

Abbas, Faisal; Ali, Shoaib; Yousaf, Imran; Rizwan, Sohail

Article

How commercial banks adjust capital ratios: Empirical evidence from the USA?

Cogent Business & Management

Provided in Cooperation with:

Taylor & Francis Group

Suggested Citation: Abbas, Faisal; Ali, Shoaib; Yousaf, Imran; Rizwan, Sohail (2020) : How commercial banks adjust capital ratios: Empirical evidence from the USA?, Cogent Business & Management, ISSN 2331-1975, Taylor & Francis, Abingdon, Vol. 7, Iss. 1, pp. 1-18, <https://doi.org/10.1080/23311975.2020.1859848>

This Version is available at:

<https://hdl.handle.net/10419/245026>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.



<https://creativecommons.org/licenses/by/4.0/>

How commercial banks adjust capital ratios: Empirical evidence from the USA?

Faisal Abbas, Shoaib Ali, Imran Yousaf & Sohail Rizwan |

To cite this article: Faisal Abbas, Shoaib Ali, Imran Yousaf & Sohail Rizwan | (2020) How commercial banks adjust capital ratios: Empirical evidence from the USA?#, Cogent Business & Management, 7:1, 1859848, DOI: [10.1080/23311975.2020.1859848](https://doi.org/10.1080/23311975.2020.1859848)

To link to this article: <https://doi.org/10.1080/23311975.2020.1859848>



© 2020 The Author(s). This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.



Published online: 21 Dec 2020.



Submit your article to this journal [↗](#)



Article views: 641



View related articles [↗](#)



View Crossmark data [↗](#)



Citing articles: 2 View citing articles [↗](#)



Received: 09 February 2020
Accepted: 01 December 2020

*Corresponding author: Faisal Abbas,
Accountancy and Finance, University
of Lahore, Lahore, Pakistan
E-mail: faisalabbaspcc@gmail.com

Reviewing editor:
David McMillan, University of Stirling,
Stirling, UK

Additional information is available at
the end of the article

BANKING & FINANCE | RESEARCH ARTICLE

How commercial banks adjust capital ratios: Empirical evidence from the USA?

Faisal Abbas^{1*}, Shoaib Ali², Imran Yousaf² and Sohail Rizwan³

Abstract: This study examines the speed of adjustment of the leverage and regulatory capital ratios between 2002 and 2018 for large commercial banks of the USA. The study applies a two-step system GMM technique to obtain the speed of adjustment. The results prove that higher-quality capital requires greater time to restore equilibrium after an economic shock. The results also show that large commercial banks adjust their regulatory ratios faster than leverage ratios. Furthermore, the speed of adjustment is heterogeneous for cross-sections. The speed of adjustment for well-capitalized banks is higher than adequately and undercapitalized commercial banks. The speed of adjustment for highly liquid is higher than low liquid banks. This study also finds the banks quickly adjust their capital before the crisis period. The heterogeneous results have implications for regulators, policymakers, and bank managers for better decision making.

ABOUT THE AUTHOR

Faisal Abbas is a researcher in the Department of Accounting & Finance at The University of Lahore, Pakistan. His area of interest includes risk-management, financial economics, corporate finance, accounting, Islamic and Conventional banking. He has publications in well-reputed national & International journals. Shoaib Ali is a lecturer at Air University in Islamabad, Pakistan. His area of interest includes financial economics, corporate finance, risk-management, Islamic banking, and financial institutions. He has several publications in leading and well-reputed national & international journals.

Dr. Imran Yousaf (Phd. Finance), is an Assistant professor at Air University in Islamabad, Pakistan. His area of interest includes financial economics, corporate finance, and financial institutions. He has several publications in leading and well-reputed national & international journals.

Sohail Rizwan is a senior researcher at Capital University of Science and Technology in Islamabad, Pakistan. His area of interest also includes financial economics, corporate finance, risk management, Islamic banking, and financial institutions. He has several publications in leading and well-reputed national & international journals.

PUBLIC INTEREST STATEMENT

In this study, we tend to advocate the literature of banking and empirical findings for the extended period from 2002 to 2019. The last financial crisis 2007–08 explores the importance of bank capital and bank liquidity in banking sectors. This study also aims to highlight the pace of large commercial to adjust their leverage and regulatory capital ratios in the USA. This study may be valued for the decision-makers. They may seek guidance from this study for formulating policies in this area in future. This study may also open a new horizon for researchers.

Subjects: Economics; Finance; Business, Management and Accounting

Keywords: leverage ratio; regulatory ratios; capital buffer ratio; speed of adjustment
JEL: G20; G21; G28; G32

1. Introduction

Following the financial crisis of 2007–2009, regulators announced extensive reforms to the financial institution's guidelines, in particular by remodeling the currently prevalent base of the capital required. The regulators tighten the redesigning frameworks for the required capital for financial intuitions (Bakkar et al., 2019). Over the last decade, researchers have examined many facets of bank capital (Abbas, Iqbal et al., 2019; Dermine, 2015; De Jonghe & Öztekin, 2015), particularly for the assessment of required capital on the performance (Berger & Bouwman, 2013; Bitar et al., 2018; Chortareas et al., 2012) and risk-taking banks (Allahrakha et al., 2018; Ding & Sickles, 2018, 2019; Färe et al., 2004).

This study targets to bridge the particular gaps in the existing literature. Firstly, this study addresses the following questions: Are there differences in the average speed of adjustment for leverage ratios, regulatory ratios, and capital buffer ratio? Does the speed of adjustment of leverage ratios, regulatory ratios, and capital buffer ratios of large commercial banks is similar? Does the pace of adjustment for leverage ratios, regulatory ratios, and capital buffer ratios is similar in pre, pro and post-crisis periods? Do the speed of adjustment is similar for well, adequately, undercapitalized, high liquid, and low liquid banks in the USA?

The motivation stems from the most recent development of Basel III regarding the requirement of a higher amount in capital for the stability of the financial system to face unexpected economic shocks. In this analysis, the focus is on leverage ratio, tier-I leverage ratio, regulatory ratio, tier-I regulatory ratio, common equity regulatory ratio, capital buffer ratio, tier-I buffer ratio, and common equity buffer ratio by following the prior studies (Abbas & Masood, 2020b; Bakkar et al., 2019; Jokipii & Milne, 2011; De Jonghe & Öztekin, 2015). The adjustment process is similar to the previous studies (Abbas & Masood, 2020a, 2020b; Bakkar et al., 2019; De Jonghe & Öztekin, 2015). Theoretically, this study is significant for investors interested in dividend income. The priority of banks is regulatory requirements for required capital for which banks retain profits to boost their capital ratio. Due to this reason, banks cut dividend payments.

