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The Effects of Regulatory Capital Requirements and Ownership Structure on Bank Lending in Emerging Asian Markets

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Abstract: This study examines the impact of regulatory capital requirements and ownership structure on bank lending in Emerging Asian Markets. The findings of the study imply that banks with excess capital are less affected by capital constraints and enjoy opportunities to extend their credit portfolios. The monitory policy indicator has the expected negative and significant impact on bank lending. In case of well-capitalized banks, the interaction between the excess capital and monetary policy indicator has a significant positive relation with bank lending, which means that banks with excess capital have capability to raise uninsured financing and shield their loan portfolios as compared to less-capitalized banks that reduce their lending in the period of monetary tightening. In the case of bank ownership structure, banks with excess capital ratios and ownership concentration lead towards an increase in lending activity. The findings also show that well-capitalized banks with managerial ownership tend to reduce lending which validates agency theory of corporate governance.

Keywords: regulatory capital requirements; ownership structure; bank lending; monetary policy indicator; emerging Asian markets

1. Introduction

Capital and liquidity shortage in the international banking system has been exposed as a big threat to the stability of financial systems, particularly after the 2007 US sub-prime and 2009 European sovereign crises. Therefore, to improve the global financial system, Basel Committee on Banking Supervision (BCBS) proposed Basel III to change the banking system regulations in terms of capital, liquidity and credit risk (Tanda 2015). Basel III was introduced in 2010 and has increased the capital requirements in terms of risk weighted assets but its economic implications up to this point are still not clear. Banks may increase their capital ratios either through improving their capital levels or by decreasing their risk weighted assets (Admati et al. 2018). Increase in the capital is considered by regulators as 'good deleveraging' while reduction in risk weighted assets has a potential adverse impact if banks simultaneously involve in cutting their lending activity, i.e., to reduce the corporate and consumer lending (Majcher 2015). Thus, the question of how banks adjust their lending activity in response to new capital requirements is a crucial one to understand its actual implications. Therefore, the current study identifies this problem as one of its objectives and attempts to answer the question of how banks respond to these regulatory capital requirements.

The investigation of the relationship between regulatory capital and bank lending is a major issue discussed in previous literature, that either focus their direct association (Fang et al. 2018; Plosser and Santos 2018) or indirect relation through economic or bank-specific characteristics. The economic features include the monetary policy indicator that is explained by conventional bank-lending channel

that how bank capital influences the lending activity under assumption of imperfect debt markets. Particularly, bank equity affects the ability of banks to issue uninsured form of debt and consequently contain the effect of deposit fall on lending through the following mechanism. Reservable deposits drop, subsequent to a monetary contraction, and banks issue nonreservable debt in order to defend their lending portfolios. The nonreservable financing is usually uninsured (i.e., CDs or bonds) and banks face problems in fund issuance and suffer from adverse selection. Hence, banks have little capacity to protect their credit relations and less-capitalized banks are recognized by market more risky as compared to banks with excess capital (Dwarkasing et al. 2017; Gambacorta and Mistrulli 2004; Salachas et al. 2017; Heryán and Tzeremes 2017; Xiong 2013; Plosser and Santos 2018).

Economic features also include the output (i.e., GDP) indicators. Bank capital effects the lending through output indicators and the impact depends on the relationship between bank capital and risk-aversion behavior. On one side, it is argued that well-capitalized banks react less to output shocks as compared to less-capitalized banks because they hold excess capital and need little adjustment in lending during economic downfalls and also their profits are less sensitive to business cycles. On the other side, well-capitalized banks are considered more risk-averse because they have a portfolio of borrowers, ex ante, who are less financially fragile and thus limiting banks' exposure to default risk when an economic downturn occurs (Gambacorta and Mistrulli 2004). The other strand of studies examine the supposition that the impact of bank equity on lending varies depending on other bank related features, specified that this impact varies depending on level of equity itself (Berrospide and Edge 2010; Cornett et al. 2011; Ivashina and Scharfstein 2010).

Because of the crises faced in the last three decades, banking sector activities have been reformed by introducing new business forms to the traditional intermediation roles. These reforms result into consolidation of banking industry and change in ownership patterns especially in the form of increased institutional ownership that leads towards the change in bank risk-taking attitude and ultimately in its lending activity (Barry et al. 2011). Also the separation of ownership and management lead towards agency problems in corporate banking sector. Gorton and Rosen (1995) document that entrench managers are inclined to take on further risk rather than less in a damaged banking system that is subject to moral hazard problem. In an environment of increased competition, managers who have better information regarding portfolio quality might have greater chances to pursue a relaxed strategy than the other stakeholders, who are expected to be extremely risky *ex-post*.

The previous literature either considers the direct impact of ownership structure on bank lending or indirect effect depending on type of financial crisis (Allen et al. 2017; Coleman and Feler 2015; Berger and Sedunov 2017) or it considers the impact of ownership structure and regulatory environment on bank lending corruption (Barry et al. 2016). There are no studies, however, that have examined the joint impact of capital regulation and ownership structure on bank lending activity and whether the findings can be generalized beyond the US and Europe, where most of the previous studies are conducted. The debate on the ownership structure in banking sector is of the paramount importance because various factors interact with and alter the ownership pattern like bank capital regulations, supervision mechanisms and opacity of banking industry assets. The motivation behind the current study is that we employ the ownership structure as a determinant of bank lending activity and consider its moderating role, by including interaction term between bank capital and ownership structure.

The current study contributes to literature in several ways. First, we examine the direct impact of regulatory capital requirements on bank lending and also consider its indirect role. The indirect impact is captured through the economic features and against bank related features like bank size and liquidity. Second, we employ the bank ownership structure as a determinant of lending activity and also consider its moderating role. We want to examine how the relation between regulatory capital and bank lending changes under diverse ownership structures. This is the first study, to our knowledge, that consider the joint impact of regulatory capital and ownership structure on bank lending. Third, Basel III is introduced in reaction to a financial crisis that mainly prevailed in western economies but the regulations are introduced not only to counter the reasons behind crisis but also to eliminate the

gaps in regulatory standards throughout the world. However, it is later revealed that these regulations are mainly aimed for advanced economies and emerging market needs are ignored. Then the question that 'Is Basel III bad news for emerging market economies?' matters because advanced and emerging markets have divergent risk preferences. In case of advanced economies the purpose of Basel III is to avoid the episode of crisis, but in emerging markets the main concern is growth, i.e., to tackle the rapidly growing population needs (Sheng 2013). Then, there is a need of paramount importance for the proper balance between the conservation of Asian region growth impetus and the continuous power of its financial structure. Most of the previous studies, related to Basel regulatory requirements, focus on western economies like US and Europe, and studies related to the Asian economy are limited or far from conclusive. Consequently, Asian emerging economy provides an attractive place for investigation of the implications of Basel regulatory capital requirements in the present era.

