IMPACT OF BASEL III ON INVESTMENT DECISIONS OF COMMERCIAL BANKS IN PAKISTAN

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Abstract
The effect of financial regulations on banks' lending behavior has been analyzed extensively in recent years, particularly in the case of developing countries. The concern arises mainly because government securities are considered as risk-free assets in financial regulation, prompting banks to hold them to keep a balanced portfolio. This research paper analyses the impact of financial regulations on Pakistani commercial banks' investment behavior in government securities, explicitly focusing on the effect of long-term liquidity requirements. The data has been analyzed using the Generalized Method of Moments method. The results suggest that Risk-Based Capital and long-term stable liquidity requirements incentivize banks to invest in government securities. However, the leverage ratio negatively affects bank investment in government securities. Additionally, the study highlights the importance of improving asset quality and increasing banks' market share to enhance their capacity for investment in government assets. The study also reveals that fiscal deficit amplifies the demand for funds, which increases bank investment in sovereign securities.

Key Words: Bank Investment in Government Securities, Basel III, Capital Adequacy Ratio, Net Stable Funding Ratio, Leverage Ratio
Research Article: JEL Classification: G01, G21, G28

1. Introduction:

It is evident from past analysis that a financial crisis significantly affects price levels. It also damages the real economy and the financial system. Furthermore, when the crisis relates to real estate, it takes longer to adjust prices in the economy; thus, growth is seriously affected (Allen & Carletti, 2009). Following the 2008 global financial crisis, the Basel Committee of Banking Supervision began enhancing its liquidity and capital requirements to save banks from such failures. Financial regulations can reduce the probability of crisis by demanding that banks keep a balanced portfolio to control their exposure to risky assets (BCBS, 2010). The aspect of risk management is vital because, nowadays, bank management's incentives are primarily based on maximizing investment return. So, management can increase banks' profits by lending funds to profitable ventures. However, high risks usually accompany highly profitable opportunities (Rajan, 2006).

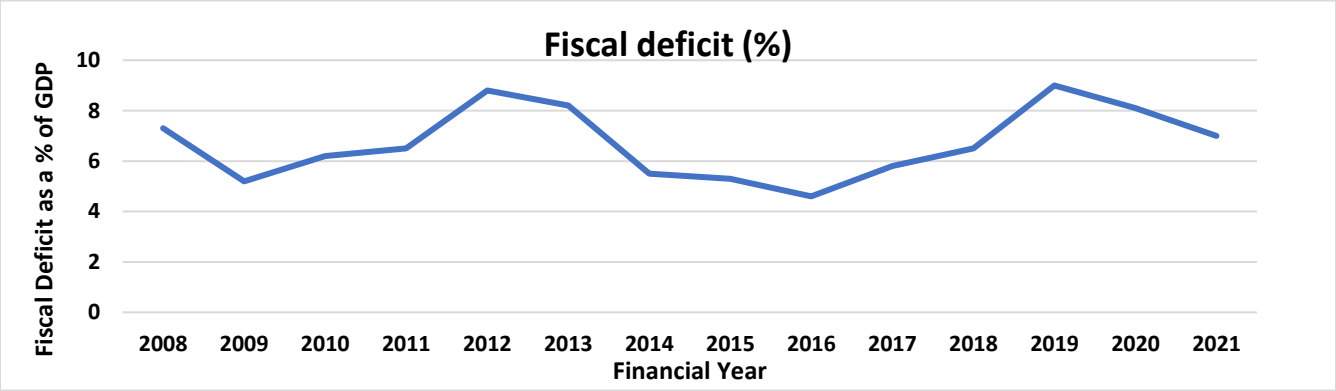
In assessing financial asset risks, financial regulations treat government securities as risk-free instruments that help banks balance their risk profile. However, the risk-free nature of sovereign bonds may distort banks' investment decisions. The favourable treatment of financial regulations towards government bonds incentivises banks to increase their exposure to them (Andreasen et al., 2015). This mainly happens if banks' equity is significantly low, and they need help to raise new equity as it is a costly option for them. So, the banks may compromise on profitable opportunities because it reduces their chances of violating the capital adequacy requirement (Heuvel, 2002). A risk-based capital approach can be considered a regulatory cost for banks, which is high for the banks with greater risk exposure and low for the banks with less risky assets. In this way, banks' management gets inclined to lend more towards less risky instruments to reduce banks' overall risk-weighted assets. This shift will likely move banks' asset portfolios from risky advances to government securities as they are the least risky with zero-weighted risk factors (Berger & Udell,1994).

