0,049
(t-2)	0,000	0,775	0,000	0,692	0,000	0,553
(t-3)	0,000	0,527	0,000	0,151	0,000 *	0,075
Reserve Requirements						
Foreign Currency (t)	0,033	0,454	0,024 **	0,563	0,018	0,665
(t-1)	0,081 *	0,088	0,072	0,123	0,063	0,198
(t-2)	-0,056	0,208	-0,056	0,184	-0,063	0,144
(t-3)	-0,026	0,433	-0,022	0,472	-0,029	0,347
Bank controls						
Capital Ratio (t)	-0,083	0,109	-0,100 *	0,065	-0,118 **	0,044
(t-1)	0,156 ***	0,006	0,159 ***	0,005	0,170 ***	0,002
(t-2)	-0,036	0,500	-0,020 **	0,699	-0,019	0,729
(t-3)	0,126 **	0,030	0,130 **	0,026	0,121 **	0,039
Liquidity ratio (t)	0,033	0,119	0,031	0,143	0,031	0,147
(t-1)	0,015	0,107	0,014 *	0,099	0,011	0,225
(t-2)	-0,006	0,641	-0,004 ***	0,743	-0,003	0,820
(t-3)	-0,035 **	0,046	-0,035 **	0,046	-0,035 **	0,041
Log (Total assets) (t)	-3,504 ***	0,007	-3,383 ***	0,007	-3,091 ***	0,008
(t-1)	0,292	0,717	0,295	0,639	0,221	0,696
(t-2)	0,374	0,647	0,480 **	0,529	0,436	0,548
(t-3)	2,317	0,115	2,313 *	0,088	2,098	0,112
PdDollar	-0,489	0,447			1,686	0,147
PdDollar (t-1)			-1,016 **	0,051	-2,362 ***	0,004
PdDollar (t-2)					0,785 *	0,098
PdDollar (t-3)					-1,130 *	0,085
Constant	2,964	0,576	0,808	0,869	1,389	0,783

Table A10
Regression Results for Mortgage Dollarization Rate
Joint Significance Test

	Contemporaneous Effect		First Lag Effect		Contemporaneous and Lagged Effects	
	Coef.	P-value	Coef.	P-value	Coef.	P-value
Macroeconomic controls						
Δ Exchange rate	5.885	0.112	7.530 **	0.023	6.172 **	0.031
Δ Interbank rate	-0.304 ***	0.009	-0.298 **	0.011	-0.269 **	0.014
Δ Gross Domestic Product	80.436	0.107	73.872	0.160	28.824	0.179
Δ Current Account	0.000	0.261	0.000 *	0.090	0.000 **	0.039
Reserve Requirements						
Foreign Currency	0.033	0.741	0.024	0.848	0.018	0.914
Bank controls						
Capital Ratio	-0.083	0.234	-0.100	0.215	-0.118	0.246
Liquidity ratio	0.033	0.619	0.031	0.601	0.031	0.718
Log (Total assets)	-3.504	0.233	-3.383	0.425	-3.091	0.382
Conditional Reserve Requirements						
Constant	2.964	0.576	0.808	0.869	1.389	0.783

