LEVERAGING ON THE EFFECTS OF EARNINGS VOLATILITY, GOVERNMENT BORROWING, AND LIQUIDITY ON SOUTH AFRICAN BANKS' CAPITAL STRUCTURE

by

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ABSTRACT

The thesis aimed to investigate the effect of earnings volatility, government borrowing and liquidity on the capital structure of financial firms utilising a sample of registered commercial banks in South Africa from 2012 to 2021. Despite the extensive literature on this association, few prominent researchers have studied this phenomenon in the banking sector. Applying the generalised method of moments model, the study found a positive but significant relationship between earnings volatility and capital structure measured by total debt ratio. This suggests that the higher the volatility, the higher the debt. On the contrary, but in line with the theoretical prediction, the study finds a negative but significant relationship between earnings volatility and long-term debt ratio and short-term ratio. This implies that firms with fluctuating earnings may limit their lending capacity since raising debt formally commits the firm to make borrowing obligations.

The study also established a positive but significant relationship between government borrowing and the capital structure. Contrary to the crowding-out effects detects, results revealed a positive but significant relationship between government borrowing and capital structure. The crowding-in effect better explains these results, where government borrowing stimulates the local market, motivating banks to borrow more. The results imply that government borrowing does not stifle the private sector. Therefore, the South African government should not worry about crowding out effects. If government borrowing is earmarked for the productive sector, this will stimulate the economy and increase the gross domestic product. The results of the study revealed a positive but significant relationship between the current ratio and capital structure. The study also shows a positive and significant link between liquidity coverage ratio and total debt ratio. Yet, a positive but insignificant relationship exists between liquidity coverage ratio and short-term ratio. There was a negative but insignificant link between liquidity coverage ratio and long-term debt ratio. The study indicated a positive but significant nexus between the bank liquidity mismatches index. This implies that banks can still borrow despite worrying about liquidity as a there is positive between bank liquidity

mismatches index and capital structure. The result of the study also shows a positive and significant link between COVID-19 and total debt ratio. However, there is a negative but significant link between COVID-19 and long-term debt ratio. The study shows a negative but insignificant association between COVID-19 and short-term ratio. Future research should test the cointegrating and causality relationship between government borrowing and bank capital structure. Also, given that the banking sector is constrained by Basel III's Capital adequacy requirement, controlling for this factor is critical in future research.

Our main contribution was investigating how the bank liquidity mismatches index (BLMI) influences capital structure. The bank liquidity mismatch index is a new measure of liquidity that incorporates three dimensions: the funding side, the asset side, and the liquidity spiral; this has never been tested before, so that is one of our main contributions. Furthermore, as indicated, we also looked at the government borrowing effect on a capital structure and whether it affected the crowding-in effect or the crowding-out effect. The results even showed that contrary to theory, actual government borrowing in South Africa has a crowding-in effect.

Keywords: bank, earnings volatility; government borrowings; crowding-in effect; liquidity; capital structure

ISISHWANKATHELO

Le thisisi ibijolise ekuphandeni isiphumo sokuguquguquka kwemivuzo, ukuboleka kukarhulumente kunye nokuhlawulwa kwamatyala kwisakhiwo semali seenkampani zemali, isebenzisa isivandlakanyi seebhanki zorhwebo ezibhalisiweyo eMzantsi Afrika ukususela ngo2012 ukuya ku2021. Nangona kukho uncwadi olubanzi kolu nxulumano, bambalwa abaphandi abadumileyo abaye baphanda le meko kwicandelo lebhanki. Olu phando lufumanise ubudlelwane obulungileyo nobubalulekileyo phakathi kokuguquguquka kwemivuzo kunye nesakhiwo semali esilinganiswe ngomlinganiselo opheleleyo wamatyala ngokusebenzisa indlela eqhelekileyo yemodeli yamaxesha amafutshane (*moments model*). Oku kubonisa ukuba apho ukuguquguquka kuphezulu, kulapho ityala liphezulu khona. Ngokwahlukileyo

koko, kodwa ngokuhambelana noqikelelo lwethiyori, olu ophando lufumanisa ubudlelwane obungalunganga kodwa obubalulekileyo phakathi kokuguquguquka kwemivuzo kunye nomlinganiselo wamatyala exesha elide kunye nomlinganiselo wexesha elifutshane. Oku kuthetha ukuba amashishini anomvuzo oguquguqukayo anokunciphisa ukubolekisa kwawo nanjengoko ukunyusa ityala ngokusesikweni kubophelela ishishini ukuba lenze izibophelelo zokubolekisa.

Uphando luphinde labonisa ubudlelwane obulungileyo nobubalulekileyo phakathi kokuboleka kukarhulumente kunye nesakhiwo semali. Ngokwahlukileyo kwiziphumo zokungafezeki okanye zokusilela kwenkcitho yotyalomali yecandelo labucala enciphayo ngenxa yokwanda kokuboleka kukarhulumente kurhwebo lweengxowamali ezibolekisayo (eyaziwa ngokuba yi*crowding-out*), iziphumo zibonise ubudlelwane obulungileyo nobubalulekileyo phakathi kokuboleka kukarhulumente kunye nesakhiwo semali. Isiphumo senkcitho ephezulu karhulumente ekhuthaza amashishini ukuba atyale imali eninzi (eyaziwa ngokuba yi*crowding-in*) sizichaza ngcono ezi ziphumo, apho ukuboleka kukarhulumente kuvuselela urhwebo lwasekhaya, kukhuthaza iibhanki ukuba zibolekise ngaphezulu. Iziphumo zibonisa ukuba ukuboleka kukarhulumente akuthinteli icandelo labucala. Ngoko ke, urhulumente woMzantsi Afrika makangaxhalabi ngeziphumo zenkcitho yotyalomali yecandelo labucala enciphayo ngenxa yokwanda kokuboleka kukarhulumente kurhwebo lweengxowamali ezibolekisayo (*crowding-out*). Oku kuya kuvuselela uqoqosho kwaye kwandise imveliso epheleleyo yonyaka yelizwe, ukuba ukuboleka kukarhulumente kubekelwe ecaleni kwicandelo lemveliso. Iziphumo zophando zibonise ubudlelwane obulungileyo nobubalulekileyo phakathi komlinganiselo wangoku kunye nesakhiwo semali. Olu phando lukwabonisa unxibelelwano olulungileyo nolubalulekileyo phakathi komlinganiselo wokubandakanywa kokuhlawulwa kwamatyala kunye nomlinganiselo opheleleyo wamatyala. Ukanti, ubudlelwane obulungileyo kodwa obungabalulekanga bukhona phakathi komlinganiselo wokubandakanywa kokuhlawulwa kwamatyala kunye nomlinganiselo wexesha elifutshane. Kubekho unxibelelwano olungalunganga kodwa olungabalulekanga phakathi komlinganiselo

wokubandakanywa kokuhlawulwa kwamatyala kunye nomlinganiselo wamatyala exesha elide. Uphando lubonise unxibelelwano olulungileyo nolubalulekileyo phakathi kwesalathisi sokungangqinelani kokubhatalwa kwamatyala ebhanki (*bank liquidity mismatches index*). Oku kuthetha ukuba iibhanki zisenokubolekisa nangona zixhalabile malunga nokubhathalwa kwamatyala nanjengoko kukho okulungileyo phakathi kwesalathisi sokungangqinelani kokubhatalwa kwamatyala ebhanki kunye nesakhiwo semali. Isiphumo sophando sikwabonisa unxibelelwano olulungileyo nolubalulekileyo phakathi kwe*COVID-19* kunye nomlinganiselo wamatyala ewonke. Nangona kunjalo, kukho unxibelelwano olungalunganga kodwa olubalulekileyo phakathi kwe*COVID-19* kunye nomlinganiselo wamatyala exesha elide. Olu phando lubonisa unxulumano olungalunganga nolungabalulekanga phakathi kwe*COVID-19* kunye nomlinganiselo wexesha elifutshane. Uphando lwexesha elizayo kufuneka luvavanye ubudlelwane obude kunye nobufutshane phakathi kwezi nkalo zimbini kunye nobudlelwane obubonisa isiphumo sento ethile ngenxa yenye into ethile okanye ifuthe lazo zombini enye kwenye (*cointegrating and causality relationship*), phakathi kokuboleka kukarhulumente kunye nesakhiwo semali sebhanki. Kwakhona, nanjengokuba icandelo lebhanki lithintelwa yimfuneko yokwaneliseka ye*Basel III's Capital*, ukulawula le mpembelelo kubalulekile kuphando lwexesha elizayo.

Igalelo lethu eliphambili ibikukuphanda indlela isalathisi sokungangqinelani kokubhatalwa kwamatyala ebhanki i*bank liquidity mismatches index* (*BLMI*) esichaphazela ngayo isakhiwo semali. Isalathisi sokungangqinelani kokubhatalwa kwamatyala ngumlinganiselo omtsha wokungabhatalwa kwamatyala obandakanya iinkalo ezintathu: icala lenkxasomali, icala lezixhobo zokusebenza, kunye nemeko apho ukuhla kwamaxabiso ezixhobo zokusebenza kunokukhuthaza iibhanki ukuba zinciphise ukunikezelwa kwamatyala, okuye kubangele ukuhla ngakumbi kwamaxabiso ezixhobo zokusebenza (okwaziwa ngokuba yi*liquidity spiral*); oku akuzange kwavavanywa ngaphambili, ngoko ke eli lelinye igalelo lethu eliphambili. Ngaphezu koko, nanjengoko kubonisiwe, siphinde sajonga isiphumo sokuboleka kukarhulumente kwisakhiwo semali nokuba sisichaphazela njani

isiphumo senkcitho ephezulu karhulumente ekhuthaza amashishini ukuba atyale imali eninzi (*crowding-in effect*) okanye isiphumo senkcitho yotyalomali yecandelo labucala enciphayo ngenxa yokwanda kokuboleka kukarhulumente kurhwebo lweengxowamali ezibolekisayo (*crowding-out effect*). Iziphumo ziye zabonisa ukuba ngokuchasene nethiyori, ukuboleka ngokwenene kukarhulumente eMzantsi Afrika kunesiphumo senkcitho ephezulu karhulumente ekhuthaza amashishini ukuba atyale imali eninzi.

Amagama angundoqo: ibhanki, ukuguquguquka kwemivuzo; ukuboleka kukarhulumente; isiphumo senkcitho ephezulu karhulumente ekhuthaza amashishini ukuba atyale imali eninzi (*crowding-in effect*); ukubhatalwa kwamatyala; isakhiwo semali

SETSOPOLWA

Sengwalwanyakišišo se be se ikemišeditše go nyakišiša ka ga seabe sa go ba kotsing ga letseno, go adima ditšhelete ga mmušo le go phuhlama ga sebopego sa letlotlo la dikhamphani tša ditšhelete ka go šomiša sampole ya dipanka tša kgwebo tše di ngwadišitšwego ka Afrika Borwa go thoma ka 2012 go fihla ka 2021.Ka ntle ga dingwalwa tše ntši ka ga seemo se, ke fela banyakišiši ba mmalwa ba go tsebega bao ba nyakišišitšego ka maemo a ka lekaleng la dipanka. Ka go diriša mokgwakakaretšo wa mekgwa ya sebjalebjale, dinyakišišo di hweditše gore go na le kamano ye kaone eupša ye bohlokwa magareng ga go ba kotsing ga letseno le sebopego sa letlotlo ge di elwa ka kelo ya palomoka ya sekoloto. Se se šišinya gore ge letseno le eba kotsing kudu, dikoloto di ba godimo. Go fapana le se, eupša go sepelelana le kakanyo ya teori, dinyakišišo di hwetša kamano ye e sa kgahlišego eupša ye bohlokwa magareng ga go ba kotsing ga letseno le kelo ya sekolo ya lebaka le letelele le kelo ya lebaka le lekopana. Se se ra gore dikhamphani tšeo di nago le letseno la go fetogafetoga di ka fokotša maatla a tšona a kadimo ya ditšhelete ka ge go oketša dikoloto ka semmušo go gapeletša khamphani yeo go dira ditlamego tša dikadimo.

Dinyakišišo gape di utollotše gore go na le kamano ye kaone eupša ye bohlokwa magareng ga kadimo ya mmušo le sebopego sa letlotlo. Go fapana le dikutollo tša diabe tša go beeletša ga mmušo, dipoelo di utollotše gore go

na le kamano ye kaone eupša ye bohlokwa magareng ga kadimo ya mmušo le sebopego sa letlotlo. Seabe sa go beeletša ga mmušo ka mebarakeng go hlaloša bokaone dipoelo tše, fao kadimo ya mmušo e hlohleletšago mmaraka wa ka nageng, fao go hlohleletšago dipanka go adima kudu. Dipoelo di laetša gore kadimo ya mmušo ga e gatelele lekala la phraebete. Ka fao, mmušo wa Afrika Borwa ga se wa swanela go tshwenyega ka go beeletša ga mmušo ka mebarakeng. Ge e le gore kadimo ya mmušo e ikemišeditše gore go be le lekala la go ba le tšweletšo, se se tla hlohleletša ekonomi le go oketša palomoka ya letseno la ka nageng. Dipoelo tša dinyakišišo di utollotše gore go na le kamano ye kaone eupša ye bohlokwa magareng ga kelo ya bjale le sebopego sa letlotlo.Dinyakišišo di laeditše gape gore go na le kamano ye kaone le ye bohlokwa magareng ga kelo ka kakaretšo ya go phuhlama ga dikgwebo le kelo ya palomoka ya dikoloto. Le ge go le bjale, kamano ye kaone eupša ye bohlokwa e gona magarteng ga kelo ya kakaretšo ya go phuhlama ga dikgwebo le kelo ya lebaka le lekopana. Go bile le kamano ye e sego ya loka eupša ye e sego ye bohlokwa magareng ga kelo ya kakaretšo ya go phuhlama ga dikgwebo le kelo ya dikoloto ya lebaka le letelele. Dinyakišišo di laeditše kgokagano ye kaone eupša ye bohlokwa magareng ga dipalopalo tša go se sepelelane ga go phuhlama ga dipanka. Se se ra gore dipanka di ka tšwela pele go adima ditšhelete ka ntle le go tshwenyega ka ga go phuhlama ga tšona ka ge go na le kamano ye kaone magareng ga dipalopalo tša go se sepelelane ga go phuhlama ga dipanka le sebopego sa letlotlo. Dipoelo tša dinyakišišo le tšona di aletša gore go na le kamano ye kaone le ye bohlokwa magareng ga COVID-19 le palomoka ya kelo ya dikoloto. Le ge go le bjale, go na le kamano ye e sego ya loka eupša ye bohlokwa magareng ga COVID-19 le kelo ya dikoloto ya lebaka le letelele. Dinyakišišo di laetša gore go na le kamano ye e sego ya loka eupša le ye e sego ye bohlokwa magareng ga COVID-19 le kelo ya lebaka le lekopana. Dinyakišišo tša ka moso di swanetše go leka kamano ya mabakanako a go se swane le ye e sego ya thwii magareng ga kadimo ya mmušo le sebopego sa letlotlo la panka. Gape, ka ge lekala la dipanka le iletšwa ke nyakego ya go ba maleba ga Letlotlo go ya ka Basel III, go laola lebaka le go bohlokwa ka dinyakišišong tša ka moso.

Seabe sa rena se segolo e bile go nyakišiša ka fao dipalopalo tša go se sepelelane ga go phuhlama ga dipanka (BLMI) go huetšago sebopego sa letlotlo. dipalopalo tša go se sepelelane ga go phuhlama ga dipanka ke kelo ye mpsha ya go phuhlama ga dipanka yeo e akaretšago mahlakore a mararo: lehlakore la thušo ya ditšhelete, lehlakore la dithoto, le lebakanako la kamano ya go phuhlama; se ga se sa ka sa lekwa mo nakong ye e fetilego, gore e be ye nngwe ya diabe tša rena tše kgolo. Godimo ga fao, ka ge go laeditšwe, re lebeletše gape le sabe sa kadimo ya mmušo go sebopego sa letlotlo le ge eba e amile go se beeletše ga mmušo goba go beeletša ga mmušo ka mebarakeng. Dipoelo di tloga di laeditše gore go fapana le teori, kadimo ya mmušo ya mmakgonthe ka Afrika Borwa e na le seabe sa go beeletše ga mmušo.

Mantšu a bohlokwa: panka, go ba kotsing ga letseno; dikadimo tša mmušo; go se beeletše ga mmušo; go phuhlama ga mebaraka; sebopego sa letlotlo

Table of Contents

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

BLE	Book leverage
BLMI	Bank liquidity mismatches index
CEE	Central and Eastern Europe
CR-CS	Credit rating-capital structure
CPI	Consumer price index
CURR	Current ratio
FEM	Fixed effect model
FGB	Foreign government borrowing
GDP	Gross domestic product
GMM	Generalised methods of moments
GO	Growth opportunity
INR	Inflation ratio
IR	Interest rate
LGB	Local government borrowing
LCR	Liquidity coverage ratio
LMI	Liquidity mismatches index
LTDR	Long-term debt ratio
SME	Small and medium-sized firms
STDR	Short-term debt ratio
TDR	Total debt ratio
POT	Pecking order theory
QR	Quantile regression
TOT	Trade-off theory

NPV	Net present value
OLS	Ordinary least squares
ROA	Return on assets
ROE	Return on equity
REM	Random effects model
TSE	Tehran stock exchange
SEM	Structure equations modelling
S and P	Standard and Poor
ERCA	Ethiopian revenue and customs authority
GMM	Generalised method of moments
SOE	State-own enterprises
USA	United States of America

CHAPTER 1: INTRODUCTION, RESEARCH PROBLEM AND OBJECTIVES

1.1 Introduction and Background

Several determinants of capital structure have been investigated theoretically and empirically in literature. Furthermore, several theories have been proposed to explain longitudinal changes in gearing / leverage ratios across firms. Generally, intuition suggests that firms are geared to leverage and optimise on costs and benefits of different sources of finance. The two main underlying theories used to explain these determinants are the trade-off theory (Kruas & Litzenberger, 1973) and the pecking order theory (Myers & Majluf, 1984). According to the trade-off theory, corporations weigh the costs and benefits of debt and, as a result, move towards an optimal debt ratio (Kruas & Litzenberger, 1973). In the pecking order hypothesis, information asymmetry among managers and shareholders influences the cost of borrowing (Myers & Majluf,1984).

Empirical work on the determinants of capital structure has always lagged behind theoretical research. Titman and Wessels (1988) argue that empirical literature on the determinants of capital structure lagged behind theory because the relevant firm attributes are often abstract concepts that are not directly observable and, therefore, difficult to conceptualise and test them empirically. Some of the determinants of capital structure that were extensively tested include size, profitability, assets tangibility, growth opportunities, debt tax shield, non-debt tax shield and risk. However, new factors influencing firm leverage, including earnings volatility, government borrowing, and liquidity (see, for example, Dencic-Mihajlov & Malinic., 2015; Demirci, Huang & Sialm, 2019; Marozva & Makina, 2020; Akkoyun, 2018 & Khan, Bashir & Islam, 2020), are yet to be thoroughly tested empirically in different set-ups.

This study investigated the effect of earnings volatility, government borrowing and liquidity on the capital structure of banks in South Africa. Diamond (2007)

opines that banks' important function is to create liquidity, that is, to offer more liquid deposits than the assets they hold. Therefore, it is imperative to investigate the effects of liquidity on the capital structure, as the need to hold liquid assets and liabilities seems counterintuitive to holding long-term debt. Similarly, the Basel three requirement for banks to maintain a minimum Tier 1 Capital discourages increasing gearing ratios (Marozva, 2021). Minimum capital is required as banks are involved with depositor's money, raising the issue of fiduciary duty.

Given that banks repackage depositor's funds into loans, does government borrowing crowd out bank credit provision? The linkage between government debt and bank capital structure remains an unresolved empirical debate. Lastly, banks being fiduciary stability in earnings is a requirement, and the nexus between earnings volatility and capital structure is yet to be fully explored in the banking sector.

We do not know whether government borrowing results in a crowding-out effect or a crowding-in effect, and the study found that there is a crowding-in effect contrary to the theory. Similarly, on the liquidity side, other studies looked at liquidity using measures of the current ratio, regulatory liquidity ratios like liquidity coverage ratios, and net stable funding ratio. Hence, no study has looked at the effect of the bank liquidity mismatch index on capital structure yet, in literature is shown that the bank liquidity mismatch index is a better measure of liquidity when it comes to banks than other measures(Bai, Krishnamurthy, & Weymuller, 2018 & Marozva & Makina, 2020). The challenge is that we do not know the bank liquidity mismatch index's influence on capital structure.