The study uses a standard approach for partial adjustment to estimate the average speed of adjustment (Abbas & Masood, 2020b; Berger et al., 2008). This adjustment model undertakes that every institution has a desired and required leverage ratio, regulatory ratio, and capital buffer ratio. For example, banks must have to hold a risk-based capital ratio of at least 8% of risk-weighted assets at any time. Similarly, banks have to maintain a 2.5% ratio of capital buffer to avoid possible bankruptcy. However, there is very difficult to maintain desired ratios in a round number, and these ratios remain different in friction because of the holding cost of capital. Therefore, randomly bank's actual capital ratios and target capital ratios always remain different (Abbas & Masood, 2020b; Bakkar et al., 2019). The actual and regulatory ratio is considered as the weighted average of a lagged number of respective capital ratios. In this situation, one can think and expect the faster adjustment of the bank's regulatory ratios than capital buffer ratio and leverage ratios; other things remain constant. There may be a set of factors to use for the frictions of these capital ratios (Abbas & Masood, 2020a; De Jonghe & Öztekin, 2015). Here the banks can use their balance sheet to adjust their capital ratios as per their desires. There may be changes in risk-weighted assets to adjust the capital ratios for the time being. As we use the annual data for this analysis, to avoid regulatory violations, the various variables may be manipulated to produce the desired results. The study used annual financial data of large commercial banks as reported to FDIC. Due to this reason, our analysis provides an average speed of adjustment on an annual basis. We use the tendency of fluctuation in risk-weighted assets, liquidity level, absolute equity number, and retained earnings to examine the

difference in the speed of adjustment in leverage ratio, regulatory ratio, and capital buffer ratio (Abbas & Masood, 2020a; Bakkar et al., 2019; De Jonghe & Öztekin, 2015).

This study enriches the existing literature in several aspects. The study is unique due to the data set, advancement in regulations, technological transformations, and financial integrations. This study contributes to the existing literature of banking for the adjustment of leverage ratio, tier-I leverage ratio, regulatory ratio, tier-I regulatory ratio, common equity regulatory ratio, capital buffer ratio, tier-I buffer ratio, and common equity buffer ratio. The significant contributions include comparing the speed of adjustment for well, adequately, undercapitalized, high liquid, and low liquid large commercial banks. The next contribution of this work is to highlight the differences in the adjustment of the leverage ratio, tier-I leverage ratio, regulatory ratio, tier-I regulatory ratio, common equity regulatory ratio, capital buffer ratio, tier-I buffer ratio and common equity buffer ratio for pre, pro, and post-crisis period.

The rest of the paper is structured as follows. The second part reviews the literature on the adjustment of capital. The third section provides the partial adjustment model, data collection sources, sample selection and definitions, and measurement of variables used in the analysis. The fourth part of this paper describes the discussion of empirical findings. The fifth section of this research contains conclusions, limitations, and future recommendations.

2. Review of literature for adjustment of capital

This part provides the literature about the adjustment of capital. In recent literature, Abbas and Masood (2020a) explore the speed of adjustment for large commercial banks in the USA. The study concludes that commercial banks adjust their regulatory capital ratios faster than leverage ratios. Abbas and Masood (2020b) prove that the speed of adjustment is similar in pre, pro, and post-crisis periods. The study also confirms that the pace of adjustment is heterogeneous for well, adequately, undercapitalized, high, and low liquid large commercial banks. De Jonghe and Öztekin (2015), they collected comprehensive data for banks using the Bankscope for bank-specific proxies over the period ranging from 1994 to 2010. They took data for commercial banks, cooperative banks, and savings banks. They argue that banks primarily use equity to adjust their capital instead of asset liquidation. They conclude that banks normally use earnings to extend their assets. They conclude that the speed of adjustment is not similar across countries. They find that banks make quick adjustments in their capital ratios, where the regulations are stringent. The banks adjust their capital more rapidly in a crisis period. Bakkar et al. (2019) conduct a study on the listed banks from OECD economies over the period ranging from 2001 to 2012. They find that how the speed of adjustment and capital ratios is different. They conclude that banks adjust their capital ratio faster than the regulatory capital ratio. They classify the sample according to size and conclude that larger banks manage their capital ratio slower, whereas they provide that riskier banks adjust their regulatory capital ratio faster than their leverage ratio.

Öztekin and Flannery (2012) investigate how legal and political features influence the speed of adjustment. They document that financial traditions and legal laws significantly influence capital adjustment in the short-run; other things remain unchanged. They argue that larger organizations have lower transaction costs to adjust leverage. The findings of their study are consistent with the trade-off theory of capital. Memmel and Raupach (2010) analyze the speed of adjustment of the large German banks. They use regression analysis to estimate the speed of adjustment of large German banks separately. They concluded the large differences across financial entities. They argue that the liability side for the adjustment of capital is more appropriate, whereas the tendency of capital adjustment is greater from the assets side. They also argued that the banks adjust their capital ratio faster than other origination. Lepetit et al. (2015) conduct a study to test the adjustment of bank capital by using the data from 17 European countries over the period ranging from 2002 to 2010. The results show that most European banks in the absence of excess control rights boost their capital ratio by equity without reducing lending. They also

conclude that in the presence of excess control rights, banks decrease their capital by repurchasing equity. Leary and Roberts (2005), they empirically investigate whether originations adjust their capital structure under the availability of extra cost. They conclude that organizations actively rebalance their capital ratio in the presence of adjustment costs to achieve an optimal level in the short-run.

Huang and Ritter (2009) find that firms use external financing to adjust their capital ratio when the cost of the new issue remains low. They found a moderate pace with a half-life of 3.7 years for the capital ratios to achieve their targeted equilibrium ratios. Flannery and Rangan (2006) provide that on average, firms remain one-third of the deviation between target capital ratio and actual capital ratio in a year. They favor that firms have their target capital ratio and try to achieve that possibly at a lower cost. While studying the swiss firms' sample, Drobetz and Wanzenried (2006) find that firm-specific factors and macroeconomic factors are influential in adjusting a firm's debt and capital ratios. They conclude that during a handsome profit margin and good economic conditions, firms adjust their capital quickly. Cohen and Scatigna (2016) find that the availability of a higher amount of capital makes banks phase out the crises and earn greater profits by lending more other things to remain unchanged.

3. Data and partial adjustment model

3.1. Data

To obtain results into how the USA's large commercial banks manage their different capital ratios, bank-specific data collected from the balance sheets and income statement reported to FDIC quarterly. The information for economic indicators collected from the World Bank, and economic freedom data are obtained from the heritage foundation established in 1996. The annual dataset consists of data from 2002 to 2018. The sample of the study is balanced to a comparable panel data containing insured commercial banks of the US as described in the reports of FDIC and further, the assets based on a consolidated form. There were many banks in nearly 1806 in the mentioned list dated 31 December 2018, which listed by FDIC. However, the criteria of inclusion of the study sample units for appropriate and reliable data analysis based on the following criteria: There must be the active status of listed banks on the reported date. There must not be any missing observations for any specific study variables of at least 2 years in the long-run period. The total assets of banks must be higher than 300 USD million, as dated 31 December 2018. After filtration of properly used criteria, there were 899 banks selected for the study sample size. For a more in-depth understanding and enrich insights, the sample is categorized into well, adequately, under, significantly undercapitalized banks on the bases provided by regulators. If the banks' total risk-based capital ratio is 10% or higher is well capitalized, if the ratio is 8% is graded as adequately capitalized, if the ratio is less than 8% or equal to 6% is considered undercapitalized if the ratio is less than 6%, the category is considered to be significantly undercapitalized. The list of variables and their definitions are provided as under:

3.2. Partial adjustment model

In the present situation of stringent regulations, banks usually maintain their desire capital ratio. The financial institutions are bound to follow the regulator's recommendations. In case of violation, banks have to bear the cost as imposed by regulators. The banks may operate by keeping the higher ratio of capital as suggested by a regulator or lower. The situation where the cost of adjustment of capital is higher than the cost to bear by operating at a lower capital ratio than required. Such a process is based on the trade-off between the cost of adjustment of capital and costs to bear at a lower capital ratio (Bakkar et al., 2019; De Jonghe & Öztekin, 2015). It has developed in practice in the previous studies to model capital ratio using a partial adjustment process (Abbas & Masood, 2020b; Bakkar et al., 2019; Flannery & Hankins, 2013). In a capital adjustment model, a bank's current capital (leverage ratios, regulatory ratios, and capital buffer ratios) is X_{it} , it is a weighted average of required capital ratio (leverage ratios, regulatory ratios, and