Table A11
Regression Results for Mortgage Non-Performing Loan Rate

	Contemporaneous Effect		First Lag Effect		Contemporaneous and Lagged Effects	
	Coef.	P-value	Coef.	P-value	Coef.	P-value
Macroeconomic controls						
Δ Exchange rate (t)	-0,557	0,769	-2,108	0,514	-4,880 **	0,016
(t-1)	0,889	0,726	-1,214	0,547	-3,310 *	0,070
(t-2)	-16,152	0,252	-18,366	0,384	-36,929 **	0,024
(t-2)	-9,886 *	0,085	-3,989	0,448	-11,343 **	0,038
Δ Interbank rate (t)	0,330	0,300	0,330	0,435	0,852 **	0,017
(t-1)	-0,196	0,611	0,269	0,243	0,025	0,876
(t-2)	-0,272	0,439	0,154	0,350	-0,287	0,205
(t-3)	0,402	0,133	0,405	0,330	0,818 **	0,036
Δ Gross Domestic Product (t)	100,559 **	0,046	60,643	0,384	191,909 **	0,043
(t-1)	-84,464 **	0,046	-55,132	0,381	-195,840 **	0,049
(t-2)	15,452	0,447	-13,543	0,417	29,578	0,189
(t-3)	-68,776 **	0,032	-48,379	0,314	-132,325 **	0,041
Δ Current Account (t)	0,000	0,192	0,000	0,450	0,001 **	0,034
(t-1)	0,000	0,696	0,000	0,311	0,000	0,682
(t-2)	0,000	0,216	0,000	0,244	0,000	0,155
(t-3)	0,000	0,107	0,000	0,432	-0,001 **	0,028
Reserve Requirements						
Foreign Currency (t)	0,031	0,444	-0,014 **	0,081	0,038	0,361
(t-1)	0,061 **	0,050	0,037	0,282	0,072 *	0,053
(t-2)	0,008	0,582	0,009	0,348	0,010	0,562
(t-3)	0,016	0,359	0,005	0,556	0,024	0,428
Bank controls						
Capital Ratio (t)	0,005	0,522	0,005	0,575	0,005	0,523
(t-1)	0,005	0,379	-0,002	0,762	0,005	0,378
(t-2)	0,007	0,466	0,015 **	0,053	0,007	0,466
(t-3)	0,007	0,230	-0,010 **	0,043	0,007	0,230
Liquidity ratio (t)	-0,003	0,252	-0,001	0,390	-0,003	0,250
(t-1)	-0,002	0,500	-0,001	0,712	-0,002	0,500
(t-2)	0,006 **	0,069	0,007 ***	0,004	0,006 *	0,069
(t-3)	0,000	0,881	-0,004	0,126	0,000	0,883
Log (Total assets) (t)	0,321	0,225	0,141	0,418	0,320	0,225
(t-1)	0,104	0,517	0,158	0,381	0,104	0,516
(t-2)	-0,213	0,135	-0,397 **	0,016	-0,213	0,135
(t-3)	-0,214	0,231	0,096	0,489	-0,214	0,232
PdDollar	0,927 *	0,058			1,948 *	0,081
PdDollar (t-1)			0,591	0,390	omitted	
PdDollar (t-2)					-1,214 *	0,099
PdDollar (t-3)					0,685	0,218
Constant	-0,261	0,780	0,419	0,397	0,495	0,633

Table A12
Regression Results for Mortgage Dollarization Rate
Joint Significance Test

	Contemporaneous Effect		First Lag Effect		Contemporaneous and Lagged Effects	
	Coef.	P-value	Coef.	P-value	Coef.	P-value
<i>Macroeconomic controls</i>						
Δ Exchange rate	-0.557	0.172	-2.108	0.172	-4.880 **	0.023
Δ Interbank rate	0.330	0.812	0.330	0.812	0.852 **	0.020
Δ Gross Domestic Product	100.559	0.291	60.643	0.291	191.909 **	0.032
Δ Current Account	0.000	0.211	0.000	0.211	0.001	0.125
<i>Reserve Requirements</i>						
Foreign Currency	0.031	0.206	-0.014	0.206	0.038	0.216
<i>Bank controls</i>						
Capital Ratio	0.005 **	0.017	0.005 **	0.017	0.005 **	0.017
Liquidity ratio	-0.003	0.528	-0.001	0.528	-0.003	0.524
Log (Total assets)	0.321	0.980	0.141	0.980	0.320	0.977
Conditional Reserve Requirements	0.927 *	0.058	0.591	0.390	1.419 **	0.022
Constant	-0.261	0.780	0.419	0.397	0.495	0.633

Table A13
New Equation 2 for Commercial Credit Growth

	Coefficient	Standard Error	t-statistic	P-value
Macroeconomic Controls				
Δ Interbank Rate (t-1)	0.012	0.002	8.15	0.000
Δ Exchange Rate (t-1)	-0.083	0.029	-2.88	0.004
Δ Current Account (t-1)	0.000	0.000	1.59	0.111
Reserve Requirement in Domestic Currency (t-1)	0.004	0.001	6	0.000
Reserve Requirement in Foreign Currency (t-1)	-0.001	0.001	-2.81	0.005
Bank Controls				
Capital Ratio (t-1)	0.002	0.001	3.41	0.001
Liquidity Ratio (t-1)	0.000	0.000	-0.77	0.443
log of Assets (t-1)	-0.098	0.004	-23.61	0.000
Deposits to Liabilities (t-1)	0.000	0.000	1.22	0.223
Macprudential Tool				
<i>Easing Periods</i>				
<i>Dynamic Provisison</i>	0.025	0.015	1.67	0.096
<i>Dynamic Provisison*Loan Structure</i>	-0.001	0.000	-2.31	0.021
<i>Tightening Periods</i>				
<i>Dynamic Provisison</i>	-0.038	0.013	-2.79	0.005
<i>Dynamic Provisison*Loan Structure</i>	0.000	0.000	1.16	0.246
Constant	-0.024	0.002	-9.56	0.000
Seasonal Effects				Yes
Bank Fixed Effects				Yes
Observations				862,461