The study findings show that banks with excess capital are less effected by capital constraints and enjoy opportunities to extend their credit portfolios. The monetary policy indicator has the expected negative and significant impact on bank lending but the banks with excess capital have ability to raise uninsured form of financing and therefore shield their loan portfolios in period of monetary tightening. In the case of bank ownership models, results show that banks with excess capital and ownership concentration lead towards an increase in lending activity. The finding also implies that well-capitalized banks with managerial ownership tend to reduce lending which validates the agency theory of corporate governance that management act for their own interests as compared to other stakeholders' and owners' interests.

The remainder of the study is organized in the following sections. Section 2 contains the Literature review and hypothesis development. Section 3 comprises sample selection and data description. The fourth section presents the empirical methods and econometric model. Results and discussion are given in Section 5 and final section concludes the study.

2. Literature Review

The section deals with academic literature regarding presence (or absence) of the credit crisis provoked by the implementation of Basel capital accord. Regulatory capital requirements can influence the banking system capacity to expand credit. If regulatory capital level is set excessively higher (i.e., beyond economic needs of capital), in that case risk-adjusted market returns on bank loans will not be enough to cover the artificially higher capital cost, thus decreasing bank credit creation activity. So, the cumulative economic activity is influenced by this so-called credit crunch.

2.1. Regulatory Capital Requirements and Bank Lending

Previous studies regarding the effect of regulatory capital requirements on credit availability either focus their direct relation or indirect relation through economic or bank specific characteristics. Gambacorta and Mistrulli (2004) investigate the presence of cross-section changes in lending, in reaction to monetary policy and output shocks, with reference to difference in bank capital. The study results indicate that banks with excess capital may better protect their lending in reaction to monetary policy indicator as they have an easy access to uninsured form of debt, consistent with 'bank-lending channel' proposition. Capital also influences the manner in which banks respond to output shocks: well-capitalized banks can better absorb short-term financial problems on behalf of debtors and maintain long-run lending relations. Berrospide and Edge (2010) findings show the modest effect of bank capital change on lending. The nonlinearity tests and interaction term effects with output shocks are also being analyzed but not proved to be significant in any case.

In comparison to previous studies, Gambacorta and Marques-Ibanez (2011) document that standard bank specific feature, normally included in literature (size, capitalization, liquidity etc.), are unable to completely capture the working of bank-lending channel new dimensions. Firstly, the findings of study show that the quantity of short-run financing and securitization seems to be essential in the way banks respond to monetary policy shocks. The findings also show that a prolonged era of

down interest rates may enhance lending that is consistent with bank "risk taking channel" proposition. Finally, study results do not identify major deviations in normal effect of monetary shock on credit during periods of economic crisis. Cornett et al. (2011) study how banks handle liquidity crisis that prevail throughout 2007 financial crisis, also how they attempts to sustain loan availability. The study results show that banks that mainly rely on core deposits and capital financing carry on their lending. Banks which hold less liquid assets on balance sheet, in comparison, improve assets liquidity and decrease lending.

Carlson, Shan, and Warusawitharana (Carlson et al. 2013) investigate the impact of bank capital on lending by valuing variations in loan growth to differences in capital level. The study provides evidence that, all else being equal, banks with relatively higher real capital ratios have strong loan growth during financial crisis of 2008 to 2010, but there is no clear relationship in prior years. The findings also show that impact of bank capital on loan growth is nonlinear. Xiong (2013) focuses on role of bank-lending channel in monetary policy transmission mechanism in China. The study results suggest that central banks' monetary policies unevenly affect bank lending behavior. Well-capitalized banks appear to probably amend more their lending behavior in reaction to expansionary policy, and on the other hand, banks with low-capitalization tend to change with initiation of tight monetary policy.

Nicolò (2015) revisits the matter by reviewing latest literature and offers new evidence with worldwide data sets at firm and state level. The results of the study propose that negative impact of the increase in bank capital requirements on lending and real economic activity is notably larger than in earlier studies both in the short and long run. Hamada (2017) examines the impact of bank-lending channel in the Indonesian banking segment and investigates the effects of monetary policy shocks on lending through bank capital levels. The findings of the study show that well-capitalized banks raise their provisions of loans, but non-forex banks still not react against monetary policy. Aysan, Disli, and Ozturk (Aysan et al. 2017) focus on change in deposits and credit behavior in conventional and Islamic banks in reaction to monetary shocks. The findings support the presence of bank-lending channel in Turkey. It is, however, observed that reactions of deposit and credit to monetary shocks are larger in Islamic banks' case. The study finds comparable findings vies- a-vies lending activities, specifying that demand of credit is more influenced in case of Islamic banks subsequent to changes in policy rate.

Bank liquidity also plays a role in examining the relation between regulatory capital and credit crunch. The hypothesis that 'The impact of bank equity on credit supply is directly related to the liquidity level of the bank' points to the fact that bank capital impact on lending shows a rising slope depending on liquidity level; in another way, we anticipate that banks with high level of liquid asset are likely to provide more credit subsequent to increase in equity than the banks with low level of liquid asset. This forecast is consistent among previous researches arguing that low liquidity banks are expected to cut loans to sustain their holdings of liquid assets above a severely low position (Berrospide and Edge 2010; Cornett et al. 2011; Kashyap and Stein 2000).

The above proposition can also be described based on two strands of theories on relation between bank equity and liquidity formation, 'financial-fragility/crowding-out' and 'risk-absorption' hypotheses, given by Berger and Bouwman (2009). The 'financial-fragility/crowding-out' proposition forecasts that impact of bank equity on credit availability is negative as capital investors, unlike depositors, cannot run on banks and are unwilling to supply loans. On the contrary, the impact of bank equity on credit availability is positive according to 'risk-absorption' hypothesis because bank equity improves the risk-bearing capability of banks. Kim and Sohn (2017) document that 'financial fragility/crowding out' impact takes over 'risk absorption' impact once banks have not enough liquidity. Though, once banks build up enough liquidity, it is expected that equity holders become less unwilling to provide credit and increase in bank equity develops bank risk absorption ability extensively. The result suggests that impact of rise in bank capital on loan growth is notably negative for low liquidity levels, becoming radically positive merely after big banks maintain enough liquid assets. On the basis of previous academic literature we test the following hypothesis:

Hypothesis 1 (H1). *There is a direct impact of regulatory capital requirements on bank credit availability.*

Hypothesis 2 (H2). *The effect of regulatory capital requirements on bank credit is associated with monetary policy indicator.*

Hypothesis 3 (H3). *The effect of bank capital requirements on lending is associated with output indicator.*

Hypothesis 4 (H4). *The effect of bank capital requirements on lending is associated with bank-specific characteristics.*

2.2. Ownership Structure and Bank Lending

In this section we discuss the association between ownership structure and bank lending and also the joint impact of capital requirements and ownership structure on bank lending. Earlier, foreign banks entry is thought to be a positive sign for CEE (Central Eastern and European) region because prior empirical literature proves that foreign banks entry brings more efficiency in banking industry (Bonin et al. 2005; Fries and Taci 2005). A cross-country analysis by Clarke et al. (2006) show that companies in regions with higher level of foreign banks involvement consider the long-term loan access and interest rates as weak constraints on their growth and operation than the companies in regions with low or modest presence of foreign banks.

