Universal and Commercial Banks' Reaction to Monetary Policy in the Philippines

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Reinterpretation of the monetary policy transmission channels is a continuing challenge to central banks (Kamin, et al., 1998) because these channels are neither mutually exclusive nor unchanging over time. The design and implementation of monetary policy must, therefore, consciously take into account the changes in the structure of the economy – including changes in the balance sheet position, in financial sector technology and institutions, or in expectations concerning future policy.

Over time, the importance of the credit channel of monetary policy may have diminished relative to that of the interest rate channel as a result of financial liberalization. But recent crisis experiences (e.g., Tequilla crisis in Mexico in 1994-1995, Asian financial crisis in 1997, Long-Term Capital Management (LTCM) collapse and Russian crisis in 1998, the NASDAQ/Enron crisis in 2001, and the global financial crisis that started in 2007) amid a more liberalized global financial system may have also deepened the fragility of the financial sector, thereby highlighting anew the credit availability channel. These crises were fundamentally triggered by the deterioration in bank balance sheets after the lending boom fueled by huge capital inflows following financial liberalization (Mishkin, 1999). The regulatory and supervisory systems then were ill-prepared to mitigate the moral hazard arising from the government safety net. Thus, the opportunities opened up by financial liberalization led to excessive risk taking by banks that eventually contributed to the deterioration in their balance sheets.

The easing bias of monetary policy in the post-global financial crisis era could create conditions that render debt more attractive than equity (Hannoun, 2014). In this thesis, a protracted period of policy-induced low interest rate has the amplifying effect on the financial cycle. By reducing the price of leverage, it boosts asset prices and potentially blurs risk perception. This could have the adverse effect of damaging the supply side of the economy by worsening the misallocation of credit and inducing policymakers to delay critical growth-enhancing reforms. While an improved regulatory framework may have moderated the risks of overvaluations, it still does not adequately address the amplifying effect of monetary policy on financial leverage.

A number of empirical studies have been conducted to test whether lending responds to a change in monetary policy (e.g., Bernanke & Blinder, 1992; Kashyap & Stein, 1995; Islam & Rajan, 2011; Kishan & Opiela, 2000). The existence of a bank lending channel posits that a restrictive monetary policy leads to a drop in bank deposits. Meanwhile, Mishkin (1996) emphasized that only banks that have large asset sizes and, moreso, a larger share of liquid assets have the ability to protect their loans from monetary policy shocks. Larger banks have better access to external finance; hence, they do not have to reduce their lending as strongly as smaller banks or less liquid banks (Bernanke & Gertler, 1995).

Among countries in Europe, Finland, Luxembourg, and Spain did not appear to show any role for a bank lending channel while weak signs were found in Russia (De Souza, 2006). Engler, Terhi, Merkl, Kaltwaseer, and De Souza, L.V. (2005) also found evidence of

a functioning bank lending channel in Austria via capitalization levels. Golodniuk (2006) also found the existence of a bank lending channel in Ukraine. In the case of Germany, empirical evidence had been inconclusive, regardless of methodology or of type of data used. While Tsatsaronis (1995), Stoss (1996), Guender and Moersch (1997), Favero, Giavazzi, and Flabbi (1999) came to the conclusion that a bank lending channel did not exist in Germany, Worms (1998), De Bondt (1998), Kakes and Sturm (2001), Hülsewig, Winker, and Worms (2001), and Merkl and Stolz (2006) found evidence in favor of the presence of bank lending channel.

The response of loan supply to monetary policy tightening has been found to depend on certain bank characteristics. Fruwirth-Schnatter and Kauffman (2006), in testing for the presence of a lending channel in Austria, classified banks by how similar they react to changes in interest rates. A number of papers that classify banks according to asset size also confirmed that asset size has an effect on the bank's loan portfolio growth. De Bondt (1998) used liquidity as a variable to prove the presence of a lending channel for Germany, Belgium and the Netherlands; Coll, Torres, and Santander (2005) for Venezuela; Hernando and Matrinez-Pages (2011) for Spain; and Kashyap and Stein (1995) for the US. Specifically, they used bank size, liquidity, and capitalization as their bases for investigating the bank lending channel. Lui (2012) used bank size and loans to show the relationship between Australian banks' credit stability and policy-induced movements in their deposits. The results of their studies are consistent with the hypothesis that bank size, liquidity, and capitalization have a significant effect on banks' loan growth as monetary policy tightens.