Name of Variable	Measurement of Variables
Leverage ratio	Total Equity to Total Assets (Lee & Hsieh, 2013; Abbas & Ali, 2020)
Tier-I leverage	Tier-I equity to total assets (Abbas, Butt et al., 2019)
Regulatory ratio	Tier I Plus Tier II to Risk-Weighted Assets (Guidara et al., 2013)
Capital Buffer Ratio	Actual Capital Ratio less than 8% (Guidara et al., 2013; Jokipii & Milne, 2011)
Tier-I regulatory ratio	Tier-I equity to Risk-weighted Assets (Bitar et al., 2018)
Common equity regulatory ratio	Common equity to Risk-weighted assets (Bitar et al., 2018)
Tier-buffer ratio	Actual Tier-I ratio less than 6% (Abbas, Butt et al., 2019; Bitar et al., 2018)
Common equity buffer ratio	Actual Common equity ratio less than 4.5% (Abbas, Butt et al., 2019)
Profitability	Net Income to Total Assets (Yousaf et al., 2019))
Liquidity	Liquid assets to total assets (Yousaf et al., 2018; Ali et al., 2020)
Loan growth	Loans to Total Assets (Abbas, Iqbal et al., 2019)
Bank size	Natural Log of Total Assets (Ali et al., 2019; Lee & Hsieh, 2013)
Economic growth	Real gross domestic product (Abbas & Masood, 2020b)
Inflation Rate	Annual change in Consumer Price Index (Lee & Hsieh, 2013)

capital buffer ratios), X^*_{it} , and the last period's capital ratio, X_{it-1} , as well as a random shock, ε_{it} . The equation of the partial model is as under:

$$X_{it} = \gamma X^*_{it} + (1 - \gamma) X_{it-1} + \varepsilon_{it} \quad (1)$$

Here “it” represents cross-section (i), which is a bank in this case and period (t), which is the year in this study. In general, each period, every bank closes a proportion γ of the difference between required and actual capital level. The lower the value of Gamma (γ), the more critical the capital ratio is, and the bank required a longer time to achieve its required capital ratio after a shock occurred in an economy or an industry. Therefore, the sign of γ used as a gauge of capital adjustment, which is also called the speed of adjustment for a bank and its complement $(1 - \gamma)$ as the part of the capital that is inertial.

Bank's target capital (leverage ratios, regulatory ratios, and capital buffer ratios), X^*_{it} , is unknown, and it is not a constant value, and it has varied concerning time and working. This target capital ratio is based on a linear trend of the lagged ratio of capital, characteristics of bank, and time fixed factors. The equation would be like this:

$$X^*_{it} = \beta Z_{it-1} + V_t + \alpha_i \quad (2)$$

To incorporate the bank characteristics, we follow the model of (Abbas & Masood, 2020b; Bakkar et al., 2019) they recently used the data of banks and found out the speed of adjustment of bank capital ratio and an earlier study of (Gropp & Heider, 2010; De Jonghe & Öztekin, 2015) show the adjustment of capital by using the data of non-financial firms. We included different factors like bank size, profitability, liquidity, loan growth, economic growth, and inflation rate. Most of the factors are used in different studies (Abbas & Masood, 2020b; Bakkar et al., 2019; Gropp & Heider, 2010). We use a similar set of indicators for the capital ratio, risk-based capital ratio, and capital buffer ratios in the entail model. Then, revised the model and only

included the influential factors of each capital ratio to explore the difference in speed of adjustment to reduce the proxy definition and measurement bias.

In this partial model of adjustment for capital ratios, we incorporated two factors of unobserved heterogeneity called time (V_t) and panel fixed effect α_i . The panel-fixed effects unobserved heterogeneity includes the efficiency of management, risk behavior, economic conditions, financial and business freedom and governance of banks as well as of the country in which the financial intuition is in operation, which is the USA in this case. The inclusion of fixed effects in the capital adjustment model is supported by (Abbas & Masood, 2020a; Bakkar et al., 2019; Gropp & Heider, 2010). Putting the equation of required capital, equation (2), in equation (1) and the specification would become like:

$$X^*_{it} = \gamma (\beta Z_{it-1} + V_t + \alpha_i) + (1 - \gamma) X_{it-1} + \varepsilon_{it} \quad (3)$$

In the existence of a lagged value of the dependent variable, the use of ordinary least squares and fixed effects would provide biased estimators. Due to the biasedness of OLS and fixed effects model, we would estimate the coefficient of equation (3) by applying a generalized method of moments (GMM) as suggested by (Abbas & Masood, 2020a, 2020b; Bakkar et al., 2019; Blundell & Bond, 1998). This model is to apply separately for capital ratio, risk-based capital ratio, and capital buffer ratio.

4. Results and discussion

4.1. Descriptive statistics

Table 1 contains the descriptive statistics, which provide information for the minimum, maximum, average, standard deviations, and no observation of the proxies used in the analysis. The main focused and variable of interest is the ratios of capital. The leverage ratio's maximum value is 17.3%, with an average of 11.2%, and the minimum leverage ratio is 6.5%. The maximum value of the regulatory ratio is 27.2%, with an average of 13.1%, and the standard deviation is 2.7%. The average value of the capital buffer ratio is 8.9%, the maximum value is 15.1%, and the standard deviation is 3.1%.

Table 1. Descriptive statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
Leverage ratio	17010	.112	.018	.065	.173
Regulatory ratio	17010	.131	.027	.024	.275
Tier-I leverage	17010	.094	.015	.050	.151
Tier-I regulatory ratio	17010	.128	.020	.080	.207
Common equity regulatory ratio	17010	.126	.021	.047	.201
Capital buffer ratio	17010	.089	.031	-.026	.151
Tier-I buffer ratio	17010	.067	.020	-.008	.146
Common equity buffer ratio	17010	.082	.025	-.017	.165
Profitability	17010	.009	.005	-.051	.027
Liquidity	17010	.048	.027	-.054	.156
Loans growth	17010	.714	.148	.044	1.185
Bank size	17010	13.58	.95	12.259	15.538
Economic growth	17010	.020	.014	-.025	.038
Inflation rate	17010	1.934	.649	.759	3.218

(Source authors calculation by using Stata)

4.2. Correlation matrix

Table 2 shows the Correlations matrix, which provides the relationship and connectivity sign among variables. The results show that the values are in the required range. The lower correlation among variables provides no problem of high multicollinearity among explanatory variables, which is needed. The sign of variables shows the economic significance and importance.

