



IMF Working Paper

Determinants of Credit Growth and Interest Margins in the Philippines and Asia

Tatum Blaise Pua Tan

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Asia and Pacific Department

Determinants of Credit Growth and Interest Margins in the Philippines and Asia

Prepared by Tatum Blaise Pua Tan¹

Authorized for distribution by Rachel van Elkan

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Abstract

Despite robust deposit growth, credit growth has been sluggish in the Philippines. We attribute this to legacy weaknesses in bank balance sheets, consumption-led economic growth, and relatively high net interest margins. Bank-level analysis suggests that interest margins in the Philippines rise with bank size, bank capitalization, foreign ownership, overhead costs and tax rates. Using bank-level data for a number of Asian economies, we find that higher growth, lower inflation, higher reserve requirements, greater banking sector development, smaller stock market development and lower government deficits reduce net interest margins, informing the policy debate on strengthening financial intermediation in the Philippines.

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

¹ Ms. Tan is Bank Officer I at the Bangko Sentral ng Pilipinas (BSP) and was research associate in the IMF-Manila Office of the Resident Representative in 2011. The author is grateful to Dennis Botman, Vivek Arora, Rachel N. van Elkan, Jay Peiris, Ola Melander, and Yoga Affandi from the IMF and to Diwa C. Guinigundo, Ma. Cyd N. Tuaño-Amador, Johnny Noe E. Ravallo, Rosabel B. Guerrero, Jose Ernesto N. Gonzales, Regina C. Juinio, Racquel A. Claveria, Hazel C. Parcon, Rosario D. Soriquez, Rebecca E. Abis, Jade Eric T. Redoblado and Cristeta B. Bagsic from the BSP for their valuable suggestions and support.

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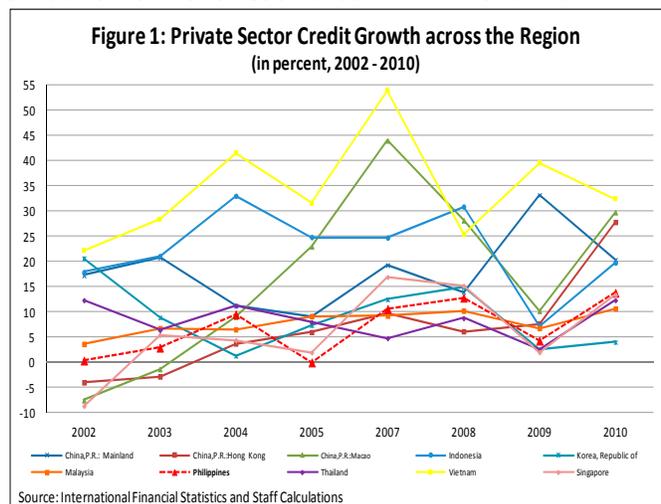
I. INTRODUCTION

Lingering structural and regulatory fragilities in the financial system of advanced economies emerged front and center during the recent global financial crisis, adversely affecting many emerging economies along the way. This serves as a stark reminder of the importance of a sound and well-functioning financial system in facilitating economic growth. The Philippine financial system weathered the global financial storm well, owing to significant reforms since the Asian financial crisis that have led to high capital-adequacy ratios, low non-performing loans, strong banking supervision, and generally risk-averse behavior by the banking community.

With macro stability generally ensured, the attention of Philippine policymakers is now shifting towards achieving higher and more inclusive economic growth that includes, among others, the acceleration of financial sector development as elaborated in the Philippine Development Plan 2011-16 (2011). Several studies relate the development and efficiency of the financial system to economic growth. Levine and Zervos (1998, p.554) analyzed 47 countries over the period of 1976-1993 and concluded that financial development and economic growth are indeed positively related and that financial dynamics are a vital part of the growth process. Their results revealed that both stock market liquidity and banking sector development have a strong and positive relationship with contemporaneous and future rates of economic growth, capital accumulation, and productivity growth. Calderon and Liu (2002) tested the causality between financial development and growth over the 1960–1994 period for 109 countries and found that financial development improved economic growth, particularly through faster capital accumulation and growth in productivity. In addition, they found a bi-directional causality when the sample was divided between developing and industrialized countries implying that economic expansion promotes financial deepening, especially in developing countries, and vice-versa.

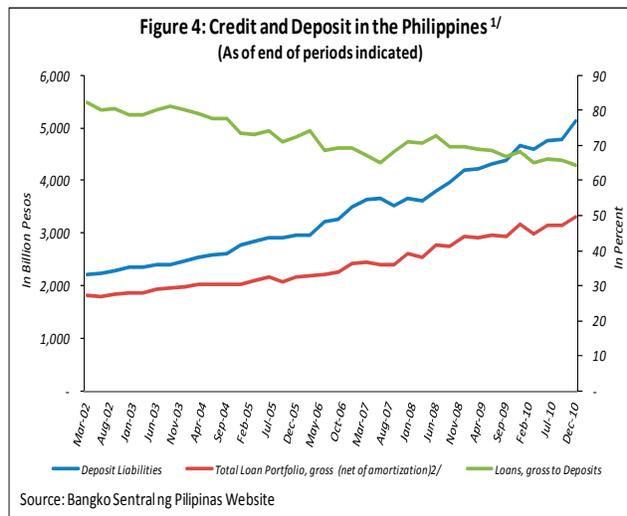
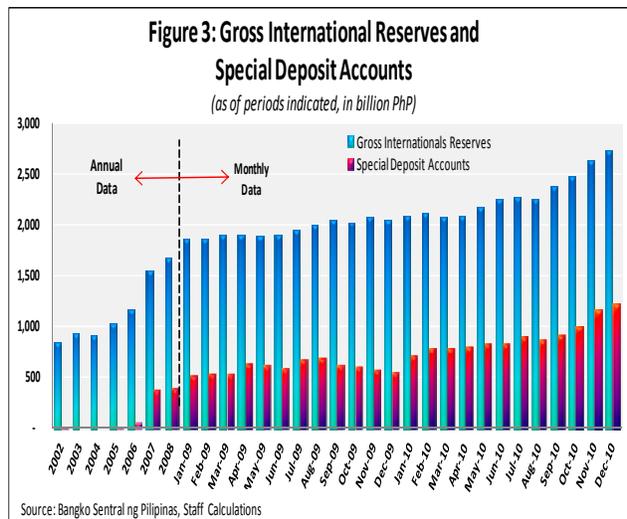
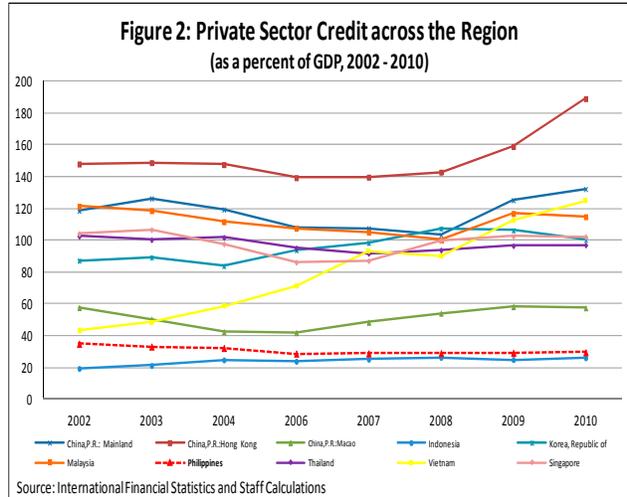
So how exactly does a well-functioning financial market contribute to economic development? Levine and King (1993) used an endogenous growth model and systematically disentangled the mechanisms behind the causality. According to the authors, financial systems are able to assess prospective entrepreneurs, channel savings to projects with the highest potential productivity, allow diversification of risks associated with innovative pursuits, and disclose probable returns for undertaking such activities. Khan (2000) agrees with some of the said views and at the same time, provided additional insights, like the financial systems' ability to generate liquidity for both short- and long-term projects and facilitate trade as a creditor as well as a guarantor.