An earlier work by Bernanke and Blinder (1992) likewise showed the effect of monetary policy shifts on banks' loan supply. Their results indicated a decrease in loans with a lag after an increase in policy rates. However, it could not be determined whether the decrease was from a decline in loan supply or a decline in loan demand. Kashyap and Stein (2000) then pointed out that since market imperfections influence banks' ability to induce marginal sources of financing, the effect on loan supply, therefore, may be more evident in smaller banks. Their empirical tests, using bank level data, yielded results consistent with their hypothesis.

Sources of loanable funds other than demand deposits (e.g., from interbank and financial markets) are available to these larger banks, thus providing them with alternative forms of loan fund supply (Olivero, Li, & Jeon, 2011). Disyatat (2010) argued that the emphasis on policy-induced changes in deposits is misplaced and proposed a reformulation of the bank lending channel that works primarily through the impact of monetary policy on banks' balance sheet strength and risk perception. He reasoned that contrary to conventional wisdom, greater reliance on market-based funding enhances the importance of the bank lending channel. Thus, depending on the strength of their balance sheets, banks could act either as absorbers or amplifiers of shocks originating in the financial system.

With greater access to other sources for their loan supply, bigger banks are less likely to restrain their lending activities as compared to smaller banks (Fruwirth-Schnatter & Kauffman, 2006). Van den Heuvel (2002) established that capital adequacy of banks affects their ability to sustain their lending, as low-capitalized banks have a delayed and

amplified reaction to interest rate shocks compared to banks with ample capital. Aban (2012), quoting the study of Bischel and Perrez (2005), noted that excess liquidity can be a source of loan supply for banks as it can be an alternative to equity or debt. Kashyap and Stein (2000) showed that banks with a higher level of liquidity exhibited an increase in the growth of their loan portfolio despite monetary policy tightening.

Objectives of the study

In the Philippines, there are only few studies that use bank-level data in examining their response to monetary policy. Studies of Aban (2012, 2013) observed that loan growth from small banks is sensitive to movements in monetary policy and emphasized that size of banks can have a substantial influence in the existence of a bank lending channel. Bayangos (2010), using a macroeconometric model, found that the aggregate measure of capital adequacy of banks is a significant factor in banks' ability to sustain their lending activities after monetary policy adjustment. This paper seeks to add to the literature by examining whether Philippine banks' balance sheet indicators of financial condition can help shield their loan portfolios from changes in monetary policy using bank-level data.

II. Stylized Facts: Philippine Financial System

The Philippine financial system remains heavily bank-dominated. As of March 2015, banks account for 81 percent of total resources, with universal and commercial banks comprising the lion's share. The same holds for specific balance sheet indicators (Table 1). However, in terms of physical network of financial intermediaries supervised by the Bangko Sentral ng Pilipinas (BSP), banks are of comparatively smaller number (40%), more than half of which are commercial and universal banks.

Table 1
Selected Indicators on the Structure of the Philippine Financial System

	BANKS	Universal and Commercial Banks	Thrift Banks	Rural Banks/ Cooperative Banks	NON-BANKS
Share to Total Resources of the Financial System [1/]	0.81	0.73	0.07	0.01	0.19
Share to Total Number of Financial Institutions [2/]	0.40	0.22	0.08	0.10	0.60

[1/] As of October 2016 (preliminary) except for rural banks/cooperative banks and non-banks data which are updated as of end-Jun 2016. Meanwhile, in terms of total loans (gross loans) as of Nov 2016, UBs/KBs account for about 82% of total and the remaining 18% accounted for by government banks and FX banks.
[2/] As of September 2016
Source of basic data: Bangko Sentral ng Pilipinas

Given the dominance of universal/commercial banks in terms of total resources of the financial system, it would be reasonable to assume that they are also the primary credit service providers to equally large non-financial corporations (NFCs) and that they can offer a wider range of financial products and services. Similar to large NFCs, universal and