4.3. Full sample results

Table 3 reports the results for the speed of adjustment of large commercial banks traditional/leverage ratios and regulatory/risk-based capital ratios. The findings provide proof that the average speed for the adjustment of leverage ratio, tier-I leverage ratio, regulatory ratio, tier-I regulatory ratio and regulatory common equity ratio are 18.5%, 15.4%, 22.6%, 17.2%, and 19.9%, respectively. This speed of adjustment expresses the gap between actual and desire capital ratios. The findings indicate that commercial banks require 3.4 years to 4 years for the adjustment of leverage ratios and 2.7 to 3.7 years for regulatory capital ratios. This time is similar to the results of (Abbas & Masood, 2020a, 2020b). According to these results, banks require a higher time to adjust their tier-I capital ratios than leverage and regulatory ratio. In line with the argument, large commercial banks require 4 years and 1 month to adjust tier-I leverage ratio that is higher than the adjustment time of leverage ratio which is 3.4 years. Similarly, the time requires to adjust tier-I regulatory ratio, and regulatory common equity ratio is higher than the time requires to adjust the regulatory ratio. The findings are in line with the results of (Abbas & Masood, 2020a, 2020b; Bakkar et al., 2019; De Jonghe & Öztekin, 2015). The time required for achieving the equilibrium computed by the half-life as a log of (0.5) scaled by a log of (1-speed of adjustment) similar to (Berger et al., 2008) and (Gropp & Heider, 2010).

The findings are consistent with theory and prior studies. Because the time requires for tier-I leverage, common equity regulatory ratio and tier-I regulatory ratio is higher than total leverage ratio and regulatory ratio. It is easy for commercial banks to adjust their total leverage or regulatory ratio than equity issues. The leverage ratio and regulatory ratio can be adjusted by using the right and left side of the bank balance sheet. However, the issue of equity has cost in terms of decline in market price and issuing cost; the results are in line with the findings of (Abbas & Masood, 2020a; Huang & Ritter, 2009). The list of control variables that include profitability, liquidity loans growth, bank size, economic growth, and inflation are in line with the previous literature (Abbas & Masood, 2020b; Bakkar et al., 2019; De Jonghe & Öztekin, 2015), in short run, other things remain same.

4.4. Pre, pro, and post-crisis period results

Table 4 contains the findings for the pre, pro, and post-crisis period. Table 4 Panel-A consists of the findings for the post-crisis era. The findings conclude that large commercial banks approximately take 1.37 years to restore their target leverage ratio with an average pace of 39.5%. The findings confirm that commercial banks adjust their regulatory ratios faster than leverage ratios. The findings are in line with studies of (Abbas & Masood, 2020b; Huang & Ritter, 2009). In absolute terms, the speed of adjustment for the regulatory ratio is 42%, tier-I regulatory ratio is 35.2%, and common equity regulatory ratio is 44.5%. The findings are in line with (Abbas & Masood, 2020b; Bakkar et al., 2019; Berger et al., 2008). Table 4 Panel-B reports the results for during the crisis period, the speed of adjustment and time to achieve equilibrium capital ratios are significantly different than before and post-crisis periods. The speed of adjustment is higher for leverage ratios than regulatory ratios. It is indicated that banks remain in difficulty in boosting up their core capital during-crisis period in a short period. The findings show that an average pace of leverage ratio is 35.5% that is higher than speed of regulatory ratio of 13.4% in the crisis period. The findings provide evidence that commercial banks require a higher time to restore their target regulatory ratio in the crisis period than the post-crisis period. The rate of change is in line with prior studies (Bakkar et al., 2019; Fama & French, 2002; Flannery & Rangan, 2006). Table 4 Panel-C contains the finding for the before-crisis period. In the before-crisis period, it was easy for commercial banks to adjust their leverage and regulatory ratios. This may refer to the relaxed monitoring policies of regulators. The results confirm that in the before-crisis period, the rate of leverage is 56.6%, and the regulatory ratio rate is 55.9%. Both ratios are higher than post-crisis

Table 2. Pairwise correlations matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Leverage ratio	1.000													
Regulatory ratio	0.496*	1.000												
Tier-I leverage	0.766*	0.639*	1.000											
Tier-I														regulatory
0.528*	0.912*	0.683*	1.000											
Com. equity														regulatory
0.499*	0.900*	0.631*	0.939*	1.000										
Capital buffer ratio	0.481*	0.983*	0.630*	0.934*	0.917*	1.000								
Tier-I buffer ratio	0.474*	0.957*	0.630*	0.947*	0.924*	0.982*	1.000							
Common equity buffer	0.504*	0.922*	0.631*	0.926*	0.984*	0.922*	0.923*	1.000						
Profit ability	0.062*	0.069*	0.081*	0.044*	0.083*	0.062*	0.054*	0.087*	1.000					
Liquidity	0.036*	0.181*	0.113*	0.193*	0.184*	0.184*	0.177*	0.181*	-0.074*	1.000				
Loan growth	-0.084*	-0.447*	-0.055*	-0.470*	-0.458*	-0.443*	-0.435*	-0.459*	0.034*	-0.151*	1.000			
Bank size	0.134*	-0.101*	-0.081*	-0.137*	-0.158*	-0.099*	-0.117*	-0.155*	-0.040*	-0.064*	-0.038*	1.000		
Economic growth	0.018*	0.035*	0.057*	0.048*	0.036*	0.035*	0.046*	0.036*	0.166*	-0.061*	0.005	-0.024*	1.000	

(Continued)

Table 2. (Continued)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Inflation rate	-0.097*	-0.105*	-0.088*	-0.102*	-0.109*	-0.113*	-0.107*	-0.105*	0.132*	-0.193*	0.083*	-0.127*	0.546*	1.000

* shows significance at the.05 level

Table 3. Findings for the full sample of commercial banks. Dependent variable ratios: Leverage ratio, tier-I leverage ratio, regulatory ratio, tier-I regulatory ratio, common equity regulatory ratio

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Leverage ratio	Tier-I leverage	Regulatory ratio	Tier-I Regulatory ratio	Common equity regulatory ratio
Logged Dependent	0.815*** (0.025)	0.846*** (0.029)	0.774*** (0.037)	0.828*** (0.028)	0.801*** (0.027)
Profitability	−0.239*** (0.048)	−0.357*** (0.056)	−0.357*** (0.078)	−0.292*** (0.050)	−0.145*** (0.052)
Liquidity	−0.014*** (0.004)	−0.017*** (0.004)	0.050*** (0.006)	0.039*** (0.004)	0.045*** (0.004)
Loans growth	−0.008*** (0.001)	−0.012*** (0.001)	−0.031*** (0.002)	−0.021*** (0.002)	−0.022*** (0.002)
Bank size	0.001*** (0.000)	−0.000*** (0.000)	−0.001*** (0.000)	−0.001*** (0.000)	−0.001*** (0.000)
Economic growth	0.013* (0.008)	0.042*** (0.008)	−0.005 (0.014)	0.001 (0.010)	−0.026*** (0.010)
Inflation rate	0.000** (0.000)	−0.001*** (0.000)	−0.001*** (0.000)	−0.000** (0.000)	−0.000 (0.000)
Constant	0.019*** (0.003)	0.035*** (0.004)	0.070*** (0.009)	0.047*** (0.006)	0.050*** (0.006)
Observations	16,065	16,065	16,065	16,065	16,065
Number of id	945	945	945	945	945
No. of Instrument	9	9	9	9	9
AR (2)	0.261	0.226	0.572	0.417	0.458
Hansen value	0.429	0.087	0.146	0.082	0.524

Robust Standard errors*** p <0.01, ** p <0.05, * p <0.1

and during crisis speed of adjustment. From 2002 to 2006, banks adjusted their capital by using their risk-weighted assets, liquidity, and credit risk. This difference of adjustment indicates that bank managers were not using their profits to boost their capital ratio. They were adjusting their balance sheet assets side structure to boost the capital ratio in the short-run, which became one the major cause of the financial crisis of 2007 and 2009. The bank management knows that banks deal with liquidity and which can easily be used to increase or decrease their balance sheet assets to achieve their target ratio of capital (Lepetit et al., 2015). The results show that there was a lower time required to achieve a total risk-based capital ratio and capital buffer ratio than the post-crisis period. The results for the crisis, before-crisis and post-crisis period have economic significance.