The studies (Emran & Farazi, 2009) show that in recent years, banks have preferred to invest in sovereign securities, especially in the case of developing countries. The question is, despite low returns, why are banks still investing money in government securities? Bouis (2019) identifies financial regulations as the prime reason for motivating banks to invest in government securities and keep low-risk-weighted assets. The private sector showed their concerns over banks' lending behaviour as they increasingly lend in government securities. It results in less credit being available to the private sector, resulting in a slowing down of economic growth (Wasim et al., 2023). However, Rodrigues (1993) argued that though the risk-based capital standards may have influenced some bank decisions, this effect seems important only for a relatively small fraction of banks with weak capital positions. However, a decline in the growth in economic activity appears partially responsible for the building-up of government security. The issue of growth is a problem with developing economies that are unable to increase their revenues because the set of policy instruments available is limited, resulting in a persistent fiscal deficit. Hasan et al. (1999) added that in many developing countries, the accumulation of fiscal deficits leads to a high domestic debt burden, compounded by interest payments, making it difficult for the government to repay the principal amount and consequently, previous debts are rolled over (Haque et al., 2023).

1.1. Pakistan's fiscal deficit problem and shift of bank lending towards government sector

Pakistan is also facing a persistent fiscal deficit problem, resulting in an increase in public domestic debt. Table A in the appendix and Figure 1 below shows the fiscal deficit position of Pakistan from 2008 to 2021.

Figure 1 Trend of Fiscal deficit of Pakistan



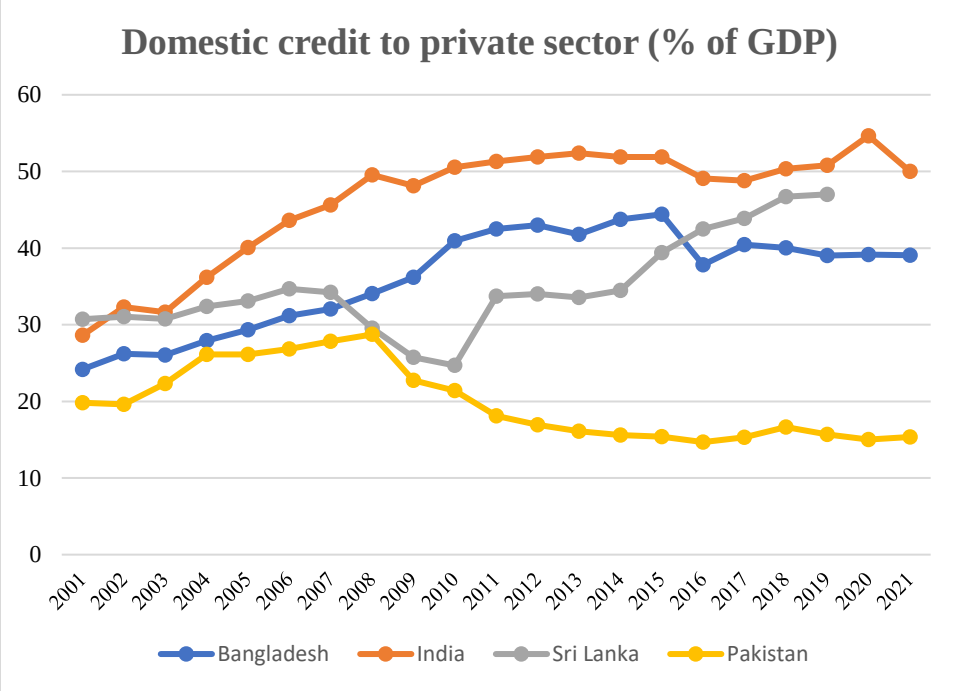
Source: Illustrated by authors, data extracted from Pakistan Economic Survey 2020-21[1]

[1] Data Source: https://www.finance.gov.pk/survey/chapters_21/04-Fiscal.pdf

Theoretical foundations suggest that governments can finance fiscal deficits through various methods, including currency printing, using foreign reserves, and borrowing from external and domestic sources. However, the consequences of each method must be carefully considered. Money printing can lead to an increase in money supply, resulting in demand-pull inflation. Borrowing from domestic sources can divert the flow of funds towards the government and decrease private funding (Fischer & Easterly, 1990; Ali & Khalid, 2019; Serfraz & Anwar, 2009)

The trend of Pakistan's total public debt[2] during the past 40 years has been shown in Appendix Figure A1. It depicts that there has been a massive increase in public debt during the last few years. In Pakistan, domestic borrowing can be done through banking and non-banking sources.

