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RESEARCH PAPER

Capital Buffer in The Presence of Market Structure and Business Cycle: An Assessment

[1]Dr. Khurram Iftikhar [2]Muhammad Imran Khan* [3]Luqman Khan

1. Research Economist, Applied Economics Research Centre University of Karachi, Sindh, Pakistan
2. Ph.D. Scholar, Applied Economics Research Centre University of Karachi, Sindh, Pakistan
3. MS Scholar, Department of Economics, Institute of Management Sciences Peshawar, KP, Pakistan

***Corresponding Author:** Imran14pide@gmail.com

ABSTRACT

The primary aim of this paper is to check the influence of business cycles and market structure on capital buffers after the implementation of the Basel Accords. To achieve the objective of this study, we considered 34 Pakistani commercial banks over the period from 2006 to 2017 by adopting the two-step system Generalized Method of Moment estimation technique. The empirical findings for the whole period suggest that the impact influence of the business cycle (output gap) on the capital buffer is found to be pro-cyclical. However, when we examined the behavior of the business cycle on the capital buffer in the post-Basel-II period, the sign of output gaps turns to be positive (counter-cyclical). Furthermore, it is important that market structure influence a negative impact on the capital buffer, which indicated that the banks do not take the excessive risk for increasing their profit, so they reduced their level of the capital buffer.

KEYWORDS Basel Accords, Business Cycle, Capital Buffer, Market Structure

Introduction

Banks play a crucial role in boosting the performance of any economy because they can transform the funds from savers into investors via different financial instruments. Therefore, the basic function of banks is to provide ease of monetary control in an economy, but they also offer long-term economic stability. After the financial crisis, policymakers became more concerned about the intense and insecure impact of credit risk on the banking sector, which created a situation of uncertainty and increased the level of risk in several economies (Furfine, 2000). Hence, researchers tried to focus on numerous banks that close their operations across the world because they adopt higher risk-taking behavior to cover their lower efficiency, but these kinds of shocks influence economic activity (Lee and Hsieh, 2013). Consequently, the committee of regulators (BCBS) decided to launch a mechanism in which they can protect their banking sector as well as maintain their economic stability. Therefore, they launched the Basel-III accord to secure their banking system by using their micro-prudential along with macro-prudential policies. Under the new Basel Accord, the capital buffer was determined as the main source for the removal of pro-cyclicality in the momentum of business activities. The banks that increased the size of their capital buffer demonstrated that they are capable of absorbing unseen losses and avoiding the cost of bankruptcy. However, the fluctuations in the business cycle may lead to an increase in the risk factor, if banks maintain the same ratio of capital requirements over the momentum of economic cycles. Hence, banks could easily exceed the minimum level of capital requirement after the imposition of a capital buffer, which reflected their stability and accuracy in the markets, besides increasing their credit ratings, as well (Jackson et. al., 1999).

Numerous research has examined to find the influence of different bank-specific variables, including non-performing loans, loan growth, bank liquidity, profitability, and macroeconomic variables (Gross domestic product GDP and inflation) on the capital buffer. Studies like Ayuso et al. (2004), Lindquist (2004), Atici and Gursoy (2011), and Coffinet et al. (2012), have found the negative influence of cyclical behavior on the capital buffer, which

indicated the shortsightedness of the banks in the period of the Basel-II Accord that increased the risks during the boom period. However, Jokipii and Milne (2011) and Iftikhar (2018) considered the period of Basel-III, and surprisingly, found a positive relationship between the business cycle and capital requirements. After that, they suggested that banks converted their approach from backward-looking to forward-looking aspects because they had taken appropriate and viable measures during the boom period to ensure the exacting stability of the banking industry, but some authors include an important variable of market structure. Later on, Ruckes (2004), Fonseca and Gonzalez (2010), Saadaoui (2014), Xu (2016), and Valencia and Bolanos (2018) include the market structure with the business cycle to find out the impact on the capital buffer. Additionally, several studies have revealed that banks in the banking market structure with greater market power have a significant influence on their profitability, as well as their capital buffer.