However, numerous latest studies show that foreign ownership banks reduce the credit supply during financial crisis of 2008 in CEE region. Allen et al. (2017) examine the relationship between bank lending activities, ownership structure, and crisis situations by using a sample of 400 banks during period of 1994–2010 in CEE region. The results of study show that the impact of ownership structure on lending depends on the type of crisis i.e., whether it is a home, host, or worldwide or simultaneous crisis. Cull and Peria (2013) also show that foreign-owned banks credit growth decrease more than the private domestic banks. They also document that state-owned banks credit growth exceeded as compared to foreign and domestic ownership banks during a crisis in Latin America. However, the study does not provide any evidence regarding state-owned banks credit growth as compared to private-owned banks. Haas et al. (2015), by using a large dataset, find weak support that state-owned banks reduce lending less as compared to private-owned banks in CEE region in 2009. The study documents that some states used government banks to smooth the aggregate level of lending while private banks started to deleverage. Barry, Lepetita, and Strobel (Barry et al. 2016) analyze the impact of ownership structure, regulatory environment, and economic development on lending corruption in banks of both the developed and developing countries. The findings show that lending corruption is high when large percentage of loans are provided to economy by state ownership and family ownership banks. The strong regulations lead towards reduced corruption in case of family ownership banks.

By reviewing previous academic literature, the current study finds a gap on the joint impact of regulatory capital and ownership structure on bank lending. So, the present study contributes to existing literature that it not only considers the direct impact of ownership structure but also examines its moderating role in influencing lending activity through regulatory capital. This is the first study, to our knowledge, which investigates the impact of bank ownership structure on credit supply depending on regulatory capital ratios. On the basis of previous literature we test the following hypothesis:

Hypothesis 5 (H5). *The effect of bank capital requirements on lending is associated with bank ownership structure.*

3. Sample Selection and Variable Description

3.1. Sample Selection

The current study used the FTSE (Financial Times Stock Exchange) Russell country classification of markets and MSCI (Morgan Stanley Capital International) emerging market index for sample selection. A recognized provisional review of country categorization within FTSE global equity indexes is carried out every March by using a broad, transparent, and reliable method to keep investors informed fully about markets that have been placed on Watch List the preceding September. The MSCI Emerging Markets Index is used to quantify the performance of equity market in emerging global markets. Thus, the selected sample includes the Asian Emerging markets that are the part of both index i.e., FTSE Russell index and MSCI emerging market index.

The final sample includes the seven Asian emerging markets comprising China, India, Pakistan, Indonesia, Malaysia, Thailand, and Philippines. The sample includes the listed commercial banks on the national exchanges and data range from 2004–2017 and we include the banks which have (1) consecutive ten or more years data available, (2) regulatory capital ratios data available (3), lending data available (i.e., the dependent variable in the model), (4) as most of the banks have ownership data available from 2007 onwards, so the ownership model data ranges from 2007–2017.

The present study examines the bank-level panel dataset encompassing the seven Asian emerging markets. The actual data sources are the sample countries bank annual reports and S&P Capital IQ database. The financial and regulatory capital data is collected from S&P Capital IQ database and ownership data is collected from relevant countries bank annual reports. The macroeconomic data is collected from World Development Indicator and International Monetary Fund. The detail of the Dependent and independent variables used in study is given in Table 1.

Table 1. Variables Description.

Classification	Variables	Description
Dependent Variable	Bank Loans (Loans)	Annual growth rate of natural log of Bank Loans
Independent Variables	Monitory policy indicator (MP)	Monetary policy indicator is central bank policy rate of the Banks and other credit institutes
	Economic growth (GDP)	Real GDP growth ratio
	Inflation rate (INF)	Measured by Consumer Price Index
	Excess capital of banks (EXCAP)	Regulatory capital minus capital requirements [1]
Control Variables	Liquidity (LIQ)	Calculated as total of cash and marketable securities to total assets
	Size (SIZE)	Calculated as log of total assets
	Non-performing loans ratio (NPLR)	Non-performing loans to total loan
Ownership Variables (OWN)	Ownership Concentration (OC)	% of shares held by top three shareholders who hold greater than or equal to 10% of shares (OC10).
		% of shares held by top five shareholders who hold greater than or equal to 5% of shares (OC5).
	Managerial Ownership (MO)	% of shares held by management and directors
	Foreign Ownership (FO)	% of shares held by foreign entities

[1] The excess capital measure is calculated by taking the difference of banks' regulatory capital ratio and the minimum capital requirements under Basel III (i.e., 8%). We take the conservative measure of capital ratio as regulatory capital, defined as tier 1 ratio, which includes the stock issues, provisions and reserves for general bank risks.

3.2. Variables Description

The current study examines the impact of regulatory capital requirements and ownership structure on bank lending in case of Asian emerging economies. The study employs the annual growth rate of bank loans as a dependent variable. The independent variables include a measure of bank excess capital, ownership variables and control variables. The detail of the variables used in study is given in Table 1.

4. Empirical Methods and Model

The current study employs Arellano and Bond (1991) two step dynamic panel technique because of the possibility of endogeniety problem. Dynamic panel techniques incorporate the endogeniety in model by instrumental variables approach. This endogenous relation is defined as the presence of correlation between error term and dependent variable that relate causal link between variables described in model, inadequate quality of data, auto-regression and auto-correlation, related variables omission (Mileva 2007; Wooldridge 2013).

The Dynamic Panel model, developed by Arellano & Bond, is recognized as Difference GMM estimator, as it uses the differences of lags as instrumental variables. Further, the Difference GMM have choice to do analysis through two options i.e., One step GMM and Two step GMM, depending on the homoscedasticity or hetrocedasticity of the weighting matrix. Academic Literature reveals that two step GMM method is more effective with use of hetrocedastic weighting matrix in the analysis (Labra and Torrecillas 2018). Another issue related with dynamic panel model is the presence of over-identification problem that can be effectively checked by Sargan & Hansen tests. Also the number of cross-sections must be larger than the total of instruments used in order to evade the over-identification of model (Roodman 2009). As the present study have the number of cross-sections (banks) that are larger than number of instruments used, so the over-identification problem can be avoided. The study also employs the Arellano and Bond autocorrelation test in order to test the serial correlation in error terms.