Based on the trade-off theory, earnings volatility and a company's leverage have a negative connection. It is predicted that a corporation's volatile earnings will reduce its creditworthiness, which mainly occurs since, by issuing debt, the firm explicitly commits to making debt-related payments (Khan et al., 2020). In contrast, if a firm's earnings are still not consistent, such obligations may cause an extreme burden. However, the pecking order theory suggests a positive relationship between risk and financing decisions (Frank & Goyal,

2009). It ought to be based on the notion that such volatility of cash flows matches the volatility of earnings (Sibindi & Makina, 2018). As a result, the company should support its internal funds. So, to address such a problem, raising funds from outside markets would be necessary, beginning with borrowings.

Numerous researchers worldwide are concerned about the connection between risk and capital structure. Earnings volatility may reflect a firm's inability to meet contractual claims when they become due (Sheikh & Wang, 2011). A company's leverage ratio may also decline when its earnings volatility rises, implying a negative relationship between earnings volatility and leverage. Nguyen and Nguyen (2020) studied six elements influencing firm capital structure, including return on assets (ROA), return on equity (ROE), firm size, tangible assets, risks and growth. Their study revealed a positive and statistically significant link between return on assets, tangible assets, risks, growth and company capital structure.

Saif-Alyousfi, Md-Rus, Taufil-Mohd, Taib, and Shahar (2020) studied the drivers of capital structure in Malaysian non-financial listed companies from 2008 to 2017. The study employed static panel estimate techniques and two-step difference and system dynamic GMM estimators. According to empirical research, the debt-measure endurance indices are positively significant. Profitability, growth potential, tax shielding, liquidity, and cash flow volatility have a negative and significant impact on debt variables, whereas collateral, non-debt tax, and earnings volatility have a positive and significant impact on debt indicators. They contend that because earnings volatility affects all debt metrics positively, the greater the profit volatility, the more outstanding the debt (Saif-Alyousfi et al., 2020).

The observation that earnings volatility positively impacts debt metrics contradicts the trade-off and pecking order theories, which postulate that as earnings volatility grows, companies use very little debt to minimise financial issues or insolvency (Akhtar, 2012). In general, their findings support the hypotheses presented by both the pecking order and trade-off models. On the

other hand, firms with a highly variable capital structure generate a lower profit and have tighter dividend policies (Campbell & Rogers, 2018). At the same time, Sheik and Qureshi (2017) found a negative influence on earnings volatility on capital structure. This suggests that when companies face high earning volatility in their commercial activities, they decrease the usage of total debt in their capital mix. The foregoing studies show that the results of additional empirical studies varied. Some findings support the trade-off hypothesis, whereas others suggest the pecking order notion; nevertheless, none is superior.

In recent years, authorities and academics in advanced economies have paid particular attention to government borrowing and its economic impact (Ahmad, Aamir & Umer, 2020). The latter contend that public debt positively affects the nation's development as its benefits exceed the debt's costs. However, Demirci, Huang and Sialm (2019) claim that increasing the quantity of government debt would raise the expected value of government securities and other debt instruments that seem to be similar products. Firms may cut financial leverage with increasing fixed-income securities funding costs, leading to the government crowding out firm debt (Demirci et al., 2019). Meanwhile, Friedman (1978) argues that if investors have an inadequate supply of funds and have favourites for the precise kinds of securities, for example, long-term versus short-term, government debt could affect a firm's financing.

Prior research on global capital structure examined the association between government borrowings and capital structure. However, empirical studies have contradictory findings. For instance, during World War I, Akkoyun (2018) conducted a study on the effect of government debt on finance companies in the United States of America (USA) from 1916 to 1919. The study focuses on the war period because the status of the economy, the manner of corporate security of aid and the alternative financing strategy of the United States government provide a suitable empirical context to characterise the effect. The analysis found that long-term government bond issues had a negative impact

on long-term company bonds with a life expectancy of more than five years, common stocks and preferred stocks. Furthermore, the negative impact was more significant for high-rated corporate bonds and corporate equities providing consistent dividends.

However, Bahal, Raissi and Tuling (2018) explored whether public investment remained excessive or insufficient before 1980. Utilising investment-project data from the CapEx-CMIE, they also created a new data set of average public and private investment in India from 1996 to 2015. Their findings suggest that public investment may have crowded out commercial investment in India from 1950 to 2012. Yet, from 1980 to 2012, their results supported crowding in capital funding. Furthermore, their analysis revealed that crowding is confirmed by their quarterly model, which uses investment project datasets CapEx-CMIE from 1996 to 2015.

Likewise, Ayturk (2017) examined the connection between government borrowing and corporate finance choices in 15 major European nations from 1989 to 2014. The study used a country-level aggregate and a fixed-effects panel data model with aggregate flow data to study the data. The analysis found a strong negative relationship between government borrowing and company debt in advanced European countries. Furthermore, research revealed that the long-term debt of major credit-worthy enterprises is more complex than government debt in comparison to small, economically hampered firms. This suggests that long-term corporate debt issued by creditworthy companies is a better substitute for government bonds (Ayturk, 2017).

Graham, Leary and Robert (2014) looked into the effect of government debt on commercial financing and investment in the United States. Their study discovered a statistically insignificant link between government debt and company equity regulations. Nonetheless, they find a substantial positive link between government debt, corporate cash and other short-term cash reserves, such as treasuries. Ayturk (2017) explored only a simple connection

between government borrowing and corporate funding. On the contrary, Graham et al. (2014) evaluated the impact of government debt on commercial financing and investments.

Earlier research that also studied the effect of government borrowing on company capital structure include Krishnamurthy and Vissing-Jorgnsen (2012), Barker, Greenwood and Wurggler (2003) and Greenwood, Hanson and Stein (2010). Krishnamurthy and Vissing-Jorgnsen (2012) reveal that government borrowing influences treasury corporate yield spreads by fluctuating the premium investors are intense to pay to hold safe and liquid assets. Although Barker et al. (2003) highlight anticipated bond market yields, Greenwood et al., (2010) point to macro liquidity provision by companies to variations in treasury supply throughout the yield curve. The findings of the preceding analyses add to Friedman's (1985) prediction that public debt financings will reduce the cost of corporate debt relative to equity. What is unclear at the moment is whether the transmission mechanism occurs when government borrowing reduces the money supply, raises interest rates, and finally affects capital structure.

According to the trade-off hypothesis, the more liquid firms have a greater capacity to fulfil debt obligations; hence they will borrow higher debt (Thabet & Hanefah, 2014). In addition, Jensen (1986) contends that leverage eliminates agency issues, particularly for companies with significant liquidity yet weak growth rates. On the other hand, the pecking-order hypothesis offers a different perspective on the effect of liquidity on capital structure (Thabet & Hanefah 2014). They argued that it was expected that corporations with significant liquidity would have little debt. Because decision-making is motivated by financing costs, managers seem more inclined to use internal funds to finance respective initiatives.

The effect of the liquidity of the company's assets on the optimal capital structure has been debated for many years (Lipson & Mortal., 2009; Sibilkov., 2009; Dencic-Mihajlov & Malinic., 2015). Lipson and Mortal (2009) studied the

association between liquidity and capital structure. They found a significant but negative association between the equity market liquidity and capital structure in a sample of US companies. They argued that companies with high liquid equity have lower leverage and choose equity financing when raising capital. Sibilkov (2009) investigated a study on asset liquidity's effect on public companies' capital structure in the United States of America (USA) from 1982 to 2005. The study found a positive relationship between asset liquidity and leverage. Furthermore, the findings of the study reveal a positive relationship between assets liquidity and secured debt, yet a curvilinear association between assets liquidity and unsecured debt was found.

On the contrary, the current ratio is a standard indicator of a firm's liquidity. A high proportion ensures a positive working capital with enough finances to support the firm's expenditures and activities since it creates net income. As a result, seeking outside funding is unnecessary (Serrasquerio, Matias & Salsa, 2016; Kumar, Colombage, Rao, 2017 & Neves, Henriques & Vilas, 2019). This is supported by a previous study by Deesomsak (2004), which studied the capital structure drivers of firms operating in the Asia-Pacific region and determined the existence of a poor association between liquidity with leverage. They concluded that firms with substantial cash prioritise internal funding over external funding because of the lower risk. As a result, firms with insufficient liquidity seem to rely more on debt to pay their short-term obligations. Likewise, a study by Neves, Serraqueiro, Dias and Hermano (2019) found a negative connection. Nevertheless, a positive association may exist, as evidenced by Vo's (2017) study, which used dynamic panel data to examine the determinants of the capital structure of Chinese enterprises from 2006 to 2015. Based on the study, firms with a high level of liquidity can sustain higher debt since they have a more vital ability to meet short-term obligations.

This study will further add to the aforementioned studies by looking at the effect of liquidity on capital structure. Sibilkov (2009) looked at assets' liquidity on the capital structure of companies. In contrast, Lipson and Mortal (2009)

explored equity liquidity in the capital structure of companies. So far, no known study has considered the assets side of the statement of financial position and the liability side. Hence, this study used assets liquidity, equity liquidity, and funding liquidity to explore their effect on a company's capital structure, specifically in the banking sector in South Africa.

Drehmann and Nikolou (2013) argue that when looking at liquidity from the asset and liability side of the statement of financial position, it turns out to be a complex phenomenon that needs to be considered from both sides. Furthermore, they contend that the ease with which an asset is traded, that is, market liquidity affects and is pretentious by the simplicity with which dealers can get funds that fund liquidity (Drehmann & Nikolaou, 2013). Besides, Dencic-Mihajlov et al. (2015) contend that both the asset structure, which is the ability to convert certain assets to liquid form and capital structure, the proportion of liabilities and their maturity, are central elements of liquidity. Therefore, the attractiveness of such research is mainly underlined by the fact that illiquidity problems inspire further borrowing and growth in the level of financial leverage and default risk (Denic-Mihajlov et al., 2015). Therefore, the study aimed to determine the effect of earnings volatility, government borrowings and liquidity on the South African bank's capital structure from 2012 to 2021.

1.2 Problem statement

There are many elements of capital structure that have been researched theoretically and empirically. These determinants include the size, profitability, assets tangibility, debt tax shield, non-debt tax shield and risk. The original theories to explain the determinants of capital structure are the trade-off theory (Kruas & Litzenberge, 1973) and the pecking order theory (Myers & Mjluf, 1984). Nevertheless, a new body of literature points to unique factors that affect company leverage. And some of these include earnings volatility, government borrowing and liquidity (see, for example, Dencic-Mihajlov & Malinic., 2015; Demirci, Huang & Sialm, 2019; Marozva & Makina, 2020; Akkoyun, 2018 & Khan, Bashir & Islam,2020).

Although much research has been conducted to examine volatility and spill over across various nations and economies, the relationship between volatility and firm capital structure remains unexplained (el Alaoui, Bacha, Masih & Asutay, 2017). Furthermore, little is known about how earnings volatility affects bank capital structure, notably in South Africa. As a result, the study fills this gap by looking into the impact of earnings volatility on bank capital structure and, if reduced leverage, as specified by bank standards, might keep interest rates low and provide better segments to the financial sector.

Previous studies on global capital structure explored the relationship between government borrowing and capital structure (Akkoyun, 2018; Demirci et al., 2017; Yusuf, 2017 & Graham et al., 2014). Yet, they found conflicting results. Friedman (1978) argues that it is vital to appreciate one probable impact of government borrowing on corporate financing, denoted as financial crowding out. In contrast, Pereira (2001) contends that public capital is possibly utilised by increasing productive ability, a crowding effect. Yet, public capital typically complements private capital in the production and distribution of private output, a crowding-in effect (ibid). Although its impact has been studied, no consensus has been reached on its reality, primarily because of the empirical identification problems (Hubbard, 2012). What is not clear at the present moment is whether the transmission mechanism when government borrowing reduces the money supply and increases interest rates and ultimately affects capital structure.

Several studies have been conducted internationally on liquidity and capital structure (Lipson & Mortal, 2009, Sibilkov, 2009; & Dencic-Mihajlov et al., 2015; Marozva & Makina, 2020). However, there are few studies on this issue in emerging countries (Udomsirikul, et al., 2011). Some used asset liquidity, while others used equity liquidity on capital structure and found contradictory results. Thus far, no study is known, which has looked at both sides of the statement of financial position, that is, assets and liability. Notably, no study examined the effects of liquidity on capital structure within the context of asset-liability mismatches (see Marozva, 2017; Bai, Krishnamurthy, & Weymuller,

2018). Therefore, this study sought to bridge this knowledge gap by investigating the effect of earnings volatility, government borrowing and liquidity on the capital structure of registered Banks in South Africa from 2012 to 2021. We do not know the effects of government borrowing on capital structure, whether the crowding-in or crowding-out effect. Moreover, the impact of the bank liquidity mismatch index is not known on capital structure. Previous studies focused on traditional liquidity measures and regulatory liquidity measures. Furthermore, South Africa is an emerging market with liquidity problems, and the environment is high risk; therefore, we need to investigate the earning volatility ultimately; they also have high government borrowing.

1.3 Research objectives

1.3.1 Primary objective

The primary objective of this study was to determine the effect of earnings volatility, government borrowing and liquidity on the capital structure of registered commercial banks in South Africa from 2012 to 2021.

1.3.2 Secondary objectives

- To investigate the relationship between earnings volatility and the capital structure of registered commercial banks in South Africa from 2012 to 2021.
- To examine the relationship between government borrowing and the capital structure of registered commercial banks in South Africa from 2012 to 2021.
- To investigate the relationship between liquidity and capital structure of registered commercial banks in South Africa from 2012 to 2021.

1.4 Research questions

- What is the relationship between earnings volatility and the capital structure of registered commercial banks in South Africa from 2012 to 2021?
- What is the relationship between government borrowing and the capital structure of registered commercial banks in South Africa from 2012 to 2021?

- What is the relationship between the liquidity and capital structure of registered commercial banks in South Africa from 2012 to 2021?

1.5 Research hypothesis

- H_1: There is a significant effect of earnings volatility on the capital structure of registered commercial banks in South Africa
- H_2: Banks' capital structure is significantly influenced by its level of total government debt, internal government debt and external government debt
- H_3: There is a significant effect of liquidity mismatch index (LMI) on the capital structure of registered commercial banks

1.6 Contribution of the study

The contribution of the present study is sixfold. It is critical to test capital structure theories in emerging economies for various reasons (Ramjee & Gwatidzo, 2012). To begin with, this allows us to evaluate capital structure theories formulated with western or developed economies in mind using companies from developing nations whose institutional environments may differ from those in developed markets. Moreover, the current study focuses on the banking sector since the setting for the banking sector in South Africa is fundamentally and technically different from those of the developed economies (Marozva, 2020). Wang and Mayes (2012) opine that a relationship between financial variables depends on the structural and institutional features of the banking sector under scrutiny. To the degree that South African companies' sources of finance are comparable to those of European or developing nations, they give us independent samples to test existing capital structure hypotheses. In addition to the proportion that South African companies have distinct institutional structures, experts' capacity to distinguish through various explanations and build theories that relate to the South African setting would rise.

Secondly, South Africa is important for several reasons; It is considered the gateway to Africa as a more powerful, prosperous country than some other African countries. And as other countries may desire to follow its growth and economy. This is how it operates in South Africa and may also apply to other

African countries. This seems to be highly crucial considering South Africa's economic importance in Africa. On the contrary, the banking sector is mainly essential in South Africa as a capital structure flow comes through banks.

Thirdly, previous studies that sought to test the effect of liquidity on the firm capital structure used standard liquidity proxies to measure liquidity. However, the current study used three liquidity proxies to measure liquidity: the current ratio, liquidity coverage ratio and bank liquidity mismatch index. The liquidity mismatch index was the primary liquidity measure that has never been tested on the capital structure. It is a correct measure of liquidity because it incorporates the assets and liability side of the statement of financial position, considering the market spiral. The justification for using the bank liquidity mismatches index as the primary proxy is that it focuses on both sides of the financial position statement, assets and liabilities. Theoretical and empirical finance literature has paid little attention to improving a liquidity proxy from the perspective of asset-liability mismatches. Notably, no known study investigated the effect of liquidity mismatch index on capital structure within the context of asset-liability mismatches (Bai, Krishnamurthy & Weymuller, 2018; Marozva & Makina, 2020). The study's results revealed a significant positive relationship between the bank liquidity mismatches index (BLMI) and capital structure.

Fourthly, the effect of government borrowing on the firm capital structure has been studied in developed countries by Graham *et al.* (2014), Ayturk (2017), Akkoyun (2018) and Demirci *et al.* (2019). However, no similar study has been conducted in developing countries regarding this issue, particularly in South Africa. Other studies have used local government borrowing to measure government borrowing, while others have used both local and foreign government borrowing to estimate government borrowing. However, the current study used total government borrowing and local and foreign government borrowing to measure government borrowing. Moreover, none of these studies empirically tested the effects of government borrowing on banks' leverage ratios. Contrary to crowding out theory and other empirical studies,

results showed that government borrowing does not crow-out the private sector; rather, it crowds-in. This is one of the main findings of this study.

Fifthly, many researchers worldwide are intrigued by the link between risk and capital structure. Earnings volatility may indicate a company's failure to pay contractual obligations when they become due (Sheikh & Wang, 2011). When a company's earnings volatility grows, its leverage ratio may also fall, demonstrating a negative link between earnings volatility and leverage. The study advises banks to focus on stable earnings because it might help them maintain a stable capital structure. That is, the higher the volatility of earnings, the lower the capital structure since they are unsure whether they will be able to repay the debt. They should ideally be in a negative connection. In line with theory detects, the current analysis found a negative relationship between EV and the capital structure measurements LTDR and STDR.

Lastly, this research effort was conducted during the COVID-19 period such that it presented a window opportunity to investigate the impact of the pandemic on a financial firm's capital structure. As such, this study sought to add to the growing body of literature that has aimed to examine the impact of COVID-19 on firm capital structure.

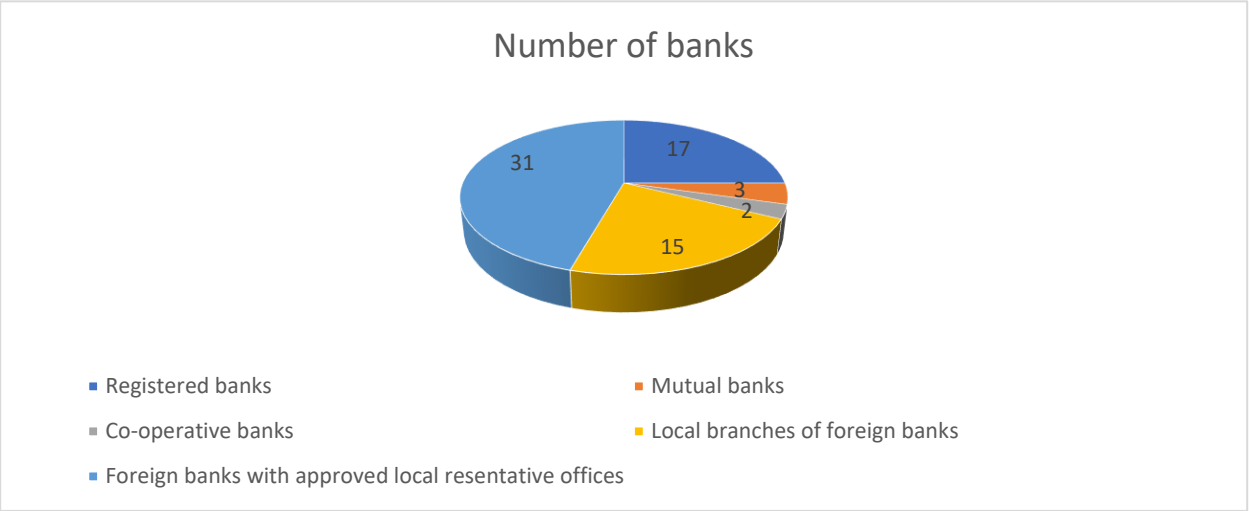
1.7 The Financial Sector in South Africa

Well, over decades, the South African financial sector has expanded by enormous amounts. This might be ascribed to various factors, the most important of which are financial liberalisation, globalisation, technological advancements, and economic boom (Sibindi,2017). South Africa has two layers of the official financial industry (Akinboade & Makina, 2006:106). The institutional and market levels are as follows. The banking and non-banking financial intermediaries are at the organisational level; meanwhile, the stock market, bond market, money market, and foreign exchange markets are at the market level (Sibindi, 2017). However, the banking sector's organisational structure was evaluated for the context of this research. An overview of this structure is offered in the next section.

1.8 An overview of the banking industry in South Africa

The profile of the South African banking industry is presented in Figure 1.1. The banking industry comprises 17 registered banks, three mutual banks, two cooperative banks 15 local branches of foreign banks and 31 foreign banks with approved local representative's offices (SARB, 2017).