Figure 2: Domestic credit to the private sector

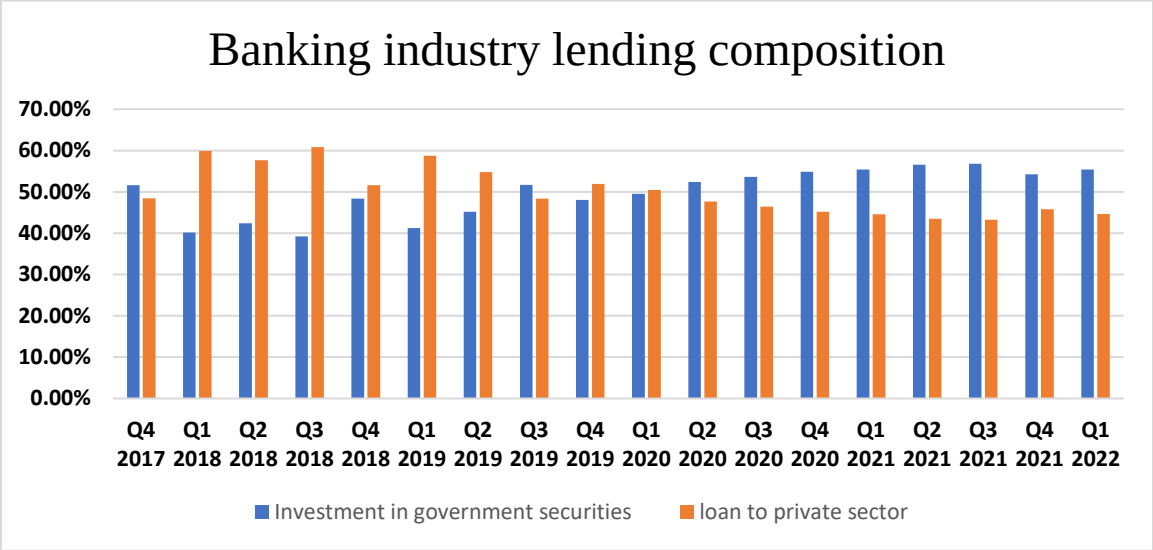


In Figure 2 above, it can be observed that since 2010, less than 20% of credit has been given to the private sector. This is alarming as Zaheer et al. (2017) concluded that in Pakistan, a notable correlation has been observed between government borrowing from the banking system and private sector credit growth. For each one percentage point increase in government borrowing, there is an average decline of 8 basis points in private sector credit growth over a four-month period. This excessive investment in government securities results in a crowding out effect which hamper economic growth.

In Figure 3 below, Pakistan's banking industry lending composition is mentioned, where a shift of bank lending towards the government sector despite low profit can be observed.

[2] Sum of domestic debt and external debt

Figure 3: Banking industry lending composition



Source: Illustrated by authors, data extracted from financial statement of Banks 2020-21[3]

1.2. Theoretical background for Basel regulations

The primary objective of Basel regulations is to strengthen the banking industry regulation, supervision and risk management practices. The Capital Adequacy Ratio (CAR) has been introduced in Basel regulations to mainly deal with the issue of credit risk because banks' financial health is the primary concern for regulatory authorities. Banks are required to maintain a certain level of capital to absorb losses and secure depositors from financial damage. Highly capitalised banks can absorb output shocks better than less-capitalised ones because they hold a higher capital buffer. The mandatory capital requirements have forced banks to increase their capital buffer to reduce the risk (Hunjra et al., 2020; Gambacorta, 2003). In challenging economic circumstances, the requirement to meet capital adequacy may encourage banks to invest in government securities rather than the private sector to reduce their risk-weighted assets and improve their capital requirement (Berger & Udell,1994).

The second variable of Basel III regulation is the banks' Leverage ratio (LR). LR is a non-risk-based capital requirement in the Basel III framework. Karmakar & Gambacorta (2017) suggested that continuous monitoring of bank leverage is essential as there are chances that banks may engage in excessive leverage while continuing to maintain a high risk-based capital ratio. This was among the prime reasons behind the 2008 financial crisis. Therefore, the requirement for banks to maintain a non-risk-based leverage ratio supports the Risk-Based Capital requirement.

The third variable of Basel III regulation is the bank's Net Stability Funding Ratio (NSFR). It has been developed to ensure the bank's stable liquidity creation and to limit the undue maturity transformation risk (Gobat et al., 2014). Studies have shown that there is a high probability that excessive maturity transformation can result in bank failure (Brunnermeier & Oehmke, 2013; Fungacova (2021). There is a high probability that banks which are more constrained concerning regulatory requirements reduce their lending considerably more compared to the less constrained ones (Behn et al., 2019).