Researchers have examined the behavior of regulatory capital over the different phases of the business cycle, but they do not include the period after Basel-III due to the unavailability of financial data. Therefore, the objective of this paper is to empirically examine the different phases of the business cycle on the capital buffer after the implementation of the Basel-II and Basel-III accords. It is concluded from the literature that the influence of market power has several effects on the bank's capital. Large banks have greater market power as compared to smaller banks, so they become more risk-averse. In a highly concentrated market structure, market behavior is considered a monopoly in which banks obtain higher profit margins in order to hold capital requirements over and above the minimum requirement (Bremus 2005). Thus, we have tried to check the influence of market concentration, calculated by the Herfindahl–Hirschman Index (HERF), and the business cycle on the capital buffer for Pakistani banks. The contribution of this paper is that there is not found any research article or paper on market structure linked with the capital buffer on the Pakistani banks.

Our present paper is organized in the following setup. With the commencement of the initial section presenting the introduction, we have then devoted section 2 towards the discussion of the existing literature on the capital buffer and business cycle also linked with market power. In section 3, we have specified an empirical model along with a detailed discussion on the methodology applied in this research paper. Consequently, in section 4, the data and empirical results have been stated accordingly. Ultimately, we have presented our conclusions in the last and final section 5.

Literature Review

In Basel-II, this agreement contains a major concern of pro-cyclicality, which indicates that when economic activities decreased, the committee pushed banks to increase their capital requirements during the period of tough while the banks declined their capital requirements as economic activities increased in the boom period. Numerous studies were undertaken to investigate the cyclical behavior of the business cycle and capital buffer.

Business Cycle and Capital Buffer

Earlier, Lindquist (2003) empirically explored the influence of bank risk on regulatory capital for Norwegian banks, which indicated that bank risk and the business cycle have a negative influence on the capital buffer. Similarly, Ayuso et al. (2004) constructed a model for capital buffers and tried to study the different phases of the business cycle and other bank-specific capital buffers in Spanish banks. It is important to indicate that the business cycle has a negative influence on capital, which reveals the pro-cyclical effect found in Spanish banks. Moreover, it is also found that bank profitability has positive while bank risk has a negative impact on the capital buffer.

Furthermore, Estrella (2004) investigated the influence of capital requirements on the phases of the business cycle for European banks. It was interesting to note that the pro-

cyclical effect was checked between capital requirements and the business cycle, which revealed that an adjusted cost of capital would fabricate a capital buffer in expectation of impaired loans. Likewise, the majority of the European banks that build up capital in an economic downturn do so due to the pro-cyclical effect. Similarly, Heid et al. (2007) tried to check the influence of regulatory capital on risk for German banks, which revealed that bank profitability has a positive influence but bank size and risk have negative influences on the capital buffer. Additionally, they also included that those banks that set their regulatory capital above their minimum standard have an ability to adjust risk in association with bank risk.

Stolz and Wedow (2006) tried to inspect the influence of macroeconomic indicators, especially business cycles and inflation, on the regulatory capital buffer for German banks. Therefore, they indicated that the German banks have found countercyclical behavior with capital buffers during the fluctuation of the economic cycle. In addition to that, Boucinha and Ribeiro (2007) tried to observe the influence of different phases of the business cycle on the capital buffer for Portuguese banks', which indicated that there is a negative impact of the output gap on the excess regulatory capital (buffer). Furthermore, D'Avack and Levasseur (2007) investigated the determinants of regulatory buffers for European banks. They revealed that banks adopted a pro-cyclicality nature with a capital buffer, which indicated that banks sanction higher loan amounts during the boom period. Moreover, they also found that profitability has a positive but risk has a negative influence on the capital buffer.

Kleff and Weber (2008) investigated the determinants of capital buffer for the German banking sector (saving, cooperative, and commercial), which suggested that the business cycle has a negative influence on the capital buffer, but the risk has a positive effect on the capital buffer for savings banks, while bank profitability has a positive influence on the capital buffer. Similarly, Jokipii and Milne (2008) examined different phases of economic activity on capital buffers for European banks, which suggested that European banks have negative cyclical behavior during the business cycle on capital buffers. Moreover, they also established the distinction between the types and sizes of the banks and found that large banks (savings and commercial) move counter-cyclically, but small banks (savings and cooperatives) drive the pro-cyclical effect on the European banks.