Figure 1.1: A profile of the banking sector in South Africa



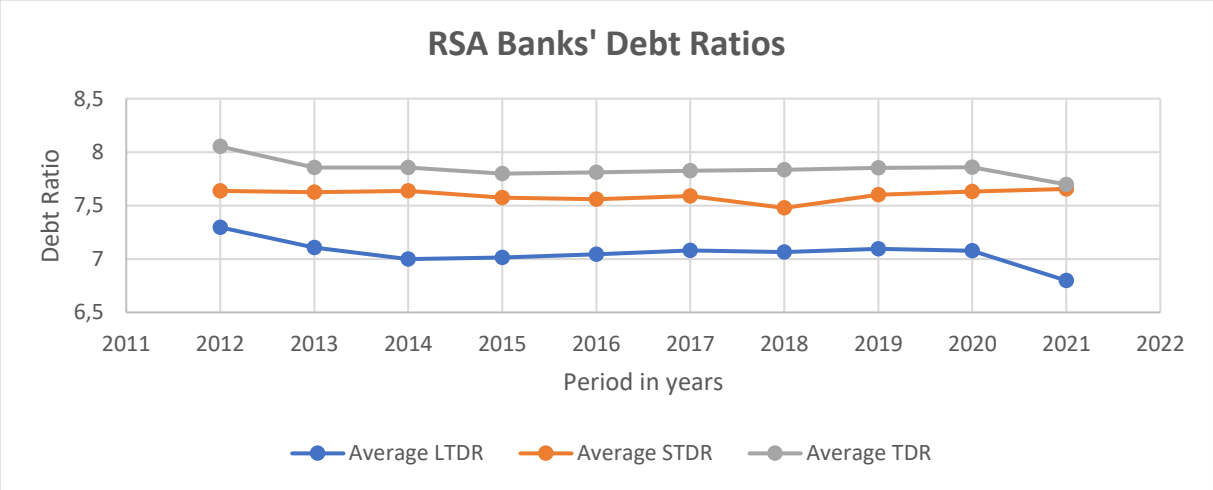
Source: Researcher's own compilation adapted from SARB (2017)

1.8.1 Exegesis of banking and Debt ratios in South Africa

The South African banking system has advanced tremendously on regulatory framework and technical innovation. On the contrary, Kumbiria and Webb (2010) suggest that the South African banking sector has incurred rising regulatory, competitiveness and innovation expenses. Since the country's return to democracy in 1994, the industry has also seen a significant infusion of foreign banks. The dynamics in the banking sector highlighted bank performance, particularly when and after the global financial crisis from 2007 to 2009. There are numerous studies on bank performance and efficiency in South Africa (see, for example, Okeahalam, 2006; Erasmus & Makina, 2014). Earlier studies have concentrated on non-financial enterprises to test capital structure hypotheses and establish deterrents (Sibindi, 2018). Their reasoning for excluding financial firms from their capital structure analyses has been either that they are governed firms or that they have fundamental vital factors

such as having premiums or deposits as an additional source of capital. However, little research has been conducted on bank capital structure in South Africa, with the researcher only finding one study on the subject (Sibindi, 2018). In addition, Sibindi measured leverage using book value, deposit leverage (deposit liabilities), and non-deposit leverage (non-deposit liabilities). However, the current study measured the capital structure using debt ratios (total, long-term, and short-term debt ratios).

Figure 1.2 Trends in average debt ratios of the South African Banking industry



Source: Author's own compilation

Data source: SARB- Banks BA900 Returns

https://www.resbank.co.za/RegulationAndSupervision/BankSupervision/Banking%20sector%20data/Pages/Banks-BA900-Returns.asp

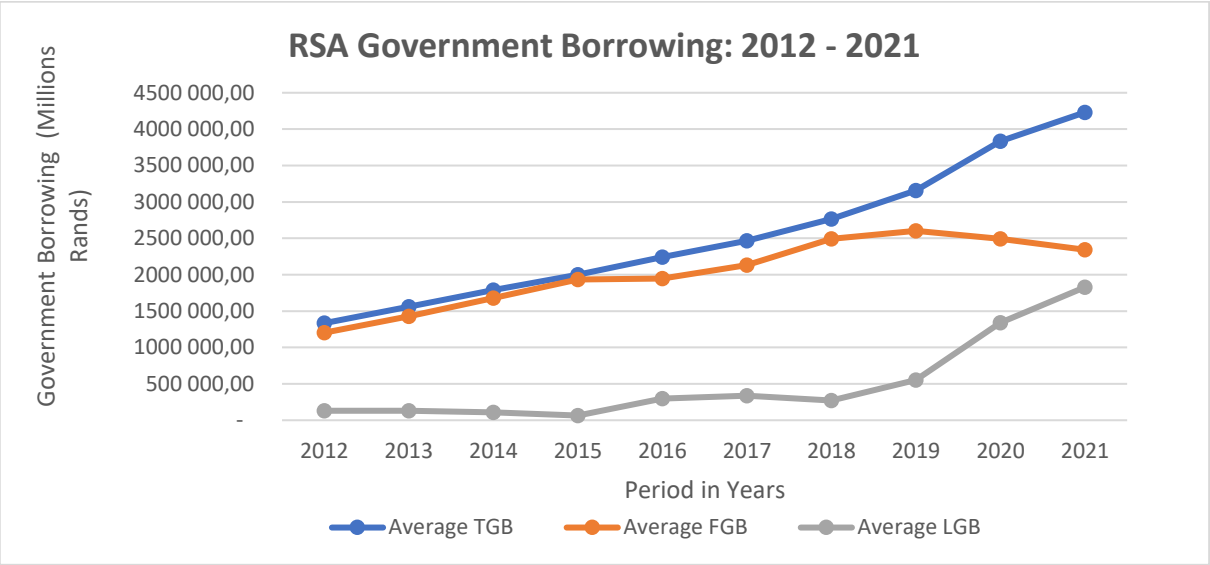
The capital structure of banks consists of the total debt ratio (TDR), long-term debt ratio (LTDR) and short-term debt ratio (STDR). Figure 1.2 shows that, on average, the total debt ratio of banks exhibited a sustained decrease from a level of 8,05 of the total debt ratios in 2012 to 7,70 in 2021. Comparatively, the long-term debt ratios of banks slightly increased from 7,64 in 2012 to 7,70 of the long-term debt ratios in 2021. Similarly, the short-term debt ratio declined from a peak of 7,30 short-term debt ratio in 2012 to a low of 6,70 short-term debt ratios in 2021. Therefore, it can be deduced that the debt ratio

substituted both the long-term and short-term debt ratios for the period under consideration.

1.8.2 Exegesis of government borrowing in South Africa

Government borrowing was measured by total government borrowing, local government borrowing and foreign borrowing in this study. Therefore, Figure 1.3 discusses the trends in average government borrowings in South Africa from 2012 to 2021.

Figure 1.3: Trends in average government borrowing: 2012-2021



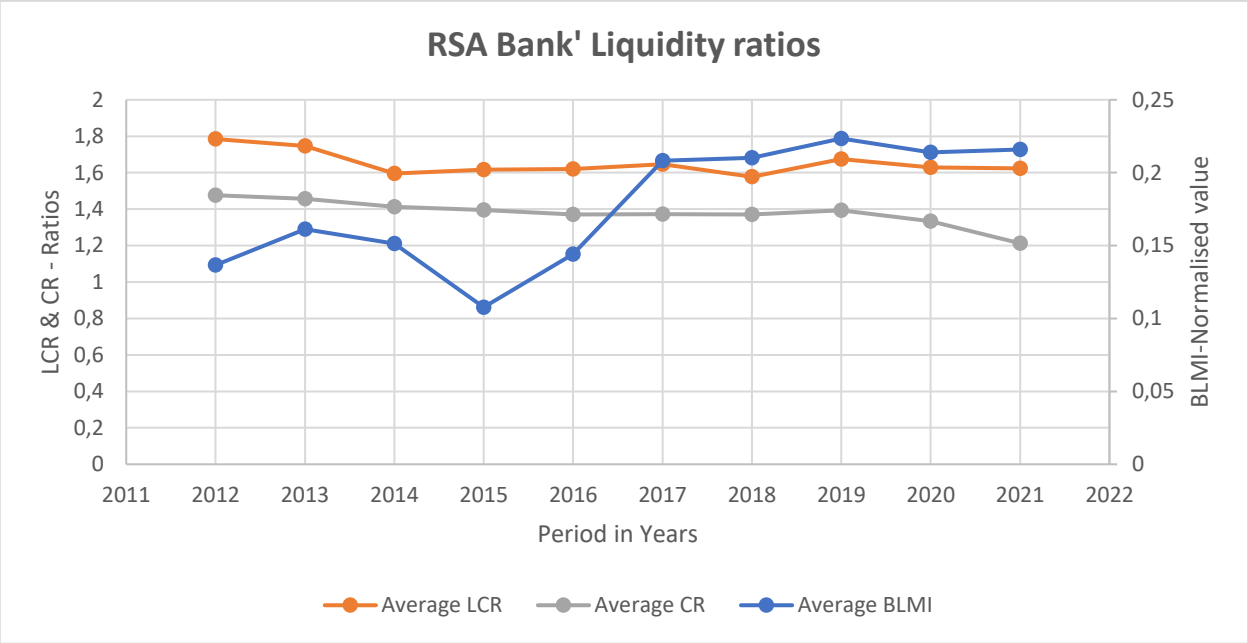
Source: Author's own compilation

Figure 1.3 indicates that total government borrowing increased from R1334 110,00 in 2012 to R 4230 630,00 in 2021. Comparatively, foreign government borrowing increased from R1202 942,00 in 2012 to R2343 843 89 in 2021. Similarly, local government borrowing increased from R131 168 00 in 2012 to R1827 764, 08.

1.8.3 Development of bank liquidity in South Africa

The current study used the current ratio (CR), liquidity coverage ratio (LCR) and bank liquidity mismatch index (BLMI) to measure liquidity. The following figure discusses the trends in the average bank's liquidity ratios.

Figure 1.4: Trends in average banks liquidity ratios in South Africa: 2012-2021



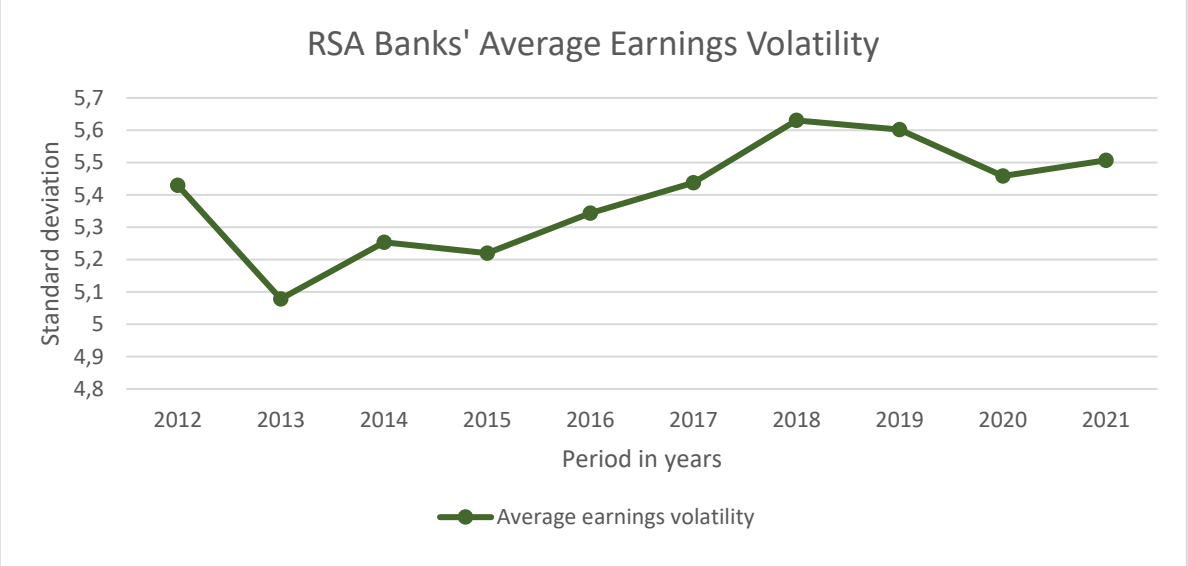
Source: Author's own compilation

Focusing on the period under investigation, Figure 1.4 shows that, on average, South African banks' liquidity coverage (LCR) decreased from 1,78 in 2012 to 1,62 in 2021. Comparatively, the average current ratio (CR) also reduced from 1,48 in 2012 to 1,21 in 2021. A decrease in the aforementioned liquidity measures, which are LCR and CR, especially from 2019 to 2021, may be caused by the COVID-19 pandemic. On the contrary, the bank liquidity mismatches index (BLMI) increased from 0,14 in 2012 to 0,16 in 2013. In 2013, the BLMI decreased from 1,16 to 0,11 in 2015. Furthermore, the BLMI, on average, started to increase from 0,11 in 2015 to 0,22 in 2021. The desire for liquidity becomes essentially intrinsic in the finance industry throughout the pandemic crises. The Basel III framework also calls for substantial changes in liquidity requirements (Marozva, 2017). The framework imposed stricter liquidity needs, sorted over several years. According to Marozva (2017), despite implementing the net stable funding ratio (NSFR) and the LCR, banks believe it is prudent to keep more significant liquid asset buffers.

1.8.4 The progression of South African bank's earnings volatility

The trends in South African banks' average earnings volatility measured by standard deviation are documented in Figure 1.5.

Figure 1.5: Trends in average banks earnings volatility in South Africa



Source: Author's own compilation

The average earnings volatility started at a peak level of 5,43 in 2012. It then fell during the 2013 period to a low of 5,08 before it rebounded in 2014 at average earnings volatility of 5,25 until it reached a peak of 5,63 in 2018. The average value began to fall from 5,63 in 2018 to 5,60 in 2019. Moreover, the average earnings volatility decreased from 5,60 in 2019 to 5,46 in 2020. The COVID-19 pandemic in South Africa may cause a decline in average earnings volatility from 2019 to 2020. Lastly, the average earnings volatility increased slightly from 5,46 in 2020 to 5,51 in 2021.

1.9 The layout of the thesis

Chapter 1: Background and Introduction

Chapter 1 introduces the research study. The study's problem statement, objectives, outputs, and benefits were discussed, and the thesis structure was summarised.

Chapter 2: Theories of Capital Structure

This chapter clarifies the relevant terms and the main concepts of the study. It discussed capital structure theories from the seminal works of M&M (1958). Modigliani and 'Miller's relevant and irrelevant theorem and the more prominent capital structure theories, such as the trade-off and packing order theories, are considered. The chapter also discusses the crowding-out effect theory and summarises the main capital structure theories.

Chapter 3: Empirical literature on the determinants of capital structure

The chapter begins by discussing the empirical issues of capital structure and government borrowing. Furthermore, the chapter analyses the empirical issues of capital structure and growth opportunity and the empirical issues of capital structure and earnings volatility. It then examines other firm-specific capital structure determinants and the other macroeconomic determinants of capital structure.

Chapter 4: Hypothesis development

The research problem is presented as a logical extension of the debate in Chapter 2 and 3. As stated in this chapter, this research problem has evolved into precise measurable hypotheses that were empirically tested. Furthermore, this section provides more detail on the study's three main objectives: the effect of earnings volatility on capital structure, the impact of government borrowing on capital structure and liquidity's effect on capital structure.

Chapter 5: Research Methodology

This chapter describes the methodologies used to address the research objectives and the developed hypothesis. The general methodological issues and challenges with this study in comparison to other comprehensive empirical studies are examined. The advantages and disadvantages of various research designs and econometric methods are discussed in terms of their suitability for the study. This process resulted in the generalised method of moment (GMM) model being selected as the preferred technique for evaluating hypotheses.

Chapter 6: Data analysis and discussion

The results of various econometric tests are presented and analysed. Puzzling issues and potential solutions are discussed. In this chapter, the research methods discussed in Chapter 5 were used to examine capital structure measures against their determinants empirically. The chapter further presents and analyses the results of testing the effect of earnings volatility on capital structure. It also examines the findings to test the effect of government borrowing on capital structure. Finally, the chapter presents the empirical results from a study of the effect of liquidity on capital structure.

Chapter 7: Summary of conclusions and directions for future research

The findings of this research are summarised in this chapter by providing concluding remarks on theoretical and empirical findings. The chapter also discusses the conceptual framework of the study. Furthermore, a summary of the study's contribution to the existing body of knowledge on earnings volatility, government borrowing, liquidity and capital structure was provided. Lastly, the chapter highlights some shortcomings of the study and provides directions for future research.

CHAPTER 2: THEORIES OF CAPITAL STRUCTURE

2.1 INTRODUCTION

The financing decision is an essential notion in corporate finance. The financing decision is critical as of the need to exploit yields to numerous organisational communities and also the effect such a decision has on a company's ability to deal with its competitive atmosphere. The capital structure of a company is essentially a mix of diverse securities. Abor (2005) claims that a company could choose among various other capital structures. It can issue a large amount of debt or very little, arrange lease financing, use warrants, issue convertible bonds and sign forward or trade bond swaps. Lastly, it can print tons of distinct securities in numerous combinations, yet it endeavours to find the precise combination that maximises its overall market value.

The rest of the chapter is structured as follows: Section 2.2 begins by defining key terms including capital structure, government borrowing, growth opportunity, liquidity and risk. This is done to delimit the study and to provide clarity on the focus of the research. Section 2.3 discusses the theories of capital structure, such as trade-off theory, pecking order theory, signalling theory, market timing theory, agency cost theory, free cash flow theory, and crowding-off effect theory. Section 2.6.9 provides a summary of the main ideas of the capital structure. Lastly, section 2.6.10 concludes the chapter.

2.2 Definition of key terms

This section begins by discussing the definition of capital structure in detail and the new factors that deemed to influence the firm capital structure, such as the government borrowing, growth opportunity, liquidity and risk.

2.2.1 Capital structure

According to, Kruk (2021), a company's capital structure combines debt and equity to finance its affairs. They argue that a similar company can have altered kinds of common stock, debt and preferred stock. Similarly, Yildirim, Masih and Bacha (2018) defines a company's capital structure as the mix of debt and equity the company utilises its operation. On the contrary, Brealey

and Myers (2003) assert that the choice of capital structure is fundamentally a market problem. They argue that the company could issue dozens of dissimilar securities in countless mishmashes, yet it endeavours to find the particular clutter that exploits market value (Brealey & Myers, 2003).

The capital structure measured long-term and short-term leverage ratio (Vinho Vo, 2017). On the contrary, Handoo and Sharma (2014) state that capital structure measured by total debt ratio (TDR), long-term debt ratio (LTDR) and short-term debt ratio (STDR). Total debt ratio (TDR) is defined as the financial ratio that shows the percentage of firm's assets which provided in comparison to total debt (ibid). Vinho Vo (2017) defines long-term leverage as the ratio of long-term liabilities to total assets while short-term leverage described as the ratio of short-term debt to total debt (Vinho Vo, 2014). Hence, this study will use long-term debt ratio and short-term debt ratio to measure capital structure following Handoo and Sharma (2014). They also used the total debt ratio, long-term debt ratio, and short-term debt ratio to measure the capital structure.

2.2.2 Government borrowing

Different authors define government borrowing, also known as government debt, public debt or sovereign debt in different ways. Ajah and Jacob (2022) defined government debt as the overall contractual liabilities incurred by a country's government entities, including outstanding debts to individuals, unit trusts, pension plans, external governments, and others. The sum of money borrowed by the government from both domestic and foreign sources to encompass its budget shortfall is referred to as the government's debt (Ogbodo, Okafor & Nwaobi, 2022). On the contrary, Hyman (2014) defines sovereign debt as the net debt of a national government. Hyman (2014) claims that in most of the time debt issued by governments to the public in the form of securities of several maturities such as notes, bills and longer-term bonds alternating from a five-year maturity to 30 years or longer is observed as reasonably free of the default.

There are two factors of public debt, namely, external and internal debt, also known as the domestic debt (Black *et al.*, 2003:255). External debt, also known as the foreign debt, is defined as the debt acquired by the government

when borrowing from foreign residence or institutions (Black *et al.*, 2003:255). Conversely, Black et al. (ibid) define internal debt as the debt sustained by the government when borrowing from local citizens or institutions. They claim that internal government debt calculated by deducting external government debt from total government debt outstanding (Demirci *et al.*, 2017). Also, Demirci *et al.*, (ibid) used both internal and obligation to as proxy for government debt. Therefore, this study used total government borrowing, internal government borrowing and foreign government borrowing because we want to test crowding out effects by the government.