Research has been done in the past on financial regulations and their impact on financial institutions' stability in developed countries, primarily based on the European region (Naceur et al., 2018; Bridges et al.,2014; Andrle et al., 2019). Research in Pakistan mainly focuses on bank lending to

[3] Data Source: https://www.finance.gov.pk/survey/chapters_21/04-Fiscal.pdf

the private sector. Past studies indicate that Pakistani commercial banks have taken measures to mitigate portfolio risk by responding to risk-based capital requirements. This response has led to a reduction in their lending to the private sector, implying that strict financial regulations are exerting adverse effects on bank lending to private enterprises in Pakistan (Ashraf et al., 2016; Bashir & Hassan, 2017; Anees et al. (2023). The need here is to analyse whether financial regulations, especially risk-based financial requirements, are incentivising banks to increase their investment in government securities to balance their risk portfolio. It is important to understand the role financial regulation is plays in the bank's investment in sovereign investment as it reduces private lending (Zaheer et al., 2017)

The research concludes that risk-based capital requirements and fiscal deficit are the main factors driving banks' investment in government securities. The risk-based capital financial regulations are increasing the concentration of banks' assets in government securities as it earns profit without increasing their risk profile, typically when the economy is struggling. The second conclusion is that the increase in fiscal deficit increases government reliance on the banking sector to meet its deficit budget.

This research offers some original insights into the existing body of literature. No research has been made yet to explore the impact of Basel's long-term liquidity ratio (NSFR) on Pakistani commercial banks' investment in government securities. Past literature on Basel capital regulations has mainly focused on bank lending to the private sector, with a major focus on Western countries and limited attention given to Asian economies. Since the Basel reforms are applied uniformly, a research gap exists concerning the impact of Basel regulations on the banks' investment behaviour in Pakistan.

1.3. Introduction of Basel Regulations in Pakistan

SBP started Basel I implementation in 1997[4], requiring banks to hold a minimum CAR equal to 8% against their risk-weighted assets. Calculations of risk-weighted assets were based on credit risks only. However, it was revised in 2004, when SBP demanded that banks consider market risk along with credit risk in calculating risk-weighted assets.

SBP implemented Basel II in 2008, with changes made in the calculation of risk-weighted assets of CAR. Banks were instructed to include operational risk in the calculation of risk-weighted assets, along with credit risks and market risks.

Basel III implementation was phased from December 31, 2013, to December 31, 2016. In the first phase of Basel III, a revision of the requirement of the Capital Adequacy Ratio has been made. As shown in Appendix Table B, an additional component of the Capital conservation buffer (CCB) has been added to the basic requirement of the Capital adequacy ratio. Along with CCB, the Leverage ratio, a non-risk-based capital ratio, has been introduced[5]. In the second phase[6], NSFR and Liquidity Coverage Ratio (LCR) were introduced in Basel III to deal with liquidity issues. NSFR mainly deals with long-term liquidity risks, and LCR deals with short-term liquidity risks.

2. Methodology and Data

This research investigates the impact of financial regulations on bank investments in government securities. An unbalanced dynamic panel dataset consisting of 23 commercial banks for 16 quarters, from Q4 2017 to Q3 2021, has been used in this research. The study considers the Breusch Pagan test to identify the presence of heteroscedasticity in the data. Dynamic two-step Generalized Method of Moments (GMM) method has been used in this research to deal with the potential endogeneity problem. The method has been developed by Arellano & Bond (1991) and Blundell and Bond (1998). The lag of bank investment in

[4] BPRD Circular # 36 of November 4, 1997
[5] BPDR2013
[6] BPRD circular # 08 dated June 23, 2016

Government instruments (dependent variable) has been used as Instrumental Variable in this study. A similar approach has been used by Iftikhar and Iftikhar (2018), Abbas et al. (2019) and (Wasim et al., 2023). Pooled OLS, as a comparative method, and Sargan and autocorrelation tests as post-estimation diagnostic tests have also been included in this research to evaluate the robustness of the findings further.

The data of dependent variables related to individual banks' holding of government securities were not publicly available; therefore, it has been calculated using the statement of the financial position of banks. Data relating to bank-specific explanatory variables have been obtained from individual banks' statements of financial position. Fiscal Deficit and interest rates have been taken from the SBP and the Government of Pakistan Finance Division. Basel III accord variables have been used to assess financial regulation requirements. There are four variables in Basel III. Capital Adequacy Ratio (CAR) and Leverage Ratio (LR) are related to the capital requirement. NSFR and LCR are related to Basel liquidity requirements. Since LCR is associated with maintaining short-term liquidity, it has not been considered in this research. The control variable includes four banks specific variables[7] and two macroeconomic variables[8].

2.1. Model.

$$\text{Log\_GI} = \beta_o + \beta_1 \text{Log\_GI}_{i,(t-1)} + \beta_2 \text{CAP\_BF}_{i,t} + \beta_3 \text{LR}_{i,t} + \beta_4 \text{NSFR}_{it} + \beta_5 X_{i,t} + \beta_6 Y_{i,t} + \varepsilon_t$$

where,

'GI' represents 'log of Bank investment in government securities.