Jokipii and Milne (2011) also examined the influence of capital buffers on risk and the business cycle for US banks. They revealed a positive influence of capital buffers on risk, which confirmed the existence of the theory of moral hazard behavior. Whereas there is some interesting result that big, banks follow the theory of capital buffer, which indicates that when bank risk increases the capital buffer also increases by the bank management. Shim (2013) tried to establish the link between the cyclical pattern and the capital buffer of US banks by using the quarterly data and the estimation technique of fixed and random effect panel data. In this research, it was established that the business cycle and capital buffer were found to be negative, which implied that banks increased their size of the capital buffer for the period of economic downturn. Similarly, Atici and Gursoy (2013) investigated the determinants of capital buffer in the Turkish banking sector, which indicated that the association between capital buffer and risk, loan growth, merger, and acquisition has a negative influence on the capital buffer, while profit and liquidity have a positive impact on the capital buffer.

Lee and Hsieh (2013) examined the influence of excess capital on profitability and risk for all banks in Asian countries. They revealed that regulatory capital has a positive effect on profitability, but investment banks have a very low influence on profitability. It is also concluded that banks belonging to low-income countries have a positive impact on profitability but a negative influence on bank riskiness. Mahakud, et al (2013) investigated the influence of different phases of the business cycle and bank-specific variables on capital buffers for Indian banks. They revealed that Indian banks adopt pro-cyclical behavior with a capital buffer. Moreover, Tabak et al (2012) investigated the bank-specific variable on

capital buffers for Brazilian banks. They found that bank profitability has a positive influence on the capital buffer, but they managed their risk negatively. Similarly, Rahman et al (2015) investigated the influence of capital buffer on different bank-specific variables for Bangladeshi banks and found that Bangladeshi banks maintain a high level of regulatory capital against their riskiness behavior but big banks maintain low capital and they take higher risk, which indicated that they follow moral hazard behavior.

Capital Buffer and Market Power

Ruckes (2004) also confirmed that stronger competition makes banks more reluctant in their lending practices, which consequently lowers the capital buffer by increasing the risk-weighted asset. Therefore, it is clearly established that a positive association between capital buffer and market structure exists in the literature. Similarly, Fonseca and Gonzalez (2010) examined the important determinants of capital buffers. They have found that market concentration has a positive influence on the capital buffer, which indicates that banks obey the competition stability hypothesis. Similarly, Saadaoui (2014) examined the 740 banks in 50 different countries. It revealed that during the economic boom period, banks with greater market power had lower levels of leverage and also maintained lower levels of capital requirements. Valencia and Bolanos (2018) investigated the influence of competition and different phases of the business cycle on regulatory capital by choosing 79 banks. They revealed that the behavior of the business cycle on the capital buffer is found to be pro-cyclical. However, they found that when an increase in competition in the economy, banks also increased the size of the capital buffer in developed countries but reacted the opposite in the case of underdeveloped countries. Moreover, Xu (2016) tried to examine the empirical impact of the business cycle and market structure on the capital buffer for Chinese banks. The result highlighted that Chinese banks behave counter-cyclically with regard to the capital buffer and business cycle but found a negative impact of market structure on the capital buffer.

Moreover, it is very important to note that most of the studies do not include the important variables of market concentration or market power to examine the impact on the capital buffer. Earlier, Ruckes (2004), Fonseca and Gonzalez (2010), Saadaoui (2014), Xu (2016), and Valencia and Bolanos (2018) included the market structure with the business cycle to find out the impact on the capital buffer. Several studies have revealed that banks in the banking market structure with greater market power have a significant influence on their profitability, as well as their capital buffer. In a highly concentrated market structure, it means that market behavior is considered as their monopoly in which banks obtain higher profit margins, to hold capital requirements over and above the minimum requirement. Therefore, we have tried to examine the impact of market concentration, measured by the Herfindahl–Hirschman Index and the business cycle on capital buffer for Pakistani banks. Therefore, the primary objective of this paper is to check the behavior of the capital buffer in the presence of market concentration and, whether the capital buffer was pro-cyclical or counter-cyclical during both periods of the Basel-II Accord and Basel-III Accords for Pakistani banks during the period between 2006 and 2017. The contribution of this paper is not found in any research article on market concentration linked with capital buffers for Pakistani banks.