2.2.3 Growth opportunity

The market value of total equity divided by the book value of total equity is known as the growth opportunity (Zafar, Wangsurawat Camino, 2019). Growth raises the cost of financial distress, decreases free cash flow issues, and amplifies debt collection agency issues (Frank & Goyal, 2009). Shareholder co-investment is more critical to a growing company. As a result, according to the trade-off theory, growth decreases leverage. Antoniou, Guney and Paudyal (2008) anticipate that growth possibilities and leverage will negatively affect two reasons. Trade-off theory postulates that the cost of financial burden rises in tandem with predicted growth, driving managers to minimise their capital structure's debt. Second, when information asymmetries exist, corporations prefer to issue equity rather than debt when overvaluation results in higher predicted growth. However, Antoniou *et al.* (2008) point out that rising enterprises' internal resources may not be adequate to fund their positive net present value (NPV) investment prospects and that they may need to raise external capital. In contrast, perking order theory postulates that if a company needs external financing, it should issue debt before equity. In terms of pecking order theory, growth opportunities and leverage are therefore positively connected.

These three are measures that can be used to measure growth opportunities, according to Khemiri and Noubbigh (2018). Firstly, growth is the ratio of total asset change between time t and time t-1 divided by total asset change at time t-1. Secondly, (I) is defined as the ratio of the change in tangible assets from

time t to time t-1 divided by the change in tangible assets at time t-1. Finally, (Q) represents the market capitalisation plus long-term debt to total assets ratio (Dahmarde Ghalerno & Sistani Badoei, 2014).

2.2.4 Liquidity

The definition of liquidity and its measurements are explained in this section. Keynes' liquidity is defined by Hayes (2018) as the extent to which the worth of an asset in aspects of functional outcome is impartial to shifts in the state of long-term anticipation. Hayes' definition distinguishes convertibility and capital risk. However, it ignores the significance of cash-equivalent securities' short-term or self-liquidating essence (Culham, 2020). In contrast, Gitman et al. (2012:50) define liquidity as the solvency of the company's general financial position. Gitman et al. (2010:50) argue that since a common originator of financial distress and bankruptcy is low or declining liquidity, these ratios can offer early signs of a cash flow problem. On the other hand, liquidity is viewed as the measure of the company's ability to fulfil its short-term obligations with the existing assets (Megginson, Smart & Graham, 2010:50).

The ability to pay company bills as become due is driven by a current liability on the statement of financial position and referred to as the funding liquidity (Andrievskaya, 2012). Strahan (2008) describes market liquidity as the cost of selling assets that relates to costs linked with the clearance of support in the markets. Although liquidity is not new in the corporate finance literature, there is no adequate definition. The dearth of an agreed-upon definition stems from the circumstance that the notion of liquidity ascends from different economic backgrounds (Alder, 2012). It is, therefore, can be defined from the context of how easily security traded and in the perspective of how simply one can acquire funding to sell a security (Marozva, 2017). Hence, this study focused on both sides of the statement of financial position that is market and funding liquidity. Marozva (2017) argues that since the relaxed the security traded means the casual, it is to acquire funds to sell securities; therefore, market and funding liquidity are corresponding.

2.2.5 Risk

Risk is defined in finance as the possibility of a trade deficit leading to a loss of earnings (Sibindi, 2017). Risk is a term used to describe the volatility of a company's cash flows or earnings expectations. The likelihood of a firm defaulting on its debt payments rises as the firm's volatility rises (Yildirim, Masih & Bacha, 2018). This limits creditors' willingness to make new loans to risky businesses, resulting in more significant financial costs. According to the trade-off principle, these businesses must reduce their debt levels to reduce their chance of bankruptcy.

Firms with substantial earnings volatility run the risk of falling short of their debt-service obligations (Antoniou et al., 2008). In such a case, reorganising funds at a considerable expense or risking bankruptcy may be the only options. As a result, companies with fluctuating solid profitability need to use less loan capital. Therefore, companies that have significantly fluctuating profitability should have less debt capital. In the same vein, Frank and Goyal (2009) support this viewpoint. They argue that companies with more fluctuating cash flows are more likely to experience financial difficulties and therefore employ lower debt. The likelihood of fully utilising the tax shield is reduced when cash flows are more erratic.

In contrast, the pecking order theory predicts a positive correlation between business leverage and risk. This should be based on the assumption that cash flow volatility equals earnings volatility (Sibindi & Makina, 2018). They claim that the company is forced to finance with retained earnings. To circumvent the moral hazard stumbling block, it would have to seek funds from external markets, commencing with the debt market. To overcome the moral hazard problem, it would have to look for money in the external markets, beginning with the debt market. Frank and Goyal (2009) concur, claiming that organisations with volatile shares are likely to have variable views. It is possible that such businesses are subjected to more discrimination. If this is the case, the packing order hypothesis predicts that riskier businesses will have more leverage. However, Goyal and Frank (2009) aver that organisation

with fluctuating cash flows may need to access external capital markets on a regular basis.

Financial leverage has a positive association with age, size, risk, growth, and tax (Almanaseer, 2019). This indicates that old banks, large banks, as well as banks with high growth rates will require additional money to fuel their expansion initiatives, and if funds generated from internal sources are insufficient, funds from external sources, such as borrowing, will be used. This results in increased leverage, high risk, and expensive debt financing costs. They will ultimately become less prone to failure than smaller banks, which is in line with the classic capital structure theory of banks (Almanaseer, 2019). On the contrary, Al-Najjar and Hussainey (2011) found a negative link between company leverage and risk. They looked at a group of UK companies and discovered that risk and capital structure have a negative association. They claim that high-risk companies are more likely to default and have less access to debt financing. Therefore, this study used risk volatility earnings to measure risk.

2.3 Theories of capital structure

The main aim of this section is to discuss the contradiction in M&M relevant and irrelevant theorem and the capital structure theories on the basis that the capital structure does or does not affect the value of the firm. These theories include trade-off theory, pecking order theory, signalling theory, market theory, agency cost theory and free cash flow theory. Also, the M&M theory firstly consists of proposition one without tax and with tax. Secondly, proposition two without tax and with tax. The following section will discuss these two propositions of M&M theories in detail. The capital structure puzzles unwound, and a vibrant image extended in terms of why the capital structure is essential.

2.3.1 Modigliani and 'Miller' relevant and irrelevant theorem

The capital structure theory can be traced back upon the pioneering paper of Modigliani and Miller (1958). They illustrated in their work that the choice between debt and equity does not have any material influence on the company value. Hence, this proposition indeed holds presume perfect capital markets.

An ideal market is referred to as the one which there are no frictions, namely bankruptcy and transaction cost. Yet, in the real-world scenario, the question that one may raise is whether all capital markets are perfect. When a fault market such as bankruptcy and transaction costs take into consideration capital structure may be relevant. This means that slightly adjustment costs may cause large differences in the capital structure (Strabulaev, 2007).

M&M first analysed leverage under the assumption that there are no corporate or personal income taxes (Brigham & Dave's, 2007:551). Based on this assumption, M&M provides algebraically two propositions:

M&M Proposition 1 state that the leverage firm value is the same as the unleveraged firm value (Ross, Westfield & Jordan, 2008). Hence the firm's value is not affected by the capital structure perfect market. M&M Proposition 1 developed as follow:

$$V_L = V_U \tag{2.1}$$

Where V_L donates, a firm levered and V_U represents an unlevered firm. M&M Proposition 1 claimed that changing the capital structure will not change a firm's value. Also, Modigliani and Miller examine the impact of financial leverage on the cost of equity. As the cost of debt is less than the cost of equity and using more debt than equity, this will result in a lower cost of capital, yet using debt improves a firm's risk. If a company risk improves, shareholders will demand a higher ROI (Ross, 2008). Modigliani and Miller postulates that the cost of equity is positively associated with leverage. Therefore, based on the assumption mentioned above, they developed proposition two as follows:

M&M Proposition 2 with no tax suggests that a firms cost of equity is a positive linear function of its capital structure. Based on the proposition as mentioned above, the cost of equity articulated as:

$$r_e = r_a + D/E + (r_a = r_d) \tag{2.2}$$

Where r_e represents the cost of equity r_a required rate of return of firm's assets (weighted cost of capital (WACC)), D measures the value of firm's debt, E captures the value of firm's equity and r_d represents the cost of debt. Equation

2.2 was formulated from the original weighted cost of capital (WACC) to unravel the cost of equity which articulated as:

$$WACC = E/V \times r_e + D/V \times r_d \quad (2.3)$$

The above two propositions imply that utilising more debt in the capital structure will not improve the value of the firm since the benefits of the less debt will exactly offset by an increase in the riskiness of the equity, therefore in its cost (Brigham & Dave's, 2007:552). As a result, MM argue that in a world with no taxes, both the value of a firm and its WACC would not be affected by its capital structure.

The proposition of perfect markets and consolidation of corporate tax into the model was relaxed later by (Modigliani & Miller, 1963). The reason for doing so was the understanding that debt is tax-deductible and hence a company which uses debt is destined to appreciate an interest tax shield. As a result, as raising more debt is utilised, the market value of a company would strengthen by the present value of the interest tax shield. On the contrast, they also caution that all the same the existence of tax advantage for debt financing. It does not essentially mean that the companies must, at all times, seek to utilise the maximum possible amount of debt in the capital structures. For one thing, other, forms of financing, such as the retained earnings that are cheaper when the tax status of investors under personal income tax are considered (M & M, 1963).

According to Brigham and Dave's (2007:555), the condition when firms exposed to income taxes, yet there are no personal taxes, is a special case of the condition with both personal tax and corporate taxes. Therefore, we present outcomes at this point. M&M Proposition 1 with tax state that the value of the levered firm is equivalent to the value of an unlevered firm in the same risk class plus the gain from leverage. The gain from leverage is the value of the tax savings, found as the product of the company tax rate times the amount of the debt the company utilises (D):

$$V_L = V_U + TD \quad (2.4)$$

Where V_L is the value of the levered firm, V_U is the value of unlevered firm, T represents the firm tax rate, and D is the debt of the firm. M&M look at the impact of leverage on the company's cost of equity. In a world of no tax, leverage rises the company's risk which results in higher cost of equity which shareholders demand (Alghamdi, Donleavy, Al Farooque, Anderson and Khan, 2018). Therefore, it suggests that a positive association occurs between the cost of equity and leverage. On the contrary, where there is tax, M&M anticipate a similar decision. Hence, they added the amount of tax shield benefit from adding to the equity (Alghamdi *et al.*, 2018). Therefore, tax shield benefit will decline the firm's total cost of capital. On the contrary, M&M Proposition 2 with tax suggests that the cost of equity increases with leverage because the risk to equity increases with leverage. Based on the M&M proposition 2 with tax, the firms cost of capital articulated as follows:

$$r_e = r_a + D/E\ (1\text{-}T_C) + (r_a = r_d) \tag{2.5}$$

Where r_e is the cost of equity, r_a is the required rate of return of firm's assets (WACC), r_d donates the cost of debt, D measures the value of firm's debt, E represents the value of the firm's equity and T_C is the tax rates firms. Moreover, the weighted average cost of capital (WACC) uttered as follows:

$$\text{WACC} = D/V \times r_d\ (1\text{-}T_c) + E/V \times r_e \tag{2.6}$$

Based on the above analysis, the M&M propositions with the inclusion of tax suggest firms should, in the absence of bankruptcy costs, utilise 100% as debt since there are tax shield benefits that businesses can exploit (Alghamdi et al., 2018).

Jensen and Meckling (1976) argue that in their financing decisions, companies would aim to reduce agency costs owing to the conflict that may exist among managers (agency) and shareholder (principal). They describe agency cost as the bonding expenditures by managers, the monitoring expenditures by shareholders and lastly, the residual loss. Therefore, Jensen

and Meckling (1976) confirm that an optimal capital structure attained by trading off the agency cost debt contrary to the benefit of debt.

In a year later, Millier (1977) introduced the effect of personal taxes in their model. They contend that in the equilibrium, the tax advantage of debt would exactly be offset by the increased personal taxation, which implies that a shareholder would be indifferent to know how much leverage the company utilises. He argues that if the optimal capital structure is about rebalancing tax advantages against bankruptcy costs and raised a question, why then the observed capital structures indicate little discrepancy over time.

In contrast, DeAngelo and Masulis (1980) contend that Millers' (1972) theorem is immensely sensitive to the practical and unassuming changes in the corporate tax code. They claim that tax shield is not a result of the interest expense for example depreciation, investment tax credits and deductible allowance indicated that there is a market equilibrium in any company that has a unique optimal capital structure. Also, they maintain that market prices reveal personal and corporate taxes in a way that the bankruptcy costs are a substantial reflection in a trade-off among interest tax-deductibility and risk of financial distress (DeAngelo & Masulus, 1980).

In the same year, Modigliani (1980) reviewed M & M's irrelevance theorem. He argues "that the value of the firm should not be affected by the share of debt in its financial structure or by what will do with returns paid out as dividends or reinvested (profitably)". Yet, Chen and Kim (1979), on their synthesis of theory, in some way recognise the benefits of debt on the aggregate level but is not able to answer why companies are utilising risky debt on the distinct group. Hence, it soon becomes clear that M&M's irrelevance theorem may perhaps not exist in a real-world, and the scholars concluded that capital structure needs to be relevant for a market value of a company (Marinsek, 2015).

2.3.2 Trade-off theory

Kraus and Litzenberger conceptulised trade-off theory (TOT) (1973), in their research that develops the theoretical groundwork of the static trade-off theory in future, revealed that the optimal leverage reflects a trade-off between tax benefits of debt and the burden costs bankruptcy. Myers (1984) modified it in his static trade-off model, suggesting that companies set a target debt to value ratio and slowly change towards it, in the same way, that companies adjust dividends to move towards a target dividend payout ratio. Rasiah and Kim (2011) claim that the trade-off theory is a capital structure theory that emphasises on the equilibrium between the benefits of interest tax shield and the costs of dispensing debts to govern the optimum level of obligations that a company ought to issue to exploit its interests. The optimum point of trade-off attained when the marginal value of benefits, with the tax shield from debt financing, just aligns the incremental present value of costs related with dispensing more debts (Sibindi, 2017).

Nguyen, Bai, Hou and Vu (2021) observed that, based on the trade-off theory, any discrepancy in debt financing from the ideal capital structure might result in a company's value decrease in the value of a firm (Nguyen et al. 2021). On the other hand, this theory does not appear to explain contexts wherein debt is non-existent (Miglo 2020). A tax shield raises the firm's market value while increasing debt because financial implications lower the tax framework (Gajdka and Szyma'nski , 2019).

The static trade-off theory premised on the company's selecting a financial policy that centres upon linking the costs and benefits of debt that derived from the optimal capital structure, such as the tax advantage of debt, the mitigation of free cash flow agency costs, the costs of financial distress as well as the agency costs stakeholders (Rasiah & Kim, 2011). Static trade-off theory regulates an optimal capital structure by adding several limitations, including taxes, costs of financial distress and agency costs, while on the other hand, maintaining the assumptions market efficiency and symmetric information (Baker & Wurgler, 2002). This view is supported by Carpentier (2006). They claim that the static trade-off theory upholds that companies select an optimal

capital structure by trading off the advantages of debt financing in contrast to its cost.

The trade-off theory suggests that a principal borrowing inducement is the tax advantage of interest payment (Antoniou, Guney & Paudyal, 2008). DeAngelo and Masulis (1980) postulate that tax deductions for depreciation and investment tax credits are measured as alternates for the tax benefits of debt financing. These factors can lead to market equilibrium, where a company has optimal central leverage. Hence a company's inspiration to borrow declines with a rise in non-debt tax shields. The other constraint of the static trade-off was adequately set by Myers (2001), who argues that the trade-off theory is in immediate distress on the tax front, as it appears to rule out conservation debt ratios by tax-paying companies. If the idea is correct, a value-exploiting company should at no time pass up interest shields when the probability of financial distress is remotely small (Myers, 2001). Hence, there are various reputable, profitable firms with greater credit ratings operating for years at little debt ratios.

The trade-off theory is a capital structure theory that focuses on the balance between benefits of debt and costs of debt to determine optimal leverage for the company (Ali, Yousaf & Naveed, 2020). The benefits of debt typically comprise the tax-deductibility of interest payments as associated with stock dividends which are not deductible. The disciplinary impact of debt in forcing managers to payout free cash flow (as of divergent to wasting it a territory building or other value reducing projects). The cost of debt includes the present value of the expected direct and indirect cost of bankruptcy, including the negative impacts of risk shifting or lack of incentives related to higher leverage (Kisgen, 2006). The trade-off theory implies that a company will incline to move back near its optimal power to the degree that it advances from its optimum (Fama & French, 2002).

The four most important predictions of the trade-off theories summarised as follows: Firstly, the trade-off theory predicts that companies will have a target

debt ratio and that these ratios will vary depending on the sector the company is falling on. Graham and Harvey (2001) supported this prediction, asserting that most of the surveyed Chief Financial Officers acknowledge that they follow the target debt ratio.

Secondly, the trade-off theory predicts that companies with fairly safe tangible assets will not much be open to the costs of financial distress, and will, therefore, be likely to borrow extra. The underinvestment companies with uncertain intangible assets are more visible to the costs of financial distress and anticipated to borrow fewer. The above prediction is confirmed by Rajan and Zingales (1995) for companies in seven developed countries, and Frank and Goyal (2009) for non-financial companies in the USA.

Thirdly, the trade-off theory predicts that the greater marginal tax rates related to more levels of leverage. This prediction was confirmed by Graham (1996) who revealed that a statistically significant positive relationship exists between marginal tax rates and debt ratios. Similarly, Rasiah and Kim (2011) argue that companies with a higher taxable income ought to borrow additional debt to take advantage of the interest tax shield. Contrary to the foregoing prediction, Negash (2002) found a negative relationship among debt and tax rate for a sample of 64 listed companies on the Johannesburg Stock Exchange (JSE) industrial sector.

Fourthly, the trade-off theory predicts that companies with more taxable income and legally insufficient non-debt tax shields such as investment tax credits and depreciation will have extra incentives to borrow (DeAngelo & Masulis, 1980). The main empirical limitation of trade-off theory is usually supposed to be the fact that more profitable firms generally have lower leverage (Frank & Goyal, 2009). They argue that in dynamic trade-off models yet leverage and profits are negatively associated.

To take advantage of the interest tax shields, companies with less tax non-debt tax shields ought to have few debts in their capital structure (Chipeta, 2012). Shah and Khan (2017), Moradi and Paulet (2019) and Silva, Gomes

and Lopes (2020) found conflicting evidence to the above prediction. They found a positive association between company debt to value ratios and non-debt tax shields. The positive relationship implied that companies that have high non-debt tax shields such as depreciation have tangible assets. On the contrary, Zaheer, Ahmed, Ali and Aleen (2021) revealed contradicting result that a significant but negative association between leverage and non-debt tax shields. Abeywardhana (2017) asserts that trade-off theory postulate that all companies have an optimal debt ratio at which the tax shield equal the financial distress cost. The trade-off theory excludes the influence of information asymmetry and including the diverse information on conflicts between internals and externals pecking order theory proposed (Abeywardhana, 2017).

Kigsen, (2006) argues that companies to some extent far away from a downgrade would be less anxious about a small contribution of debt. On the contrary, these companies will still be worried about the possible effects of a vast debt contribution. Meanwhile, a large offering could create a downgrade for them. Similarly, companies that are reasonably far from an upgrade may reflect a large equity contribution to get an upgrade; yet, they would be less probable to issue lesser equity contributions relative to companies actual near to an upgrade (Kigsen, 2006).

In summary, it seems like numerous empirical studies support the first three main predictions of trade-off theory. While many studies indicate that companies which utilities supplementary non-debt tax shields have additional debt in their financing behaviour, and this based on the fourth prediction.

2.3.3 Pecking order theory

Myers and Majluf (1984) developed the pecking order theory of capital structure and suggests that it is commonly better to provide safe securities than the ones that are risky. This interpretation is supported by Meyers (1984), who claimed that the company would prefer internal to external financing and debt to equity if it can provide the securities. Hence, the pecking order theory

implies that debt will rise for companies when investment go beyond within generated funds while debt will decline when the asset is less than internally created funds (Shin, Kim & Shin, 2011).

The pecking order theory is also explained as the asymmetric information theory. Information asymmetric arises owing to managers of a company having more information about what is happening inside the organisation and forthcoming outlook than do investors. Since managers make decisions on how to increase the wealth of shareholders, therefore, asymmetric information can influence the capital structure decisions which managers make (Gitman, Smith, Hall, Lowies, Max, Strydom & Van der Merwe, 2010).

The pecking order theory foresees a robust short-term response of leverage to short term dissimilarity in the earnings and investment (Shin et al., 2011). The parking order theory implies that debt will increase for companies when the investment is above the internally created funds while debt will decline when the asset is lower than internally generated funds (Shin et al., 2011). On the contrary, owing to the information asymmetry, Ali and Javid (2015) claim that credit ratings help companies to have lesser cost and improved access to the capital market. The traditional capital theories do not reflect all the information specified by credit ratings and hence, miss seeing essential issues associated with the access to external financing and financial distress (Akatan, Celik, Abdulla & Alshakhoori, 2019).