Basel III variables include 'CAP_BF' representing Capital Buffer, 'LR' representing Leverage Ratio, 'NSFR' is representing Net Stability Funding Ratio.

X is representing bank specific variables which includes Log of Non-performing loans, Log of each banks' Total Assets, Net interest Margin to bank's total lending, Market Share of individual banks in term of deposits,

Y represents Macroeconomic variables which includes ratio of lag of Fiscal deficit to GDP and Interest Rate.

All of Basel III variables and bank specific variables are taken for 'i' banks at time 't'. Macroeconomic Variables such as Fiscal Deficit taken at time 't-1'and Interest Rates at time 't'

2.2. Dependent Variable

Natural log of Bank investment in government securities has been considered as an explained variable in this study. In past, very few studies have been made in which impact of financial regulation on bank investment in government securities has been analysed, especially for Pakistani commercial banks.

2.3. Independent Variable

2.3.1. Bank Specific Variables

2.3.1.1 Capital Buffer:

In order to evaluate the impact of risk-based capital requirements on bank investment towards government securities, the Capital Buffer (CAP_BF) has been considered in this research. Capital buffer represents the difference between banks' actual CAR and the SBP's minimum CAR requirement. Under Basel regulations, banks are required to hold a certain amount of capital for their total risk weightage

[7] Bank profitability, bank size, non-performing loans and market share

[8] Fiscal Deficit and interest rate

assets. In the past, research has been done where the requirement to hold a certain amount of risk-based capital may have forced banks to reduce commercial lending and move towards low-risk assets (Ashraf et al., 2016; Berger & Udell,1994).

2.3.1.2 Leverage Ratio (LR):

In order to evaluate the impact of non-risk-based capital requirements on bank investment behaviour towards government securities, Leverage Ratio (LR) has been used in this research. Under Basel III financial regulation, banks are required to maintain at least 3% leverage ratio (BIS, 2014). Since LR is a non-risk-based ratio, if a bank is required to increase its leverage ratio by reducing the asset portfolio size, they will prefer to reduce their investment in soverign securities because the return from these securities is lower than other risky portfolio assets (Anees et al., 2022)

2.3.1.3 Net Stability Funding Ratio (NSFR):

NSFR has been used to analyse the impact of banks' stability fund requirements on bank investment in government securities. The ratio makes sure that banks have enough stable funds to support their liabilities. If banks lend more to the commercial and private sectors, then they will be required to have more stable funds to finance it and keep NFSR more than 100%. Therefore, it is expected that banks with high NSFR tend to show growth in government securities because it will not increase the 'required stable fund' requirement for them.

2.3.1.4 Asset Quality:

The log of non-performing loans has been considered a bank-specific variable in this research to evaluate the impact of asset quality on bank investment in sovereign securities. As per Huljak et al. (2022), high non-performing loan points out the low quality of the credit portfolio, which poses a significant risk to the financial health of banks, restricting their ability to generate sufficient profits and reinvest in the economy. Therefore, including the NPL variable in the analysis aims to study the influence of financial regulations on bank investment in government securities.

2.3.1.5 Bank's Profitability:

Net Interest Margin (NIM) is a widely recognized indicator of a bank's profitability. It represents the excess interest income earned by a bank's assets over the interest expense incurred by its liabilities. In this research, a ratio of NIM to total loans has been considered. Higher NIM values indicate greater profitability, enabling banks to expand their loan portfolios using self-generated funds. (Naceur et al., 2018).

2.3.1.6 Bank size:

The log of total bank assets has been used to examine how bank size affects banks' investment decisions. Small banks are more efficient in processing soft information than larger ones. Large banks are less motivated to lend to customers with compromised information and do not connect with their borrowers, like smaller banks. Smaller banks may have relative advantages in generating soft information due to their broad customer base. This, in turn, enables the expansion of their credit activities, resulting in improved financial performance (Berger et al., 2005; Beck et al., 2012).

2.3.1.7 Market share:

Market share has been calculated as the ratio of deposits held by a bank to the total industry deposits during a quarter. Iftikhar et al. (2022) identified market share as a crucial factor in bank lending because growth in banks' deposits enhances their fund capacity; as a result, more funds are available to the borrowers. Therefore, increasing the market share of deposits would likely lead to a rise in bank lending activities.