Given the importance of the financial sector for growth, private sector credit growth in the Philippines, albeit the recent uptrend, remains weak (Figure 1)



consistent with a relatively lower credit-to-GDP ratio compared to most other countries in the region over the period 2002–10 (Figure 2). Private credit growth in the Philippines, as a percent of GDP, is not only sluggish but on a downtrend. This is surprising given the emergence of excess liquidity in the Philippines since the mid to late 2000s as evidenced by the expansion in the BSP’s Special Deposit Accounts (SDAs), which was created for its liquidity-management operations as it is not allowed under its charter to issue its own securities (Figure 3). The substantial increase in SDAs over the years reflected sterilization of strong capital inflows, as well as the modest loan-to-deposit ratio of the banking system leading to abundant domestic liquidity conditions (Figure 4). According to the Asian Development Bank (ADB) (2007), the constraints to real domestic credit growth in the Philippines emanate from the demand side, particularly the corporate sector’s weak demand for credit in light of lethargic investment growth rather than the availability of funds in the financial sector. Indeed, credit expansion picked up sharply in 2011 alongside an increase in private investment.

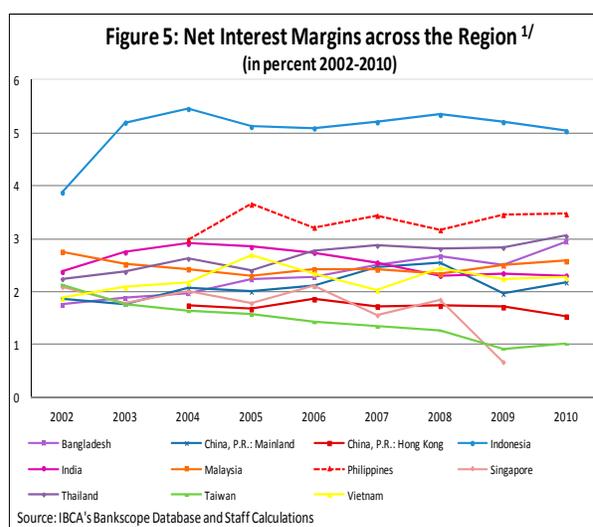
A number of country-specific as well as regional studies have been conducted to analyze the determinants of private sector credit growth. Catão (1997) tackles the disconnect between the recovery in bank deposits and the failure of private sector credit to catch up in Argentina by exploring both demand and supply side factors using 61 observations from June 1991 to June 1996. On the demand side, Catão identified the following determinants which may have contributed to the weakening of private sector credit in late 1995: changes in interest rates, the level of indebtedness of the private sector coupled with expected changes in the



^{1/} Philippine Banking System
^{2/} From 1999-2004, data on Total Loan Portfolio is computed by multiplying the loan to deposit ratio with the total deposits, both taken from the website. Some of the data provided in the website for Total Loan Portfolio on said years are no longer net of amortization, and thus, will not add up to the given ratio.

economy and level of unemployment. On the supply side, adverse selection and limited information drove financial institutions to lend to the public sector, enhance their net foreign asset position, and settle their obligations with the Central Bank. Iossifov and Khamis (2009) studied credit growth in 43 countries in Sub-Saharan Africa from 1997-2007. Empirical findings show that bank credit to the private sector (in terms of real growth and as a ratio to non-oil GDP) was mainly driven by GDP per capita, the nominal interest rate, the money multiplier and credit extension of foreign banks to local banks. In addition, Igan and Tamirisa's (2009) empirical findings on credit growth in the Baltics and Central and Eastern Europe in two sub-periods, 1995-2000 and 2001-05, revealed that bank profitability, measured by net interest margins, was a significant driver of private sector credit expansion.

This study aims to identify the determinants of private sector credit growth in the Philippines. We adopt the baseline model by Guo and Stepanyan (2011), but propose additional explanatory variables to capture Philippine-specific determinants of private credit growth such as distressed asset ratio (DAR) and net interest margins (NIMs).² NIMs are relatively high and sticky in the Philippines, despite progressively improved macroeconomic stability (Figure 5), potentially hampering credit growth. In addition, we analyze whether the fact that growth in the Philippines has been consumption-led has inhibited financial sector development. This study also analyzes in greater detail the determinants of NIMs in the Philippines using bank-level data following Demirgüç-Kunt and Huizinga's (1999) earlier research. Furthermore, the scope of the study is expanded by including other countries in the region to shed light on the macroeconomic variables that may have a significant bearing on bank spreads, possibly providing policy recommendations to stimulate private sector credit growth.



^{1/} Computed as Net Interest Income divided by Total Assets.

Notes: Data sample covers the top 20 banks in each country except for Singapore which only include 19 banks. The ranking follows Bankscope's ranking based on total assets (rolling rank, calculated on the basis of the most recent asset figure, provided that it is not older than 3 years). Ratios are calculated for each bank in each country and then averaged for that given year.

The rest of the paper is organized as follows: Section II provides a brief overview of the Philippine banking industry; Section III analyzes the key drivers of private credit growth; Section IV studies the determinants of interest margins both from bank- to macro-level, progressing from a Philippine-specific analysis towards a wider cross-country analysis; and Section V discusses policy implications and concludes.

² Following the literature we estimated NIMs as net interest income/total assets. An alternative would have been Lending rates – Deposit rates, however, the data is not available on a bank by bank basis.

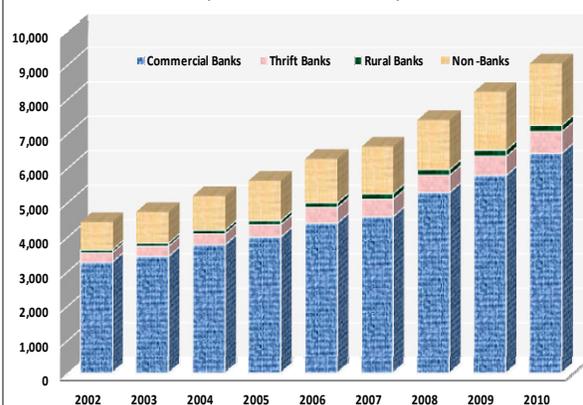
II. A BRIEF OVERVIEW ON THE PHILIPPINE BANKING INDUSTRY

Abola (1998) described the 1950-1970 era as the Philippine banking industry's formative years, marked by a four-fold increase in the number of banks following the enactment of new legislations such as the establishment and regulation of rural and development banks, secrecy of bank deposits, and the establishment of deposit insurance. As recounted by Gochoco-Bautista (1999), a joint IMF-Central Bank Banking Survey Commission recommended amendments to the General Banking Act and the Central Bank Act in 1972–73. The proposed amendments of the commission include the following: a) realignment of regulation by function rather than by type of bank; b) consolidation of central bank authority over banks and nonbanks; c) omission of the promotion of economic growth from the central bank's responsibilities; and d) restrictions on bank entry. The next two decades witnessed major reforms toward financial liberalization and deregulation to enhance competition in the industry, including the deregulation of the foreign exchange market, entry of foreign banks, and relax bank branching regulations. In 1993, the new Central Bank act was approved. In the last decade, several reforms have been implemented such as the adoption of the Basel Framework, the enactment of the Special Purpose Vehicle (SPV) Act and the Securitization Act, among others (Guinigundo 2005).