In testing the pecking order theory empirically, Shyam-Sunder and Myers (1999) consider probing the empirical predictions of theoretical model on companies which relies on the internal financing sources every time conceivable. They argue that only in the case of a financial deficit will the company consider choosing external financing, which secured debt is favoured, followed by risky debt and then equity. Their results indicate that pecking order theory is an excellent first-order descriptor of corporate financing performance for their companies.

Besides, Degryse, Goeij and Kappert (2012) suppor the pecking order theory in Dutch small and medium enterprises (SME's), observing that after internal

funds, long-term debt is the subsequent ideal capital. Chauhan (2016) notes strong support for the pattern of financing as predicted by pecking order theory (POT) for Indian companies. Furthermore, Cevheeeroglu-Acar (2018) conclude that capital structure choices of non-financial companies in Turkey are typically consistent with the hypothesis of POT fairly than the trade-off theory.

Other scholars have pinpointed what denoted to as a modified pecking order theory. Wang and Lin (2010) revisited the pecking order theory and revealed that high market value companies are keen to issue equity, whereas those with low market value issue debt. Strictly, they argued that the original pecking order theory could reverse. Other scholars, on the other hand, contradict the pecking order theory. Leary and Roberts (2010) reveal that the pecking order theory displays poor performance in relating debt-equity issuance conclusions. Therefore, that after allowing for the difference in the company's debt capacities, they perceive only less than 20% of the companies follow the pecking order theory. Moreover, Komera and Lukose (2015) rejected the debate that the company follow the pecking order theory in making their financing decisions.

There are some benefits and limitations of the pecking order theory. The main benefits of using pecking order theory are that it displays that financial managers are intense to uphold the control of the company, and it helps in reducing the cost of equity and agency problem (Buff, Khan & Nafees, 2013). Yet, there are also some limitations of pecking order theory (Buff et al., 2013). The primary limitation of pecking order theory is that it fails to include the effect of taxes, cost of dispensing new securities and agency problems. The second limitation of the pecking order theory is that it oversees the issues related to the decisions of finance managers to gather so much financial relaxation that they become threatened to market discipline. Lastly, it reflects the effect of financial casual on the company and the effect of accessibility of positive net present value (NPV's) of projects. Pecking order theory does not consider the liquidity of an organisation as it makes a fatal implicit mistake that the organisations have sufficient cash flows to finance their businesses from

retained earnings. The presence of liquidity level as a determinant for capital structure decision proved that liquidity is statistically essential in leverage determination (Ahmad Mohamad Ali, 2017). They argue that higher liquidity shows greater flexibility in terms of cash generation; therefore, not as much of reliance on external financing anticipated.

2.3.4 Signalling Theory

The signalling theory emerges from the asymmetry theories, which can be traced back from the work of Ross (1977). The author claimed that if managers possess internal information, then, the option of managerial incentive arrange and of a financial structure signals data to the market and in competitive balance the implications tired from the signals will be confirmed (Ross, 1977:23). Putting more to an organisation's capital structure can serve as a credible signal of more expected future cash flow (Dencic-Mihajlov, Malinic & Grabinski, 2015).

Besley, Brigham and Sibindi (2015:268) claim that a signal is an action taken by the management of the companies, which gives an idea to potential investors on how management views the company's predictions. Hence, managers of companies when they employ their choice of capital structure, they will communicate the information to the markets. If management believes that their companies are underrated, they will issue debt instead of issuing equity. Therefore, this is viewed as a positive signal by the administration of companies. Yet, if management believed that their companies overvalued, they will issue equity instead of issuing debt. Hence, this is viewed as a negative signal (Gitman et al., 2010:510).

In testing the signalling prediction where only modification of return is the inspiration of the signalling equilibrium, Brick, Frierman and Kim (1998) signify that if the manager has private evidence of the company, low debt levels signal an inferior stock return of the company. The signalling theory predicts a negative association between ownership concentration and leverage since the role of debt in alleviating both moral hazard and unfavourable selection problems (Deesomsak, Paudyal & Pescetto, 2004). On the contrary,

Hennessy, Livdan and Miranda (2010) establish a dynamic model of company signal positive information by replacing debt for equity. This result shows the inverse association between a company's debt and net value.

Besides, Hommel (2011) argues that the signalling theory could not stand by empirical evidence. Furthermore, Hommel (2011) maintains that signalling prediction cannot precisely demonstrate as it has not tested in the number of academic studies appreciated by the trade-off theory stopping from Modigliani and Miller (1963). Hu (2018) argues that this is because the expectations of a signalling model is criticised as being ignorant.

The signalling model undertakes that financing decisions designed essentially to convey the manager's confidence in the company's future predictions to external investors (Barclay & Smith, 2005:11). They argued that, in most instances, this is done to increase the value of shares when managers believe that they are undervalued (Barclay & Smith, 2005:11). Moreover, Barclay and Smith (2005:11) contend that debt orders company to make a fixed traditional cash payment to debtholders over the term of the debt security.

The fundamental limitation of the signalling theory is that it advocates that manager's private information about the companies' predictions play an essential role in both their financing selections and how the market responds to such choices (Sibindi, 2017). On the contrary, Barclay and Smith (2005:9) argue that it is not easy to detect when managers have such proprietary evidence; it is difficult to test this proposition. Another weakness is that it makes a severe assumption that markets are inefficient; so many stocks that can trade at a price which is significantly different from its intrinsic value.

2.3.5 Market timing theory

The market time theory is part of information theory which resulted in the development of signalling theory. The market time theory also avoids the idea of optimal capital structure, and it has drawn back from the work of Barked and Wurgler (2002). They argue that managers time their equity issues in the perception that they will issue new shares when the share price is recognised to be higher. On the contrary, they will buy shares when they are perceived to

be cheaper. Therefore, when prices of shares change, they will influence a company's capital structure.

There are two categories of timing that results in similar capital structure dynamics (Barker & Wurgler, 2002). Firstly, companies tend to proclaim equity issues after the release of positive information, which may lead to the decline of asymmetry information. Secondly, theory presumes that the investors or management are irrational because there is time-varying mispricing or insight of mispricing. Therefore, the management issue equity when they think it cost irrationally less and buys equity when they believe its cost is irrationally high. Since it is essential to know the second category of this theory, it does not entail that the market almost to be ineffective. The hypothesis is that managers believe that they can time the market.

In a research conducted by Graham and Harvey (2001), content that managers acknowledge trying to time the equity market and many of those which have careful issuing common stock reveals that the amount by which our inventory is underrated or overrated was an essential reflection. They supported the hypothesis of the market theory, which says that managers believe they can time the market. Yet they do not differentiate between the mispricing and the dynamic information asymmetric scenario of market timing.

On the contrary, Flannery and Rangan (2006) argue that managers who believe that their companies are overrated are more likely to issue equity. They contend that what stands out is that the market timing theory asserts that managers generally utilise asymmetries information to advantage contemporary shareholders (Flannery & Rangan, 2006). Almost any realistic optimising model of corporate leverage is likely to have time-varying costs and benefits (Frank & Goyal, 2009). This result in time-varying optimal choices. More importantly, market timing offers very deniable cross-sectional suggestions within this empirical framework and no direct explanation for the star patterns that we perceive (Frank & Goyal, 2009).

Consequently, Brendea (2012) demonstrates that the impact of market timing on the capital structure of listed companies in Rome is consistent over time. Precisely, the propensity of these listed companies to increase equity when

their market value is high is not a constant feature owing to the effect of market circumstances. Furthermore, Oztekin (2015) investigated the market timing hypothesis considering the impact of the macroeconomic environment and financial development. The study indicates that after controlling these two institution dynamics, the influence of equity cost on the level of leverage is not statically significant. In contrast, the equity cost significant reduction the adjustment speed.

Abeywardhana (2017) argues that market timing theory does not explain an optimal capital structure and according to this theory capital structure is an upshot of numerous conclusions the company has reserved over time. This theory proposes that companies issue new shares when they notice they overvalued and that company's repurchase own shares when they contemplate these to be undervalued (Abeywardhana, 2017).

Recently, Allini, Rakha, McMillan and Caldarelli (2018) their results suggest that historical market-to-book ratios have no significant effect on the Egyptian company's capital structure. As such, this provides no support for market timing attempts by the Egyptian company's. They argue that taking these findings composed, issuance activity in Egyptian perspective seems more closely to the need of funds as an alternative of exploiting any windows of the prospect that may occur in equity (Allini *et al.*, 2018). This result may ascend owing to capital limitations confronted by the companies. However, the company may not be able to issue acceptable debt or equity when facing favourable market conditions (Allini *et al.*, 2018).

2.3.6 Agency cost theory

Agency theory was advanced by Jensen and Meckling (1976) building on the previous work by Fama and Miller (1972). They argue that an agency conflict between the shareholders to managers and lenders derives from the manager's tendency who puts their interest ahead of the company's goals (Jensen & Meckling, 1976). For instance, agency cost is borne by a company to align the interests of managers to those of shareholders. The assumption is that the managers (agency) in most cases, will not always behave in the

best interest of the shareholders (principal). The reason for that is the managers might not consistently perform in the best interest of their shareholders is because they want to fulfil their personal goals to protect the companies.

Hence, it is the responsibility of the shareholders to ensure that they incentivise the agency to minimise them to act in the best of their interest. Yet, it is not ensuring that the managers will do their best to satisfy their shareholder since they incentivise them; therefore, the companies will end up making a loss by paying more bonuses to their managers. Therefore, Jensen and Meckling (1976) argue that agency cost is the summation of the observing payments by the shareholders (principal), the bonding costs by the managers (agency) and lastly the residual loss.

According to Jensen and Mackling (1976), the optimal capital structure attained by trading off the agency cost of debt alongside the benefit of debt. They find disagreements between shareholders and managers because of management's ownership is less than 100% of the equity (Jensen & Mackling, 1976). Jensen (1986) suggests that this problem could minimise by enhancing the percentage of shares owned by the agency (managers) or by improving debt in the capital structure. This would lead to the decreasing of the amount of available cash to managers not being used (Jensen, 1986 & Stulz, 1990).

Agency models have shown a positive association between leverage and firm value, regulatory abidance, probability of defaults, value at the time of liquidation, free cash flows and the significance of managerial reputation (Handoo & Sharma, 2014). They argue that firm value and leverage are positively related because these two measurements move together in response to some exogenous factors (Hischleifer & Thakor, 1989). Agency theory has shed light on the idea of capital structure; however, it does not elaborate on all the changes in capital structures perceived in practice (Handoo & Sharma, 2014). Although agency theory is practical and popular, it is still suffering from different limitations, and these limitations recognised by scholars such as Eisenhardt (1989), Shleirfer and Vishny (1997) and Daily, Dalton and Rajagopalan (2003). Firstly, the theory assumes a contractual

agreement between the shareholders and managers for an inadequate or unrestricted future period, where the future is unclear. Secondly, the theory also assumes that contracting can eliminate the agency problem, yet practically it faces many hindrances like information asymmetry, rationality, fraud and transaction cost. Shareholders pay more attention to only maximise firm return; however, their role restricted in the firm. Lastly, the theory regards the managers as the opportunistic and pay no attention to their competence of the managers. In conclusion, there is no standard theory of debt-equity superior. Different interpretations set headfirst concerning the financing selections.

2.3.7 The free cash flow theory

Jansen (1986) confiscates the argument regarding the agency costs further by advancing the free cash flow of debt. The author sites this on the regulator hypothesis notion that debt can be valuable in encouraging managers and their companies to be well-organised. In a pioneering work, Jansen (1986) defines free cash flow as the amount of money left after the company has invested in all projects with a positive net present value (NPV) and asserts that calculating the free cash flow of a company is challenging. Meanwhile, it is not possible to determine the precise number of likely investments of the company.

The free cash flow established by Jansen (1986) asserts that firms with extensive cash flow and insufficient investment opportunities always tend to face conflicts between managers and shareholders. According to Labhane and Mahakud (2016), the excess amount of free cash flow in the hands of managers raises the agency cost as they are free to utilise these financial reserves for their interests. Jensen (1986) argues that excessive free cash flow accessible to managers leads to investing more owing to investment in projects with negative net present value.

Guizani (2017) contends that to make sure that there is no wasteful expenditure, shareholders of such companies monitor the actions of

managers. These monitoring diversions improves the company cost of monitoring and therefore increase the agency cost (ibid). Besides from utilising free cash flow to invest in projects that have a negative net present value (NPV), Kadioglu and Yilmaz (2017) advocate that managers tend to make worthless expenditures affiliated with their benefits.

Zhang, Cao, Dickinson and Kutan (2016) investigated free cash flow and investment using a sample of 169 energy firms in China from 2001 to 2012. Their results support the free cash flow (FCF) hypothesis in the energy-associated firms in China. They find that evidence that company size, ownership structure and governance are essential dynamics for understanding the agency problem in China's energy companies.

Kadioglu and Yilmaz (2017) studied whether the free cash flow hypothesis is valid for companies listed in Borsa Istanbul using a sample of 227 companies from the period of 2008 to 2014. They find a statistically significant but negative relationship between debt ratios, dividends per share and free cash flow. Moreover, they also find a significant but positive relationship between free cash flow and total assets. Their findings support the free cash flow hypothesis, which suggests that dividend circulation and external financing decrease the amount of free cash flow as the destruction of managers. Hence, the regulatory bodies may reassure dividend supply to align the benefits of managers with those of shareholders, therefore reducing agency cost (Kadioglu & Yilmaz, 2017).

Besides, Nguyen (2017) indicates a positive association between free cash flow and company financial performance. Since under severe information asymmetry, free cash flow would also benefit companies by providing the openness to managers and acting as an inexpensive source of funds compared to other external sources of funds (Nguyen, 2017). As a result, in instances of high information asymmetry, like in Vietnamese financial markets, these can decrease, invalidate, or even outweight the agency cost of free cash flow by Jansen (1986). Furthermore, Ding, Knight and Zhang (2018) argue that the free cash flow hypothesis offers a useful clarification for China’s

overinvestment in the non-state sectors. However, in the state sector, overinvestment is attributable to the poor screening and monitoring of enterprises by banks. Free cash flow theory suggests that managers of firms with unused borrowing control and sizeable free cash flow are probable to undertake low-benefit or even value destroying managers (Jensen, 1988). Karpavicius and Yu (2017) found that increased institutional ownership alternates two costly mechanisms that lessen the agency problem related to extra cash flow-debt and dividends. They argue that owing to the effective monitoring of investors, lesser debt and compensation ratios lead to better cash holdings rather than to value-destroying investment.

2.3.8 The crowding-out effect theory

The neoclassical and Keynesian theories can be used to explain the crowding-out effect hypothesis. The neoclassical theory emphasises high employment and competitive markets despite government interference. The interest rate process, based on the neoclassical loanable fund hypothesis, will respond to the rebalancing of savings. For example, a rise in government spending boosts interest rates, rebalancing the capital market and crowding out private investment (Arrow & Kurz, 1970). This view was supported by David and Scadding (1974), who argue that an increase in government bond issuance crowded out an equivalent percentage of private capital because deficit finance is subject to public capital and the letter serves for private capital investment.

Aschuaer (1989) suggests that an increase in public capital spending elevates the overall average wealth creation above the level determined by stakeholders; hence, public capital spending may crowd out private capital. Therefore, according to Andrade and Duarte (2016), the crowding-out effect refers to a circumstance in which, following an increase in state public investment, there is a decline in capital funding as well as other aspects of total expenditure, which can be sensitive to interest rate variations (financial crowding-out). The fact that resources are scarce clarifies these impacts, as does the existence of a transmission mechanism in the economy between

financial markets and product markets (Andrade & Duarte, 2016). The rise in interest rates may therefore result in a drop in private investment and other components of aggregate expenditure that are more susceptible to interest rate swings. The crowding-out effect refers to the drop in some components of the aggregate cost that occurs as a result of an increase in public spending (Blanchard, 2008).

When rising borrowing is ideal for financing the large budget and public deficits, crowding out occurs. It restricts the funds available to the private sector, reducing the impact of private investments on growth (Demirel, Erdem & Erooglu, 2017). They contend that the government could finance public deficits through borrowing, central bank reserves, or privatisation. Each type of financing has a different impact on the economy. Borrowing will raise the cost of borrowing in financial markets, resulting in an interest rate increase (Demirel et al., 2017). In addition, if central bank reserves are used to finance public deficits, an inflationary effect may occur. According to Demirel et al. (2017), it is also important to note that privatisation is a shorthand for funding public debt.

According to Graham, Leary, and Roberts (2013), the associations between government debt and corporate policies may reveal fluctuations in aggregate investment opportunities that are ineffectively measured in their regressions. They argue that when deficit financing rises and investment opportunities are scarce in bad times, companies do not require as much external financing and invest less. The difference in the outcomes of government debt and company debt and equity is indicative of crowding-out and therefore does not entirely alleviate this concern if companies prefer debt financing due to tax benefits (Miller, 1977). Myers and Majluf (1984) contend that information frictions, for example, if a company's debt dimensions or optimal leverage ratios are procyclical (see, for example, Bernanke & Gertler, 1989, Gertler & Hubbard, 1991).

Recently, Saidjada and Jahan (2018) used a bound testing approach to cointegration within the ARDL framework to investigate whether public investment crowds out or crowds in private investment between 1981 and 2015. They found that the empirical results of the three different model specifications show that public investment has a significant crowding-out effect on private investment in the long and short-run. They also discover that real output has a significant but positive long-run and short-run impact on private investment. However, the real interest rate only hurts private investment in the long run. Furthermore, there is a significant coefficient between public investment and liberalisation, indicating that public investment has a diverse influence on private investment in the post-liberalisation era. They contend that the positive coefficient of the relations term demonstrates that liberalisation has a controlling effect on the crowding-out force in Bangladesh. The recent empirical studies that support the crowding-out effect theory include scholars such as (Zhang, Brookins & Huang, 2022; Doruk, 2022; Xai, Lia & Shen, 2021 & Xu, Lui, Su & Petru, 2021).

On the contrary, Keynes (1936) offered the push for the thesis that government spending does not choke out private debt. It is assumed that government expenditure enhances private investment due to the positive impact of government spending on share prices; therefore, crowding occurs. Carlson and Spencer (1975) assert that while the Keynesians constructed multiple models, they were never tested as interrelated components. Friedman (1978) proposes a portfolio crowding-out strategy based on the substitutability of public debt and many other assets in shareholders' portfolios, which could also result in either crowding-out or crowding-in of capital funding. This researcher sharply criticises the widespread mistaken notion that the negative impact of asset portfolio impact on capital funding is the only method for resolving the model. Hence, he shows that the deficit financing over the sale of government bond may be in some cases, a foundation of portfolio crowding out and crowding in effect (Friedman, 1978:608).

Theoretical work by McDonald (1983) and Benninga and Talmor (1988) put forward a similar association between government and company debt arises from the existence of market imperfections mainly taxes that cause an imperfectly elastic demand curve for corporate debt. Also, the Keynesian theory asserts that expansionary fiscal policy will lead to slight or no increase in the interest rate and as an alternative an increase in output and income and therefore, a crowding-in rather than crowding-out (Aschauer, 1989). Moreover, the crowding-in effect perceived when there is a rise in private investment as a result of increased public investment, for example, through the construction or improvement of physical infrastructures such as roads, water and sanitation, ports, airports and railways (Hatano, 2010).

It was in utilising a production function approach that Heintz (2010) assessed for the period 1951 to 2006 the effect of public investment on the productivity of the US private sector. The research finds evidence of cointegration association in a dynamic specification of an empirical model that concluded public infrastructure as an element of the production. This shows that the existence of a long-run association between the US public capital stock and productivity of the private capital stock, which is the existence of crowding-in effects between both variables.

A pioneering study was conducted by Aschauer (1989) who advocated that the public investment may induce private investment, directing his attention to growths in the productivity of private capital subsequent from the accumulation of public capital over public investment. Surprisingly adequate, his theory based on greatly neoclassical theory, not a Keynesian theory (Hatano, 2010). Moreover, to a private investment function which contained within public investment and profit of private capital as right-hand side variables. The model also controlled a profit function for private capital, which comprised public capital as a right-hand-side variable based on a production function (Hatano, 2010). Utilising this simple model of simultaneous questions and without resorting to the outdated argument that emphasises the significance of aggregate demand management, Aschauer (1989) raised the likelihood that

an active fiscal policy may have a crowding-in effect through the productivity effect of public capital. To be more precise about the features of Aschauer's model, public investment affects private investment in his model, mainly over the following two ways. One is the negative effect of public investment that seems to be the intimate product that looks in the profit function through the productivity effect of public capital, which is known as the crowding-in effect as contrary to the crowding-out effect (Hatano, 2010). Saidjada and Jahan (2018) argue that, within the Keynesian framework, an increase in public investment could be supportive to private investment if the government invests in infrastructure, capacity enhancing projects and human resources development. These kinds of public investments reassure private investment by raising productivity and generates a crowding-in effect in turn (Saidjada Jahan, 2018). Other empirical studies that support the crowding-in theory include authors such as (He, Yang, Ahmad, Ozturk, Draz, & Chandio, 2022 & Rong & Lifei, 2022).