4.5. Findings of sub-categories based on capitalization

Table 5 Panel-A contains the results of well-capitalized banks' capital ratios. The speed of adjustment for leverage are 27.7%, regulatory ratio 31.6%, tier-I regulatory ratio 21.1%, tier-I leverage ratio 19.3% and common equity regulatory ratio 35.3%. Table 5 Panel-B contains the results of adequately capitalized banks capital ratios. The speed of adjustment for leverage are 10.8%, regulatory ratio 19.8%, tier-I regulatory ratio 10.2%, tier-I leverage ratio 15.5% and common equity regulatory ratio 19.1%. Table 5

Table 4. Findings for Before-crisis, During-crisis, and Post-crisis periods of commercial banks. Dependent variable ratios: Leverage ratio, tier-I leverage ratio, regulatory ratio, tier-I regulatory ratio, common equity regulatory ratio

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Leverage ratio	Tier-I leverage	Regulatory ratio	Tier-I Regulatory ratio	Common equity regulatory ratio
Panel-A: Post-crisis results					
Lagged Dependent	0.605***	0.746***	0.580***	0.648***	0.555***
	(0.033)	(0.029)	(0.041)	(0.037)	(0.047)
Panel-B: During-crisis results					
Lagged Dependent	0.641***	0.666***	0.866***	0.784***	0.793***
	(0.078)	(0.309)	(0.309)	(0.037)	(0.357)
Panel-C: Before-crisis results					
Lagged Dependent	0.434***	0.546***	0.441***	0.548***	0.731***
	(0.108)	(0.029)	(0.105)	(0.037)	(0.064)
Constant	0.019***	0.035***	0.070***	0.047***	0.050***
	(0.003)	(0.004)	(0.009)	(0.006)	(0.006)
Observations	16,065	16,065	16,065	16,065	16,065
Number of id	945	945	945	945	945
No. of Instrument	9	9	9	9	9
AR (2)	0.155	0.108	0.168	0.917	0.487
Hansen value	0.095	0.059	0.156	0.387	0.295

Standard errors in parentheses*** p <0.01, ** p <0.05, * p <0.1

Panel-C contains the results of under-capitalized banks' capital ratios. The speed of adjustment for leverage are 18.5%, regulatory ratio 23.8%, tier-I regulatory ratio 22%, tier-I leverage ratio 17.9% and common equity regulatory ratio 23.6%. The speed of adjustment is consistent with the following studies (Abbas & Masood, 2020b; Bakkar et al., 2019; Berger et al., 2008). Well-capitalized banks adjust their regulatory ratio, tier-I regulatory ratio, and common equity regulatory ratios faster than the leverage and tier-I leverage ratios. The findings show that well-capitalized banks use profitability to adjust the leverage ratio and liquidity to manage their regulatory ratios, the findings are consistent with (Abbas & Masood, 2020b; De Jonghe & Öztekin, 2015). The results of adequately capitalized banks show that the speed of adjustment for the regulatory ratio is higher than the leverage ratio findings are similar to Flannery and Rangan (2006). Whereas the rate of the regulatory ratio is consistent with (Fama & French, 2002; Huang & Ritter, 2009).

The results show that undercapitalized banks increase their capital significantly in the last decade, and managers remain busy to secure the desired capital level (De Jonghe & Öztekin, 2015). The results show that the adjustment of the regulatory ratio is faster than the leverage ratio. These results indicate that undercapitalized banks are more fixable to adjust their regulatory capital before than leverage ratio. These results show their economic worth in the sense that undercapitalized banks primarily adjust their required ratio of capital to avoid the regulatory cost. The undercapitalized banks remain tight to adjust their capital ratios due to their operations. The findings explore that well-capitalized banks adjust their regulatory ratios faster than the leverage ratio. The findings of adequately and undercapitalized banks are consistent with adjusting their regulatory ratios faster than leverage ratios. The speed of adjustment of well-capitalized banks is higher than adequately capitalized banks. The pace to adjust capital ratios is higher for

Table 5. Findings of Sub-categories based on the capitalization large of commercial banks. Dependent variable ratios: Leverage ratio, tier-I leverage ratio, regulatory ratio, tier-I regulatory ratio, common equity regulatory ratio

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Leverage ratio	Tier-I leverage	Regulatory ratio	Tier-I Regulatory ratio	Common equity regulatory ratio
Panel-A: Well Capitalized Banks					
Lagged Dependent	0.723***	0.807***	0.684***	0.789***	0.647***
	(0.068)	(0.079)	(0.105)	(0.077)	(0.113)
Panel-B: Adequately Capitalized Banks					
Lagged Dependent	0.892***	0.845***	0.802***	0.898***	0.809***
	(0.115)	(0.105)	(0.089)	(0.080)	(0.071)
Panel-C: Under Capitalized Banks					
Lagged Dependent	0.815***	0.821***	0.762***	0.780***	0.764***
	(0.040)	(0.047)	(0.044)	(0.040)	(0.040)
Profitability	-0.059	-0.156	0.068	-0.030	0.315*
	(0.128)	(0.107)	(0.238)	(0.093)	(0.178)
Liquidity	-0.011	-0.015**	0.009	0.012	0.011
	(0.010)	(0.007)	(0.020)	(0.008)	(0.011)
Loan growth	-0.005**	-0.008***	-0.023***	-0.012***	-0.013***
	(0.002)	(0.002)	(0.004)	(0.002)	(0.003)
Bank size	0.001	0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Economic growth	0.019	0.049**	-0.059	-0.030	-0.037
	(0.021)	(0.020)	(0.037)	(0.020)	(0.023)
Inflation rate	0.000	-0.001	0.000	-0.000	-0.001*
	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)
Constant	0.029***	0.028***	0.063***	0.041***	0.063***
	(0.009)	(0.009)	(0.022)	(0.014)	(0.020)
Observations	2,482	2,482	2,482	2,482	2,482
Number of id	146	146	146	146	146
No. of Inst.	9	9	9	9	9
AR (2)	0.717	0.572	0.726	0.936	0.999
Hansen value	0.789	0.332	0.579	0.984	0.440

Standard errors in parentheses*** p <0.01, ** p <0.05, * p <0.1

undercapitalized banks than adequately capitalized banks. The findings remain in line with the results of (Abbas & Masood, 2020a, 2020b; Bakkar et al., 2019).