Table A14
Commercial Credit Growth

	Coefficient	Standard Error	t-statistic	P-value
Macroeconomic Controls				
Δ Interbank Rate (t-1)	0.016	0.002	8.42	0.000
Δ Exchange Rate (t-1)	-0.104	0.030	-3.44	0.001
Δ Current Account (t-1)	0.000	0.000	2.51	0.012
Reserve Requirement in Domestic Currency (t-1)	0.004	0.001	5.79	0.000
Reserve Requirement in Foreign Currency (t-1)	-0.001	0.001	-1.99	0.047
Bank Controls				
Capital Ratio (t-1)	0.002	0.001	2.69	0.007
Liquidity Ratio (t-1)	0.000	0.000	0.05	0.961
log of Assets (t-1)	-0.101	0.004	-25.71	0.000
Deposits to Liabilities (t-1)	0.000	0.000	0.57	0.569
Macroprudential Tool				
Dinamyc Provisison (Cummulative Index)	-0.031	0.021	-1.51	0.132
Dinamyc Provisison (t-1)	-0.035	0.027	-1.32	0.188
Dinamyc Provisison (t-2)	0.034	0.018	1.86	0.063
Dynamic Provisions*Loan Structure	0.000	0.000	0.14	0.890
Dynamic Provisions*Loan Structure (t-1)	0.001	0.000	2.1	0.036
Dynamic Provisions*Loan Structure (t-2)	-0.001	0.000	-2.49	0.013
Constant	0.979	0.047	20.87	0.000
Seasonal Effects				Yes
Bank Fixed Effects				Yes
Observations				862,461

Table A15
Commercial Credit Growth

	Coefficient	Standard Error	t-statistic	P-value
Macroeconomic Controls				
Δ Interbank Rate (t-1)	0.013	0.002	5.66	0.000
Δ Exchange Rate (t-1)	-0.109	0.031	-3.52	0.000
Δ Current Account (t-1)	0.000	0.000	2.17	0.030
Reserve Requirement in Domestic Currency (t-1)	0.003	0.001	4.89	0.000
Reserve Requirement in Foreign Currency (t-1)	-0.001	0.001	-1.98	0.047
Bank Controls				
Capital Ratio (t-1)	0.002	0.001	3.01	0.003
Liquidity Ratio (t-1)	0.000	0.000	-0.09	0.932
log of Assets (t-1)	-0.097	0.005	-19.46	0.000
Deposits to Liabilities (t-1)	0.000	0.000	0.58	0.559
Macroprudential Tool				
<i>Easing Periods</i>				
<i>Dynamic Proviission</i>	0.021	0.025	0.82	0.413
<i>Dynamic Proviission (t-1)</i>	0.000	0.032	-0.01	0.991
<i>Dynamic Proviission (t-2)</i>	0.003	0.023	0.11	0.909
<i>Dynamic Proviission*Loan Structure</i>	0.000	0.000	-1.38	0.168
<i>Dynamic Proviission*Loan Structure (t-1)</i>	0.000	0.000	0.04	0.967
<i>Dynamic Proviission*Loan Structure (t-2)</i>	0.000	0.000	0.09	0.932
<i>Tightening Periods</i>				
<i>Dynamic Proviission</i>	-0.022	0.025	-0.85	0.393
<i>Dynamic Proviission (t-1)</i>	-0.039	0.036	-1.08	0.279
<i>Dynamic Proviission (t-2)</i>	0.025	0.024	1.02	0.306
<i>Dynamic Proviission*Loan Structure</i>	0.000	0.000	-0.43	0.669
<i>Dynamic Proviission*Loan Structure (t-1)</i>	0.001	0.001	1.62	0.105
<i>Dynamic Proviission*Loan Structure (t-2)</i>	-0.001	0.000	-1.47	0.141
Constant	0.943	0.058	16.18	0.000
Seasonal Effects				Yes
Bank Fixed Effects				Yes
Observations				862,461