Fig.1
Local Currency (LCY) Bonds Outstanding

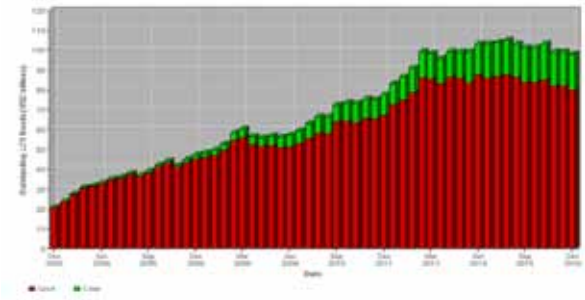


Fig.2
Foreign Currency (FCY) Bonds Outstanding

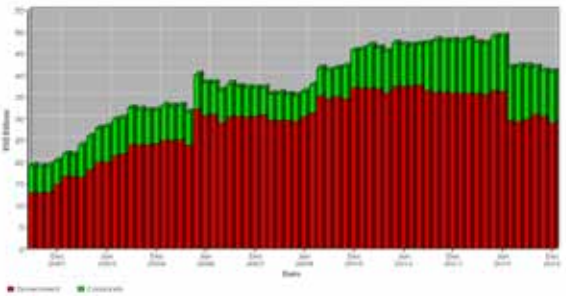
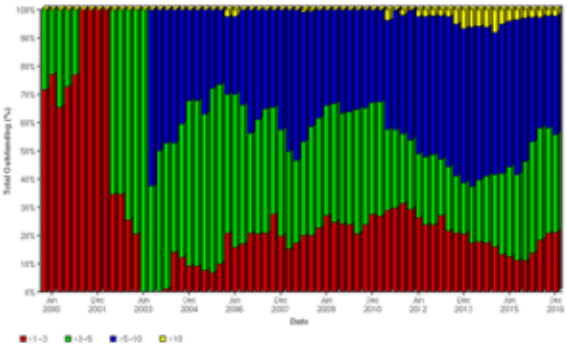


Fig.3
Government Securities Maturity Profile

Fig. 4
Corporate Securities Maturity Profile



Source: https://asianbondsonline.adb.org/philippines/data.php

commercial banks also have access to a number of financing instruments. They can raise equity, issue bonds, or even take out loans from foreign financial institutions, which could diminish the importance of the bank lending channel of monetary policy. While the bond market is still dominated by government issuances, the corporate sector (which includes financial institutions) has also been increasingly tapping the bond market for funding, with maturity profile within the medium- to long-term range.

After the Asian financial crisis, it took longer for the Philippines to unwind non-performing loans (NPLs), which nevertheless declined significantly over time. Asset indicators also remained healthy. Unlike neighboring Asian countries that were able to set up government-funded asset management corporations, the Philippine government did not fund one in the aftermath of the Asian financial crisis. Thus, banks undertook balance sheet consolidation independently.

Table 2

Asset Indicators of the Philippine Banking System (%)

	Jun 2015	Sep 2015	Mar 2016	Jun 2016	Sep 2016	Dec 2016
Past Due Ratio	2.65	2.57	2.47	2.45	2.43	2.14
RL to TLP	0.60	0.58	0.52	0.51	0.52	0.49
Loan Loss Reserves (LLR) to TLP	2.82	2.72	2.52	2.45	2.43	2.27
Gross NPL Ratio (inclusive of Interbank Loans)	2.36	2.32	2.24	2.19	2.14	1.90

Gross NPL Ratio (exclusive of Interbank Loans)	2.41	2.36	2.29	2.24	2.19	1.96
Net NPL Ratio (inclusive of Interbank Loans)	0.61	0.63	0.78	0.79	0.74	0.57
NPL Coverage 1/	119.49	117.59	112.53	111.88	113.46	119.43
NPA to Gross Assets	2.26	2.16	2.08	2.05	2.02	1.85
NPA Coverage 2/	77.16	77.17	75.80	76.36	77.29	80.41
Distressed Assets 3/	4.59	4.42	4.13	4.00	3.92	3.54