Material and Methods

The sample in this study consists of 34 commercial banks in Pakistan during the period between 2006 and 2017. The data relating to bank-specific has been extracted from different sources. For example, the financial data about bank-specific variables, namely: bank size, asset quality, bank liquidity, bank profitability, bank mergers, and loan growth, has been collected from the annual statements of each bank and the State Bank of Pakistan (SBP) annual report. Similarly, the data on macroeconomic-specific variables such as the output gap and the inflation rate has been gathered from the World Development Indicators

(WDI) *and* the Economic Survey of Pakistan (ESP). Furthermore, we can calculate the industry-related variables by using bank-specific variables.

The Bank-Specific Variables

A capital buffer gives a cushion against unexpected financial crises. It is calculated by the difference between the target capital adequacy ratio (CAR) and the obtained capital minimum requirement (8%). In our model, the capital buffer is treated as an endogenous variable, which includes all eligible assets for Tier-I and Tier-II. The State Bank of Pakistan (SBP) set the minimum capital requirement at 11.275 percent in 2017, which is higher than the international standard (9.25 percent). The profitability indicator is the best variable to explain the cost of holding capital. Therefore, it is expected that there is a negative impact of bank profitability on the capital buffer, which reveals that banks hold a higher buffer when they earn profitability. The calculation of this proxy is the ratio of total earnings (ROE) after interest payment and taxation over total assets. Since internal funding is cheaper than external funding, so firms prefer internal funding (retained earnings) as compared with external funding (debt), Myers and Majluf (1984) also agreed on the above intuition. It is an important variable to determine the influence on the capital buffer, but it also explains that there are higher chances of unexpected losses between banks and borrowers. Since there are some possible ways, such as monitoring and screening, to reduce the chances of losses, the banks prefer to increase the capital buffer. Therefore, larger banks can increase the size of their assets due to economies of scale, which leads to their profitability. The most appropriate proxy for bank size is the natural logarithm of total assets of individual banks (SIZE), which is used by Kashif et al (2016). Bank liquidity is defined as the ratio of total loans over total assets (LTA), which shows how banks can turn their total assets into the most liquidized form. The lower the ratio of LTA, there is greater the chance for banks to meet short-term financial obligations. Hence, the banks increase their capital buffer. There is apparently a negative association between the capital buffer and liquidity, as described by Fonseca and Gonzales (2010). It is defined as an assessment of the quality of assets to examine the risk or cost of bankruptcy of banks. The main factor defining the quality of the assets and loans. The proxy used by the assets quality is the ratio of the quality of the asset to the total loans. Earlier, the above proxy was adopted by Estrella (2004). Loan growth is defined to capture the changes in the demand for credit (loans) over one year. Banks usually increase their loan growth in the boom period, which leads to an increase in non-performing loans with their risks. The relationship between loan growth and the capital buffer is expected to be negative. Earlier, this ratio used by Shim (2013) suggested that an increase in loan growth reflects the risk of banks. The dummy variable (Merger) is used for taking over one bank and merging into another, even though the purchasing process. If one bank takes over the other bank(s) in the same year, it is denoted as one, otherwise zero. Moreover, Boucinha (2008) indicated that the impact of a merger on the capital buffer has negative relation.

Macro Specific Variables

We have included some macroeconomic indicators, such as Gross Domestic Product (GDP), as a proxy of the business cycle to capture the influence of upward and downward economic activity on the capital buffer, which is one of the most important independent variables in this study. Earlier, Atici and Gursoy (2013) used the output gap using the Hodrick-Prescott (H-P) filter method as a proxy for the business cycle indicator. However, we have calculated the output gap by subtracting a non-linear trend from real GDP, using the H-P filter method. To be more precise, one of the main reasons for using an output gap is to remove the trends from time series variation (Hodrick and Prescott, 1997). Moreover, inflation is used as a different macroeconomic indicator. It reflects the overall price level in an economy to be connected with the capital buffer. When the price level increases, the borrowers will face a very harmful effect and will cause many difficulties in repaying their

loans instantly. This indicates that the costs of borrowing become more expensive and deteriorate the quality of the loan portfolio.