Table A16
Commercial Credit Growth

	Coefficient	Standard Error	t-statistic	P-value
Macroeconomic Controls				
Δ Interbank Rate (t-1)	0.014	0.001	9.31	0.000
Δ Exchange Rate (t-1)	-0.066	0.029	-2.25	0.024
Δ Current Account (t-1)	0.000	0.000	1.79	0.073
Reserve Requirement in Domestic Currency (t-1)	0.003	0.001	4.21	0.000
Reserve Requirement in Foreign Currency (t-1)	-0.001	0.001	-2.45	0.014
Bank Controls				
Capital Ratio (t-1)	0.003	0.001	3.86	0.000
Liquidity Ratio (t-1)	0.000	0.000	-2.25	0.025
log of Assets (t-1)	-0.100	0.004	-23.55	0.000
Deposits to Liabilities (t-1)	0.000	0.000	0.99	0.323
Interactions Bank Controls - Macroprudential Tool				
Capital Ratio (t-1)	-0.004	0.001	-3.05	0.002
Liquidity Ratio (t-1)	0.000	0.000	3.95	0.000
log of Assets (t-1)	0.002	0.002	1.02	0.306
Deposits to Liabilities (t-1)	0.000	0.000	0.08	0.935
Macroprudential Tool				
Dinamyc Provisions (Cummulative Index)	-0.033	0.045	-0.73	0.464
Dynamic Provisions*Loan Structure	0.000	0.000	1.24	0.215
Constant	0.945	0.056	16.97	0.000
Seasonal Effects				Yes
Bank Fixed Effects				Yes
Observations				862,461

Table A17
Mortgage Dollarization

	Coefficient	Standard Deviation	t-statistic	P-value
Macro Controls				
Δ GDP (t-1)	-31.18	22.85	-1.36	0.20
Δ Current Account (t-1)	0.00	0.00	2.03	0.07
Δ Interbank Rate (t-1)	0.87	0.33	2.62	0.03
Δ Exchange Rate (t-1)	7.96	4.39	1.81	0.10
Δ Reserve Requirements in Foreign Currency (t-1)	0.08	0.03	2.59	0.03
Bank Controls				
log Assets (t-1)	-0.82	0.40	-2.02	0.07
Capital Ratio (t-1)	0.60	0.26	2.27	0.05
Liquidity Ratio (t-1)	-0.02	0.01	-1.52	0.16
Macro Prudential Tool				
MP	1.65	1.08	1.52	0.16
MP (t-1)	-0.62	0.74	-0.84	0.42
MP (t-2)	1.63	0.58	2.83	0.02
MP (t-3)	-1.55	0.56	-2.79	0.02
MP*Loan Structure	-0.04	0.07	-0.55	0.60
MP*Loan Structure (t-1)	-0.15	0.05	-3.28	0.01
MP*Loan Structure (t-2)	0.02	0.03	0.64	0.54
MP*Loan Structure (t-3)	0.05	0.04	1.22	0.25
Constant	-1.11	4.88	-0.23	0.83
Bank Fixed Effects				Yes
Seasonal Effects				No
Observations				451
Number of Banks				11

Table A18
Mortgage NPL rate

	Coefficient	Standard Deviation	t-statistic	P-value
Macro Controls				
Δ GDP (t-1)	-3.47	0.72	-4.79	0.00
Δ Current Account (t-1)	0.00	0.00	-3.69	0.00
Δ Interbank Rate (t-1)	0.05	0.03	1.83	0.10
Δ Exchange Rate (t-1)	1.47	0.61	2.43	0.04
Δ Reserve Requirements in Foreign Currency (t-1)	0.00	0.00	-0.39	0.71
Bank Controls				
log Assets (t-1)	-0.02	0.01	-1.40	0.19
Capital Ratio (t-1)	-0.01	0.01	-0.81	0.44
Liquidity Ratio (t-1)	0.00	0.00	0.38	0.71
Macro Prudential Tool				
MP	-0.14	0.10	-1.43	0.18
MP (t-1)	0.78	0.28	2.76	0.02
MP (t-2)	-1.37	0.56	-2.45	0.03
MP*Loan Structure	0.00	0.01	0.70	0.50
MP*Loan Structure (t-1)	-0.06	0.02	-2.91	0.02
MP*Loan Structure (t-2)	0.12	0.04	3.29	0.01
Constant				
Constant	0.31	0.17	1.80	0.10
Model Specifications				
Debtor Fixed Effects				Yes
Seasonal Effects				No
Observations				1379207
Number of debtors				135465