2.3.2. Macroeconomic Variables

2.3.2.1 Fiscal Deficit (FD):

The present study has employed the fiscal deficit as an independent variable to analyse its potential impact on the demand for government securities. In many developing countries, including Pakistan, borrowing from domestic banks is a common practice for financing infrastructure and other developmental projects. However, the persistent fiscal deficit the government faces has led to increased government borrowing, resulting in a shortage of funds for the private sector and a rise in the interest rate, leading to inflation (Zaheer et al., 2017; Serfraz & Anwar, 2009; Ali & Khalid, 2019). Increased demand from the government has incentivised banks to seek risk-free returns through investments in government securities, potentially creating an environment in which they become captive to easy profits (Akram, 2011). As the fiscal deficit determines the government's loan requirement, it is an important variable influencing the demand for bank investment in government securities.

2.3.2.2 Interest Rate:

Interest rate has been used in this study to analyse the potential impact of monetary policy on bank investment in government securities. Countries facing fiscal deficits and economic uncertainties are more likely to experience increasing interest rates, leading financial institutions to accumulate government securities to avoid risks (Bouis, 2019; Kim et al., 2021).

3. Empirical Results

Table 1: Summary of statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Investment in Government securities $_{(t-1)}$	336	19.047	1.438	13.122	21.418
Capital Buffer	320	4.160	4.140	-11.500	15.570
Leverage Ratio	319	4.729	1.450	1.490	11.020
Net Stability Funding Ratio	330	164.248	52.562	90.800	457.000
Profitability	337	0.045	0.039	0.002	0.519
Asset Quality	340	16.628	1.078	11.375	19.122
Bank size	340	20.170	1.205	14.707	22.140
Interest Rate	352	8.609	2.539	5.750	13.250
Fiscal Deficit	242	1.794	1.070	0.700	4.900
Market Share	338	4.735	3.997	0.401	17.263

Table 1 includes the number of observations, mean, standard deviation, minimum, and maximum values of dependent and independent variables used in this research. Table C in Appendix shows pair-wise correlations among bank investment in government securities and all explanatory variables. It has been found that the correlation of bank investment in government securities with asset quality, bank size and market share is statistically significant at 5%. The Variation Inflation Factor (VIF) in Appendix Table D has been found to be less than 5.

Table 3 displays that the p-value (0.1547) is greater than the typical significance level of 0.05, so we do not have sufficient evidence to reject the null hypothesis. Therefore, based on the Sargan test, we conclude that the overidentifying restrictions are valid. This suggests that the instrumental variables used in the estimation are appropriate and do not violate the orthogonality condition with the error term. For the first order of autocorrelation, the test statistic (z-value) is -1.914. The corresponding p-

value is 0.0556. The null hypothesis is that there is no autocorrelation. Since the p-value is greater than the significance level of 0.05, it suggests that there is no autocorrelation.

Table 3: Comparison of two step system GMM and Pooled OLS

	GMM			Pooled OLS		
Variables	**Coefficient**	**Std. Err.**	**P-value**	**Coefficient**	**Std. Err.**	**P-value**
Investment in Government securities $_{(t-1)}$	0.63283*	0.03632	0.000			
Capital Buffer	0.0644*	0.0153	0.000	0.114*	0.025	0.000
NSFR	0.0052*	0.0010	0.000	0.001	0.001	0.987
Leverage Ratio	-0.3153*	0.0332	0.000	-0.310*	0.053	0.000
Asset Quality	-0.1048*	0.0167	0.000	0.009	0.078	0.91
Profitability	-4.5018**	1.9576	0.021	-11.980*	2.132	0.000
Bank Size	-0.0448*	0.0050	0.000	0.194*	0.059	0.001
Fiscal Deficit $_{(t-1)}$	0.0153***	0.0089	0.084	0.137**	0.060	0.023
Market Share	0.1195*	0.0416	0.004	0.187*	0.022	0.000
Interest Rate	0.0558*	0.0156	0.000	0.047***	0.026	0.078
Number of Banks	23			23		
Number of Observations	195			199		
R-squared	n/a			0.6984		
Sargan test (p-value)	0.1547			n/a		
AR test (p-value)	0.0556			n/a		

Note: The dependent variable is bank investment in government securities.
(*), (**), (***) represents coefficients are significant at 1%, 5% and 10% respectively.

The result in Table 3 shows a significant and positive behaviour of capital buffer with bank investment in government securities. The relationship is positive because a bank prefers higher investment in government securities if it wants to improve its capital adequacy buffer. This improves its CAR buffer as government securities do not increase risk-weighted assets. Considering the risks in Pakistan's economy, it is difficult for banks to raise capital, so they prefer to change their asset portfolio (Bashir & Hassan, 2017; Ayub & Javeed, 2016; Berger & Udell, 1994). Pakistani commercial banks have stayed financially stable by investing more in safe investments, which means they take fewer risks and may not use their money efficiently[9]. Increasing investment in government securities is reducing the banks' ability to contribute efficiently to the economy as private lending is mostly efficient Zaheer et al. (2017). However, to protect the depositor's money, it's a safe strategy.