As elaborated in a recent report by the IMF (2010), the Philippine financial system is still dominated by banks. After the continuing trend of mergers and acquisitions coupled with the exit of feeble banks, the Philippine banking system by end-2010 consisted of 758 deposit-taking institutions, including universal, and commercial banks, thrift, rural and cooperative banks. It managed to sustain its stability, liquidity and profitability amidst trying times. As of end-December 2010, their combined assets reached ₱7,230.2 billion, some 80.3 percent of GDP or about four fifths of the whole financial system's total resources (Figure 6). Of the financial system's total assets, universal and commercial banks (mostly domestic private banks) account for about 71.2 percent.

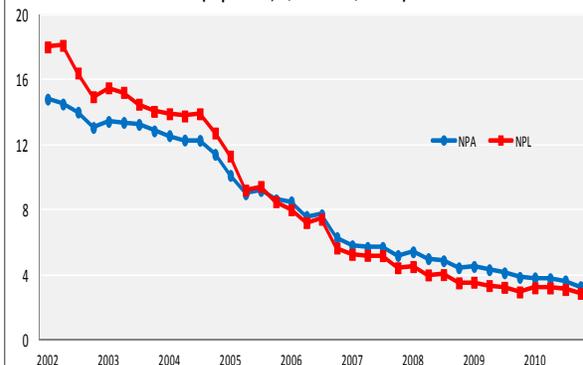
Asset quality is steadily improving as demonstrated in the declining non-performing loans (NPL) and non-performing assets (NPA) ratios, and better loan-loss provisioning. The NPL and NPA ratios of universal and commercial banks fell to 2.9 percent and 3.3 percent, respectively (Figure 7). Moreover, capital

Figure 6: Total Resources of the Philippine Financial System
(in billion PhP, 2002-2010)



Source: Bangko Sentral ng Pilipinas and Staff Calculations

Figure 7: Non-performing Loans^{1/} and Non-performing Assets Ratios^{2/}
(in percent, Q1:2002 - Q4:2010)



Source: Bangko Sentral ng Pilipinas and Staff Calculations

^{1/} Non-performing Loans/Total Loans Portfolio of Universal and Commercial Banks, inclusive of interbank loans

^{2/} Non-performing Assets/Gross Assets of Universal and Commercial Banks

adequacy ratios (CAR) are high at 16.2 percent on a solo basis and at 17.3 percent on a consolidated basis as of end 2010. Finally, return on assets (ROA) as well as return on equity (ROE) are similar to regional peers at 1.4 and 12.7 percent, respectively, by end-2010.

III. WHAT DRIVES PRIVATE CREDIT?

A. Data and Methodology

Guo and Stepanyan (2011) analyzed the determinants of bank credit in 38 emerging markets from 2001:Q1 to 2010:Q2, and further decomposed their analysis into pre- and post-crisis periods. The authors employed the following benchmark specification:

$$\begin{aligned} \text{Credit Growth}_{i,t} = & \beta_0 + \beta_1 (\text{Share of deposits in total credit to the private sector}_{i,t-4} \\ & \times \text{Deposit Growth}_{i,t}) + \beta_2 (\text{Share of deposits in total credit to the} \\ & \text{private sector}_{i,t-4} \times \text{Non-resident Liability Growth}_{i,t}) + \beta_3 \\ & \text{Inflation}_{i,t} + \beta_4 \text{Lagged GDP Growth}_{i,t-1} + \beta_5 \text{Lagged deposit} \\ & \text{rate}_{i,t-1} + \beta_6 \text{Change in Fed Fund Rate}_t + \varepsilon_{i,t} \end{aligned} \quad (1)$$

where i represents the observation and t represents time period.

Their empirical findings revealed that domestic deposits, liabilities to non-residents, inflation and GDP growth contribute positively to credit growth. Guo and Stepanyan (2011, p.8) found that for every penny of extra funding, whether domestic or foreign, half of it goes to the private sector on average. On the other hand, the deposit rate and the Fed fund rate were both negatively related to credit growth.

Furthermore, they found that for most of the countries in Asia, domestic deposits and economic development were the main determinants of credit expansion for both the pre- and post-crisis periods. They also observed a large variation in the credit growth rate in the countries within the sample, particularly in the pre-crisis era, and a contrasting trend in credit growth between the two periods.

This study, using quarterly series spanning from 2002:Q4 to 2010:Q4, extends the model by Guo and Stepanyan (2011) to analyze the potential impact of relatively high banking spreads in the Philippines on private credit expansion.³ This paper also considers the fact that growth has been mainly consumption rather than investment led. Moreover, the distressed asset ratio, the broadest measure of asset quality, was included as an indicator of the banking system's health and market confidence. This study, however, does not include deposit rates separately because of possible correlation with NIMs.

³ Estimated with OLS using Newey-West HAC Standard Errors & Covariance (lag truncation=3).

The explanatory variables are:

Inflation. We expect inflation to be positively related to credit growth, a rise in inflation results to higher demand for nominal credit. Indeed, Guo and Stepanyan (2011) found a positive relationship.

Growth Rate of Deposits/Credit. Like Guo and Stepanyan (2011, p.7), this variable is computed as the growth of total deposits (Deposit Growth_t) weighted by the share of total deposits to total credit to the private sector four quarters ago (Weight_{t-4}) to control for the overall importance of domestic deposits as a source of fund. We expect the growth of deposits to have a positive effect on private credit growth. An expansion in deposits provides banks more funds available for lending, thereby, encouraging credit extension. Results from Mohanty, Schnabel and Garcia-Luna's (2006) research on 21 emerging market countries from 1999-2004 suggested that changes in the banking system's loanable funds, defined as total liabilities less capital and reserves, have a significant impact on the bank's lending capacity. They estimated that credit expansion declines by less than a third of the decrease in loanable funds.

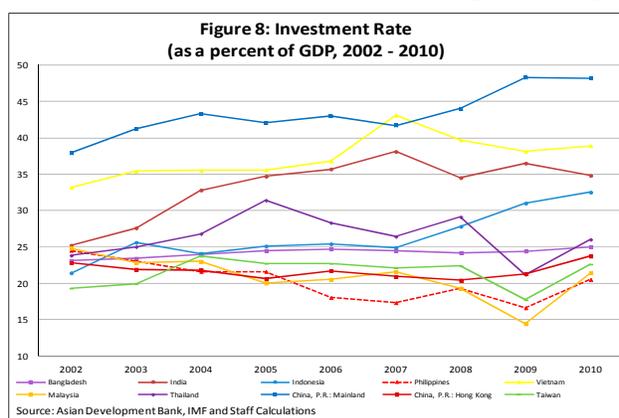
Growth Rate of Liabilities to Non-Residents/Credit. Similarly, this variable is computed by applying the same weight as explained above to the growth of liabilities to non-residents ($\text{Non-resident Liability Growth}_t$). We expect a positive relationship between the growth of liabilities to non-residents and the growth in private sector credit. Banks' ability to borrow funds abroad likewise improves their capacity to lend. Estimation results of Guo and Stepanyan's (2011) study assigned a positive coefficient on the variable.

Change in the Federal Fund Rate ($\text{Fed rate}_t - \text{Fed rate}_{t-4}$). A negative coefficient is expected for this variable. When the Fed rate goes down, the impact of easing liquidity conditions is not only felt in the US, but also internationally, encouraging higher growth in local credit. The study conducted by Guo and Stepanyan (2011) substantiates the negative relationship between the changes in fed rate on credit expansion.