4.6. Findings of sub-categories based on liquidity

Table 6 Panel-A contains the results for high liquid commercial banks. The results show that the speed of adjustment of the leverage ratio is 19.9%, which is lower than the regulatory ratio of 25.1% that means liquid banks require 2.3 years to restore their target regulatory ratio. The findings are in line with (Abbas &

Masood, 2020b; Bakkar et al., 2019). Table 5 Panel-B reports the outcomes of low liquid banks. The pace of adjustment for low liquid banks are leverage ratio 17.5%, tier-I leverage ratio 14.8%, regulatory ratio 20.5%, tier-I regulatory ratio 15.2%, and common equity regulatory ratio 17%. The findings confirm that low liquid banks adjust their regulatory ratios faster than leverage ratios, consistent with (Abbas & Masood, 2020b). In comparison, the high liquid banks adjust their capital ratios fast than low liquid banks after an economic shock (Abbas & Masood, 2020a; Fama & French, 2002). The high liquid banks are more concerned about adjusting their regulatory ratios. The high liquid banks required 3.12 years for leverage, 3.7 years for regulatory ratio similar to (Leary & Roberts, 2005) (Lepetit et al., 2015). The high liquid banks adjust their capital ratios by adjusting their assets side, particularly long-term loans; other factors remain constant, findings are in line with (Huang & Ritter, 2009; Memmel & Raupach, 2010). The findings indicate that low liquid banks needed a higher time to adjust their capital ratio than high liquid banks. Low liquid

Table 6. Findings of sub-categories based on the liquidity of large commercial banks. Dependent variable ratios: Leverage ratio, tier-I leverage ratio, regulatory ratio, tier-I regulatory ratio, common equity regulatory ratio

VARIABLES	(1) Leverage ratio	(2) Tier-I leverage	(3) Regulatory ratio	(4) Tier-I Regulatory ratio	(5) Common equity regulatory ratio
Panel-A: High Liquid Banks					
Lagged Dependent	0.801***	0.831***	0.749***	0.793***	0.769***
	(0.036)	(0.043)	(0.044)	(0.034)	(0.039)
Panel-B: Low Liquid Banks					
Lagged Dependent	0.825***	0.852***	0.795***	0.848***	0.830***
	(0.035)	(0.039)	(0.059)	(0.041)	(0.036)
Profitability	-0.201***	-0.409***	-0.412***	-0.289***	-0.050
	(0.066)	(0.085)	(0.112)	(0.071)	(0.077)
Liquidity	-0.017***	-0.024***	0.025***	0.023***	0.033***
	(0.005)	(0.005)	(0.008)	(0.006)	(0.006)
Loans growth	-0.009***	-0.015***	-0.039***	-0.027***	-0.027***
	(0.001)	(0.001)	(0.003)	(0.002)	(0.002)
Bank size	0.000	-0.001***	-0.002***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Economic growth	0.003	0.043***	0.002	0.007	-0.037**
	(0.010)	(0.010)	(0.018)	(0.013)	(0.014)
Inflation rate	0.000**	-0.001***	-0.001***	-0.001***	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.028***	0.042***	0.094***	0.065***	0.069***
	(0.006)	(0.007)	(0.013)	(0.009)	(0.010)
Observations	7,973	7,973	7,973	7,973	7,973
Number of id	469	469	469	469	469
No. of Inst.	9	9	9	9	9
AR (2)	0.604	0.572	0.974	0.916	0.969
Hansen value	0.290	0.106	0.712	0.328	0.058

Standard errors in parentheses*** p <0.01, ** p <0.05, * p <0.1

banks use profitability to adjust their leverage ratio, whereas adjusts credit risk and liquidity to adjust regulatory ratios. The results show that assets diversification is also an important factor in the adjustment of capital ratios of low liquid banks; other factors remain unchanged.

5. Robustness checks

We use several robustness checks to validate our empirical findings. In first, we use alternative econometric techniques to test the speed of adjustment. In second, we opt for the alternative capital ratios to research the conclusions. We use panel OLS and find consistent results in most cases except for adequately and low liquid banks' results for tier-I leverage and tier-I regulatory ratios. However, to save the space, the results for panel OLS are not reported but available if needed. Secondly, we use the capital buffer proxy to confirm that baseline findings for the large commercial banks. The study uses capital buffer ratio, tier-I buffer ratio and common equity buffer ratio. We expect the higher time for these ratios after an economic shock. Because after an economic shock, in first preference banks try to adjust their regulatory ratio and then move to hold a capital buffer of any kind. The findings are provided in [Tables 7 and 8](#), which indicate that the findings are in line with the expectations.

Table 7. Findings of large commercial banks for capital buffer ratios.—dependent variables capital buffer ratio, tier-I buffer ratio, common equity buffer ratio

	(1)	(2)	(3)	(1)	(2)	(3)
VARIABLES	Capital buffer	Tier-I buffer	Common equity buffer	Capital buffer	Tier-I buffer	Common equity buffer
Full Sample Results			Well Capitalized Banks Results			
Lagged Dependent	0.791*** (0.028)	0.802*** (0.028)	0.797*** (0.026)	0.659*** (0.099)	0.701*** (0.106)	0.773*** (0.081)
Profitability	−0.314*** (0.064)	−0.303*** (0.057)	−0.178*** (0.068)	0.004 (0.167)	0.013 (0.138)	0.380* (0.214)
Liquidity	0.042*** (0.005)	0.037*** (0.004)	0.053*** (0.005)	0.003 (0.015)	0.002 (0.012)	0.025* (0.014)
Loan growth	−0.024*** (0.002)	−0.021*** (0.001)	−0.026*** (0.002)	−0.014*** (0.003)	−0.010*** (0.002)	−0.016*** (0.003)
Bank size	−0.001*** (0.000)	−0.001*** (0.000)	−0.001*** (0.000)	0.000 (0.001)	0.000 (0.001)	−0.000 (0.001)
Economic growth	−0.007 (0.011)	0.004 (0.010)	−0.028** (0.011)	−0.061** (0.027)	−0.051** (0.024)	−0.031 (0.030)
Inflation rate	−0.001*** (0.000)	−0.000*** (0.000)	−0.000 (0.000)	0.000 (0.001)	0.000 (0.001)	−0.002** (0.001)
Constant	0.042*** (0.004)	0.038*** (0.004)	0.047*** (0.005)	0.032*** (0.012)	0.028** (0.012)	0.039*** (0.013)
Observations	16,065	16,065	16,065	2,482	2,482	2,482
Number of id	945	945	945	146	146	146
No. of Ins.	9	9	9	9	9	9
AR (2)	0.448	0.359	0.646	0.868	0.479	0.334
Hansen value	0.245	0.060	0.236	0.407	0.352	0.570

Standard errors in parentheses*** p < 0.01, ** p < 0.05, * p < 0.1

Table 8. Findings of large commercial banks for capital buffer ratios. Dependent variables capital buffer ratio, tier-I buffer ratio, common equity buffer ratio