Source: Bangko Sentral ng Pilipinas (http://www.bsp.gov.ph/banking/bspsup_pbs.asp)
1/ Ratio of Allowance for Credit Losses (Loans) to Gross Non-Performing Loans
2/ Ratio of Allowance on NPA to NPA
3/ (Distressed Assets) to [(Total Loan Portfolio, Gross) + (ROPA, Gross, inclusive of Performing SCR)]
p/ Preliminary
Definitions:
- Past Due Ratio = Past Due Loans/ Total Loan Portfolio (TLP), gross
- RL to TLP = Restructured Loans (RL), gross/ TLP, gross
- Loan Loss Reserves (LLR) to TLP = Allowance for Credit Losses (ACL) – TLP/ TLP, gross
- Gross NPL Ratio (inclusive of Interbank Loans (IBL))= Gross Non-Performing Loans (NPL)/ TLP, gross
- Gross NPL Ratio (exclusive of IBL)= Gross NPL, net of NP IBL (i.e., Gross NPL + Non-performing IBL)/ TLP, gross net of IBL (i.e., TLP, gross + IBL Receivables)
- NPL Coverage = ACL – TLP/ Gross NPL
- NPA to Gross Assets = Non-Performing Assets (NPA) (i.e., Gross NPL+ ROPA, gross (Real and Other Properties Acquired (ROPA) + Non-Current Assets Held for Sale + Non-Performing Sales Contract Receivables (SCR))/Gross Assets (i.e., Total Assets + Allowance on NPA)
- NPA Coverage = Allowance on NPA/ NPA
- Distressed Assets Ratio= Distressed Assets (i.e., NPA+ RL, Performing)/ TLP, gross+ Total ROPA (i.e., ROPA, gross+ Performing SCR)

III. Data and Methodology

Inconclusive evidence on the existence of the credit channel based on aggregate data may be fraught with identification problems. The money channel works through banks' liabilities (deposits) while the credit channel works through the asset side (loans). Hence, more recent studies use micro data and panel econometric techniques to glean insights from banks' balance sheet information that are related to loan supply and at the same time control for bank-level indicators that are related to loan demand (income and risk).

Limitations of the study

This study, thus far, is one of the few micro-based studies on the bank lending channel in the Philippines. Limitations in publicly available data only permit an analysis of the behavior of 24 universal and commercial banks in response to monetary policy. In addition, the analysis used balance-sheet and income-statement data for the period 2008 Q1 – 2013 Q1 only. With a sample size of 504 (where n = 24 and t = 21),[1] reasonable estimates can be obtained from a panel estimation method.

1 With n = 24 banks and t = 21 quarters, the panel data used in the analysis contains 504 observations. However, only 384 observations were effectively used in the estimations as a result of getting the year-on-year change in the dependent variable and specifying an interaction term between the change in monetary policy and the financial condition indicator of banks.

The variation in the reaction to monetary policy across different types of banks (i.e., including rural banks and thrift banks) is not examined due to lack of publicly accessible data. Nonetheless, by focusing on universal and commercial banks, the study expects to shed light on the bank lending behavior of market movers in response to monetary policy.

Data and Empirical Methodology

The study uses publicly available bank-level data on 24 universal and commercial banks for the period 2008 Q1 – 2013 Q1. Banks with incomplete data are excluded. For banks that merged during the coverage period, their respective balance sheet items prior to the merger are summed up. It is recognized at the outset that the time period used for the study coincides with the global financial crisis, which had induced a downward bias in global interest rates and correspondingly affected domestic interest rates.

The banks' balance sheet data are obtained from the BSP website. The data used for analysis are seasonally adjusted quarterly series. The use of seasonally adjusted series is intended to avoid erroneous attribution of any reaction to monetary policy to seasonal factors. Moreover, year-on-year growth rate is used, as quarter-on-quarter growth rate tends to be noisy and volatile.

Fixed-effects regression is employed to control for time-invariant individual characteristics that may potentially influence the predictor variable. It is assumed that there are no substantial differences across the 24 universal and commercial banks that could have an effect on the growth rate of bank loan supply. By controlling for the time-invariant characteristics (α_i) that are unique to each bank in the panel, the pure effect of the predictor variables on the outcome variable can be assessed (Stock and Watson, 2003). Thus, the estimated coefficients cannot be biased because of any omitted time-invariant characteristics. In general form, the fixed-effect regression is specified as follows:

$$Y_{it} = \beta_1 X_{it} + \alpha_i + \mu_{it}$$

where:

Y_{it} = outcome (dependent) variable where subscripts *i* and *t* stand for bank and time, respectively

α_i = unknown intercept for each entity (bank)

β_1 = coefficient of the predictor variable

X_{it} = predictor (independent) variable(s)

μ_{it} = error term

The study tests the responsiveness of the growth rate of bank loans against the policy rate and a measure of bank's financial condition that defines banks' capacity to supply loans (i.e., total assets, liquid assets-to-total assets, or capital-to-asset ratio). The study also controls for predictor variables that capture differential loan demand component, namely, bank income and bank risk indicator (i.e., non-performing loan ratio). Given constraints in the data length, acceptance is set at 10% level of significance.