Banks' liquidity, measured through NSFR, has mostly been found to be significant and positively related to banks' investment in government securities. The primary reason for this is that NSFR assumes that if a bank holds unencumbered, high-quality assets, which can be securitized or traded, they are not required to be entirely financed using stable funding. Therefore, results show that if banks wish to maintain high NSFR in Pakistan, they increase their investment in government securities in a higher proportion.

[9] Same conclusion has been drawn in Financial Stability Review, 2020, https://www.sbp.org.pk/FSR/2020/Box-3.1.pdf

The Leverage Ratio has been found to be significant and negative with banks' investment in government securities. It is mainly because Leverage Ratio does not consider the asset's underlying risks. The results suggest that if banks want to improve their Leverage Ratio, they may reduce their total asset portfolio. Since the leverage ratio is a non-risk-based capital ratio, banks tend to prefer contraction in government securities for the maintenance of the Leverage Ratio. Government securities are less attractive to banks because they are low-yield assets. These results are in line with the analysis made by Smith et al. (2020).

The results suggest that along with Basel III variables, asset quality is also significant for banks' investment decisions. Non-performing loans, representing asset quality, negatively correlate with banks' investment in government securities, which is contradictory to the expected results (Bouis, 2019). This depicts that an increase in non-performing loans deteriorates banks' overall asset quality, which reduces their investment capacity (Kashif et al., 2016).

Results indicate that bank size, represented by bank assets, is significant and negative with their investment in government securities. It can be inferred that large banks are less willing to invest in government securities investments, as Uchida et al. (2008) concluded.

A negative relationship was observed between banks' investment in government securities and their profitability in Pakistan. The findings are consistent with previous studies (Teixeira et al., 2021) that have found a similar negative association between profitability and banks' allocation of funds to sovereign assets. Pakistani banks often choose to invest in government securities as a way to minimize their overall risk; however, investing more in government securities earns less money on their investments, which can lead to lower profits overall. This suggests that banks in Pakistan need to carefully consider their investment decisions. While investing in government securities can help reduce risk, it can also negatively impact profits. Banks need to find a balance between these two factors in order to maximize their long-term profitability.

Market power is significant and positively related to banks' investment because increasing deposits increase banks' lending and investment capability. Therefore, a higher market share in deposits tends to increase banks' investment in government securities (Iftikhar et al., 2022).

Based on the analysis presented in Table 3, the results indicate that there is a significant and positive relationship between fiscal deficit and banks' investment in government securities. This means that when the fiscal deficit is higher, there is a greater demand for public debt, prompting commercial banks to allocate more funds towards government securities. These findings align with the conclusions reached by Zaheer et al. (2017) and support the notion that fiscal deficit plays a role in influencing banks' investment decisions regarding government securities.

The results suggest that interest rates significantly and positively impact bank investment in government securities. The reason is that an increase in the interest rate increases the company's cost of capital, which lowers the demand for loanable funds from the private sector. As a result of which, banks are left with limited options, and investment in sovereign securities is one of them. The results are in line with the conclusion made by Košak et al. (2013).

3.1. Further Robustness Tests: Comparison of GMM and Pooled OLS

Pooled Ordinary Least Squares (OLS) method has been used in this research to assess the robustness of the results obtained from GMM. Results from Pooled OLS have been presented in Table 3, along with its comparison with GMM findings. The outcomes of Pooled OLS suggest that risk-based capital buffer, leverage ratio, profitability, fiscal deficit, bank size, market share, and interest rate significantly impact bank investment in government securities. Similar results have been found in GMM, indicating the robustness of this study.

4. Conclusion

Financial regulations are becoming increasingly important in the banking industry, especially after the 2008 financial crisis. Regulations primarily focus on how banks should reduce their risk exposure to risky assets, due to which there has been a surge in the holding of sovereign securities by commercial banks, typically if banks are operating in a risky economy. In this article, an analysis has been made to evaluate the impact of Basel III regulations on the volume of commercial banks' investment towards government securities in Pakistan.

The findings indicate that Risk-Based Capital requirements and the long-term stable liquidity requirement have incentivised banks to invest in government securities due to their low-risk nature. This is because banks aim to improve their regulatory ratios and government securities are classified as risk-free by SBP. However, the study also found that bank leverage ratio and profitability are negatively related to bank investment in government securities due to their low-yield nature. Thus, banks may have to reduce their total asset base if their aim is to improve their leverage ratio. The results also indicate that market share in terms of deposits helps banks to increase their investment in government securities. Furthermore, a positive relationship between the fiscal deficit and banks' investment in government securities has found, indicating that an increase in fiscal deficit creates a need for issuing government securities and, thus, increases the chances of banks investing in these securities.