The empirical design is proposed to analyze whether banks with diverse capitalization level respond in a different way against economic indicators, ownership structure, and bank specific characteristics. The observed models are specified by following equations that includes interaction terms which are product of excess capital with real GDP, monetary policy indicator, ownership structure, and bank specific characteristics; all the bank related and economic variables refer to $t-1$ in order to avoid an endogeniety bias[1] (Gambacorta and Mistrulli 2004; Kashyap and Stein 2000):

$$\begin{aligned}\Delta lnLoan_{it} = {} & \mu_i + \alpha \Delta lnLoan_{i\,t-1} + \beta \Delta MP_t + \gamma INF_t + \delta \Delta lnGDP_t + \lambda EXCAP_{i\,t} \\ & + \rho EXCAP_{i\,t} \Delta MP_{\,t} + \tau EXCAP_{i\,t} \Delta lnGDP_{\,t} + \Phi_{it} + \varepsilon_{it}\end{aligned} \tag{1}$$

$$\begin{aligned}\Delta lnLoan_{it} = {} & \mu_i + \alpha \Delta lnLoan_{i\,t-1} + \beta \Delta MP_t + \gamma INF_t + \delta \Delta lnGDP_t + \lambda EXCAP_{i\,t} \\ & + \omega OWN_{\,it} + \rho EXCAP_{i\,t} \Delta MP_{\,t} + \tau EXCAP_{i\,t} \Delta lnGDP_{\,t} \\ & + \theta EXCAP_{i\,t} OWN_{\,it} + \Phi_{it} + \varepsilon_{it}\end{aligned} \tag{2}$$

where $i = 1, \ldots$ N (i.e., number of banks), $t = 1, \ldots$ T (Time period)
$Loan_{it}$ = loans of bank i in quarter t
MPt = monetary policy indicator
GDP_t = real GDP growth rate
INF_t = inflation rate
$EXCAP_{i\,t}$ = excess capital measure
$OWNit$ = ownership type and ownership concentration
Φ_{it} = control variables.

The excess capital is measured by taking the difference between regulatory capital and minimum capital requirements. The regulatory capital ratio is defined as Tier 1 capital ratio that is more appropriate measure of bank capital. The control variables set (i.e., Φ_{it}) includes a liquidity variable, specified by sum of cash and marketable securities to total assets ratio and size factor, specified by log of total assets. As like the other bank-specific variables, bank size and liquidity indicators also refer to

[1] Because of the possibility of endogenous relation between dependent and independent variables, the current study employs lag values of all bank related and economic variables. As the large number of lags in model inflate the standard errors of coefficients and can increase an estimation bias, so we use one year lag value in model estimation (Hanck et al. 2019; Wooldridge 2013).

$t-1$ to avoid the endogeniety bias. The interest rate is proxy of monetary policy indicator measured by central bank policy rate between banks and credit institutes or the rate on key bank refinancing operations. Consumer price index (CPI) as inflation and real GDP growth rate are employed to control for loan demand effect and to capture cyclical movement. The details of the variables, used in this study, is given in Table 1.

The robustness of the results is tested in numerous ways. The first robustness test includes the interaction term between excess capital and liquidity indicator. This term examines the impact of excess capital on bank lending through bank specific characteristics i.e., its liquidity.

$$\begin{aligned}\Delta lnLoan_{it} = {} & \mu_i + \alpha\Delta lnLoan_{i\,t-1} + \beta\Delta MP_t + \gamma INF_t + \delta\Delta lnGDP_t + \lambda EXCAP_{i\,t} \\ & + \rho EXCAP_{i\,t}\Delta MP_{\,t} + \tau EXCAP_{i\,t}\Delta lnGDP_{\,t} + \theta EXCAP_{i\,t}LIQ_{\,it} + \Phi_{it} \\ & + \varepsilon_{it}\end{aligned} \tag{3}$$

The second robustness test includes the interaction term between excess capital and bank size. This term examines the impact of excess capital on bank lending through bank specific characteristics i.e., its size.

$$\begin{aligned}\Delta lnLoan_{it} = {} & \mu_i + \alpha\Delta lnLoan_{i\,t-1} + \beta\Delta MP_t + \gamma INF_t + \delta\Delta lnGDP_t + \lambda EXCAP_{i\,t} \\ & + \rho EXCAP_{i\,t}\Delta MP_{\,t} + \tau EXCAP_{i\,t}\Delta lnGDP_{\,t} + \theta EXCAP_{i\,t}SIZE_{\,it} + \Phi_{it} \\ & + \varepsilon_{it}\end{aligned} \tag{4}$$

The third robustness rest is to incorporate interaction term between monetary policy indicator and liquidity factor in basic regression model. The rationale for this analysis is to confirm whether asymmetric effect of monetary policy because of excess capital remain appropriate; the interaction term between liquidity and monetary policy indicator, in fact characterize an important factor. The equation is as follows:

$$\begin{aligned}\Delta lnLoan_{it} = {} & \mu_i + \alpha\Delta lnLoan_{i\,t-1} + \beta\Delta MP_t + \gamma INF_t + \delta\Delta lnGDP_t + \lambda EXCAP_{i\,t} \\ & + \rho EXCAP_{i\,t}\Delta MP_{\,t} + \tau EXCAP_{i\,t}\Delta lnGDP_{\,t} + \theta LIQ_{i\,t}\Delta MP_{\,t} + \Phi_{it} + \varepsilon_{it}\end{aligned} \tag{5}$$

The next robustness test is to set up further interaction terms uniting excess capital with inflation, recreating the basic model (1). The motive behind the test is the likely existence of endogeniety between capital and inflation; excess capital can be high when inflation is higher or vice-versa.

$$\begin{aligned}\Delta lnLoan_{it} = {} & \mu_i + \alpha\Delta lnLoan_{i\,t-1} + \beta\Delta MP_t + \gamma INF_t + \delta\Delta lnGDP_t + \lambda EXCAP_{i\,t} \\ & + \rho EXCAP_{i\,t}\Delta MP_{\,t} + \tau EXCAP_{i\,t}\Delta lnGDP_{\,t} + \theta EXCAP_{i\,t}INF_{\,t} + \Phi_{it} \\ & + \varepsilon_{it}\end{aligned} \tag{6}$$

As the purpose of the study is to investigate whether banks with diverse capitalization level respond in a different way to monetary policy, GDP indicator, ownership structure, and bank specific characteristics, so we divide the banks into two subsamples based on their excess capital. A bank is said to be well-capitalized if its excess capital ratio is greater than or equal to 90th percentile, and described as less-capitalized if the ratio is less than or equal to 10th percentile. The study also check the robustness of results by dividing sample into three subsample based on geographical position, i.e., South-East region, South Asian region, and East Asia region. The subsamples results are used to test the overall significance of results.

5. Results and Discussion

Table 2 reports the descriptive statistics of the combined sample and individual countries. The combined sample study results are given in Tables 3 and 4 that represent the long-term elasticity of bank lending with respect to independent variables. The models are estimated by using Arellano and Bond (1991) Two-step Dynamic Panel GMM technique that provides the consistency and efficiency.

This methodology ensures that models are not subject to order two serial correlation and instruments employed are also valid. The presence of bank capital asymmetric effect is tested by considering the four samples including Combined Asian emerging markets, and also subsamples, East-Asia emerging economies, South-Asia emerging markets, and South-East Asia emerging economies, because of the changes in bank-specific, macroeconomic, and ownership characteristics that are discussed in previous literature.

Table 2. Descriptive Statistics.