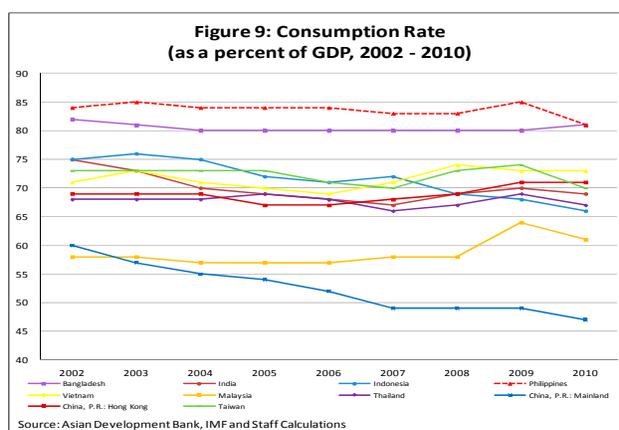
Real GDP Growth. We expect a positive relationship between real economic growth and bank lending. Real GDP growth measures the country's overall performance. According to Aysan, Dalgic and Demirci (2010) high growth signifies high consumption and investment which can translate to higher demand for credit by both firms and households. Following Guo and Stepanyan's (2011) approach to avoid reverse causality, lagged real GDP growth was likewise included. Mohanty, Schnabel and Garcia-Luna's (2006) analysis on bank credit's relationship with output, using the output gap and per capita income growth, found that credit extension to the private sector moves procyclically with output. Their study revealed that a larger than one coefficient for the output gap signifies that credit is expanding more than proportionally with a recovery of output. They also found that the positive relationship between bank credit and lagged growth of per capita income suggest that strong economic performance indicates higher expected income in the future and credit availment.

Apart from these indicators, we include a number of additional variables that are potentially relevant in the Philippines:

Sources of Growth: Investment-Led or Consumption-Led? In the case of the Philippines, it may be worthwhile to break down the components of growth and separately study their impact on private credit growth. The persistent low rate of investment in the Philippines vis-à-vis its peers in the region may be critical in explaining the relatively weak credit growth in the country (Figures 8 and 9).



*Distressed Asset Ratio (DAR) of Universal and Commercial Banks.*⁴ DAR is a sound indicator of the quality of the assets held by banks and the overall health of the financial system. As high credit growth could reduce DAR, we include its lagged values. When DAR ratios are high, one would expect that banks will tend to adopt a more cautious stance in their lending activity resulting in a contraction in credit conditions. Thus, we expect a negative coefficient for this variable. Espinoza and Prasad (2010), using a panel VAR on 80 banks in the Gulf Cooperative Council countries over the 1995-2008 period, found that a one-standard deviation increase in the NPL ratio results in a diminished credit growth after two to three years. Mohanty, Schnabel and Garcia-Luna (2006, p. 24) likewise concluded that bank credit is highly sensitive to the NPL ratio.



Net Interest Margins (net interest income_{*i,t*}/total assets_{*i,t*}). NIMs are expected to be negatively related to bank credit. A higher bank spread may be due to high lending rates which can discourage demand for credit. Moreover, a high NIM could be a consequence of inefficiency in both the individual banks' operation and the financial system, in general. Such a case would imply that banks are not able to effectively function as intermediaries and optimally channel resources from savers to investors. However, there have also been studies, such as Igan and Tamirisa (2009) for the Baltics and Central and Eastern Europe, that have found a positive relationship between NIMs, as a measure of profitability, and credit growth.

Lagged Credit Growth as one might expect persistence or cycles in credit growth.

⁴ The ratio of distressed assets (sum of NPLs, ROPA, gross, non-current assets held for sale, past due loans and receivables but not yet non-performing, and current restructured loans) to total loans (gross of allowance for probable losses), inclusive of interbank loans, plus ROPA (gross of allowance for losses). (BSP, 2010)

B. Empirical Results

Table 1 presents the regression results on the determinants of private credit growth in the Philippines. Results of the benchmark specification (presented in the first column) show that all coefficients have the expected signs; however, only deposit growth and the change in the Federal funds rate are statistically significant. The positive coefficient of deposit growth is similar to Mohanty, Schnabel and Garcia-Luna's (2006) findings that changes in the banks' deposit base significantly impact their lending capacity. Furthermore, it suggests that for every peso of extra funding, on average, a little more than a fifth is loaned to the private sector, consistent but well below the figures found in Guo and Stepanyan's (2011) study. The negative coefficient implies that an increase in the Fed Funds rate adversely affects liquidity conditions in the Philippines (see also Guo and Stepanyan, 2011).

Table 1: Regression Results on the Determinants of Private Credit Growth (2002Q4 - 2010Q4) ^{1/}

Constant	-0.564 (3.018)	5.946 (4.659)	9.743 ** (3.838)	39.468 *** (12.037)	32.982 *** (11.325)
Inflation	0.445 (0.369)	0.400 (0.292)	0.436 * (0.218)	0.457 (0.271)	0.208 (0.268)
Deposit Growth	0.217 *** (0.066)	0.203 *** (0.061)	0.151 * (0.074)	0.029 (0.078)	0.067 (0.073)
Liabilities to Non-residents Growth	0.379 (0.310)	0.362 ** (0.175)	0.430 ** (0.179)	0.321 (0.213)	0.372 * (0.196)
Change in Federal Funds Rate	-2.453 *** (0.496)	-2.152 *** (0.427)	-1.707 *** (0.420)		
Lagged Real GDP Growth	0.166 (0.305)				
Lagged Real Investment Growth		0.120 * (0.060)	0.095 * (0.054)	0.115 * (0.065)	0.107 * (0.059)
Lagged Real Consumption Growth		-1.090 * (0.631)	-0.962 (0.610)	-1.419 * (0.722)	-1.233 * (0.665)
Lagged Distressed Asset Ratio ^{2/}			-0.210 ** (0.087)	-0.450 *** (0.103)	-0.313 *** (0.110)
Lagged Net Interest Margins				-7.663 * (3.821)	-7.179 * (3.497)
Lagged Credit Growth					0.367 ** (0.153)
Adjusted R-squared	0.555	0.611	0.674	0.529	0.607
Number of Observations	32	32	32	32	32

* Significant at the 10 percent level

** Significant at the 5 percent level

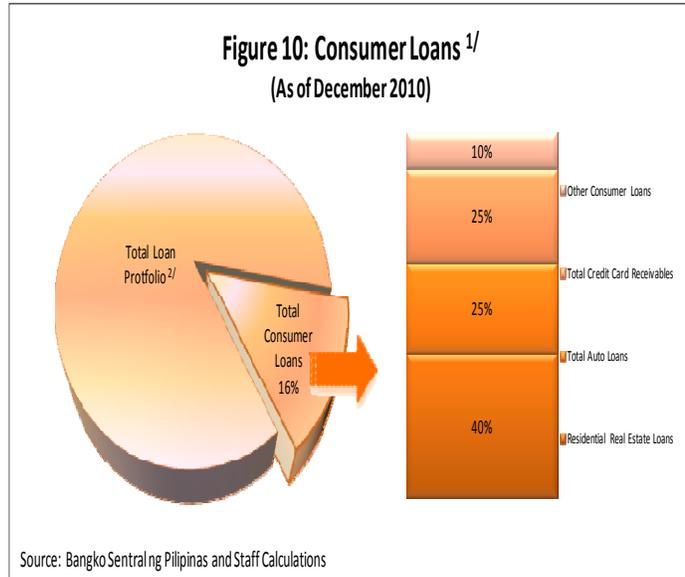
*** Significant at the 1 percent level

^{1/} Standard errors are in parenthesis

Data Source: International Financial Statistics, World Economic Outlook, US Federal Reserve Bank, Bangko Sentral ng Pilipinas and Staff Calculations

The statistical insignificance of real GDP growth in the base model prompted the alternative specification to distinguish between investment- or consumption-led-growth. Both coefficients are significant, with investment-driven growth having a positive relationship with credit growth, while consumption-driven growth has a negative impact. Hence, economic advancement propelled by robust investment activity is reflected directly in the private sector's demand for credit. The absence of investment-led growth in the Philippines supports the ADB's (2007) conclusion that demand side constraints are important in understanding the weak financial intermediation in the Philippines. As for the findings on the growth of consumption, it is plausible that firms have better access and, hence, higher

demand for credit than consumers considering the latter face higher transaction costs, but the negative coefficient is nonetheless somewhat of a puzzle. Indeed, given the high share of liquidity-constrained consumers in the Philippines, one might have expected a weak link between consumption growth and credit growth, but a negative relationship is still surprising. It should be noted though that as of end-December 2010, despite increasing, consumer loans comprised only 16.0 percent of the whole banking system's total loan portfolio (net of interbank loans), the bulk of which went to residential real estate loans (Figure 10). High consumption growth is clearly not intermediated through the banking system, hampering access to finance and economic development more generally in the Philippines.