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Appendix

Table A: Fiscal Indicators as a % of GDP

Year	Overall fiscal deficit	Expenditure (current)	Expenditure (Development)	Revenue (tax)	Revenue (non-tax)
FY 2008	7.3	17.4	4.0	9.9	4.2
FY 2009	5.2	15.5	3.5	9.1	4.9
FY 2010	6.2	16	4.4	9.9	4.1
FY 2011	6.5	15.9	2.8	9.3	3.0
FY 2012	8.8	17.3	3.9	10.2	2.6
FY 2013	8.2	16.4	5.1	9.8	3.5
FY 2014	5.5	15.9	4.9	10.2	4.3
FY 2015	5.3	16.1	4.2	11	3.3
FY 2016	4.6	16.1	4.5	12.6	2.7
FY 2017	5.8	16.3	5.3	12.4	3.0
FY 2018	6.5	16.9	4.7	12.9	2.2
FY 2019	9.0	18.7	3.2	11.7	1.1
FY 2020	8.1	20.5	2.9	11.4	3.7
FY 2021	6.1	20.5	2.9	12.1	3.9

Pakistan Economic Survey 2020-21[10].

Table B: Minimum CAR by SBP

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
CET1 (in %)	5	5.5	6	6	6	6	6	6	6	6
Total Capital (in %)	10	10	10	10	10	10	10	10	10	10
CCB (in %)	n/a	n/a	0.25	0.65	1.275	1	2.5	1.5	1.5	1.5
Total Capital + CCB (in %)	10	10	10.25	10.65	11.275	11	12.5	11.5	11.5	11.5

[10] https://www.finance.gov.pk/survey/chapters_21/04-Fiscal.pdf.

Table C: Pairwise correlation

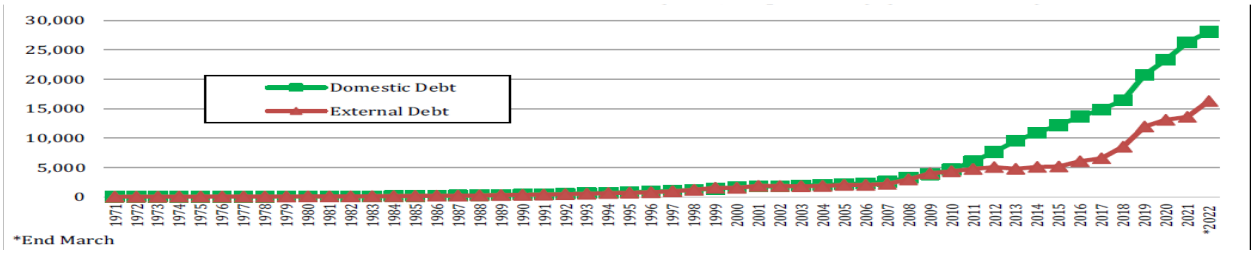
		1	2	3	4	5	6	7	8	9	10
1	Investment in Government securities $_{(t-1)}$	1									
2	CAP_buffer	0.3974*	1								
3	Bank's liquidity	0.2375*	0.3596*	1							
4	Bank's leverage	-0.3396*	0.3443*	0.1014	1						
5	Asset Quality	0.5765*	0.2210*	0.2703*	-0.2845*	1					
6	Profitability	-0.1486*	0.0542	-0.0045	0.0748	-0.0866	1				
7	Bank size	0.5187*	0.3696*	0.1826*	-0.1786*	0.3175*	0.0715	1			
8	Fiscal Deficit $_{(t-1)}$	0.0064	0.0187	0.0583	-0.0014	0.0467	0.0791	-0.0461	1		
9	Market share	0.7397*	0.3773*	0.2817*	-0.2092*	0.6746*	0.0713	0.4001*	-0.0939	1	
10	Interest	-0.0473	-0.2039*	-0.1950*	0.0694	-0.003	0.0196	-0.0488	-0.0184	-0.012	1

Note: (*) indicates the 5% significance level

Table D: Variation Inflation Factor

Variable	VIF	1/VIF
RBC_buffer	2.12	0.471479
Bank's liquidity	1.27	0.789048
Bank's leverage	1.58	0.63249
Fiscal Deficit $_{(t-1)}$	1.05	0.949103
Profitability	1.07	0.934693
Bank size	1.39	0.720418
Asset Quality	1.98	0.504624
Market Power	2.23	0.44788
Interest	1.38	0.723473
Mean VIF	1.56	

Figure A1: Domestic and External Debt of Pakistan



Data Source: Pakistan Economic Survey 2021-22[11]

[11] https://www.finance.gov.pk/survey/chapter_22/Economic%20Survey%202021-22.pdf