Industry-Specific Variable

The asset concentration of banks is measured as a Herfindahl-Hirschman Index (HHI) in the commercial banks of Pakistan. If the value of HHI is larger, more concentrated assets and a higher level of probability will be observed in the banks. To examine the bank assets concentration of banks is measured as Herfindahl-Hirschman Index (HHI), and is used for simple competitiveness in commercial banks of Pakistan. It is the most commonly accepted measurement for examining market concentration in the literature. It is measured by the squaring of market share of each bank working in the industry and then aggregates them. The value of the HHI ranges from zero to ten thousand (10,000). The larger values of HHI reflect the monopoly status in the industry while the lowest value of HHI shows pure competition. The concentration of banks in an industry refers to the sum of shares as the square of assets in banks by the relevant industry (Noman et al., 2017).

Empirical Framework

To attain the objective of this paper, the authors adopt the partial adjustment framework. This framework uses the lag value of the dependent variable on the right-hand side. The same methodology was earlier adopted by Ayuso et al. (2004), Estrella (2004), Jokipii and Milne (2008, 2011), Shim (2013), and Zheng et al (2017) to examine the impact of a capital buffer on a business cycle by using different bank-specific variables. Since this model describes the variables into two parts, namely static and dynamic. The static part helps us to determine the desired level of capital buffer, whereas the dynamic portion enables us to determine the speed of the partial adjustment process.

The empirical model could also be written as follows:

$$\Delta BUF_{it} = \lambda\left(BUF^{*}_{i,t} - BUF_{i,t-1}\right) + \varepsilon_{i,t} \text{ -------} \quad (1)$$

Wherein λ represents the speed in adjusting actual capital buffer on its optimal level, whereas, $\Delta BUF_{it} = \left(BUF^{*}_{i,t} - BUF_{i,t-1}\right)$ reflects capital buffer observed within two periods, and the error term is represented by $\varepsilon_{i,t}$. Therefore, we can write this element in the shape of the following equation:

$$BUF_{it} = \lambda\, BUF^{*}_{i.t} + (1-\lambda)BUF_{i.t-1} + \varepsilon_{i,t} \quad \text{----(2)}$$

$$BUF_{it} = \beta_1 + \beta_2 BUF_{i,t-1} + \beta_3 Cycle_t + \beta_4 \chi_{i,t} + \beta_5 \mathrm{Y}_{i.t} + \varepsilon_{i,t} \quad (3)$$

In the above equations (2 & 3), the calculations for the optimal level of the capital buffer are not directly observable. Hence, researchers prefer to include various stages within the business cycle and important bank-specific variables, such as the size of the bank, assets, provision for loan losses, bank stability and liquidity, etc. Similarly, indicate an error term that includes the unobservable bank-specific effect and the time-specific effect'. To address the potential problem of indigeneity, this study employs the two-step system GMM approach developed earlier by Arellano and Bond (1991), Blundell, and Bond (1998). This study also uses the post-estimation diagnostic tests such as the Sargan test (for the validity of over-identifying restrictions in the model) and the Autocorrelation Test of Order One (AR-1) and Order Two (AR-2) to make the hypothesis that no correlation is present in the model.

Results and Discussions

In this paper, table 1 shows the descriptive statistics of all independent variables used in the estimation of the model, which shows the different components of statistical indicators such as mean value and standard deviations, as well as the highest and lowest

values of the key determinants for the whole sample of 34 banks from the Pakistani banking industry.

Table 1
Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Capital Buffer*	387	10.4	15.95	-12.53	86
Bank Credit Risk	387	13.04	9.13	0.18	51.56
Bank Size	387	7.1	0.52	5.29	8.2
Bank Profitability	387	9.13	13.26	-47	56.91
Loan Growth	387	14.69	23.92	-65.08	98.97
Bank Liquidity	387	62.04	20.05	1.36	193.32
Market Structure	387	778.75	14.89	761.34	803.37
Inflation	387	10.35	3.81	4.5	17
Output gap	387	3.26	1.31	0.4	4.71
Merger	387	0.02	0.15	0	1

It is important to note here that macroeconomic variables, such as the output gap and inflation rate, are highly effective but negatively correlated with each other at 0.69. Similarly, the correlation between the market structure and inflation is 0.48, but it we found that the market structure is 0.21 correlated with bank size.