The basic equations, patterned after Worms' (2010), are as follows:

Equation 1: capital-to-asset ratio as bank financial indicator

$$\Delta \log(loans)_{i,t} = \alpha_i + \sum_{k=1}^{p} \beta_k \Delta \log(loans)_{i,t-k} + \sum_{k=1}^{q} \gamma_k (cap\_asset\_ratio_{i,t-k} * \Delta mp_{,t-k}) + \sum_{k=1}^{q} \delta_k (cap\_asset\_ratio_{i,t-k}) + \sum_{k=1}^{q} \vartheta_k \Delta risk_{i,t-k} + \sum_{k=1}^{q} \sigma_k \Delta \log(y_{i,t-k}) + \varepsilon_{i,t}$$

Equation 2: assets as bank financial indicator

$$\Delta \log(loans)_{i,t} = \alpha_i + \sum_{k=1}^{p} \beta_k \Delta \log(loans)_{i,t-k} + \sum_{k=1}^{q} \gamma_k (\log(assets)_{i,t-k} * \Delta mp_{,t-k}) + \sum_{k=1}^{q} \delta_k (\log(assets)_{i,t-k} + \sum_{k=1}^{q} \vartheta_k \Delta risk_{i,t-k} + \sum_{k=1}^{q} \sigma_k \Delta \log(y_{i,t-k}) + \varepsilon_{i,t}$$

Equation 3: liquid assets-to-asset ratio as bank financial indicator

$$\Delta \log(loans)_{i,t} = \alpha_i + \sum_{k=1}^{p} \beta_k \Delta \log(loans)_{i,t-k} + \sum_{k=1}^{q} \gamma_k (liq\_asset\_ratio_{i,t-k} * \Delta mp_{,t-k}) + \sum_{k=1}^{q} \delta_k (liq\_asset\_ratio_{i,t-k}) + \sum_{k=1}^{q} \vartheta_k \Delta risk_{i,t-k} + \sum_{k=1}^{q} \sigma_k \Delta \log(y_{i,t-k}) + \varepsilon_{i,t}$$

where:

Variables	As reported in the regressions	Description
$\Delta \log(loans)_{i,t}$	dlog_loans	Year-on-year growth rate of bank loans, net of RRP
$cap\_asset\_ratio_{i,t-k}$	cap2assets	Capital-asset ratio
$\log(assets)_{i,t-k}$	log_assets	Log(assets)
$liq\_asset\_ratio_{i,t-k}$	Liqassets	Liquid asset ratio
$\Delta mp_{,t-k}$	d_pol	Change in weighted policy rate
$\Delta risk_{i,t-k}$	dlog_npl	Bank risk (non-performing loan ratio)
$\Delta \log(y_{i,t-k})$	dlog_income	Growth rate of income before tax

Equation 1 tests for the significance of capital-to-asset ratio. The basic premise is that with higher capital buffer, banks would tend to be less vulnerable to information asymmetry problems in relation to their fund sources. External premium of a well-capitalized bank may be smaller than lower capitalized ones, allowing them greater flexibility not to restrict lending in response to contractionary monetary policy. With no publicly available data on risk-adjusted capital, however, it is recognized at the outset that the capital-asset ratio could be a biased indicator as a higher ratio could also signal higher riskiness of the loan portfolio of banks (Worms, 2014). By controlling for the non-performing loans of each bank, this bias may have been mitigated.

Another predictor variable considered is asset size (Equation 2). The presumption is that a larger asset size allows banks to accommodate contractionary monetary policy as they tend to have a larger client base and more diverse sources of funds such as bond market and equities market.

Liquidity (Equation 3) is also analyzed as a determining factor of the ability of banks to offset the effects of restrictive monetary policy. Just like capitalization, liquidity could also be a potentially biased indicator because maintaining higher liquid assets could also imply higher risk aversion of banks that could eventually limit their lending to the public. The three basic specifications control for the growth rate of bank-level income and non-performing loans (NPL), weighted by the share of bank *n* loans to total loans of the universal and commercial banking system. These are used as control variables to capture the differential loan demand effects. The growth rate of bank income is tied to earnings from loans extended to borrowers while NPL growth embodies the risk associated with loans of borrowers. The expected signs are positive for income and negative for NPL.