	(1)	(2)	(3)	(1)	(2)	(3)
VARIABLES	Capital buffer	Tier-I buffer	Common equity buffer	Capital buffer	Tier-I buffer	Common equity buffer
	Panel -A: Adequately Capitalized banks			Under Capita lized banks		
Lagged Dependent	0.838***	0.860***	0.798***	0.757***	0.754***	0.764***
	(0.078)	(0.076)	(0.068)	(0.036)	(0.037)	(0.038)
	Panel -B: High Liquid Banks			Low Liquid Banks		
Lagged Dependent	0.770***	0.774***	0.779***	0.806***	0.822***	0.817***
	(0.033)	(0.034)	(0.037)	(0.045)	(0.043)	(0.035)
Profitability	0.026	0.073	-0.014	-0.322***	-0.336***	-0.154
	(0.178)	(0.153)	(0.184)	(0.112)	(0.102)	(0.126)
Liquidity	0.028**	0.023*	0.037**	0.050***	0.046***	0.063***
	(0.014)	(0.012)	(0.014)	(0.010)	(0.009)	(0.010)
Loan growth	-0.022***	-0.018***	-0.027***	-0.035***	-0.031***	-0.034***
	(0.004)	(0.004)	(0.004)	(0.003)	(0.002)	(0.003)
Bank size	-0.001***	-0.001***	-0.001**	-0.001**	-0.001**	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Economic growth	0.016	0.005	-0.014	0.017	0.028	-0.018
	(0.032)	(0.031)	(0.037)	(0.022)	(0.021)	(0.023)
Inflation rate	-0.002***	-0.002***	-0.001**	-0.001***	-0.001***	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Constant	0.045***	0.038***	0.053***	0.052***	0.051***	0.053***
	(0.010)	(0.010)	(0.012)	(0.006)	(0.006)	(0.007)
Observations	1,819	1,819	1,819	4,265	4,265	4,265
Number of id	107	107	107	251	251	251
No. of inst.	9	9	9	9	9	9
AR (2)	0.254	0.154	0.839	0.850	0.969	0.848
Hansen value	0.507	0.302	0.487	0.934	0.477	0.295

Robust Standard errors in parentheses*** p < 0.01, ** p < 0.05, * p < 0.1

6. Conclusion

This study aims to explore the speed of adjustment of leverage and regulatory ratios of large commercial banks over a prolonged period from 2002 to 2019. The study uses a two-step system GMM approach to trace a pace of adjustment for different capital ratios. The findings explore that large commercial banks adjust their regulatory capital ratios faster than their leverage ratios. This study concludes that the average speed of adjustment for the leverage ratio is 18.5%, the tier-I leverage ratio is 15.4%, the regulatory ratio is 22.6%, the tier-I regulatory ratio is 17.2%, and the common equity regulatory ratio is 19.9%. The speed of adjustment explores that adjustment of the leverage ratio, tier-I leverage ratio, regulatory ratio, tier-I

regulatory ratio, and common equity regulatory ratio is partial and represents the gap between actual and target ratio is approximately close to 3 and 4 years to remove the effect of shocks.

The speed of adjustment is different in pre, pro, and post-crisis periods to restore equilibrium. The findings show that the pace of adjustment is higher in the before-crisis than during and post-crisis periods. The banks use equity to adjust their capital ratios because, in crisis banks, operations remain limited, and due to that, the contribution of profits to boost capital ratios suffers (Abbas & Masood, 2020b). The findings provide evidence that the speed of adjustment is heterogeneous for well, adequately and under-capitalized banks. The pace of adjustment of well-capitalized banks is higher than adequately capitalized banks to adjust their capital ratios. The speed of adjustment of undercapitalized banks is higher than adequately capitalized banks. Higher liquid banks require lower time to reach their target capital ratios than low liquid banks. However, high liquid banks adjust their regulatory ratios faster than their leverage ratio. The findings remain robust for using alternative proxies and panel OLS technique.

It is recommended that the regulators should consider the speed of adjustment for building commercial banks' bank capital in the USA. It is also suggested that regulators should consider the commercial banks according to their capitalization ratios for better decision making. The heterogeneity in findings has implications for policymakers in commercial banking to improve the conventional financial system. The findings help regulators to provide evidence for leverage and regulatory ratios. Besides, the regulators and policymakers may consider well, adequately, undercapitalized, high, and low liquid banks while formulating the guidelines for regulatory capital ratios.

Our results remain limited to the analysis of quantitative data only for large commercial banks of the USA. Here, we are still unable to collect data for a longer period and for only large commercial banks listed at FDIC as on 31 December 2018. Future research could be conducted to study the speed of adjustment of leverage and regulatory ratios by incorporating the mediating/moderating role of other economic variables and regulations to get better in-depth insights. Furthermore, future research could focus on the speed of adjustment of leverage and regulatory ratios by incorporating the investment banks, saving banks, and smaller commercial banks for more in-depth insights.

Funding

The authors received no direct funding for this research.

Author details

Faisal Abbas¹
 E-mail: faisalabbaspcc@gmail.com
 ORCID ID: <http://orcid.org/0000-0002-6109-6777>
 Shoaib Ali²
 E-mail: Shoaib0819@yahoo.com
 ORCID ID: <http://orcid.org/0000-0001-5954-9987>
 Imran Yousaf²
 ORCID ID: <http://orcid.org/0000-0003-1968-293X>
 Sohail Rizwan³
 E-mail: sohaildotrizwan@gmail.com
 ORCID ID: <http://orcid.org/0000-0002-9712-8494>
¹ School of Accountancy and Finance, The University of Lahore, Lahore, Pakistan.
² Air University School of Management, Air University, Islamabad, Pakistan.
³ Capital University of Science and Technology, Islamabad, Pakistan..

Citation information

Cite this article as: How commercial banks adjust capital ratios: Empirical evidence from the USA?, Faisal Abbas, Shoaib Ali, Imran Yousaf & Sohail Rizwan, *Cogent Business & Management* (2020), 7: 1859848.

References

- Abbas, F., & Ali, S. (2020). Dynamics of bank capital ratios and risk-taking: Evidence from US commercial banks. *Cogent Economics & Finance*, 8(1), 1838693. <https://doi.org/10.1080/23322039.2020>
- Abbas, F., Butt, S., Masood, O., & Javaria, K. (2019). The effect of bank capital buffer on bank risk and net interest margin: Evidence from the US. *Studies*, 5(2), 72–87. <https://doi.org/10.20448/807.5.2.72.87>
- Abbas, F., Iqbal, S., & Aziz, B. (2019). The impact of bank capital, bank liquidity and credit risk on profitability in post-crisis period: A comparative study of US and Asia. *Cogent Economics & Finance*, 7(1), 1605683. <https://doi.org/10.1080/23322039.2019.1605683>
- Abbas, F., Iqbal, S., & Aziz, B. (2020). The role of bank liquidity and bank risk in determining bank capital: Empirical analysis of asian banking industry. *Review of Pacific Basin Financial Markets and Policies*, 23(03), 2050020. <https://doi.org/10.1142/S0219091520500204>
- Abbas, F., & Masood, O. (2020a). How banks adjust capital ratios: The most recent empirical facts. *Quantitative Finance and Economics*, 4(3), 412. <https://doi.org/10.3934/QFE.2020019>
- Abbas, F., & Masood, O. (2020b). How do large commercial banks adjust capital ratios: Empirical evidence from the US? *Economic Research-Ekonomika Istraživanja*, 33(1), 1849–1866. <https://doi.org/10.1080/1331677X.2020.1763823>