^{1/} Philippine Banking System

^{2/} Net of Interbank Loans

The coefficient for the distressed asset ratio is statistically significant with the expected negative sign. Hence, when asset quality is weak, banks tend to adopt a more cautious stance in their lending activity resulting to a contraction in the credit market. Similarly, the net interest margin is statistically significant with the expected negative sign. Since this variable may be correlated with the Fed rate, the latter was dropped from the specification. The outcome suggests that high net interest margins inhibit bank lending, reflecting potentially operational inefficiencies or lack of competition in the banking system, among others (see next Section for further discussion).

The final specification tests the persistence in credit growth. As expected, the lagged credit growth is statistically significant with a positive sign. Indeed, the previous period's lending activity influences that of the next quarter's credit expansion. Its coefficient (0.37) implies a fair rate of adjustment of actual credit growth to its steady-state value, approximately 63 percent of any difference between the two values will converge in each subsequent quarter. This implies that financial deepening is persistent (Iossifov and Khamis, 2009).

In general, most statistically significant variables that affect private credit growth are beyond the control of policymakers, such as the Fed funds rate and deposit growth, although the latter can be influenced by bank regulations and discount rates, among others, to some extent. Formulating policies to modify the composition of growth towards investment, as articulated in the Government's Philippine Development Plan (2011), will be important to stimulate financial intermediation. In addition, economic policies could affect net interest margins and through this channel, policymakers might be able to affect private sector credit growth.

IV. WHAT DRIVES NET INTEREST MARGINS?

A. Data and Methodology

This study zooms in on the Philippine banking industry with the conjecture that the banks' sizable NIMs inhibit, to some degree, their effectiveness as an intermediary in channeling funds in the system, thereby potentially restraining the economy from attaining optimal growth. In addition, the study broadens its coverage by including neighboring countries to likewise test if in addition to bank-level, macroeconomic factors affect NIMs.

The Philippine-specific analysis uses quarterly bank-level data from 2002:Q1 to 2010:Q4 and employs the following baseline model:

$$\begin{aligned} \text{Net Interest Margins}_{i,t} = & \beta_0 + \beta_1 \text{Bank Size}_{i,t} + \beta_2 \text{Bank Capitalization}_{i,t} + \beta_3 \\ & \text{Foreign Ownership}_i + \beta_4 \text{Overhead Costs}_{i,t} + \beta_5 \text{Tax} \\ & \text{Rate}_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (2)$$

where i represents individual bank observations and t represents time period.

Meanwhile, the regional analysis offers a cross-country assessment on both macroeconomic and bank-specific variables. The annual panel data includes 11 countries, namely: Bangladesh, China, Hong Kong, India, Indonesia, Malaysia, Philippines, Singapore, Taiwan, Thailand and Vietnam. The data sample covers the top 20 banks in each country except for Singapore wherein the sample only included the top 19 banks. The ranking follows IBCA's Bankscope ranking based on total assets (rolling rank, calculated on the basis of the most recent asset figure, provided that it is not older than three years). Foreign ownership information was also taken from the same source and defined as shareholders owning together 51 percent or more located in another country (including those with an unknown country) and may have other shareholders in the country of origin. Only countries which contain at least three banks for a given year were included. All regressions include country and year fixed effects using dummy variables.⁵ Table 2 presents the correlation matrix for the explanatory variables:

Table 2: Correlation Matrix for the Explanatory Variables

	Bank Size	Bank Capitalization	Foreign Ownership	Overhead Costs	Tax Rate
Bank Size	1.000	(0.067)	(0.051)	(0.024)	(0.000)
Bank Capitalization	(0.067)	1.000	0.010	0.092	0.005
Foreign Ownership	(0.051)	0.010	1.000	0.236	(0.014)
Overhead Costs	(0.024)	0.092	0.236	1.000	(0.048)
Tax Rate	(0.000)	0.005	(0.014)	(0.048)	1.000

⁵ The data series were sourced from the IBCA's Bankscope Database, IFS, WEO, CEIC database, IMF e-library, ADB, Bangko Sentral ng Pilipinas (BSP), Bank of Thailand, Hong Kong Monetary Authority, Monetary Authority of Singapore and the Reserve Bank of India.

The baseline regression is as follows:

$$\begin{aligned}
 \text{Net Interest Margins}_{i,c,t} = & \beta_0 + \beta_1 \text{Bank Size}_{i,c,t} + \beta_2 \text{Bank Capitalization}_{i,c,t} + \beta_3 \\
 & \text{Tax Rate}_{i,c,t} + \beta_4 \text{Foreign Ownership}_i + \beta_5 \text{GDP}_{c,t} + \beta_6 \text{Inflation}_{c,t} + \beta_7 \\
 & \text{Overall Fiscal Deficit/Surplus}_{c,t} + \beta_8 \text{Reserve Requirement}_{c,t} + \beta_9 \\
 & \text{Stock Market Development}_{c,t} + \beta_{10} \text{Banking Sector Development}_{c,t} + \\
 & \beta_{11} \text{No. of Bank Branches}_{c,t} + \beta_{12} \text{Industry concentration}_{c,t} + \varepsilon_{i,t}
 \end{aligned} \tag{3}$$

where i represents individual bank observations, c represents the country and t represents time period.

Alternative specifications are also presented such as: panel fixed period effect specification; overhead costs in lieu of the number of bank branches; number of ATMs as a ratio to the number of bank branches; Herfindahl Index as a measure of industry concentration; and the inclusion of a crisis dummy (1 for years 2008 and 2009; 0, otherwise).

The above specification is based on Demirgüç-Kunt and Huizinga (1999), which used bank-level data for 80 countries from 1988-95. They included the macroeconomic environment, bank-specific characteristics, taxes, financial structure, and foreign ownership, among others as potential determinants of NIMs. The analysis starts by testing for the bank-level factors in the Philippines. We include the following bank-specific variables in the estimations:

Bank Size (total asset _{i,t} /total asset _{c,t}). Ex-ante, the effect of bank size on interest margins is not clear. On the one hand, a positive relationship is expected for this variable as a large bank can enhance the public's perception of its credibility and stability; hence, depositors are willing to accept lower interest earnings from their deposits in exchange for security. In addition, big banks are able to diversify their activities allowing them to generate income from other sources aside from loans. Finally, large banks can have market power. On the other hand, a study made by Demirgüç-Kunt, Laeven and Levine (2003), employing 72 countries from 1995-99, suggests that large banks are likely to have lower NIMs compared to smaller banks due to scale efficiencies.

Bank Capitalization (book value of equity _{i,t} /total asset _{$i,t-1$}). We expect a positive coefficient for this variable. Bank capitalization follows a parallel line of reasoning with that of bank size, i.e. banks which maintain high levels of capital are less likely to go bankrupt and are more creditworthy. Thus, the sense of security they provide their customers enables them to source funds at a lower rate relative to their lending rate. Claeys and Vander Vennet (2008) explained that banks maintaining higher capital than the regulatory requirement have the flexibility to enlist riskier assets with higher returns in their portfolio and the ability to reduce their funding costs because of better creditworthiness. Results of their study for Central and Eastern European Countries for the period 1994–2001 indicated that the positive impact of capital adequacy on NIMs is twice as large for transition economies compared to advanced economies. Moreover, Saunders and Schumacher (2000) basing their research on seven countries from 1988-1995, suggest that banks require higher NIM in order to mitigate the cost of maintain high capital ratios. Doliente (2005), covering banks in the South East Asian region for the period 1994–2001, confirmed the positive impact of capital adequacy on NIMs in the Philippines.