Variable	Combined Sample			China			India		
	Obs.	Mean	Std. Dev	Obs.	Mean	Std. Dev	Obs.	Mean	Std. Dev
Excap	2066	6.17	35.23	445	4.17	46.86	526	2.05	4.50
Loan Growth	1911	17.69	29.31	410	18.74	10.35	488	10.53	13.81
SIZE	2066	13.52	2.128	445	13.29	1.80	526	13.60	1.41
LIQ	2066	6.95	7.05	445	6.18	4.68	526	3.79	3.28
MO	830	1.64	4.15	205	1.53	4.32	232	1.44	4.39
FO	1054	19	17.11	201	19.28	17.21	336	18.76	17.49
OC5	1212	60.93	22.10	202	63.31	18.61	297	57.47	21.39
OC10	1243	55.49	25.95	221	58.81	23.41	312	48.72	26.26
Variable	**Pakistan**			**Indonesia**			**Malaysia**		
	Obs.	**Mean**	**Std. Dev**	**Obs.**	**Mean**	**Std. Dev**	**Obs.**	**Mean**	**Std. Dev**
Excap	258	5.80	9.96	346	14.98	65.32	138	3.67	2.48
Loan Growth	239	16.70	22.75	319	23.65	62.38	128	10.76	11.15
SIZE	258	12.27	1.25	346	16.41	1.96	138	11.59	0.90
LIQ	258	6.39	4.77	346	10.73	10.79	138	13.41	7.56
MO	83	1.31	2.43	38	4.59	7.14	90	1.72	3.45
FO	122	14.77	13.25	91	25.36	17.47	99	19.38	18.77
OC5	166	60.41	24.44	211	61.39	22.87	95	63.57	17.35
OC10	164	54.72	30.13	200	56.80	24.07	95	59.30	25.41
Variable	**Philippines**			**Thailand**					
	Obs.	**Mean**	**Std. Dev**	**Obs.**	**Mean**	**Std. Dev**			
Excap	203	10.23	13.23	150	3.72	3.42			
Loan Growth	188	15.52	20.78	139	8.97	11.18			
SIZE	203	11.98	1.59	150	13.32	1.13			
LIQ	203	10.60	7.05	150	1.60	0.90			
MO	108	.80	1.34	64	2.08	4.52			
FO	97	20.92	17.90	108	17.26	15.61			
OC5	133	52.82	23.64	108	74.01	20.15			
OC10	143	50.06	23.73	108	71.14	21.54			

Descriptive statistics reports the summary statistics of main variables included in combined sample and also in individual countries.

Table 3. Combined Sample Results.

Annual Lending Growth Rate	Model 1		Model 3		Model 4		Model 5		Model 6	
	Coeff.	*p*-Value	Coeff.	*p*-Value	Coeff.	*p*-Value	Coeff.	*p*-Value	Coeff.	*p*-Value
Cons.	144.6 ***	0.000	158.6 ***	0.000	141.5 ***	0.000	143.5 ***	0.000	142.9 ***	0.000
Loan($t-1$)	0.020	0.783	−0.122 ***	0.000	0.016	0.826	0.019	0.796	0.073	0.447
MP	−1.334 ***	0.003	−0.902 **	0.019	−1.301 ***	0.005	0.316	0.742	−1.489 ***	0.001
GDP	−0.022	0.947	0.320	0.359	0.206	0.511	0.190	0.626	0.043	0.887
Excap	0.216	0.522	−0.206	0.600	−0.204	0.776	0.316	0.397	0.278	0.297
Excap*GDP (risk-aversion effect)	0.005	0.934	0.051	0.337	0.017	0.735	−0.013	0.849	0.022	0.635
Excap*GDP (less-capitalize banks)	0.012	0.901					0.006	0.948		
Excap*GDP (well-capitalize banks)	0.520 ***	0.000					0.531 ***	0.000		
Excap*MP (bank-lending channel)	−0.002	0.967	−0.021	0.534	0.014	0.712	0.041	0.380	0.020	0.631
Excap*MP (less-capitalize banks)	−1.316	0.118	−0.935	0.182	−1.393	0.126	−1.322	0.110	−1.408	0.158
Excap*MP (well-capitalize banks)	2.054 **	0.008	0.300 **	0.051	1.917 ***	0.004	2.132 **	0.008	1.780 **	0.008
Excap*LIQ			0.002	0.133						
Excap*LIQ (less-capitalize banks)			0.074	0.209						
Excap*LIQ (well-capitalize banks)			0.200 ***	0.000						
Excap*SIZE					0.032	0.673				
Excap*SIZE (less-capitalize banks)					0.034	0.566				
Excap*SIZE (well-capitalize banks)					0.233 ***	0.000				
LIQ*MP							−0.379 *	0.055		
Excap*INF									−0.033	0.326
Excap*INF (less-capitalize banks)									0.028	0.714
Excap*INF (well-capitalize banks)									0.350 *	0.063
LIQ	0.876 ***	0.003	0.493 **	0.050	0.875 ***	0.002	0.807 ***	0.004	0.864 ***	0.002
SIZE	−10.06 ***	0.000	−10.84 ***	0.000	−9.938 ***	0.000	−10.09 ***	0.000	−9.958 ***	0.000
AR(1), AR(2), (p-value)	0.006	0.610	0.016	0.197	0.005	0.655	0.006	0.721	0.009	0.494
Wald chi2 (Prob)	0.0000		0.0000		0.0000		0.0000		0.0000	
No. of banks	155		155		155		155		155	
No. of Obs.	1601		1601		1601		1601		1601	

Table 3 reports the combined sample (Asian emerging markets) results. The current study employs the Arellano and Bond (1991) Two-step Dynamic Panel GMM technique to estimate the model and results report the hetro-robust standard errors in order to account for possible heterogeneity. The dependent variable is the annual growth rate of bank loans. The estat abond test is used to check for the possibility of error terms autocorrelation. ***, **, * represents significance level at 1%, 5% and 10% respectively. We also estimate model by including country fixed effects and time fixed effects in model (time fixed and country fixed effects are not reported here), but there is no change in the significance of model. The panel unit-root test are reported in Table A5.

Table 4. Ownership Model Results.

Annual Lending Growth Rate	Model 2 (OC5)		Model 2 (OC10)		Model 2 (MO)		Model 2 (FO)	
	Coeff.	*p*-Value	Coeff.	*p*-Value	Coeff.	*p*-Value	Coeff.	*p*-Value
Cons.	102.8 **	0.011	133 ***	0.000	145.5 ***	0.000	190.3 ***	0.000
Loan($t-1$)	0.067	0.559	−0.073	0.277	−0.098 ***	0.000	−0.214 ***	0.000
MP	−1.555 **	0.042	−0.805 *	0.072	−1.127	0.120	−1.049 *	0.066
GDP	0.559	0.195	0.415	0.100 *	0.746 **	0.014	0.295	0.290
Excap	−0.042	0.955	−0.721	0.229	1.365 **	0.017	1.354 **	0.031
Excap*GDP (risk-aversion effect)	−0.017	0.866	0.011	0.835	0.059 **	0.021	0.026	0.503
Excap*MP (bank-lending channel)	0.169	0.533	−0.090	0.243	0.011	0.927	0.047	0.377
Oc5	−0.112 *	0.075						
Excap*OC5	0.022 **	0.010						
Excap*OC5 (less-capitalize banks)	0.008	0.481						
Excap*OC5 (well-capitalize banks)	0.006	0.483						
OC10			−0.105	0.118				
Excap*OC10			0.029 ***	0.001				
Excap*OC10 (less-capitalize banks)			0.011	0.520				
Excap*OC10 (well-capitalize banks)			0.002	0.301				
MO					−0.417	0.562		
Excap*MO					0.042	0.554		
Excap*MO (less-capitalize banks)					−0.037	0.792		
Excap*MO (well-capitalize banks)					−0.232 *	0.070		
FO							0.178 *	0.090
Excap*FO							−0.022	0.175
Excap*FO (less-capitalize banks)							0.002	0.804
Excap*FO (well-capitalize banks)							-0.006	0.779
LIQ	0.807 **	0.035	0.401 **	0.047 ***	0.001	0.998	−0.000	1.000
SIZE	−7.105 **	0.009	−8.890 ***	0.000	−10.48 ***	0.000	−13.59 ***	0.000
AR(1), AR(2), (*p*-value)	0.052	0.516	0.039	0.354	0.082	0.110	0.101	0.138
Wald chi2 (Prob)	0.0000		0.0000		0.0000		0.0000	
No. of banks	124		128		88		112	
No. of Obs.	954		976		651		828	