- Ali, S., Shah, S. Z. A., & Chughtai, S. (2019). The role of bank competition in influencing bank liquidity creation: Evidence from China. *Journal of Business & Economics*, 11(1), 21–34. Retrieved from <https://search.proquest.com/scholarly-journals/role-bank-competition-influencing-liquidity/docview/2298731452/se-2?accountid=135034>
- Ali, S., Yousaf, I., & Naveed, M. (2020). Role of credit rating in determining capital structure: Evidence from non-financial sector of Pakistan. *Studies of Applied Economics*, 38(3), 3. <https://doi.org/10.25115/eea.v38i3.3066>
- Allahrakha, M., Cetina, J., & Munyan, B. (2018). *Do higher capital standards always reduce bank risk? The impact of the Basel leverage ratio on the US triparty repo market*. Elsevier.
- Bakkar, Y., De Jonghe, O., & Tarazi, A. (2019). Does banks' systemic importance affect their capital structure and balance sheet adjustment processes? *Journal of Banking & Finance*, 105518. <https://doi.org/10.1016/j.jbankfin.2019.03.002>
- Berger, A. N., & Bouwman, C. H. (2013). How does capital affect bank performance during financial crises? *Journal of Financial Economics*, 109(1), 146–176. <https://doi.org/10.1016/j.jfineco.2013.02.008>
- Berger, A. N., DeYoung, R., Flannery, M. J., Lee, D., & Öztekin, Ö. (2008). How do large banking organizations manage their capital ratios? *Journal of Financial Services Research*, 34(2–3), 123–149. <https://doi.org/10.1007/s10693-008-0044-5>
- Bitar, M., Pukthuanthong, K., & Walker, T. (2018). The effect of capital ratios on the risk, efficiency and profitability of banks: Evidence from OECD countries. *Journal of International Financial Markets, Institutions and Money*, 53, 227–262. <https://doi.org/10.1016/j.intfin.2017.12.002>
- Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), 115–143. [https://doi.org/10.1016/S0304-4076\(98\)00009-8](https://doi.org/10.1016/S0304-4076(98)00009-8)
- Chortareas, G. E., Girardone, C., & Ventouri, A. (2012). Bank supervision, regulation, and efficiency: Evidence from the European Union. *Journal of Financial Stability*, 8(4), 292–302. <https://doi.org/10.1016/j.jfs.2011.12.001>
- Cohen, B. H., & Scatigna, M. (2016). Banks and capital requirements: Channels of adjustment. *Journal of Banking & Finance*, 69, S56–S69. <https://doi.org/10.1016/j.jbankfin.2015.09.022>
- De Jonghe, O., & Öztekin, Ö. (2015). Bank capital management: International evidence. *Journal of Financial Intermediation*, 24(2), 154–177. <https://doi.org/10.1016/j.jfi.2014.11.005>
- Dermine, J. (2015). Basel III leverage ratio requirement and the probability of bank runs. *Journal of Banking & Finance*, 53, 266–277. <https://doi.org/10.1016/j.jbankfin.2014.12.007>
- Ding, D., & Sickles, R. C. (2018). Frontier efficiency, capital structure, and portfolio risk: An empirical analysis of U.S. banks. *BRQ Business Research Quarterly*, 21(4), 262–277. <https://doi.org/10.1016/j.brq.2018.09.002>
- Ding, D., & Sickles, R. C. (2019). Capital regulation, efficiency, and risk taking: A spatial panel analysis of US banks. *Panel Data Econometrics*, 405–466. Elsevier. <https://doi.org/10.1016/B978-0-12-815859-3.00013-5>
- Drobetz, W., & Wanzenried, G. (2006). What determines the speed of adjustment to the target capital structure? *Applied Financial Economics*, 16(13), 941–958. <https://doi.org/10.1080/09603100500426358>
- Fama, E. F., & French, K. R. (2002). Testing trade-off and pecking order predictions about dividends and debt. *The Review of Financial Studies*, 15(1), 1–33. <https://doi.org/10.1093/rfs/15.1.1>
- Färe, R., Grosskopf, S., & Weber*, W. L. (2004). The effect of risk-based capital requirements on profit efficiency in banking. *Applied Economics*, 36(15), 1731–1743. <https://doi.org/10.1080/0003684042000218525>
- Flannery, M. J., & Hankins, K. W. (2013). Estimating dynamic panel models in corporate finance. *Journal of Corporate Finance*, 19, 1–19. <https://doi.org/10.1016/j.jcorpfin.2012.09.004>
- Flannery, M. J., & Rangan, K. P. (2006). Partial adjustment toward target capital structures. *Journal of Financial Economics*, 79(3), 469–506. <https://doi.org/10.1016/j.jfineco.2005.03.004>
- Gropp, R., & Heider, F. (2010). The determinants of bank capital structure. *Review of Finance*, 14(4), 587–622. <https://doi.org/10.1093/rof/rfp030>
- Guidara, A., Soumaré, I., & Tchana, F. T. (2013). Banks' capital buffer, risk and performance in the Canadian banking system: Impact of business cycles and regulatory changes. *Journal of Banking & Finance*, 37(9), 3373–3387. <https://doi.org/10.1016/j.jbankfin.2013.05.012>
- Huang, R., & Ritter, J. R. (2009). Testing theories of capital structure and estimating the speed of adjustment. *Journal of Financial and Quantitative Analysis*, 44(2), 237–271. <https://doi.org/10.1017/S0022109009090152>
- Jokipii, T., & Milne, A. (2011). Bank capital buffer and risk adjustment decisions. *Journal of Financial Stability*, 7(3), 165–178. <https://doi.org/10.1016/j.jfs.2010.02.002>
- Leary, M. T., & Roberts, M. R. (2005). Do firms rebalance their capital structures? *The Journal of Finance*, 60(6), 2575–2619. <https://doi.org/10.1111/j.1540-6261.2005.00811.x>
- Lee, -C.-C., & Hsieh, M.-F. (2013). The impact of bank capital on profitability and risk in Asian banking. *Journal of International Money and Finance*, 32, 251–281. <https://doi.org/10.1016/j.jimonfin.2012.04.013>
- Lepetit, L., Saghi-Zedek, N., & Tarazi, A. (2015). Excess control rights, bank capital structure adjustments, and lending. *Journal of Financial Economics*, 115(3), 574–591. <https://doi.org/10.1016/j.jfineco.2014.10.004>
- Mimmel, C., & Raupach, P. (2010). How do banks adjust their capital ratios? *Journal of Financial Intermediation*, 19(4), 509–528. <https://doi.org/10.1016/j.jfi.2009.10.002>
- Öztekin, Ö., & Flannery, M. J. (2012). Institutional determinants of capital structure adjustment speeds. *Journal of Financial Economics*, 103(1), 88–112. <https://doi.org/10.1016/j.jfineco.2011.08.014>
- Yousaf, I., Ali, S., & Hassan, A. (2019). Effect of family control on corporate dividend policy of firms in Pakistan. *Financial Innovation*, 5(1), 42. <https://doi.org/10.1186/s40854-019-0158-9>
- Yousaf, I., Ali, S., & Shah, S. Z. A. (2018). Herding behavior in Ramadan and financial crises: The case of the Pakistani stock market. *Financial Innovation*, 4(1), 16. <https://doi.org/10.1186/s40854-018-0098-9>



© 2020 The Author(s). This open access article is distributed under a Creative Commons Attribution (CC-BY) 4.0 license.

You are free to:

Share — copy and redistribute the material in any medium or format.

Adapt — remix, transform, and build upon the material for any purpose, even commercially.

The licensor cannot revoke these freedoms as long as you follow the license terms.

Under the following terms:

Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made.

You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

No additional restrictions

You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits.



***Cogent Business & Management* (ISSN: 2331-1975) is published by Cogent OA, part of Taylor & Francis Group.**

Publishing with Cogent OA ensures:

- Immediate, universal access to your article on publication
- High visibility and discoverability via the Cogent OA website as well as Taylor & Francis Online
- Download and citation statistics for your article
- Rapid online publication
- Input from, and dialog with, expert editors and editorial boards
- Retention of full copyright of your article
- Guaranteed legacy preservation of your article
- Discounts and waivers for authors in developing regions

Submit your manuscript to a Cogent OA journal at www.CogentOA.com