The policy rate variable[2] is not used as a separate predictor variable because of endogeneity concerns even with the use of lagged policy variable. The endogeneity may stem from the fixed nature of loan contracts when a policy shock occurs at time *t*. Thus, it is expected that the response of loan growth to the policy shock may come with a lag. However, it is also probable that monetary policy eventually responds to the decline in loan growth following the contraction in loan supply. Thus, the various specifications include only an interaction term between the change in monetary policy and the financial condition indicator of banks.

IV. Empirical Results

Based on the Hausman test, the correlation between unique error terms and the regressors has been established. This confirms that fixed-effects estimates are consistent under the alternative hypothesis. The test for time fixed effects fails to reject the null hypothesis that coefficients for all years are jointly equal to zero. To mitigate the endogeneity problem, lagged values of predictor variables are used. The estimation of the fixed effects model is carried out with robust standard errors in the presence of heteroskedasticity and serial correlation. The regressions fail to reject the null hypothesis that the residuals are not contemporaneously correlated—thus, bias is minimized in the estimation.

The three separate regressions indicate that the selected indicators of banks' financial strength contain important information on banks' ability to shield their loan portfolio from restrictive monetary policy. The interaction term with change in monetary policy is positive across all specifications, although statistically significant only for capitalization. A complete description of the variables reported in the regressions is found in Appendix A.

Regression 1: capital-to-asset ratio

Higher capitalization moderates the effect of contractionary monetary policy as evidenced by the significantly positive interaction term with change in policy rate (Equation 1a). The signs of the other predictor variables conform to expectations although only marginally significant—the growth of bank income (dlog_income) positively affects loan growth while the growth of NPL has a negative coefficient. These marginally significant coefficients for demand indicators may be partly due to access of corporate clients of universal banks and commercial banks to more diverse funding sources.

2 Weighted average of reverse repurchase rate and special deposit account rate, with the weights defined by their respective volume of transactions.

A regression that controls for interbank deposits (ibd) is also carried out. The idea is that in times of contractionary monetary policy, banks may draw from their short-term deposits in other banks to protect their loan portfolio. When the regression controlled for interbank deposits, the double interaction term with capital-to-asset ratio and change in policy rate yields a significant negative coefficient (Equations 1b and 1c). This implies that contractionary monetary policy reduces the capacity of capital to mitigate the impact of a policy shock on loan supply, possibly suggesting higher risk aversion among banks as they become more concerned about capital preservation and liquidity. This finding is consistent with the general conservatism of the Philippine banking system with capital adequacy ratios that exceed both international and domestic benchmarks.

Table 3

Regression results with bank capital-to-asset ratio as financial condition indicator

	Equation 1a	Equation 1b	Equation 1c
dlog_loans(-1)	0.355***	0.343***	0.344***
ibd(-1)		0.496	0.554**
cap2assets(-1)	0.445	0.880**	0.909**
cap2assets(-1)*d_pol(-1)	0.690**	0.955**	0.969**
ibd(-1)*cap2assets(-1)		0.008	
ibd(-1)*cap2assets(-1)*d_pol(-1)		-0.115*	-0.119**
dlog_income(-1)	0.105**	0.098**	0.097**
dlog_npl(-1)	-0.101*	-0.099*	-0.100*
Number of obs	384	384	384
F(.,.)	9.86	10.05	10.39
Prob > F	0.000	0.000	0.000
R-squared	0.344	0.366	0.366

*Significance at 1% ***; 5% **; and 10% **

Regression 2: asset size

The results indicate that asset size is a significant financial indicator (Equation 2a). The coefficient of the interaction of the asset size with change in overnight policy rate is also found to be positive but insignificant. Even after controlling for the impact of the share of interbank deposits to total assets, the interaction term with asset size as well as the double interaction term is negative but insignificant. (Equations 2b and 2c)

Table 4
Regression results with total bank's asset as financial condition indicator