Dynamic panel estimation of capital buffer and market concentration with the business cycle for full sample banks.

The results shown in table 2, show that the capital buffer has a significantly negative impact on the output gap, i.e. pro-cyclicality. Therefore, it is suggested that when economic activities increase (decrease) by 1 percent, then Pakistani banks on average, decrease (increase) their capital buffer by 71 percent. These analytical findings suggest that Pakistani banks protected themselves from the probability of loan defaults during the period of recession. Therefore, the banks changed their portfolio risk to increase their capital requirement. These findings also indicated that Pakistani banks adopted the behavior of short-sightedness for minimizing their risk factors. As regards bank-specific variables, bank profitability has a significant positive impact on the capital buffer, which reveals that when Pakistani banks increase their profitability to cover their share of the capital buffers by SBP instructions. These banks hold an extra cushion of capital to cover up the potential losses on consumer credit in any kind of downturn. Hence, such banks also increased their risk-weighted capital requirements and unwillingly opted for expensive methods to increase their equity. Therefore, it is suggested that an increase in asymmetric information leads to an increase in retained earnings that also has the potential to cover a higher capital buffer. It is also equally worth noting to note that a positive sign of bank profitability indicates that banks opt for the process of recapitalization or utilizing their funds for equity building instead of debt, as suggested by the Pecking Order. Similarly, the estimated coefficient of bank size has a significantly positive impact on the capital buffer, which suggests that banks with a bigger size of assets hold a larger amount of capital buffer compared with banks with a smaller size because of unanticipated state support, i.e., being too big to fail the hypothesis. Moreover, it is also indicating that larger banks increase their buffers due to the assurance against the lack of ability to access capital, the inability to diversify their portfolios, and diseconomies of scale.

Furthermore, inflation has also shown a positive relationship with a capital buffer, which reveals that with a price level increase in economic activity; the borrower faces a hard time paying their loan obligations, so they increase the chances of bad debt for bank consumers. Hence, banks increase the capital buffer to maintain their financial stability. Similarly, the indicator of market concentration is found to be negatively significant, indicating that market concentration increases toward monopoly situation banks' also

declining their capital buffer level. Therefore, it is suggested that if banks have high market power, then there is a possibility that they could have less exposure to risk, which indicates the strong bank stability link with less capital buffer (Ariss, 2010). Moreover, when we include loan growth in our model, the capital buffer is negatively affected by loan growth. These findings suggest that high loan growth reduces the capital buffer, which increases the probability of bank default. Similarly, the addition of liquidity has been found positive and significant on the capital buffer, which reflects the risky behavior of Pakistani banks for their loan portfolios due to the larger portion of total loans. Moreover, the addition of a merger is found to be significantly negative on the capital buffer, which indicates that the impact of the merger could possibly decrease the capital buffer due to the lack of capitalization.

Table 2
Dynamic panel estimation of capital buffer and market concentration with the business cycle

Variables	-1	-2	-3	-4
Capital Buffer (t-1)	0.705***	0.709***	0.744***	0.752***
	(-0.008)	(-0.007)	(-0.018)	(-0.035)
Output Gap	-0.315***	-0.2446***	-0.135***	-0.294***
	(-0.075)	(-0.077)	(-0.05)	(-0.08)
Profitability	0.007***	0.007***	0.006**	0.0225***
	(-0.001)	(0)	(-0.003)	(-0.01)
Bank Credit Risk (t-1)	0.121***	0.113***	0.020*	0.0142***
	(-0.013)	(-0.006)	(-0.011)	(-0.004)
Bank size	4.852***	2.995***	6.343***	3.132***
	(-0.239)	(-0.242)	(-0.324)	(-0.414)
Inflation	0.064***	0.136***	0.032**	0.132***
	(-0.037)	(-0.02)	(-0.0157)	(-0.027)
Market Concentration	-0.136***	-0.122***	-0.128**	-0.130***
	(-0.02)	(-0.02)	(-0.0157)	(-0.027)
Loan Growth		-0.027***	-0.032***	-0.0159***
		(-0.004)	(-0.003)	(-0.003)
Bank Liquidity	-		0.148***	0.080***
	-	-	(-0.022)	(-0.014)
Merger(t-1)	-	-	-	-1.800**
				(-0.855)
No. of observations	381	381	381	381
No. of Banks	34	34	34	34
Sargan test	0.999	0.999	0.999	0.99
AR(1) test	0.003	0.003	0.004	0.06
AR(2) test	0.186	0.234	0.714	0.29