The crowding-out effect theory does explain the transmission mechanism when government borrowing reduces the money supply and increases interest rates. However, it has not been tested empirically on how the transmission mechanism affects the capital structure. Therefore, this creates a gap in the literature.

2.3.9 Summary of the main theories of capital structure

An introduction of the literature outlining backgrounds of the main capital structure theories as well as suggestion in support of as opposed to the theories is conferred in Table 2.1.

Table 2.1: A summary of the main theories of capital structure

Theory	Origins of the theory	Affirmation in Support of theory	Affirmation against theory

Trade-off theory	Kraus and Litzenberger (1973); modified by Myers (1984)	Graham (1996); Frank and Goyal (2009); Rasiah and Kim (2011)	DeAngelo and Masulis (980); Abeywardhana (2017)
Pecking order theory	Myers and Majluf (1984)	Shyam-Sunder and Myers (1999); Shin; Kim and Shin, 2011); Degryse, Goeij and Kappert (2012)	Leary and Roberts (2010); Komera and Lukose (2015); Buff et al, (2013); Akatan, Celik, Abdulla and Alshakhoori (2019)
Signalling theory	Ross (1977)	Brick, Frierman and Kim (1998)	Barclay and Smith (2005); Hommel (2011)
Market timing theory	Baker and Wurgler (2002)	Flannery and Rangan (2006)	Frank and Goyal, 2009); Brendea (2012); Oztekin (2015); Abeywardhana (2017)
Agency costs theory	Jensen and Meckling (1976)	Handoo and Sharma (2014)	Eisenhardt (1989); Shleirfer and Vishny (1997); Daily, Dalton and Rajagopalan (2003)
Free cash flow theory	Jensen (1986)	Zhang, Cao, Dickinson and Kutan (2016); Kadioglu and Yilmaz (2017)	Ding, Knight and Zhang (2018)
Crowding out effect theory	Arrow and Kurz (1970)	David and Scadding (1974); Zhang, Brookins and Huang, (2022); Doruk, (2022); Xai, Lia and Shen, (2021) and Xu, Lui, Su and Petru, (2021)	Keynes (1936); Aschuaer (1989); Saidjada and Jahan (2018): He, Yang, Ahmad, Ozturk, Draz, and Chandio, (2022) and Rong and Lifei, (2022)

Source: Researcher's own compilation

2.4 Conclusion

This chapter discussed the definitions of the key terms, such as the capital structure, government borrowing, liquidity, growth opportunity and risk. We started by reviewing the MM irrelevance propositions. The MM irrelevance propositions after that confirmed not to hold in a world with conflicts such as taxes and transactions costs. Moreover, the main theories of the capital structure discussed such trade-off, pecking order, signalling, market timing, agency cost, free cash flow. We also discussed the crowding-out effect theory. The main predictions and the limitations of the capital structure theories were discussed. Numerous theories discussed in this chapter can be generalised to all commercial banks in advanced emerging economies. The crowding-out effect theory does explain the transmission mechanism when government borrowing reduces the money supply and increases interest rates; however, it has not been tested empirically on how the transmission mechanism affects the capital structure.

The next section discusses the empirical issues regarding the earnings volatility, government borrowing and liquidity on the financial institution's capital structure in developed and emerging countries.

CHAPTER 3: EMPIRICAL LITERATURE ON THE DETERMINANTS OF CAPITAL STRUCTURE

3.1 INTRODUCTION

Numerous capital structure factors have been examined, such as profitability, assets tangibility, size, growth opportunities, debt tax shield, non-debt tax shield, and risk theoretically and empirically. The two leading theories to explain these factors are the trade-off theory by Kruas and Litzenberger, (1973) and the pecking order theory by Myers and Majluf (1984). The trade-off theory emphasis the balance between the benefits of debt and the costs of debt to examine the optimal capital structure of firms (Kruas & Litzenberger, 1973). However, the pecking order theory postulates that the information asymmetry among managers and shareholders affects the cost (Myers & Majluf, 1984). On the contrary, new factors such as government debt and liquidity are considered to impact firm capital structure (Maung & Chowdhury, 2014; Akkoyun, 2018; Barry, Diabate & Tarazi, 2018 & Demirci, Huang & Sialm, 2019).

The rest of the chapter discusses the empirical issues concerning government borrowing, growth opportunity, earnings volatility, liquidity, other firm-specific determinants of capital structure and macro-economic factors that affect a company's capital structure in developed and emerging economies.

3.2 Capital structure and earnings volatility

The volatility in earnings, ROA, or share price over time is commonly used to measure financial risk (Nguyen & Nguyen, 2020). According to the trade-off theory, business leverage and risk have a negative connection. Firms with higher earnings volatility incur financial distress costs (Zeitun, Temimi & Mimouni, 2017). On the contrary, the pecking order theory predicts a positive link between risk and leverage because companies with fluctuating earnings face more significant perverse incentives (ibid). The relationship between risk and capital structure has piqued the curiosity of many researchers all around the world.

Nguyen and Nguyen (2020) studied six elements influencing firm capital structure, including ROA, ROE, firm size, tangible assets, risks and growth. The study used a sample of 290 non-financial enterprises registered on the Vietnamese Stock Exchange From 2010 to 2018. ROA, tangible assets, risks, and growth positively and statistically significantly impact company capital structure. The study findings show that ROE has a statistically significant negative effect on firm capital structure.

Using a sample of 827 non-financial listed firms in Malaysia, Saif-Alyousfi, Md-Rus, Taufil-Mohd, Taib, and Shahar (2020) investigated the drivers of capital structure from the period 2008 to 2017. Static panel estimate approaches and two-step difference and system dynamic GMM estimators were used in the study. The indices of debt-measure endurance are positively significant, according to the empirical investigation. Profitability, growth opportunity, tax-shielding, liquidity, and cash flow volatility have a negative and substantial effect on debt variables, while collateral, non-debt tax and earnings volatility positively and significantly impact debt indicators. They argue that because earning volatility affects all debt measurements positively, the higher the profit volatility, the higher the debt (Saif-Alyousfi et al., 2020).

Moreover, they argue that this could be because Malaysian businesses do not employ smart debt to shield themselves from financial trouble and insolvency. As a result, they cannot pay interest or repay debt obligations at maturity. The fact that earnings volatility positively influences debt measures contradicts the trade-off and pecking order theories, which claim that enterprises employ less debt as earnings volatility rises to avoid financial difficulty or bankruptcy (Akhtar, 2012). In addition, the size of the company, its age, the rate of inflation, and the rate of interest are all essential factors in determining leverage. Their findings, in general, corroborate the propositions advanced by both pecking order and trade-off models.

Moreover, Moradi and Paulet (2019) investigated the influence of firm-specific factors on capital structure creation in a balanced panel sample of 559 enterprises from six European countries between 1999 and 2015. The study findings show that leverage with the debt-to-equity ratio is highly negatively

connected with growth, profitability, tax shielding, and the impacts of the Euro Crisis, whereas net equity is strongly positively associated. Furthermore, the analysis found that size, asset tangibility, non-debt tax shields, and earning volatility are all considerably positively connected with leverage and the debt-to-equity ratio, while net equity is significantly negatively linked. The inverse relationship between earnings volatility and net equity is aligned with the agency cost of debt, which states that risky companies borrow more (Fama & French, 2002). Other studies that find a positive relationship between earnings volatility and capital structure include scholars (Danso, Fosu, Owusu-Agyi, Ntim & Adegbite, 2020 & Khan, Bashir & Islam, 2020). This means that the higher the debt, the higher the impressive volatility.

On the contrary, they are utilising 902 company-year monitoring listed in the Tehran Stock Exchange (TSE) from 2006 to 2017. Ghasemzadeh, Heydari, and Mansourfar (2021) studied the link between earnings volatility and capital structure, focusing on the mitigating influence of financial distress in the connection between volatility and capital structure. As opposed to the aforementioned scholars mentioned (Saif-Alyousfi et al.,2020 Moradi and Paulet, 2019), who used panel data to analyse the determinants of capital structure. This study uses a MIMIC model of structural equations modelling (SEM) to explore the associations, which allows their study to quantify earning volatility and capital structure using only a few other quality predictions. The finding of the study shows that earnings volatility has a significant but negative effect on capital structure. Furthermore, the results show that financial distress substantially influences earning volatility and capital structure. In other words, the connection between earnings volatility with capital structure is less whenever financial distress functions as a mitigating element than when it does not.

Mai (2019) investigated the drivers of capital structure in Sharia-criteria manufacturing companies listed on the Indonesia Stock Exchange from 2011 to 2017. The study findings show that only profitability seems to have the same trend, which is negative for capital structure size, book leverage and market leverage. Yet, the two capital structure measurements, positive for book

leverage and negative for market leverage, are perceived differently by growth opportunity and company size. Furthermore, the study findings suggest that tangibility, business risk, and inflation positively impact market leverage. Moreover, tangibility and inflation have a positive impact, and business risk has a negative effect. According to this study, GDP growth has little impact on the two Shariah criteria for capital structure in manufacturing enterprises. Moreover, according to the researcher, this finding cannot indicate if the capital structure strategy of Sharia criterion manufacturing companies on the IDX is consistent with trade-off theory or pecking order theory predictions. Therefore, it appears to favour the pecking order idea when employing the book leverage.

Using a sample of 37 firms listed in the Ethiopian Revenue and Customs Authority (ERCA), a more extensive taxpayer's local branch in Addis Ababa, Umer (2013) investigated the factors that influenced the capital structure of large businesses in Ethiopia from 2006 to 2010. The nine traditional explanatory factors considered in the study were profitability, size, age, tangibility, liquidity, non-tax shield, growth, dividend pay-out ratio, and earnings volatility. Random-effect panel data regression was used to investigate the impact of selected independent variables on the capital structure due to improvements in existing estimate methods that allow for the simultaneous use of cross-sectional and time-series data.

The study's findings indicate that a firm's size, age, tangibility, liquidity position, and non-debt tax shield are all positively related to leverage; however, profitability, earnings volatility, and dividend pay-out ratio are all negatively affected. In addition, it was found that the growth variable is not statistically significant in affecting the leverage of sizeable Ethiopian taxpayer share firms. Furthermore, the signs of these relationships indicate that agency cost theory provides substantial additional indication than other capital structure theories to clarify the capital structure of Ethiopia's large taxpayer share firms.

The early study by Sheikh and Wang (2011) investigated the capital structure determinants of 160 industrial listed companies in KSE Pakistan between

2003 and 2007. Panel econometric approaches, such as pooled OLS, fixed effects, and random effects, are used in the analysis. They use the debt ratio as an explanatory variable to assess leverage, such as long-term and short-term debt ratios. Profitability and liquidity are negatively connected with the debt ratio, according to their empirical investigation. They suggest that the above result aligns with the pecking order notion than trade-off framework expectations.

On the other hand, the debt ratio is positively associated with the firm size. These data endorse the theory that company size indirectly measures financial distress. Moreover, their findings demonstrate a negative association between debt ratio and earnings volatility, which aligns with trade-off theory theoretical assumptions. Furthermore, a negative association exists between tangibility and debt ratio, according to the study. The study also found a substantial but negative influence of liquidity on the debt ratio, implying that companies kept too much cash on hand, encouraging managers to overspend on remuneration. The study, on the other hand, found no connection between debt ratio and growth opportunities. Lastly, the distinction between long- and short-term debt may restrict the predictive effectiveness of capital structure models derived from western contexts. Yet, the findings suggest that these models can assist in evaluating Pakistani companies' constituent parts.

Other empirical studies that find a negative association between earning volatility and capital structure include scholars such as (Shah, Gujjar, & Tunio, 2022; Chukwuani, 2021: Elmahgop, 2021; Ghasemzadeh, Heydari, & Mansourfar, 2021 Memon, Md-Rus & Ghazali, 2021 & Kenourgios, Savvakis, & Papageorgiou, 2020). The results are in line with the trade-off and pecking-order hypothesis, which anticipates that companies with significant earnings volatility might also strive for internal financing. Therefore, a conservative capital-structure strategic plan to avoid debt burden, even though high volatility, is related to greater chances of financial distress (Ghsemzadeh, Heydari & Mansourfar, 2021).

In summary, it is evident from the preceding analysis that the outcomes of further empirical research varied. Some results support the trade-off idea, while others support the pecking order theory; however, neither is consistently superior.

The following section discusses the empirical issues on the other determinants of capital structure.

3.3 Capital structure and government borrowing

The crowding-out effect theory explains the transmission mechanism when government borrowing reduces the money supply and increases interest rates. However, it has not been tested empirically on how the transmission mechanism affects the capital structure. According to Demirci, Huang and Sialm (2019), government borrowing can crowd out firm debt if stakeholders in financial markets desire to sustain a reasonably constant amount of debt and equity securities in their ranges. They argued that a rise in the supply of government borrowing might increase the anticipated return on government bonds and other debt securities nearby alternates. In response to the higher financing costs of fixed-income securities, firms might decrease debt funding, followed by crowding out of corporate debt by government borrowing (Demirci et al., 2019). Therefore, this study sought to investigate the effect of government borrowing on the capital structure of registered commercial banks in South Africa from 2012 to 2021.

Empirical studies that highlighted the effect of government borrowing on company capital structure in developed countries provide the majority of studies on this issue. These include studies by scholars such as McDonald (1983), Krishnamurthy and Vissing-Jorgnsen (2012), Graham *et al.* (2014), Ayturk, (2017), Akkoyun (2018) and Demirci *et al.* (2019). However, there is only one that we could find in emerging countries that conducted a study on this issue (Liang, Wang & Xu, 2017). McDonald (1983) conducted a study on the influence of government debt on corporate leverage in the USA. The study revealed how government financing decisions could affect the company's decision to use a mortgage or equity finance. In particular, it indicated that a

rise in the stock of taxable government debt decreases the balance amount of corporate debt and that an improvement in the capital of tax-free government debt decreases the balance magnitude of company equity.

On the contrary, in their study, Krishnamurthy and Vissing-Jorgnsen (2012) offered a theory in which the primary driver of short-term debt supplied by the financial industry is the range demand for safe and liquid assets by the non-financial sector. The central estimate of the theory is that government debt (in practice, this is mostly Treasuries). Crowd-out the net supply of privately distributed short-term debt (the private quantity of short-term safe and liquid debt, net of the financial industry's holdings of Treasuries, reserves and currency). They attested to the high estimation in U.S. data from 1914 to 2011 and took a series of tactics to address possible endogeneity concerns and misplaced variables disputes. Also, they tested whether deposits should be crowded in by government debt supply, including controls for the business cycle, exploiting a demand shock for safe/liquid assets and sightseeing the effect of government supply on the composition of consumption outlays.

Graham *et al.* (2014) examined a study on the effect of government debt on corporate financing and investment in America. The research indicates U.S. federal government debt issuance significantly influences companies' financial policies. Also, the study results show a strong negative relationship between company debt and investment and government debt, yet a strongly positive correlation with company liquidity. They argued that these relations are more distinct in more significant and fewer-risk companies whose debt is a more rapidly substitute for treasuries (Graham *et al.*, 2014). Moreover, these relations were stronger after 1970, when enhancing foreign competition for Treasuries led local intermediaries to turn to the safe company to fill a portion of their demand for safe assets in response to Treasury supply variations. Their findings recommend that companies get involve in liquidity provision, which changes both the liability and asset structures of their balance sheets in response to the provision of liquidity by the federal government (Graham *et al.*, 2014).

Ayturk (2017) studied the association between government borrowing and corporate financing decisions in 15 developed European countries from 1989 to 2014. The study used a country-level aggregate and fixed-effects panel data model with aggregate flow data to analyse data. The study found a strong negative relationship between government borrowing and corporate debt but no significant association between government debt and equity. The result of the study is inconsistent with Graham *et al*. (2014). They found a strong negative association between corporate debt, investment and government debt yet strong positive relationships with corporate liquidity. The researcher argued that these findings are robust in cooperation with the flow and stock data (Ayturk, 2017). Mainly, the more government debt levels result in financial crowding out effect on company debt in developed European countries.

Moreover, their findings indicated that the long-term debt of large credit-worthy companies is supplementary complex to government debt compared to the small, financially inhibited companies. The foregoing results mean that long-term corporate debt of crudity-worthy firms is a more rapidly substitute for government bonds. Therefore, these firms can fill supply shocks in government borrowing of developed European countries (Ayturk, 2017). However, the aforementioned study did not clearly explain why the long-term debt of large credit-worthy firms is supplementary complex to government debt compared to the small, financially constrained companies.

Similarly, Akkoyun (2018) investigated a study on the impact of government debt on company financing from 1916 to 1919 in the USA during World War 1. The study focuses on the war period since the state of the economy, the method of corporate security of assistance, and the alternative financing strategy of the U.S. government offer an appropriate empirical setting to classify the effect. However, our study focuses on how government debt affects the capital structure of registered banks in South Africa. The result of the study revealed that long-term government bond offerings negatively affected long-term firm bonds with the prime of life for more than five years, common stocks and preferred stocks. Also, the negative impact was more

substantial for high-rated firm bonds and stocks paying constant dividends. The above results align with the theoretical predictions of Friedman (1978) and Greenwood *et al*. (2010), who contend that the crowding-out effect should be more robust for company securities related to government bonds in terms of maturity, risk and payment schedule.

To test the effect of government debt on corporate capital structure choice, Demirci *et al*. (2019) utilised data on 40 countries during the period 1990 to 2014. They used domestic government debt-to-GDP_{t-1}, and external government debt-to-GDP_{t-1} to measure government debt. Hence our study only uses total government borrowing, internal government borrowing and foreign government borrowing to measure government debt since we want to test the crowding-out impact of the government. They argued that a rise in government debt supply might decrease investor's demand for corporate debt comparative to equity because government debt is a superior alternative to company debt than equity. Therefore, firms might alter their capital structure and lessen their leverage. Hence our study focuses on the crowding-out effect theory transmission mechanism when government borrowing reduces the money supply and increases interest rates and, ultimately, how it affects capital structure. Their study revealed a negative association between government borrowing and firm leverage in levels and debt variations after controlling for country and year-fixed impact and country-level controls. They also found that the crowding-out effect is robust for prominent companies with more returns and companies in economies with more developed equity markets or lower bank dependence. They argued that these companies are likely to have more openness in substituting between diverse funding sources.

Moreover, the results of their study show that the crowding-out effect is robust for government borrowing held locally or when financial sincerity is low. Thus, in both instances, local investors need to grip more of government debt shock, leaving not as much financing for domestic firm debt. Furthermore, to address the problem of endogeneity problems, they utilise an instrumental variable approach based on military spending and a quasi-natural experiment based

on the introduction of Euro currency (Demirci *et al*., 2019). Their results suggest that government borrowing crowds-out corporate debt.

While the effect of government borrowing on the capital structure has been thoroughly researched in developed countries, little is known about this issue. For instance, the researcher was able to identify only one study conducted in an emerging market (Liang, *et al*., 2017). They used a sample of state-owned enterprises (SOEs) and non-state-owned enterprises (non-SOE). Liang, *et al*. (2017) studied the effect of local government debt on company leverage in China from 2005 to 2007 and from 2011 to 2013. As such, they excluded the period 2008 to 2010 due to the unavailability of data. They used a benchmark econometric model to test the impact of crowding out and crowding in the effect of local government debt on firm leverage. Hence, our study uses a panel data regression model to examine the effect of government debt on bank's capital structure in South Africa from 2012 to 2021.

Moreover, our study utilises total government borrowing, internal government debt and foreign government borrowing as a proxy of government debt since we want to test the crowding-out effect by the government, explicitly using the generalised method of moments (GMM) model. Their study revealed that China's domestic government debt has a significant crowding-out impact on non-state-owned enterprises (SOEs) yet is crowded in that of SOEs. Also, the effect varied throughout industries and sectors. They argued that, on average, a one per cent growth in local government debt financing related to a 0.22 basis point decrease in company leverage ratio for the entire sample.

To address the endogeneity problem, they used the generalised two-step method of moments (GMM) approach with instrument variables, which were firmly in constants with their results that local government debt in China crowded out the external financing of non-SOE yet crowded in that of SOE. Furthermore, they indicate that the impact of domestic government debt on corporate financing is robust when another measure of local government debt, the ratio of Chentou issuance sum to provincial GDP, is employed.

While the study by Graham *et al. (*2015) finds a negative relationship between a government bond and new corporate securities, the source of negative association could be other issues that emanate from government debt. For example, government debt increases during recessions, when investment opportunities weaken, and firms reduce their demand for external finance (Akkoyun, 2018). Hence, the cause of this negative association might originate from the decline in firm order rather than government debt.