Table 4 reports the combined sample (Asian emerging markets) model 2 results. The current study employs the Arellano and Bond (1991) Two-step Dynamic Panel GMM technique to estimate the model and results report the hetro-robust standard errors in order to account for possible heterogeneity. The dependent variable is the annual growth rate of bank loans. The estat abond test is used to check for the possibility of error terms autocorrelation. The ownership structure includes the ownership type (MO and FO) and ownership concentration (OC5 and OC10). ***, **, * represents significance level at 1%, 5%, and 10% respectively.

The effect of excess capital on bank lending can be analyzed in Tables 3 and 4, which shows the positive relation between bank excess capital and lending but the effect is significant only in two cases. The result proves that bank with excess capital are less effected by capital constraints and enjoy opportunities to extend their credit portfolios. The monetary policy indicator has the expected negative and significant impact on bank lending in all cases. Estimating the monetary policy effect between banks with diverse capital ratios is equivalent to examining the significance of long-term coefficients of the interaction term between the monetary policy indicator and bank excess capital. The results show that in case of low-capitalized banks, the interaction between the excess capital and monetary policy shock is negative but the result proves not to be significant in any case. The bank lending channel theory predicts that banks with high capital ratios are not much effected by tight monetary policy as they have an ability to raise uninsured form of funding. As bank equity affects the ability of banks to issue uninsured form of debt and consequently restrain the effect of deposit fall on lending through the following mechanism. Reserveable deposits drop subsequent to a monetary contraction and banks issue nonreservable loan in order to shield their portfolios of loan. Because this nonreservable financing is usually uninsured (i.e., CDs or bonds), banks suffer the problem of adverse selection; less-capitalized banks are recognized by market riskier, so have more problems to issue bonds and therefore have low capacity to protect their credit relationship. But in case of well-capitalized banks the interaction between the excess capital and monetary policy shock have positive sign and the result proves to be significant in all cases, which means that banks with excess capital have ability to raise uninsured form of financing and shield their loan portfolios in case of monetary tightening as compared to less capitalize banks that reduce their lending (Gambacorta and Mistrulli 2004; Heuvel 2002; Kishan and Opiela 2000; Xiong 2013). So, we conclude that bank lending channel is proved to be weak in case of well-capitalized banks, that can issue nonreservable liabilities and shield their loan portfolios, but less-capitalized banks have the presence of bank lending channel but the result is not proved to be significant in this case.

The results also imply a positive relation between bank excess capital and output indicator (i.e., GDP), which means that an increase in GDP is likely to increase the lending and the result is proved to be significant. The interaction term between the excess capital and output is also positive and proves to be significant in most of cases, which means that the credit supply of banks with excess capital is dependent on business cycles (See Table 3). The positive relation shows that banks with excess capital are likely to increase their lending in case of economic growth. Bank capital manipulate the response of lending to GDP (i.e., output) and the effect depends on relationship between the bank capital and its risk-aversion behavior. The results show a positive and significant relation between bank lending and output indicator in case of well-capitalized banks. Which means that well-capitalized banks are less risk-averse and react more to business cycle fluctuations because they have a portfolio of borrowers, ex ante, who are more risky and retain excess capital because their lending is risky (Gambacorta and Mistrulli 2004).

In case of bank ownership structure, the study includes ownership type i.e., managerial ownership (MO) and Foreign ownership (FO), and ownership concentration (OC) i.e., percentage of shares held by top three shareholders who hold greater than or equal to 10% of shares (OC10), or percentage of shares held by top five shareholders who hold greater than or equal to 5% of shares (OC5). The study results show that ownership concentration have negative relation with bank lending activity but the results are not proved to be significant in both cases. The interaction terms between the ownership concentration and excess capital have positive and significant relation with bank lending, which means that banks with excess capital ratios and ownership concentration lead towards an increase in lending activity. Managerial ownership has a negative and insignificant relation with lending activity but the interaction term between MO and excess capital has significant negative relation with bank lending in case of well-capitalized banks. The finding implies that well-capitalized banks with managerial ownership tend to reduce lending which validates the agency theory of corporate governance that management act for their own interests as compared to other stakeholders and owners' interests.

The foreign ownership has a significant positive relation with bank lending growth rates that means banks with foreign ownership lead towards an increase in lending activity. The interaction between the excess capital and foreign ownership is not proved to be significant.

However, numerous latest studies showed that foreign ownership banks reduce the credit supply during the financial crisis of 2008 in CEE (Central Eastern and European) region (Cull and Peria 2013). The current study results do not validate these findings, as our sample encompasses the Asian emerging economies. Most of them are not directly affected by the recent global financial crisis of 2008. But we validate the findings of studies which report that foreign banks entry bring more efficiency in banking industry (Bonin et al. 2005; Clarke et al. 2006; Fries and Taci 2005).

The bank specific control variables include the liquidity and bank size. Liquidity has a significant positive and size has a significant negative relation with bank lending in all cases. Bank liquidity and size are also interacted with excess capital to examine the indirect effect on bank lending. The interaction between excess capital and liquidity has positive relation with bank lending that validates the 'risk-absorption hypothesis', because equity improves banks risk-bearing capability, but the effect is proved to be significant in case of well-capitalized banks. The hypothesis that 'The impact of bank equity on credit supply is directly related with liquidity level of bank' points to the fact that bank capital impact on lending shows a rising slope depending on liquidity level; in another way, we anticipate that banks with high level of liquid asset are likely to provide more credit than the banks with low level of liquid asset. Until acquiring enough liquid assets, bank with low level of liquid assets are expected to invest further funds in liquid assets rather than providing loans as equity increase. This forecast is consistent with the previous arguments that low liquidity banks are expected to decrease loans to sustain their holdings of liquid assets above a severely low position (Berrospide and Edge 2010; Cornett et al. 2011; Kashyap and Stein 2000).