Foreign Ownership (if > 50 percent = 1, otherwise = 0). We expect this variable to be positively related to NIM. Foreign ownership customarily involves a transfer of technology, technical expertise and better management practices from abroad. Demirgüç-Kunt and Huizinga's (1999) study show that foreign banks in developing countries have higher NIMs than domestic banks, suggesting that the foreign banks' "technological edge" is more pronounced in poor countries. However, one could also argue that better technology would imply greater efficiency and thus, lower NIMs. An alternative reason is formulated by Igan and Tamirisa (2009) in their study on credit growth and bank soundness. They suggest that foreign banks may be more willing to venture into high-risk/high-return activities, matching to the strength of their parent banks, vis-à-vis domestic banks.

Overhead Costs/Operating Expenses ($\text{overhead costs}_{i,t}/\text{total assets}_{i,t}$). When operating costs increase, NIM will also increase since we expect these costs to be at least partially passed on to the borrowers and depositors. Demirgüç-Kunt and Huizinga (1999) and Doliente (2005) conclude that banks, to some extent, are able to pass on their overhead expenses to their customers. Demirgüç-Kunt and Huizinga (*op cit.*) added that a larger portion of this expense is shouldered by the customers in wealthier countries. Meanwhile, Doliente (*op cit.*) suggests that in order for the South East Asian banks' NIM to decline, operating expenses must be brought down first. Gerlach, Peng and Shu (2005), covering 29 retail banks in Hong Kong SAR from 1994–2002, cite this pass-through effect as one of the two possible reasons why operating costs are positively related to NIM; the other one being that wider bank margins are linked to riskier loans which entail higher "monitoring and risk control" costs.

Tax Rate ($\text{provision for income tax}_{i,t}/\text{net income before tax}_{i,t}$). Demirgüç-Kunt and Huizinga (1999 and 2000) concluded in both their papers that the corporate tax burden is passed on to customers completely or partially. Thus, we expect a positive relationship between corporate taxes and NIM.

We then evaluate the same bank-specific variables using a regional cross-country dataset in order to incorporate the following macroeconomic and structural variables which may potentially affect NIMs:

Real GDP Growth. Silva, Oreiro, de Paula and Sobreira's (2007) study on bank spreads in Brazil suggests an ex-ante ambiguous effect of growth on interest spreads. On the one hand, there can be a negative effect of GDP on bank spreads due to the "default effect" (i.e. good economic performance lowers bank default), while on the other hand, there could be a positive effect due to the bank's market power (i.e. banks increase the lending rate when demand for credit is rising, while maintaining the deposit rate). Khawaja and Din (2007) found a negative relationship between real output and bank spreads in their study on interest spreads in Pakistan. Their explanation is based on Bernanke and Gertler's (1989) findings that a borrowers' creditworthiness deteriorates along with its net worth during recession, and as such, the borrowers can only borrow at higher rates, thereby raising the spreads.

Inflation. Demirgüç-Kunt and Huizinga (1999) suggest that inflation increases NIMs as banks may earn higher income from bank floats or delays in crediting client accounts. In

addition, high inflation may be indicative of a volatile economic condition, hence, a riskier market. Thus, banks may charge higher interest rate for lending to compensate for the risk.

Overall Fiscal Balance as percent of GDP. Tennant and Folawewo's (2009) research on 33 countries for the years 1988–2005 identified crowding-out by the government as among the factors that inhibit the reduction of bank margins. Hence, we expect this variable to be positive. This is crucial in the Philippines which has been persistently plagued by high levels of deficits and debt.

Reserve Requirement Rates. Reserve requirements act as a tax on banks, inhibiting their lending capacity; hence, we expect a negative coefficient for this variable. Funds could have earned higher income when lent out instead of kept as reserves. Demirgüç-Kunt and Huizinga (1999) found reserves to be inversely related to NIMs and attributed it to the under remuneration of reserves driving the interest income down, with the banks inability to pass the cost of high reserves to clients.

Industry Concentration (total loans of the top three banks_{c,t}/total loans_{c,t} and Herfindahl Index). We expect this variable to be positive. High market concentration means less competition, allowing banks to have some degree of monopolistic powers over interest rates. Using the dealer model, Doliente (2005, p.16) found that the region's NIM is explained by the non-competitive structure of its banking system and that banks in the Philippines and Thailand obtain more "monopoly rents" than banks in Malaysia.⁶

Banking Sector Development (total asset of the industry_{c,t}/GDP_{c,t}). Demirgüç-Kunt and Huizinga (2000) and Aysan, Dalgic and Demirci (2010) find that developed financial systems in OECD countries and Turkey, respectively, have lower NIMs due to more intense competition.

Stock Market Development. Ex-ante, the effect of stock market development is not straightforward. On the one hand, greater stock market development allows firms an alternative source of financing reducing the market power of banks and NIMs. On the other hand, larger stock market capitalization enables banks to earn higher NIMs possibly because it makes available better information thereby increasing the pool of prospective borrowers, reducing lending costs, and stimulating the volume of lending. Demirgüç-Kunt and Huizinga's (2000) findings suggests that the latter "complementarity" hypothesis dominates.

Financial Crisis in 2008–09. Ex-ante, the impact of the 2008-09 financial crisis on NIMs can be either positive or negative. The effect may be positive as it would reduce deposit rates and increase lending rates. The former could be the result of monetary stimulus, reducing the policy rate, which may be reflected in bank deposit rates. Moreover, banks would likely curtail financing and lend at higher rates as borrowers become riskier during times of crisis. In contrast, according to Doliente (2005), NIMs decline as the number and levels of NPL rise

⁶ For further details, see Ho and Saunders' (1981) dealer model.

during the crisis driving realized interest gains down. Similarly, the increase in actual defaulted or restructured loans pulls down the actual interest income from loan activities.

Number of Branches. The variable is expected to have a positive effect on NIMs. According to Milo (2001) banks which are more retail-oriented usually incur higher operating costs (equipment, personnel expenses, etc.) which results to higher spreads.

Automated Teller Machines (ATMs)-to-Bank Branch ratio. Carbó Valverde, Humphrey and Del Paso (2004) examined how operating costs of Spanish savings and commercial banks over 1992-2000 were affected by major technological changes, particularly ATMs and the shift to electronic banking. They found that banks will continue to realize savings from reduced operating costs by increasing the ATM to branch ratio up to around two, after which diminishing returns settle in. As such, we would expect a negative coefficient.

B. Empirical Results

Philippine Banking Industry: Bank-Level Regression

Table 3 presents the regression results for the determinants of NIMs in the Philippines using bank-specific factors. All the variables are statistically significant with the expected signs. The positive coefficient of bank size suggests that bigger banks (in terms of assets) in the Philippines are able to obtain higher NIMs. This supports the following views on large banks: 1) they benefit from greater public trust of the bank's credibility and stability; 2) they are able to engage in a wider array of income-generating activities aside from loans; and 3) they enjoy some degree of market power. In general, this may be indicative of the Filipinos' risk-averse attitude and relatively cautious stance when it comes to financial transactions.