Estimating a panel vector Autoregression model utilising data for a large group of economies, Liaqat (2019) analysed the dynamic association between government debt and capital information from 1980 to 2017. The main advantage of utilising PVARs is that several variables can be concurrently preserved as endogenous (Holtz-Eakin, Newey & Rosen, 1988), allowing for the endogenous relations between debt, interest rates and capital formation as income per capita (Liaqat, 2019). However, our study uses panel data regression analysis to analyse data. The finding of the study indicates the crowding-out effect of government borrowing and the succeeding drop in productivity growth. The researcher state that the desire response roles for sub-samples of economies show two significant findings. The result of the study revealed that the response of capital formation to a shock in debt appears to be consistent across different income categories of countries and does not depend on the size of the debt-to-GDP ratio.

Moreover, the scale and determination of the impact are lesser for the high-income economies. Therefore, the results are robust to several model specifications and for different proxies of debt as well as capital formation. Therefore, a dynamic estimation approach that accounts for overall macroeconomic aspects is essential to resolve the effects of debt. Liaqat (2019) argues that these additional factors are possible focuses for future empirical investigation.

Other empirical studies found a negative effect between government borrowing and capital structure (see, for example, scholars such as Gao, Dong & Li, 2022; Cheema & Satti, 2021; Orangian, Nadiri & Ansari, 2021 & Xia, Liao

& Shen, 2021). A rise in public debt, the accessibility of surplus public debt is soaked up by investors of companies who seek to impose on raising the returns on borrowing, which might also result in less disbursement of borrowing; as a result, corporate debt would then crowd out public debt (Cheema & Satti, 2021). As a result, increases in government borrowing may decline firm leverage and debt ratios.

In conclusion, it appears from the above review of empirical studies, Graham *et al.* (2014); Graham *et al.* (2015); Yusuf (2017); Akkoyun (2018) and Demirci *et al.* (2019) found a negative relationship between the government debt and company capital structure. They are consistent with the theoretical prediction that increasing government debt may crowd out company debt. At the same time, Liang *et al.* (2017) found a significant crowding-out effect between non-state-owned enterprises (SOEs) and crowded in that SOEs. The reason the above empirical studies found different results might be the different variables used in these studies. Nevertheless, some scholars have used internal and external government debt to measure government debt (Demirci *et al*., 2019). They argued that if external investors or global institutions absorb the supply of government debt, local finances are still accessible for firms. Therefore, we should presume a weaker crowding-out effect if external investors hold the government borrowing than if it is owned by local investors (Demirci *et al.*, 2019:346). Therefore, our study utilises total government borrowing, internal government debt and external government borrowing as a proxy for government borrowing, unlike Liang et al. (2017). The latter used a benchmark econometric model to test the impact of crowding out and crowding in the effect of local government debt on firm leverage. Our study uses a panel data regression model to examine the impact of government debt on financial institutions, specifically banks' capital structure in South Africa, from 2013 to 2021. Since panel data provide better informative data, better variability, not as much collinearity between the variable, better degrees of freedom and more efficiency (Baltagi, 2008).

3.4 Capital structure and growth opportunity

Growth raises the cost of financial difficulties, lowers free cash flow issues and worsens debt-related agency conflicts (Frank Goyal, 2009). Stakeholder co-investment is more critical to growing businesses. As a result, according to the trade-off theory, expansion diminishes leverage. On the contrary, growing companies may find that their internal resources are insufficient to fund their positive net present value investment prospects, forcing them to seek money outside (Antoniou, Guney & Paudyal, 2008). According to the pecking order theory, a company should issue debt before stock if it needs external financing. As a result, in terms of pecking order theory, growth prospects and leverage are positively associated.

Several empirical studies use growth as one of the determinants of capital structure include investigations (Danila, Noren, Azizan, Farid & Ahmed, 2020; Nguyen & Nguyen, 2020, & Khemiri & Noubbigh, 2018). Danila, et al. (2020) examined the impact of growth opportunities on the capital structure and dividend policy of the listed Indonesia Stock Exchange from 2007 to 2017. Their conclusions are based on capital structure growth prospects and Indonesian dividend policy consistent with the contracting theory. Their study shows a significant but negative link between growth opportunities, debt ratio, and dividend yield. Such a link implies that companies with substantial development potential are discouraged from issuing debt for underinvestment and asset substitution.

On the contrary, firms with more investment prospects are more likely to pay a modest dividend. In addition, since the cash flows are used for investment, corporations with more investment prospects tend to adopt a fair dividend pay-out policy. Furthermore, as control factors, business size and profitability significantly impact capital structure and dividend policy. Because of a large corporation's low bankruptcy risk and expense, firm size has a beneficial effect on leverage. However, the positive relationship-to-debt ratio is since highly profitable firms are more likely to benefit from the tax shield.

Using a sample of 290 non-financial firms listed on the Vietnamese Stock Exchange from 2010 to 2018, Nguyen and Nguyen (2020) studied the drivers of capital structure. The findings are explained using GMM. In addition, the result of their study indicates that the return on assets (ROA), firm size, tangible assets, risks, and growth all have a statistically positive impact on the company's capital structure. In contrast, the study shows that ROE has a statistically significant negative effect on company capital structure.

Similarly, when comparing sectors, the research findings revealed that factors have varying degrees of influence on capital structure. Furthermore, the research showed that the pharmacy sector had the highest debt-to-total-assets ratio, followed by industry, consumer goods, materials, and utilities. They suggest that future studies include macro-environmental factors such as economic growth (GDP, GNP) and country technological innovation. To perceive the impact of these factors on firms' capital structure while also assisting business managers and government management agencies in making effective decisions.

Khemiri and Noubbigh (2018) explored the drivers of leverage companies from 2006 to 2016 using a sample of five sub-Saharan African nations, including South Africa, Ghana, Kenya, Nigeria and Zimbabwe. Their research found that return on assets (ROA) and long-term debt had a negative and significant effect, whereas the return on equity (ROE) and long-term debt had a positive and significant impact. The negative relationship between ROA and long-term debt supports pecking theory, while the positive link between ROE and long-term debt supports trade-off theory predictions. In terms of growth opportunities, three metrics are used to assess them: total asset growth, tangible asset growth (*I*), and intangible asset growth.

Moreover, the study found a negative and significant effect on total asset growth and long-term debt. In contrast, Tobin's Q on long-term debt measures a positive link between growth tangible assets (I) and intangible growth assets. Their study also indicates a positive but significant relationship between tangibility (TANG) and long-term debt (Khemiri & Noubbigh, 2018).

Furthermore, previous leverage, taxation, and macroeconomic circumstances are substantial factors of debt's present value. Firm managers in developing economies should consider the macroeconomic environment's security and the function of the government's monetary and fiscal policies (Khemiri & Noubbigh, 2018). They suggest that this will enable the organisation to choose an appropriate financing approach that balances the benefits and costs of debt.

In summary, most studies have found a negative relationship between growth opportunity and capital structure in the foregoing empirical analysis. However, as mentioned earlier, few studies have found a negative nexus between the issue.

The following section discusses the empirical issues on the effect of liquidity and capital structure.

3.5 Capital structure and liquidity

While the effect of liquidity on the company's capital structure has been thoroughly researched in developed countries (Lipson & Mortal, 2009; Sibilkov, 2009; Gao & Zhu, 2015, Nadarajah, Ali, Lui & Huang, 2018, Chaabouni, Zouaoui & Ellouz, 2018 & Barry, Diabate & Tarazi, 2019), little is known on this issue in emerging markets (Lei & Song, 2013; Sharma & Paul, 2015 & Dencic-Mihajlvo, Malinic & Grabinski, 2015). The main reason for this is the lack of data in emerging markets, and their capital markets are not well developed (Udomsirikul, Jumreornvong & Jiraporn, 2011). On the contrary, the liquidity problem is often inappropriately argued only from the viewpoint of asset liquidity (Dencic-Mihajlvo et al., 2015). They argue that the asset structure and asset's ability to be transformed into liquid form are indeed essential determinants of liquidity. Yet, they undoubtedly do not answer whether a firm is liquid. At the same time, liquidity is known as the firm's ability to encounter its obligations when they fall due (Dencic-Mihajlvo et al., 2015).

Over the years, there has been an increasing interest in the critical role of liquidity in capital structure decisions. According to the static trade-off model, more liquid companies have fewer floatation costs for equity issuance, which

makes equity financing more attractive than debt financing. As a result, high-liquidity companies are likely to have less leverage. Furthermore, Lipson and Mortal (2009) studied the association between liquidity and capital structure in the USA. Their research revealed a significant but negative relationship between equity market liquidity and capital structure. In addition, Lipson and Mortal (2009) contend that companies with high liquid equity have lower leverage and choose equity financing when raising capital. They argued that the effect documents are not different in various cases to the economic extent of the variables that have tired extensive devotion in previous research, such as the market-to-book ratio. Therefore, stock market liquidity is the primary distress to all those involved in one or another in equity trading. For that reason, many studies are devoted to examining elements affecting liquidity and how liquidity relates to asset values and returns. Yet there are few studies that explored how stock market liquidity distresses corporate decisions. Furthermore, their finding was consistent with equity market liquidity, reducing the cost of ownership and, thus, influencing a better dependence on equity financing (Lipson & Mortal, 2009).

On the contrary, Sibilkov (2009) examined research on the effect of asset liquidity on the capital structure of public companies in the USA from 1982 to 2005. This study found a positive relationship between asset liquidity and leverage. Furthermore, the study's findings reveal a positive correlation between assets liquidity and secured debt, yet a curvilinear association between assets liquidity and unsecured debt was found. In contrast, Lipton and Mortal (2009) found a significant yet negative association between equity market liquidity and capital structure. The above outcome is in line with the view that the cost of financial distress and ineffective liquidation are economically high; therefore, they influence capital structure (Sibilkov, 2009). Utilising an international dataset, Gao and Zhu (2015) document that high-liquidity companies are expected to have lower debt financing in their capital structure. This relationship is more pronounced in countries with weak institutional environments.

Nadarajah, Ali, Lui and Huang (2018) investigated the impact of stock liquidity and corporate governance on the company's leverage in Australia. They utilised a sample of 1207 non-financial companies from 2001 to 2013. The result of their study revealed a significant but negative association between stock liquidity and leverage, suggesting that companies with more liquid stocks are significantly less leveraged. The study also indicated a significant but negative association between corporate governance and leverage, showing that companies with more corporate governance decrease leverage substantially. Furthermore, they found that the significantly negative corporate governance–leverage association occurs only in companies with less stock liquidity. The studies mentioned earlier focus on the static trade-off view of capital structure. Hence, it is crucial to know how liquidity affects the dynamic nature of the capital structure, precisely the speed at which companies adjust their capital structure toward the target (Ho, Lu & Bia, 2020).

On the contrary, using a sample of French and UK-listed commercial banks, Chaabouni, Zouaoui and Ellouz (2018) investigated the association between bank capital and liquidity creation from 2000 to 2014. They used a novel approach to measure liquidity creation proposed by Berger and Bouwman (2007). In addition, they argue that previous studies investigating bank capital's effect and liquidity creation are restricted to utilising classical ordinary least squares (OLS). The OLS describes the low impact of bank capital on liquidity creation and does not provide a complete picture of the relationship mentioned above (Chaabouni et al., 2018). Hence, they utilise quantile regression (Q.R.) and the instrumental variables of Q.R., along with, as well as panel regression, to fill the gap mentioned earlier. The results of their study using OLS and panel regression revealed a negative relationship between bank capital and liquidity creation which is in line with the risk absorption hypothesis, which predicts a negative correlation.

The result of the study about Q.R. shows a negative relationship between bank capital and liquidity creation. It indicates that the impact is homogenous across quantiles of liquidity creation circulation. Lastly, the result remains unaffected when utilising the Q.R. with instrumental variables to address the

possible endogeneity issue (Chaabouni et al., 2018). Using an unbalanced panel database of U.S. commercial banks, Barry, Diabate and Tarazi (2018) studied the effect of market liquidity shortages on bank capital structure and balance sheet adjustment from 2004 to 2014. Their study shows that severe liquidity shortages pilot small U.S. commercial banks, yet not large U.S. commercial banks, to adjust their capital ratio positively. Moreover, they argue that small banks tend to change their total capital ratio by rationalising, confining dividend payments, reducing the share of assets with complex risk weights and precisely by ranging fewer loans. Furthermore, the results of their study indicate that a positive effect on total capital ratios is robust for banks that rely more on market liquidity and small banks functioning lower than their target capital ratio.

Recent empirical studies that discovered a negative relationship between liquidity and capital structure include (Patel, Sorokina &Thornton Jr, 2022; Ku & Kalianin, 2021; Pathak & Chandani, 2021; Paramita, Suhardjo, & Asri, 2021 & Erülgen, Rjoub & Adaler, 2020). This implies that the greater the firm's liquidity, the less its level of leverage, and vice versa. However, other empirical studies found a positive effect between liquidity and capital structure (For example, scholars such as da Silva & Palma, 2022 & Sikveland & Zhang, 2020).

Some authors found mixed results of both negative and positive associations. Using the annual bank data from bank, Scope, Adrian and Zhuoyun (2013) investigated the association between liquidity creation and capital structure of banks in China from 1988 to 2009. They tested the "financial fragility-crowding out" hypothesis and the "risk absorption" hypothesis on Chinese banks. They found a negative association between bank capital and liquidity creation, which is in line with the financial fragility-crowding out the theory. This study is different from the aforementioned study because we want to test liquidity's effect on capital structure in the context of asset-liability mismatches.

Conflicting with their earlier finding, they revealed that foreign banks in China have a weaker association between liquidity creation and bank capital, which

is in line with the risk absorption hypothesis. They suggest that state-owned banks that are financially not as much of fragile may have lesser liquidity creation. The European debt and sub-prime crises were central to the provisional nationalisation of more or less leading banks. Several banks in developed countries have been functioning under laissez-faire for years. They also suggest that shifting to complete government control would reduce their ability to create liquidity since, according to their findings of government-controlled banks, the financial fragility-crowding out hypothesis dominates. Therefore, the government can minimise bank capital to enhance liquidity creation; however, resources are inclined to misallocation (Adrian & Zhuoyun, 2013). Therefore, the government then fascinates the risk of these nationalised banks, tapping the community's interest in danger.

Dencic-Mihajlvo, Malinic and Grabinski (2015) investigated a study on the association between capital structure and liquidity over the financial crisis period from 2008 to 2011. They used a sample of 108 listed companies in Serbia. Using panel data with a fixed-effects model, they found a significant but negative relationship between the quick ratio, the cash gap and revenue quality on leverage. Conflicting with their earlier finding, they found a positive but statistically significant effect of free cash flow and its volatility on hold.

They argue that their results, applicable to company managers and policymakers, are that during the crisis period, firms conveyed a substantial portion of the financing burden to their suppliers. Moreover, they argue that since suppliers are exposed to related issues during a crisis, the problem of liquidity spirals and the risk of bankruptcy threatens both distinct firms and the whole economy (Dencic-Mihajlvo & Grabinski, 2015). Therefore, they suggested that future studies could study an entire period using different savings to detect whether there are differences in the impact of liquidity determinants on firms financing decisions among countries and in different economic cycles.

On the contrary, to test the association between liquidity and capital structure decision, Sharma and Paul (2015) used a sample of 279 public shareholding

companies listed on the Bombay Stock Exchange from 2003 to 2011 in India. The results of their study revealed no empirical evidence for an inverse association between liquidity and company leverage in India. The result, as mentioned earlier, implied distinctive structures of emerging markets, namely, less sophisticated capital markets, complex information asymmetry, concentrated ownership, constrained access to debts and prevalence of family-owned businesses (Sharma & Paul, 2015).

It seemed from this review of empirical studies conducted in developed and emerging countries that many studies have found contradictory results (positive and negative relationships) concerning the effect of liquidity on company capital structure. In contrast, Sharma and Pual (2015) have no empirical evidence for an inverse relationship between liquidity and company structure. According to the static trade-off model, more liquid companies have fewer floatation costs for equity issuance, which makes equity financing more attractive than debt financing. As a result, high-liquidity companies are likely to have less leverage (Ho, Lu & Bia, 2020). Therefore, this study examined both sides of the statement of financial position, that is, market and funding liquidity. Specifically, we want to test the effect of liquidity on capital structure within the context of asset-liability mismatches.

The following section discusses the empirical issues on the effect of risk and capital structure.

3.6 Other firm-specific determinants of capital structure

Besides government borrowing, growth opportunity, liquidity and risk, other factors influence the capital structure, including credit rating, profitability, liquidity ratio, tangible assets, firm size, asset turnover and growth opportunity. However, literature on the effect of credit rating and the company's capital structure is standard in developed countries like the U.S. and Europe (for example, Kisgen, 2006; Kemper & Rao, 2013; Maung & Chowdhury, 2014 & Samaniego-Medina & di Pietro, 2019). Not much has been done in emerging markets regarding the linkage between capital structure and a firm's credit rating (Rogers, Mendes-da-Silva & Rogers, 2016; Sajjad & Zakaria, 2018).

The foregoing issue highlights the need for a considered tactic concerning financial risk management. That would reinforce firms in altering the economic environment (Sajjad & Zakaria, 2018). They argued that Asian financial markets, similar to other counties, also saw notable growth in improving credit rating agencies. Therefore, there is a need to conduct such a study in emerging markets.

In a pioneer study, Kisgen (2006) investigated one of the first recognised examinations of the credit rating–capital structure (CR-CS) model in the USA. He claims that for credit ratings to have a self-governing effect on capital structure, there must be discrete changes in the costs experienced by the company across the various rating classes. Besides, Kisgen (2006) contends that the model implies that the company near a credit rating upgrade or downgrade issue less debt relative to that company's not near a change in rating. He argues that this practice is in line with discrete costs (benefits) of rating changes; yet it is not enlightened by the traditional capital structure theories. The hypothesis indicates that a company with a plus or minus rating will be unwilling to issue debt at the margin. He further maintains that future capital structure studies would benefit from including credit ratings as part of the capital structure framework. Therefore, to ensure that there are accurate implications in capital structure, empirical tests, as well as, more generally, to acquire a more excellent inclusive depiction of capital structure behaviour (Kisgen, 2006).

In contrast, Kemper and Rao (2013) conducted a study on the role of credit ratings in the marginal financing behaviour of companies in the USA. Their findings are in contrast to previous results of Kisgen (2006), who suggested that companies consider credit rating when they make capital structure decisions. Kemper and Rao (2013) found that with the omission of B-rated companies, companies in no other rating group appear to limit debt financing when confronted with the view of losing their rating. Kisgen's (2006) results appear to be driven by companies with fewer ratings. Kemper and Rao (2013) argue that this is a weak sign in the provision of the CR-CS model, mainly

given that B–rated companies are mostly linked with financial distress. So, their marginal financing behaviour to elude debt may be more of a sign of an absence of access to the debt market than a reasonable effort to reduce debt financing (Kemper & Rao, 2013).

Hence, they argue that their marginal financing behaviour to escape debt may be a hint of an absence of access to the debt market than a suggestion of a reasonable attempt to reduce debt financing. As with other elements, their results were just puzzling. They did not find that the CR-CS model is more appropriate for firms with good financing desires or that access the debt markets on a steady basis, firms that access the commercial paper market and high-growth firms. They suggest that it is likely that firms on the edge of losing or refining their ratings may use other tools to sustain or improve their rating, like asset restructuring, for example, asset sales, spin-offs and operating cost changes for layoffs, outsourcing and offshoring cases.

Although previous studies distinguish the association between credit rating and company leverage, Maung and Chowdhury (2014) reassess the same issue empirically after adjusting for the simultaneous association between credit rating changes and the company's leverage changes in Canada. They also extend the current study by conducting whether companies adjust their debt ratios instantaneously or gradually after rating changes. Furthermore, they also study rating changes in the prior five years. They found that companies regularly decrease their leverage levels after rating downgrades. Besides, Maung and Chowdhury (2014) perceive that companies enhance their leverage following rating upgrades in successive years, yet this result is not as robust as the downgrades. Furthermore, they maintain that rating downgrades and upgrades Influence company leverage (Maung & Chowdhury, 2014). They argue that a simultaneous association occurs between rating and leverage changes. However, they notice that a firm takes time to adjust its leverage through subsequent rating variations. They argue that the time frame for such adjustment in the firm's debt ratio is more

extensive and persistently substantial in rating downgrades than rating upgrades (Maung & Chowdhury, 2014).

They used a sample of 167 companies belonging to the Standard and Poor (S&P) Europe index from 16 countries. Samaniego-Medina and Pietro (2019) studied the effect of a plus (+) or minus (-) sign on the speed of leverage adjustment of listed companies in Europe from the period 2004 to 2014. They utilised the system - GMM estimation established for the dynamic panel model by Arellano and Bover (1995) and Blundell and Bond (1998). Their findings revealed that rating, mainly its development, affects the financial structure of firms, notably their speed of adjustment to the target. Their results show that firms with negative signs adjust more slowly than those with positive or no signals.