The interaction between excess capital and size has the positive relation with bank lending, but the effect is proven to be significant only in case of well-capitalized banks. The interaction of liquidity factor with monitory policy indicator has negative and significant relation with bank lending, implying that the effect of tight monetary policy is larger for banks with more liquidity and easier access to uninsured forms of financing. The final robustness test includes the interaction term between excess capital and inflation and results show a positive impact on bank lending, but the result is proved to be significant only in case of well-capitalized banks. However, the base model results significance remain unchanged in case of all estimations which validate the robustness of results. The study also checks the robustness of results by dividing the sample into three subsamples based on geographical positions. The subsamples results are given in Tables A1–A3 in Appendix A and they prove the significance of the overall sample results.

6. Conclusions

The current study examines the relation between regulatory capital requirements, ownership structure, and bank lending in the case of Asian emerging markets over a period of 2004–2017. The study employs Arellano and Bond (1991) Two-step Dynamic Panel GMM estimation technique that provides the consistency and efficiency. The methodology ensures that models are not subject to order two serial correlation and instruments employed are also valid. The presence of bank capital asymmetric effects is tested by dividing the Asian emerging markets sample into three subsamples, which includes East-Asia emerging economies, South-Asia emerging markets, and South-East Asia emerging economies.

The results of the study show that the effect of excess capital on bank lending is positive and proves to be significant. The positive relation implies that banks with excess capital are less effected by capital constraints and enjoy opportunities to extend their credit portfolios. The monetary policy indicator has the expected negative and significant impact on bank lending in all cases. The results show that in case of low-capitalized banks the interaction, between the excess capital and monetary policy indicator, is negative but the result is not proved to be significant. However, in the case of

well-capitalized banks, the interaction between the excess capital and monetary policy indicator has positive sign and proves to be significant, which means that banks with excess capital have ability to raise uninsured form of financing and shield their loan portfolios in case of monetary tightening as compared to less-capitalized banks that reduce their lending (Gambacorta and Mistrulli 2004; Heuvel 2002; Kishan and Opiela 2000; Xiong 2013).

The results also imply a positive relation between bank excess capital and output indicator (i.e., GDP), which means that an increase in GDP is likely to increase the lending and the result is also proves to be significant. The interaction term between the excess capital and output is also positive and proves to be significant, which means that the credit supply of banks with excess capital is dependent on business cycles.

In case of bank ownership structure, the study includes ownership type and ownership concentration. The findings of the bank ownership model show that ownership concentration has negative relation with bank lending activity but the results are not proved to be significant in both cases. The interaction terms between the ownership concentration and excess capital have positive and significant relation with bank lending, which means that banks with excess capital ratios and ownership concentration lead towards an increase in lending activity. Managerial ownership has a negative and insignificant relation with lending activity but the interaction term between managerial ownership and excess capital has significant negative relation with bank lending in case of well-capitalized banks. The finding implies that well-capitalized banks with managerial ownership tend to reduce lending which validate the agency theory of corporate governance, which means that management act for their own interests as compared to other stakeholders' interests. The foreign ownership has a significant positive relation with bank lending that means banks with foreign ownership lead towards an increase in lending activity. The interaction between the excess capital and foreign ownership is not proved to be significant. However, numerous latest studies show that foreign-owned banks reduce credit supply during the financial crisis of 2008 in CEE region (Cull and Peria 2013). The current study results do not validate these findings as our sample encompasses the Asian emerging economies most of them are not directly affected by the recent global financial crisis of 2008. The study also checks the robustness of results by dividing sample into three subsample based on geographical positions. The subsamples results prove the significance of overall sample results.

The study proposes various policy implications. First, the effect of excess capital on bank lending is positive which implies that banks with excess capital are less effected by capital constraints and enjoy opportunities to extend their credit portfolios. As the present study is conducted in Asian emerging economies, most of which are not directly affected by the financial crisis of 2007, the results imply that Basel regulatory reforms should take into account the regional consideration as the banks in Asian economies have already high capital ratios. And the further increase in capital requirements may increase their cost and hamper the role of banks as liquidity providers. Second, well-capitalized banks behave differently from less-capitalized banks in response to economic indicators and also under different ownership patterns, so there is a need to account these changes when implementing policy actions.

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Appendix A

Table A1. South-East region Results.

Annual Lending Growth Rate	Model 1		Model 3		Model 4		Model 5		Model 6	
	Coeff.	*p*-Value	Coeff.	*p*-Value	Coeff.	*p*-Value	Coeff.	*p*-Value	Coeff.	*p*-Value
Cons.	306.1 ***	0.001	324.9 ***	0.000	303.98 ***	0.001	305.24 ***	0.001	328.2 ***	0.000
Loan($t-1$)	−0.052	0.382	−0.052	0.373	−0.052	0.378	−0.048	0.425	−0.051	0.376
MP	−2.896	0.030 **	−2.910	0.030 **	−2.839	0.028 **	0.068	0.980	−3.334	0.007 **
GDP	0.306	0.554	0.358	0.510	0.366	0.501	0.457	0.414	0.386	0.431
INF									−0.490	0.344
Excap	−0.369	0.416	−0.507	0.428	−0.676	0.328	−0.276	0.537	−0.438	0.408
Excap*GDP (risk-aversion effect)	0.068	0.365	0.071	0.417	0.048	0.591	0.054	0.474	0.061	0.415
Excap*GDP (less-capitalize banks)	−0.206	0.227	−0.206	0.219	−0.171	0.315	−0.185	0.286	−0.199	0.221
Excap*GDP (well-capitalize banks)	0.597 ***	0.000	0.60 ***	0.000	0.599 ***	0.000	0.615 ***	0.000	0.602 ***	0.000
Excap*MP (bank-lending channel)	0.050	0.432	0.049	0.442	0.043	0.496	0.104	0.201	0.072	0.380
Excap*MP (less-capitalize banks)	−3.202	0.233	−3.167	0.217	−2.869	0.271	−2.955	0.279	−3.067	0.233
Excap*MP (well-capitalize banks)	2.592 ***	0.000	2.585 ***	0.000	2.604 ***	0.000	2.681 ***	0.000	2.629 ***	0.000
Excap*LIQ			0.001	0.409						
Excap*SIZE					0.037	0.689				
LIQ*MP							−0.449	0.149		
Excap*INF									0.010	0.299
LIQ	1.746 ***	0.005	1.695 ***	0.004	1.757 ***	0.002	1.562 ***	0.003	1.690 ***	0.005
SIZE	−22.16 ***	0.000	−23.38 ***	0.000	−22.07 ***	0.000	−22.02 ***	0.001	−23.62 ***	0.000
Wald chi2 (Prob)	0.0000		0.0000		0.0000		0.0000		0.0000	
No. of banks	63		63		63		63		63	
No. of Obs.	648		648		648		648		648	

Table A1 reports the South-East region results. The study employs the Arellano and Bond (1991) Two-step Dynamic Panel GMM technique to estimate the model and results report the hetero-robust standard errors in order to account for possible heterogeneity. The dependent variable is the annual growth rate of bank loans. The estat abond test is used to check for the possibility of error terms autocorrelation. South-East region include the Malaysia, Indonesia, Philippines and Thailand; South-Asia includes Pakistan and India; and East-Asia includes China. ***, **, * represents significance level at 1%, 5% and 10% respectively.

Table A2. Ownership Model Sub-Sample Results.