Table 3: Regression Results on the Determinants of Net Interest Margins (2002Q4 - 2010Q4) ^{1/}

	Time Fixed Effects,			
	OLS	Time Fixed Effects	Period Weights	OLS
Constant	1.618 *** (0.091)	1.579 *** (0.092)	1.492 *** (0.088)	1.656 *** (0.092)
Bank Size	0.545 ** (0.268)	0.672 ** (0.312)	0.724 ** (0.293)	0.544 ** (0.268)
Bank Capitalization	0.546 *** (0.124)	0.523 *** (0.126)	0.348 *** (0.128)	0.515 *** (0.124)
Foreign Ownership	1.179 *** (0.163)	1.163 *** (0.164)	1.134 *** (0.155)	1.170 *** (0.163)
Overhead Costs	0.364 *** (0.025)	0.376 *** (0.026)	0.411 *** (0.024)	0.370 *** (0.025)
Tax Rate	0.240 *** (0.069)	0.213 *** (0.071)	0.231 *** (0.069)	0.245 *** (0.069)
Crisis				-0.233 *** (0.086)
Adjusted R-squared	0.220	0.217	0.252	0.223
Total panel (unbalanced) observations:	1,293	1,293	1,293	1,293

* Significant at the 10 percent level

** Significant at the 5 percent level

*** Significant at the 1 percent level

^{1/} Standard errors are in parenthesis

Source: Bangko Sentral ng Pilipinas, Staff Calculations

The expected positive sign of the coefficient for overhead costs suggests that NIMs increases with overhead expenses. In the Philippines, 36 percent of said costs are passed on to clients. Likewise, corporate taxes are also passed on customers. According to Demirgüç-Kunt and

Huizinga (2000), these taxes can adversely interfere with saving and investment decisions which can have unfavorable impact on economic activity.

The negative coefficient for the crisis, suggests that realized NIMs of Philippine banks did experience a decline of around 23 percent during the recent 2008-2009 financial crisis.

Regional Cross-Country Study: Bank-Specific and Macroeconomic Variables

Table 4 presents the regression results for the determinants of NIMs across the region. The estimation results of the benchmark specification show that coefficients have the expected signs except for bank size, number of branches, and ATM-to-bank branch ratio. Also, all variables are statistically significant except for foreign ownership, which is consistently insignificant in all the estimation results, and tax rate. In contrast to our results for the Philippines, foreign ownership does not seem to have a significant impact on the region's NIM.⁷

The baseline specification, column 1, finds that industry concentration (in terms of loans) contributes positively to higher NIMs. Consistent with the literature, the findings suggest that a highly concentrated industry means less competition and a higher degree of market power for the banks. Similar findings are presented for the fixed effect panel estimation.

Our results suggest that the “efficiency” view of bank size on NIMs dominates. The reason why this result is different from the Philippines could be related to the inclusion of market power through industry concentration in this specification. Hence, after controlling for a monopolistic market structure, large banks appear to enjoy efficiency gains, possibly in the form of lower operating expenses, and hence lower net interest margins. Indeed, after controlling for overhead costs, bank size becomes insignificant, which leads us to infer that bank size's negative impact on NIM is channeled through lower overhead costs. This supports the results in Demirgüç-Kunt, Laeven and Levine's (2003) that larger banks enjoy economies of scale that lower NIMs. Similarly, Zhou and Wong (2008, p.50) reasoned that large banks aggressively expand their business at low margins. Furthermore, it may also be that the increase in bank size is brought about by mergers and acquisitions and the exit of weaker banks in the system leaving only the efficient banks in the market.

⁷ The results for the Philippines in Table 2 are based on BSP data. Meanwhile results of the cross-country estimation in Table 3 are based on the Bankscope database for consistency across countries.

Table 4: Regression Results on the Determinants of Net Interest Margins across the Region (2002 - 2010)^{1/}

	OLS with Country and Year Dummy	Period Fixed effects	OLS	OLS	OLS	OLS
Constant	3.721 *** (0.214)	3.854 *** (0.237)	2.647 *** (0.247)	3.904 *** (0.268)	3.948 *** (0.272)	4.282 *** (0.292)
Lagged Real GDP Growth	-0.101 *** (0.014)	-0.177 *** (0.025)	-0.013 (0.010)	-0.089 *** (0.014)	-0.101 *** (0.014)	-0.115 *** (0.017)
Inflation	0.114 *** (0.013)	0.121 *** (0.015)	0.003 (0.010)	0.069 *** (0.015)	0.046 *** (0.014)	0.069 *** (0.015)
Reserve Requirement	-0.058 *** (0.006)	-0.059 *** (0.006)	-0.059 *** (0.005)	-0.062 *** (0.006)	-0.05 *** (0.006)	-0.062 *** (0.006)
Banking Sector Development	-0.636 *** (0.075)	-0.698 *** (0.088)	-0.377 *** (0.052)	-0.683 *** (0.071)	-0.550 *** (0.068)	-0.788 *** (0.078)
Stock Market Development	0.002 ** (0.001)	0.003 *** (0.001)	4.E-04 (0.001)	0.001 (0.001)	0.001 (0.001)	0.002 *** (0.001)
Government Deficit/Surplus	0.040 *** (0.014)	0.042 *** (0.016)	0.057 *** (0.012)	0.034 ** (0.015)	0.047 *** (0.015)	0.048 *** (0.016)
Foreign Ownership	0.027 (0.065)	0.005 (0.064)	-0.034 (0.053)	-0.015 (0.063)	0.003 (0.064)	-0.021 (0.063)
Number of Branches	-3.E-05 *** (9.E-06)	-2.E-05 * (1.E-05)		-5E-05 *** (9.E-06)		-4E-05 *** (9.E-06)
Bank Capitalization	2.309 *** (0.420)	2.274 *** (0.419)	2.288 *** (0.345)	2.354 *** (0.397)	2.519 *** (0.404)	2.364 *** (0.396)
Tax Rate	3.E-04 (0.002)	0.001 (0.002)	0.001 (0.001)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)
Industry Concentration	0.928 *** (0.288)	1.299 *** (0.336)	0.042 (0.248)			
Bank Size	-1.515 ** (0.624)	-1.413 ** (0.619)	-0.210 (0.473)			
Overhead Costs			0.509 *** (0.028)			
Herfindahl Index				0.387 *** (0.070)	0.276 *** (0.070)	0.376 *** (0.070)
ATM to Branch Ratio					0.043 ** (0.022)	
Crisis						0.293 *** (0.093)
Adjusted R-squared	0.369	0.384	0.510	0.400	0.386	0.405
Number of Observations	1,045	1,045	1,222	1,063	1,063	1,063

* Significant at the 10 percent level

** Significant at the 5 percent level

*** Significant at the 1 percent level

^{1/} Standard errors are in parenthesis

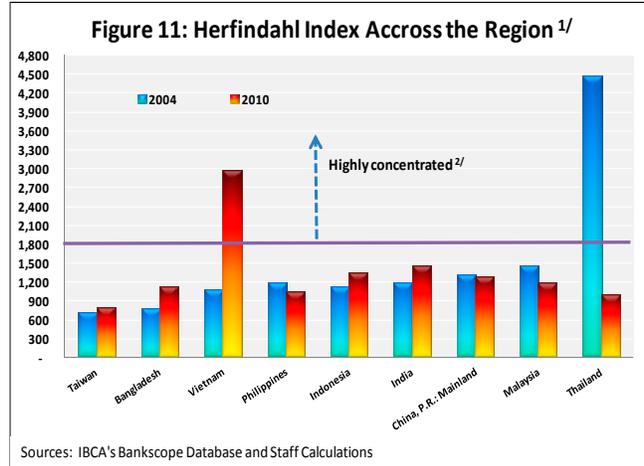
Sources: IBCA's Bankscope Database, IFS, WEO, CEIC, IMF e-library, Asian Development Bank (ADB), Bangko Sentral ng Pilipinas, Bank of Thailand, Hong Kong Monetary Authority, Monetary Authority of Singapore, Reserve Bank of India and Staff Calculations

The number of branches has a negative coefficient, which is surprising as more branches could imply higher overhead costs. The fact that higher overhead costs increase NIMs is indeed confirmed in the third specification. The results indicate that banks passed on about 50 percent of the overhead expenses to their clients, resulting in higher NIMs. Hence, there must some offsetting effect that causes the negative effect of the number of bank branches on NIMs. One possible explanation is that a greater branch network could imply, given the limited pool of funds available in a particular district, more competition leading to efficiency gains and higher deposit rates to attract funds. In addition, competing for the same number of potential borrowers, especially the creditworthy ones, can drive down lending rates.