The impact of bank-specific and macro-specific variables on the capital buffers of all Pakistani banks

In Table 3 we discussed the impact of bank-specific and macro-specific variables on the capital buffers of all Pakistani banks over the period from 2009 to 2017. As shown in Table 3, the lag-dependent variable shows a much slower speed of adjustment as compared with the entire sample data, as shown in Table 3. It is interesting to note that the negative sign of the output gap turns affirmative and significant at a 1 percent level in all columns. This positive impact of the output gap on the capital buffer confirms the proper implementation of the Basel-III accord.

Table 3
The impact of bank-specific and macro-specific variables on the capital

Variables	-1	-2	-3	-4
Capital Buffer $_{(t-1)}$	0.853*** (-0.011)	0.860*** (-0.012)	0.881*** (-0.016)	0.872*** (-0.016)
Output Gap	1.812*** (-0.362)	1.812*** (-0.402)	1.957*** (-0.419)	1.436*** (-0.46)
Profitability	0.022*** (-0.003)	0.022*** (-0.003)	0.019* (-0.003)	0.021*** (-0.004)
Bank Credit Risk $_{(t-1)}$	0.033*** (-0.004)	0.033*** (-0.004)	0.029* (-0.005)	0.026*** (-0.006)
Bank size	0.887*** (-0.181)	1.053*** (-0.145)	1.438*** (-0.197)	0.940*** (-0.379)
Inflation	0.237*** (-0.031)	0.230*** (-0.028)	0.244** (-0.044)	0.156*** (-0.044)
Market Concentration	-0.106*** (-0.004)	-0.116*** (-0.001)	-0.102** (-0.001)	-0.142*** (-0.007)
Loan Growth	-	-0.008*** (-0.004)	-0.010*** (-0.005)	-0.011** (-0.004)
Liquidity	-	-	-0.059*** (-0.023)	-0.046* (-0.024)
Merger$_{(t-1)}$	-	-	-	-0.710*** (-0.205)
No. of observations	285	285	285	285
No. of Banks	32	32	32	32
Sargan test (P-value)	0.999	0.999	0.999	0.99
AR(1) test (P-value)	0.003	0.003	0.004	0.006
AR(2) test (P-value)	0.186	0.234	0.314	0.29

Conclusion

The empirical findings for the whole sample during the periods of Basel-II and Basel-III suggest that the impact of the business cycle (output gap) on the capital buffer is observed to be pro-cyclical. However, when we explored the impact of the business cycle on the capital buffer in the post-Basel-II period, the sign of output gaps turned out to be positive (counter-cyclical). Consequently, banks strictly implemented the policies of the SBP to ensure the stability of the banking sector. Moreover, the estimated coefficient of profitability has a positive influence on the capital buffer during both periods of the Basel Accords. Therefore, it is concluded that banks take risky decisions to cover their costs, but after the completion of the next year, their risk management system forces them to align their credit risk with the capital buffer. It is also important to note that the positive impact of bank size on capital buffers rejects the *too*-big-to-fail hypothesis in Pakistani banks. Furthermore, loan growth and liquidity have a negative relationship with the capital buffer, which enhances banks' portfolio risks and chances of default. Similarly, the inverse effect of the merger on capital buffer revealed that banks exhaust their equity in purchasing low-capitalized banks or near-to-default banks, that failed to meet the standard requirements imposed by the central bank. Thus, the finding of this paper confirmed that the impact of the business cycle on the capital buffer has a pro-cyclicality effect before the global financial crisis while the regulatory committee forcefully implements Basel-III so it converts into a countercyclical. Our analysis proposes that Pakistani banks should maintain countercyclical capital buffers to avoid any kind of financial crisis.

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