	Equation 2a	Equation 2b	Equation 2c
dlog_loans(-1)	0.319***	0.327***	0.330***
ibd(-1)		4.294	0.320
log_assets (-1)	0.177***	0.145**	0.143**
log_assets(-1)*d_pol(-1)	0.158	0.262	0.261
ibd(-1)*log_assets(-1)		-0.172	
ibd(-1)*log_assets(-1)*d_pol(-1)		-0.028	-0.030
dlog_income(-1)	0.068*	0.075*	0.069*
dlog_npl(-1)	-0.098*	-0.105*	-0.104*
Number of obs	384	384	384
F(.,.)	10.20	9.83	10.13
Prob > F	0.000	0.000	0.000
R-squared	0.365	0.366	0.365

*Significance at 1% ***, 5% **, and 10% **

Regression 3: liquid assets-to-asset ratio

Liquidity has also been found to be a significant financial indicator influencing growth of loan supply. Similar to asset size, the ability of liquidity to shield loan supply from contractionary monetary policy is positive but insignificant. Since interbank deposits form part of liquid assets, controlling for interbank deposits is no longer necessary for this specification (Equation 3a).

Table 5
Regression results with total bank's liquidity ratio as financial condition indicator

	Equation 3a
dlog_loans(-1)	0.386***
liqassets(-1)	0.356**
liqassets(-1)*d_pol(-1)	0.089
dlog_income(-1)	0.084**
dlog_npl(-1)	-0.098*
Number of obs	384
F(.,.)	10.50
Prob > F	0.000
R-squared	0.350

*Significance at 1% ***, 5% **, and 10% **

V. Conclusion

The study examines which among various indicators of banks' financial condition such as asset size, capital-to-asset ratio, and liquid assets-to-asset ratio affect the growth rate of loans. The estimation controls for differential loan demand effects by including growth rates of bank loan income and non-performing loans as predictor variables. The bank data used are seasonally adjusted to account for individual seasonal patterns.

The study finds that the three indicators of banks' financial strength are important determinants of bank loan supply. While all the interaction terms with change in policy rate are positive for all specifications, statistical significance is obtained only for capital-to-asset ratio. After controlling for interbank deposits, a significantly negative double interaction term among capital-to-asset ratio, change in monetary policy, and interbank deposits is found. This could possibly indicate higher risk aversion and greater concern for preserving capital and meeting liquidity requirements in times of contractionary monetary policy. The results are in line with the thrust of Basel III towards strengthening of core capital to facilitate a smooth transmission of monetary policy.

The next research area is the differential response to monetary policy shock of universal and commercial banks, thrift banks, rural banks, and non-banks with quasi-banking functions after the compilation of larger datasets is completed. The use of risk-weighted capital would be an ideal improvement.

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Appendix A. Description of Variables

Variable Name	Description
loans_netrrp	total loans, net of banks' RRP placements
assets	total assets
liq_asset_ratio	bank's liquid assets, as a percentage of total assets *(liquid assets = cash and cash items + due from BSP + due from other banks + financial assets)*
cap_asset_ratio	bank's stockholder's equity, as a percentage of total assets
policy_wtd	weighted RRP and SDA rate
npl	bank's gross non-performing loans, scaled by the share of bank's loans to total loans of U/KBs
ibd	interbank deposits (due from other banks), as a percentage of total assets
income	bank's operating income, scaled by the share of bank's loans to total loans of U/KBs
gdp	gross domestic product at constant 2000 prices
log_assets	natural logarithm of bank's total assets
dlog_loans	$100*(\log(\text{loans\_netrrp}_t) - \log(\text{loans\_netrrp}_{t-4}))$
d_pol	$\text{policy\_wtd}_t - \text{policy\_wtd}_{t-1}$
dlog_income	$100*(\log(\text{bankincome}_t) - \text{loag}(\text{bankincome}_{t-4}))$
dlog_gdp	$100*(\log(\text{gdp}_t) - \log(\text{gdp}_{t-4}))$
assets_pol	*log_assets * d_pol*
liqassets_pol	*liq_asset_ratio * d_pol*
cap2assets_pol	*cap_asset_ratio * d_pol*
ibd_assets_pol	*ibd*log_assets * d_pol*
ibd_liqassets_pol	*= ibd* liqassets * d_pol*
ibd_cap2assets_pol	*= ibd* cap_asset_ratio * d_pol*