Annual Lending Growth Rate	South-East Region		South-Asia Region		South-Asia Region		South-Asia Region	
	Coeff.	*p*-Value	Coeff.	*p*-Value	Coeff.	*p*-Value	Coeff.	*p*-Value
Cons.	336.1 ***	0.000	226.04 ***	0.000	186.61 **	0.009	210.06 ***	0.000
Loan($t-1$)	−0.164 ***	0.000	−0.163 *	0.096	−0.174 *	0.092	−0.183 **	0.024
MP	−9.64	0.190	−0.346	0.541	−0.342	0.347	−0.353	0.259
GDP	1.556 *	0.058	0.749 *	0.072	0.352	0.233	0.322	0.259
INF	−0.289	0.723			−0.108	0.746		
Excap	1.555 *	0.056	0.284	0.646	−0.435	0.283	−0.677	0.191
Excap*GDP	0.065 *	0.080						
Excap*MP	0.115	0.432						
LIQ	−0.541	0.312	−0.752	0.200	0.257	0.569	0.207	0.653
SIZE	−26.84 ***	0.000	−15.55 ***	0.000	−12.43 **	0.012	−14.01 ***	0.001
MO	1.066	0.386	0.408	0.236				
Excap*MO	−0.169	0.124						
Excap*MO (less-capitalize banks)	−18.01 ***	0.000	0.249 *	0.078				
Excap*MO (well-capitalize banks)	0.087	0.508	−0.023	0.565				
OC10					−0.088	0.293		
Excap*OC10					0.017 ***	0.001		
OC5							-0.105 *	0.0680
Excap*OC5							0.018 ***	0.001
Wald chi2 (Prob)	0.0000		0.0000		0.0000		0.0000	
No. of banks	31		32		46		43	
No. of Obs.	237		232		352		345	

Table A2 reports the Subsamples model 2 results. The current study employs the Arellano and Bond (1991) Two-step Dynamic Panel GMM technique to estimate the model and results report the hetro-robust standard errors in order to account for possible heterogeneity. The dependent variable is the annual growth rate of bank loans. The estat abond test is used to check for the possibility of error terms autocorrelation. South-East region include the Malaysia, Indonesia, Philippines and Thailand; South-Asia includes Pakistan and India; and East-Asia includes China. ***, **, * represents significance level at 1%, 5% and 10% respectively.

Table A3. Main Model Results.

Annual Lending Growth Rate	South-Asia Region		East-Asia Region		East-Asia Region	
	Coeff.	***p*-Value**	**Coeff.**	***p*-Value**	**Coeff.**	***p*-Value**
Cons.	0.662	0.981	79.94 **	0.0190	91.41 **	0.017
Loan($t-1$)	0.261 **	0.008	0.021	0.838	0.022	0.832
MP	−1.886 ***	0.000	−2.142 **	0.009	−2.062 **	0.011
GDP	1.031 ***	0.002	−0.257	0.703	−0.392	0.584
INF	0.599 *	0.067	0.643 ***	0.003	0.655 ***	0.002
Excap	0.927 **	0.013	−1.592	0.216	−4.435	0.172
Excap*GDP	0.073	0.721	0.147	0.135	0.192 *	0.088
Excap*MP	−0.080	0.558	−0.145	0.433	−0.196	0.265
Excap*LIQ	−0.069	0.115	0.063	0.245	0.065	0.230
Excap*SIZE					0.198	0.318
LIQ	−0.259	0.601	−0.162	0.444	−0.178	0.408
SIZE	−0.048	0.981	−4.622 **	0.026	−5.396 **	0.023
Wald chi2 (Prob)	0.0000		0.0000		0.0000	
No. of banks	57		35		35	
No. of Obs.	613		340		340	

Table A3 reports the Subsamples robustness results. The current study employs the Arellano and Bond (1991) Two-step Dynamic Panel GMM technique to estimate the model and the results report the hetro-robust standard errors in order to account for possible heterogeneity. The dependent variable is the annual growth rate of bank loans. The estat abond test is used to check for the possibility of error terms autocorrelation. South-East region include the Malaysia, Indonesia, Philippines and Thailand; South-Asia includes Pakistan and India; and East-Asia includes China. ***, **, * represents significance level at 1%, 5% and 10% respectively.

Table A4. Correlation Matrix.

Variable	Excap	LIQ	SIZE	GDP	INF	Loan	MP	LIQ*MP	Excap*GDP	Excap*MP	Excap*LIQ	Excap*SIZE	Excap*INF
Excap	1												
LIQ	0.40	1											
SIZE	−0.07	−0.08	1										
GDP	−0.02	−0.06	−0.05	1									
INF	0.00	−0.09	0.03	−0.17	1								
Loan	0.19	0.14	−0.05	0.09	0.04	1							
MP	−0.01	0.03	−0.07	−0.08	0.17	−0.02	1						
LIQ*MP	−0.01	−0.00	−0.08	−0.04	0.17	−0.04	0.10	1					
Excap*GDP	0.29	0.20	−0.06	0.03	−0.00	0.11	−0.04	−0.11	1				
Excap*MP	0.01	0.06	−0.01	−0.01	0.04	0.01	0.21	0.51	−0.15	1			
Excap*LIQ	0.54	0.40	−0.04	−0.01	−0.00	0.16	0.00	0.02	0.56	0.10	1		
Excap*SIZE	0.49	0.35	−0.02	−0.03	−0.001	0.19	−0.03	−0.06	0.89	−0.05	0.81	1	
Excap*INF	0.55	0.38	−0.05	−0.06	0.05	0.15	0.00	−0.04	0.60	−0.01	0.87	0.84	1

Table A4 presents the correlation coefficients between all the variables used in the study. The dependent variable is annual growth rate of natural log of loans (Loan). The other variables represent the excess capital, bank-specific variables, macroeconomic variables and the interaction terms between the excess capital (Excap) and other variables.

Table A5. Panel Unit-root Test: Fisher-type unit-root test *.

Phillips-Perron Test			Augmented Dickey-Fuller Test		
Variable	**Statistics**	***p*-Value**	**Variable**	**Statistics**	***p*-Value**
Loan	1209.25	0.0000	**Loan**	1209.25	0.0000
Excap	864.31	0.0000	**Excap**	864.31	0.0000
LIQ	862.70	0.0000	**LIQ**	862.70	0.0000
SIZE	356.66	0.035	**SIZE**	356.66	0.035
GDP	1088.87	0.0000	**GDP**	1088.87	0.0000
MP	923.71	0.0000	**MP**	923.71	0.0000
INF	1214.28	0.0000	**INFC**	1214.28	0.0000
MO	398.19	0.0000	**MO**	398.19	0.0000
FO	456.41	0.0000	**FO**	456.41	0.0000
OC5	573.36	0.0000	**OC5**	573.36	0.0000
OC10	602.92	0.0000	**OC10**	602.92	0.0000

Ho: All panels contain unit roots, Ha: At least one panel is stationary. The *p*-value (Inverse chi-squared) represents that null hypothesis is rejected in all cases and panel contains no unit-root. * Fisher-type unit-root test is used because of the unbalanced panel data structure and it also considers the cross-section dependence in panel data.

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