The fourth column of Table 4 provides an alternative measure of industry concentration through the Herfindahl Index (Figure 11). We construct a dummy for the Herfindahl Index (1 if $<1,000$; 2 if $>1,000$ but $<1,800$; and 3 if $>1,800$; bank size was used to represent the market share; a higher value represents more concentration). In formulating the dummy variable, we followed Khawaja and Din's (2007) approach by likewise using the general criteria on the merger guidelines published by the anti-trust division of the United States, since we also believe that not all the countries in the sample have alternative lending institutions that are highly competitive to banks.⁸

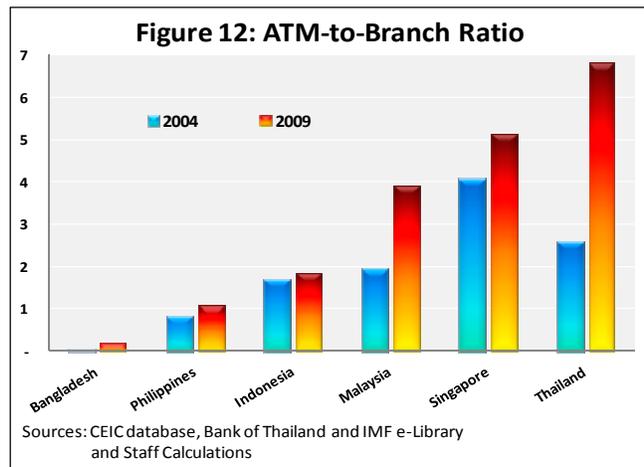
The fifth regression specification tests for the contribution of ATMs to the efficiency in the operations. Carbó-Valverde and Fernandez (2007) gathered similar results on the positive relationship between the ATM-to-Branch ratio and spreads, explaining that technological advancement favorably affected the latter (Figure 12).

The last regression model incorporates the impact of the 2008-09 crises. It presents a different scenario from that of the Philippine-specific regression results, implying that banks in the region, in general, were able to experience higher interest income during the crisis. The interest gains may have outweighed the losses from defaulted loans. The crisis led to a substantial deterioration in corporate balance sheets as well as in individual net worth. The general market condition was perceived to be highly risky. As such, banks would likely raise interest rates to serve as a premium for the lending to risky borrowers, whose creditworthiness had gone down. Banks in the region had modest exposure to the financial troubles in advanced economies, allowing them to increase their market shares.



^{1/}The bank's market share is calculated as the bank's total assets divided by the total assets of the entire sample for that country in a given year. The index is calculated for each bank in each country and then averaged for that particular year.

^{2/}For further details, see Khawaja and Din (2007, p.137)



⁸ Khawaja and Din (2007, p.137) "Under the merger guidelines published by anti-trust division of United States, an industry, other than banking, with post-merger Herfindahl-Hirschman Index (HHI) below 1000, is considered unconcentrated; between 1000 and 1800, as moderately concentrated and above 1800 as highly concentrated. In industries, other than banking, a merger generating a raise of 50 points or more in HHI in a highly concentrated industry raises significant concerns. However in banking industry, the US department of Justice allows an increase of 200 points. In US, the higher than normal threshold concentration levels for banking industry are meant to take into account the competitive effect of limited purpose lenders, that are alternate to banks, such as credit unions, saving and loans association and other non-depository institutions."

Although the effect was ambiguous ex-ante, we find that economic growth has a negative impact on NIMs providing support to the “default-effect” hypothesis. Likewise, we find evidence for the “complementarity” hypothesis of the effect of stock market development on net interest margins. We also find evidence of the crowding-out effects of fiscal deficits.

V. CONCLUSIONS AND POLICY IMPLICATIONS

Financial sector development is a vital element in promoting economic advancement. The extent to which the financial sector is able to fuel economic growth depends on its effectiveness as an intermediary of funds. More than ever, the importance of a stable financial system has never been more apparent than at present: the crises in advanced economies and its contagion effects have led to a slowdown in the global economy.

As such, the goal of this study is to take a closer look at financial intermediation in the Philippines, covering both micro- and macro-level determinants. The paper initially examined the growth of private sector credit in the country, and the findings suggest that the relatively high NIMs in the Philippines have been a significant deterrent of private credit expansion. Moving ahead, with NIMs as the focal point, we identified various factors that affect the level of bank spreads both in the Philippines and in the region.

Investment-led growth and deposit expansion both contribute positively to private credit growth. We also observed that there is persistence in credit growth. Meanwhile, results indicated that a consumption-driven growth as well as a rise in the Fed rate, the distressed asset ratio and NIMs slows down private credit. As a possible extension for future work, it would be interesting to analyze the determinants of economic growth in the Philippines and determine whether these factors are credit-driven.

The bank-specific regression results for the Philippines signified that a larger bank size, bigger bank capitalization, foreign ownership, high overhead costs and presence of corporate taxes all positively contribute to higher NIMs. This suggests that overhead expenses and taxes are passed on to clients in the form of higher lending rates. Moreover, the adverse impact of the 2008-09 crises on NIMs of banks operating in the Philippines is evident.

Finally, by expanding the scope of the study to include other countries in the region, we found the following macro variables to positively impact NIMs in the region: inflation, stock market development, government deficit, industry concentration, ATM-to-Branch ratio and the recent 2008-09 crisis. On the other hand, macro variables such as: GDP growth, reserve requirement rate, banking sector development and number of bank branches drive down NIMs. Furthermore, compared with the findings in the Philippine bank-level regression, higher overhead costs exhibited a consistent effect of raising NIMs, while a larger bank size presented an opposite effect of pulling NIMs down.

Our findings highlight several policy implications to stimulate financial intermediation and thereby the economy’s growth level. First, there is a need to shift from a consumption-driven growth to an investment-led economic expansion. The IMF (2010, p.4,11) emphasized the value of relegating venerable roadblocks toward higher investments, employment and

productivity in order to meet the challenge of sustaining macroeconomic stability, and at the same time improving the outlook for medium-term growth. In particular, fiscal reforms must be undertaken and an investment-friendly business climate must be established. Similarly, sustained investments in human capital must be made to improve productivity as well as job creation coupled with flexibility and well-functioning labor markets to support employment. Equally important is to promote financial inclusion by formulating policies supportive of the development of micro, small and medium scale enterprises (MSMEs).

As we shift focus from the macro aspects of the country's economy towards the Philippine financial system, we find that although substantial efforts have been exerted to strengthen and continuously develop the banking system, steps to further bring the level of NIMs down must be pursued to encourage credit growth. The authorities should continue to stimulate competition in the industry as large conglomerates still hold key positions in both corporate and bank ownership, posing potential concentration risks (IMF, 2010, p. 20). Furthermore, authorities should encourage banks to upgrade their operational efficiency in order to bring down overhead costs which are passed on to their clients resulting to higher NIMs. At the same time, maintaining macro stability, such as low and stable inflation and curtailing the government deficit, supports financial intermediation. Sound financial sector policies that stimulate banking sector capitalization and limit non-performing loans or assets remains essentials for robust credit growth.

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