Similarly, firms with a positive sign adjust more gradually than companies with no sign. Therefore, these findings propose that firms with signs in their ratings decline their speed of adjustment to the target leverage ratio (Samaniego-Medina & di Pietro, 2019). They argued that an indication of more significant concern around a likely downgrade. A rating with a minus sign can be justified to elude the advanced leverage costs that can arise with a rating downgrade. Therefore, these findings can be explained by the firms that usually use the dynamic trade-off theory. Also, they argued that these findings are even more evident when looking at firms close to a speculative grade rating (BBB-). As a result, these firms' leverage adjustment speed is nearly zero, indicating that firms are significantly anxious about the hurt of their investment-grade rating. They concluded that these findings lead them to trust that rating targets accustom choices near capital structure, while not in all circumstances, consistent with Kisgen's (2009) idea that companies have a minor rating level goal.

This study will add to Rogers et al. (2016) and Sajjad and Zakaria (2018), who studied the effect of credit rating on capital structure in emerging markets. The study will add to these studies by looking at the rating upgrade (+) or rating

downgrade (-) and rating with no sign on financial institutions' capital structure, specifically commercial banks in advanced emerging markets. Hence, these studies have excluded financial firms from their research. Rogers et al. (2016) investigated a study on the effect of a credit rating on the capital structure of non-financial listed companies in Latin America. The study employed a panel data regression analysis to analyse data from 2001 to 2010, using GMM. Their study did not indicate non-financial companies listed in Latin America, with the near reclassification of ratings. They embraced less debt than those without a near reclassification of their grade. In addition, these findings suggest that the near reclassification of credit ratings does not present essential information for managers of non-financial companies in Latin America when creating decisions about capital structure.

Similarly, Sajjad and Zakaria (2018) conducted a study on the effect of credit ratings for optimal capital structure decisions of non-financial Asian listed companies, evaluated by Standard and Poors from 2000 to 2016. They used panel data analysis with pooled ordinary least square (OLS), fixed effect (FE) and GMM estimation techniques to test the impact of a credit rating on capital structure choices. They found a non-linear inverted U shape in the association between the credit rating scale and leverage ratio in all econometric estimations. Furthermore, they argue that top-rated and low-rated firms own a low degree of leverage, while firms with average ratings have high degrees of force in their capital structure choices. They contend that this is due to the great benefits of sustaining high credit ratings, such as more appearance in the commercial paper market, a rise in solvency, and customer and supplier reliability. They suggested that firms should not look only at ratings and non-ratings characteristics but within rating scales and related costs and benefits. These rating scales are also critical for depicting detailed findings for creating optimal capital structures. They also suggested that cross-comparison between European and Asian firms can be studied for further insight. Therefore, we utilise a sample of listed commercial banks in emerging markets. This study mainly comprises commercial banks with a rating from the S&P database. Since numerous investigations usually use the U.S. and European data to analyse this issue, the findings of this study will be different

from those studies. Moreover, this study period ranges from 2004 to 2018. We chose this period because we intend to analyse this issue before and after the financial crisis. Furthermore, the study adopts the CR-CS model following a pioneering work by Kisgen (2006). With some modifications by investigating the effect of real change as opposed to possible change and by examining the impact of rating upgrade (+) or downgrade (-) and rating with no signs on the capital structure.

From the review of empirical studies investigated in both developed and emerging markets, it seemed that many studies had found conflicting results. Regarding the effect of credit rating and capital structure (Kisgen, 2006; Kemper & Rao, 2013; Maung & Chowdhury, 2014; Rogers, Mendes-da-Silva & Rogers, 2016; Sajjad & Zakaria, 2018 & Samaniego-Medina & di Pietro, 2019). Kisgen (2006) drew the credit rating-capital structure (CR-CS) model. The model contends that rating on downgrade or upgrade edges are related to discrete costs or benefits that will cause managers to balance reflections of discrete changes in the cost of debt about an upgrade or downgrade ratings verges with trade-off theory thoughts. For instance, according to the trade-off theory, it is likely optimal for a company to issue additional debt to increase its leverage.

On the contrary, according to the credit rating-capital structure (CR-CS) hypothesis, such an increase in leverage will generate a discrete rise in the cost of debt when the credit rating is on the downgrade edge. Therefore, the optimal leverage symmetry, in this case, should not increase to evade a more increase in the cost of debt financing. As such, this study adopts the CR-CS model following a pioneering work by Kisgen (2006). With some modifications by investigating the effect of real change as opposed to probable change and by examining the impact of rating upgrade (+) or downgrade (-) and rating with no signs on the capital structure. Hence, this study investigated the relationship between credit rating and the capital structure of financial institutions in emerging markets for the period 2004 to 2018. Since emerging markets are technically, fundamentally and structurally different from

developed markets, we expect to find different findings (Marozva, 2020; Udomsirikul *et al*., 2011).

Sbeti and Moosa (2012) investigated a study on firm-specific factors as determinants of capital structure in America. The study used a sample of 59 Kuwaiti shareholding firms working in a tax-free setting. They reported that the results support the pecking order theory more than the trade-off theory. The foregoing result confirms the essence of growth opportunities and profitability. Meanwhile, there is confirmation of some elements' significance in defining the capital structure. It is reasonable to accomplish that the capital structure decision does the matter, even in the non-appearance of taxes (Sbeti & Moosa, 2012).

With the cash flow as an explanatory variable, Mateev, Poutziouris and Ivanov (2013) tested some of the predictions of the pecking order theory. They used a sample of 3175 micro, small and medium-sized firms (SMEs) in Central and Eastern Europe (CEE) using a panel data analysis from seven CEE countries from 2001 to 2005. The result of their study revealed strong evidence to support the pecking order theory. Mainly, the result of their research reports a negative but significant relationship between profitability and leverage. Furthermore, the results of their study indicate that the cash flow coefficient remains negative but statistically significant only for medium-sized firms. They sign that more prominent firms with adequate internal funds use less external funding than smaller firms.

In contrast, some authors found mixed negative and positive association results. Gonzalez and Gonzalez (2011) studied the firm size and capital structure using a dynamic panel data analysis on a sample of 3439 Spanish firms from 1995 to 2003. The finding of their study are partially consistent with both explanations but advocate better rationality of perking order predictions for small firms. Also, the negative effect of profitability and the positive impact of investment opportunities and intangible assets on secured debt predicted by the pecking order theory is sensitive in small firms. Yet, the result of their

study revealed that no change was detected between small and large firms in their speed of adjustment to the target leverage as recommended by the trade-off theory.

They used panel data estimation on a sample of 20 firms with the OLS method, fixed-effects model, and simple and multiple linear regressions from 2009 to 2011. Serghiescu and Vaidean (2014) investigated the determinants of the capital structure of listed firms at the Bucharest Stock Exchange operating in the construction industry in Romania. The finding of the study revealed a negative relationship between profitability, liquidity ratio and total debt ratio. In addition, this study also indicates a negative association between tangible assets and leverage, while the research suggests a positive relationship between firm size, asset turnover and leverage. The aforementioned finding means that profitable firms with a more liquidity level will decline a level of debt (Serghiescu & Vaidean, 2014). They argue that this study represents a benchmark for future empirical research associated with the internal aspects, particularly for the firms operating in the construction industry.

Similarly, Vinh Vo (2017) studied the determinants of the capital structure of listed firms on the Ho Chi Minh City Stock Exchange in Vietnam from 2006 to 2015. The study used the GMM estimator to control the endogeneity problem. The study found an insignificant positive relationship between growth opportunity and all regressions for long-term and short-term leverage. Yet, the study results revealed a significant positive association between growth and long-term to short ratio. They argue that because Tobin Q used to measure the firm's growth opportunity, complex market firm value inclines to use supplementary debts to finance their investment. The study also found a significant positive relationship between tangible assets and long-term leverage while a significant negative association with short-term force. However, the study found a significant positive association between physical assets and long-term debt to short debt ratio. This finding means that firms

can borrow more long-term liabilities when they have more tangible assets collaterals.

Also, the results of the study revealed that firms with more profitability tend to borrow less short-term debt since the findings of the study show a significant negative relationship between short-term debt and short-to-long-term leverage ratio. Furthermore, the study found a significant positive association between firm size and long-term while a negative association with short-term debt. The research also shows the preference for short-term debt for more prominent firms. This finding suggests that more significant firms use long-term debt, while smaller firms use short-term debt to finance their investments (Vinh Vo, 2017). Lastly, the study found a significant negative relationship between liquidity and short-term leverage while an insignificant positive relationship with long-term leverage. Furthermore, the study also finds a significant positive association between liquidity and long-term to the short leverage ratio. This finding implied that liquidity problems limit the firm from borrowing long-term, and liquidity management is a critical issue for the success of firms in Vietnam (Vinh Vo, 2017).

A recent study by Ramli, Latan and Solovida (2019) investigated the effect of capital structure determinants on a company's financial performance and mediation impact of company's leverage in Malaysia and Indonesia from 1990 to 2010. Their findings indicated that sure of capital structure determinants affect company performance. They also find a significant positive association between company leverage and financial performance in Malaysia. In addition, they argue that Malaysian companies prefer external financing over internal financing to enhance performance. Moreover, their result indicates that company leverage is mediating in Malaysia yet not for Indonesian companies.

They also found that the assets structure, growth opportunities, liquidity, non-debt tax shield and interest rate are the elements that were indirectly affected by company leverage on company financial performance. Furthermore, they

tested the equality of the parameter estimate by using multi-group analysis (MGA) in PLP. They perceive that specific element coefficients in capital structure and company performance determinants differ significantly between Malaysia and Indonesia. Hence, this study did not use other factors, such as corporate governance and market competition, that may influence company leverage and performance. They also tested leverage as mediation without considering proxies such as managerial ownership, which can moderate relationships. Lastly, they suggested that a similar study needs to investigate in different countries, which can strengthen and replicate the same model that this study used to improve the generalisation of their results.

It appeared from the above review; some studies have found negative results on the firm-specific determinant of capital structure (Sbeti & Moosa, 2012; & Mateev, Poutziouris and Ivanov, 2013). The trade-off and pecking order theories clarify a firm's capital structure decisions. However, most empirical studies revealed conflicting results on the firm-specific determinant of capital structure (Gonzalez & Gonzalez, 2011; Serghiescu & Vaidean, 2014; Vinh Vo, 2017 & Ramli, Latan and Solovida, 2019). One reason for the conflicting results might be that emerging markets might have less information asymmetric as compared to developing countries.

The following section discusses the empirical issues on the other macroeconomic determinants of capital structure.

3.7 Other macro-economic determinants of capital structure

Using panel data from 1594 Indian corporate firms for 14 years from 1998 to 2011, Bandyopadhyay and Barua (2016) investigated the relationship between organisational industry performance with the capital structure and macroeconomic environment. They revealed empirical evidence to support the hypotheses relating to the significance of asymmetric information, agency cost, the trade-off theory, signalling and liquidity in determining a firm's capital structure decisions in an emerging market economy. Also, they found that the macroeconomic cycle significantly affects corporate financing decisions and, therefore, performance. The endogeneity between capital structure and

organisational performance was resolved using a two-step dynamic panel GMM. They recommend that the performance of any firm pivots around its capability to run on a capital structure (Bandyopadhyay & Barua, 2016).

In contrast, using firms-specific from nine Eastern European countries from 1995 to 2002, Joeveer (2013) investigated the prominence of firm-specific, country institutional and macroeconomic factors for determining firms' capital structure. The result of the study revealed that country-specific elements are the central determinants of difference in leverage for small unlisted firms. In contrast, firm-specific factors explain most of the distinction in leverage for listed and large unlisted firms. Also, the result of the study revealed that known macroeconomic and institutional elements describe half of the variation in leverage related to country factors. In contrast, the remainder is explained by unmeasurable alterations. Furthermore, regression analysis of leverage revealed negative tangibility and firm size signs. The researcher argued that a policymaker might raise approximately policy implications based on the findings. For instance, if the politician prefers lesser firm leverage since the more significant leveraged firms are more likely to face financial distress), she could support the reduction in the banking market concentration or try cutting the corporate tax rates (Joeveer, 2013).

Zeitun, Temimi and Mimouni (2017) studied the impact of the 2008 financial crisis on the capital structure of GCC firms. They used a sample of 270 listed firms from 2003 to 2013 from eight industries to investigate patterns incorporating leverage before and after the crisis and identify changes in debt financing. They found that the 2008 crisis negatively but significantly impacted leverage ratios due to the deficiency of debt supply by creditors. They also found that the demand for debt by firms is the central driver of leverage before the crisis. In contrast, the need for debt by firms and the supply of debt by creditors are both significant determinants of leverage after the crisis. In addition, they found that firms adjust their leverage near the target leverage ample slower after the disaster. Furthermore, they show that the effect of the crisis on the capital structure is diverse across sectors and countries. They

argue that these findings are of central importance for the stakeholders to understand and mitigate the impact of the crisis on capital structure (Zeiturn *et al.*, 2017).

Some authors found mixed results of both negative and positive associations. Using publicly traded American (U.S.) firms from 1950 to 2003, Frank and Goyal (2009) investigated the relative importance of many factors of capital structure decisions. The result of their study revealed that the most reliable factors to explain market leverage are median industry leverage (+ effect on leverage), market-to-book assets ratio, tangibility, profits, a log of assets and expected inflation. In addition, the study found an inverse relationship between market-book value (the growth variable) and profitability and firm leverage. In contrast, tangibility, median industry leverage, and a log of assets (size variable) were found to be positively related to firm hold. Furthermore, the study found that dividend-paying firms incline to have lesser leverage. When looking for book leverage, slightly related effects were observed. Yet, for book leverage, the impact of firm size, the market-to-book ratio and the impact of inflation were found not to be consistent. The empirical evidence appears to be rationally compatible with some versions of the trade-off theory of capital structure (Frank & Goyal, 2009). The pecking order theory offers an intuitively fair clarification for the fact that more profitable firms incline to have less leverage. Yet, the essential single empirical element is industry leverage. They claim that the role of tangibility and firm size also does not only directly flow from the underlying sense of the pecking order theory.

Studies which indicated that interest rates influence capital structure choices in developed and emerging markets include scholars Mokhova and Zinecker (2014), Suryaningprang and Suteja (2018), and Muthee, Adudah and Ondigo (2016). However, studies mentioned earlier found contradicting results of both negative and positive relations. Using a sample of seven European countries such as the Czech Republic, Slovakia, Poland, Hungary, France, Germany and Greece, symbolised emerging and developed markets. Mokhova and Zinecker (2014) investigated the effect of macroeconomic factors on the

corporate capital structure of non-financial manufacturing firms from 2006 to 2010. The results indicate the significance of company debt structure and country specifics. The findings of the study also show a positive relationship between government debt and the capital structure for most emerging markets and a negative association in developed countries. Moreover, the study found a positive association between the inflation rate and capital structure in emerging markets and Germany.

Also, the results of the study revealed a negative relationship between the inflation rate and capital structure in France and Greece. Furthermore, the study found that the interest rate for both short-term and long-term has a strong positive significant influence on the capital structure of France and Germany. However, a positive relationship between the interest rate and both short-term and long-term debt ratio is not consistent with the market time theory, which predicts a negative correlation between the interest rate and leverage. According to market timing theory, corporate managers measure both equity and debt market situations and utilise the capital market part; therefore, the best conducive to increase capital at the time. They argued that the effect of macroeconomic factors differ across countries and depends on firm debt structure. Yet external determinants of capital structure play an essential part in financing decision-making (Makhova & Zinecker, 2014). However, their model did not include the gross domestic product (GDP).

Muthee, Adudah and Ondigo (2016) studied the interest rates on gearing ratios of 62 listed firms in the Nairobi Securities Exchange from 2009 to 2013. They utilised a longitudinal research design using secondary quantitative data. Their study indicated a negative association between the gearing ratio, interest expense and profitability. Their research also showed that firm had a positive correlation of 0.275, implying that an increase in firm size generates an increase in gearing ratio. They suggested that future studies should investigate the effect of interest rates on the gearing ratio per sector since it may yield more findings as different industries encounter diverse challenges and have various structures. They also recommended that future studies look

at the effect of voluntary financial disclosure on the gearing ratio (Muthee et al., 2016).

Using a sample of bond firms listed on the IDX from 2009 to 2013, Suryaningprang and Suteja (2018) investigated the effect of interest rate, capital structure and information risk on yield to maturity in increasing the value of the bond in Indonesia. They used panel data; the study shows that the interest rate has a positive but significant effect on the maturity yield. A higher interest rate leads to a higher bond profit for investors. Also, the result of the study revealed capital structure measured by debt-to-equity ratio has a positive effect on yield to maturity, which implies that if DER increases, the return to maturity will also increase. On the contrary, the findings of their study also indicate that information risk harms yield to maturity, which means that an increase in information risk raises the transaction information. Market creators generate incomes by cumulative the selling price of the bonds. Furthermore, the results of the study revealed that bond rank has a positive effect on firm value. Lastly, the study found a positive impact on yield to maturity and firm value. If the return to maturity increases, the firm value will also increase and vice versa (Suryaningprang & Suteja, 2018).

To test the impact of interest rates on firms financing policies, Karpavicius and Yu, (2017) used a sample of U.S. industrial firms from 1975 to 2014. They found that the impact is either zero or contrary to some extent. Even in the final instance, the findings are economically insignificant. Also, they argued that the results are robust for several different measures of interest rates, with nominal and real, concurrent, historical and predictable, as well as market and average borrowing rates. Overall, their results propose that companies do not control their capital structures based on interest rates, apart from when market participants anticipate that real GDP will be harmful. Furthermore, a dynamic partial equilibrium model indicates that relatively high leverage adjustment costs can explain the weak negative association between interest rates and the company's leverage. The above result is consistent with the trade-off theory, which suggests a negative association between interest rates and firm

leverage. Lastly, they found that the federal fund rate has a negative but significant effect on firm leverage only during recessions or when market members anticipate that real GDP growth will be negative. Hence, in such periods, monetary policy is essential, and market members expect policy decisions which could support stimulate the economy (Karpavicius & Yu, 2017). Therefore, this study uses the prime rate to measure the interest rate in determining the relationship between the interest rate and capital structure.

3.8 Summary

This chapter discussed empirical issues on earnings volatility, growth opportunity, government borrowing, liquidity, other firm-specific determinants of capital structure and macro-economic factors on the company's capital structure in developed and emerging economies. Most studies have found a negative relationship between growth opportunity and capital structure. However, few studies have found a negative nexus between the aforementioned issue. Moreover, previous studies conducted in developed economies found mixed results (positive and negative) relationship between government borrowing and capital structure. In contrast, in emerging economies, Liang *et al.* (2017) find a significant crowding-out effect of non-state-owned enterprises (SOEs) and crowded in that SOEs. Hence, the relationship between government borrowing and capital structure remains ambiguous.

In addition, concerning liquidity and capital structure, previous studies found conflicting results for both developed and developing countries with positive and negative relationships. Yet, Sharma and Pual (2015) revealed no empirical evidence for an inverse relationship between liquidity and company structure. Hence most previous studies focused on market liquidity, while others concentrated on funding liquidity. Therefore, this study will focus on both sides of the statement of financial position, that is, the assets side and liability side. On the contrast, most studies have found a negative relationship between risk and capital structure. However, few studies have found a negative association with the abovementioned issue. Furthermore, early studies on the firm-specific determinant of capital structure found indecisive

results. Yet, the trade-off and pecking order theories have been confirmed to be consistent in clarifying the firm's capital structure decisions.

Moreover, emerging trends from the review of the earlier scholarly work reveal that although numerous studies on the relationship between credit rating and capital structure have been done, there is still ambiguity and no consensus on the appropriate variables for credit rating. This has to some extent resulted in differences in country studies on this issue. Also, regarding interest rates and capital structure, most empirical findings from emerging countries found contradictory results on the effect of interest rates on capital structure. On the contrary, in emerging markets, empirical studies have shown conflicting results on the firm-specific determinant of capital structure. Lastly, previous studies on other macroeconomic factors on a capital structure found inconclusive results.

The next chapter discusses hypothesis development for this study. The hypothesis development focuses on the nexus between capital structure and the four main independent variables earnings volatility, growth opportunity, government borrowing, and liquidity .

CHAPTER 4: HYPOTHESIS DEVELOPMENT

4.1 INTRODUCTION

Creating choices about the capital structure is considered one of the most significant noteworthy financial decisions in any organisation (Kumar, Colombage & Rao, 2017). Capital structure choices are vital to make the best use of shareholder wealth and the company's value as it is associated with how the company finances its processes and long-term investment through a mishmash of debt and equity (Dasilas & Papasyriopoulos, 2015). Several factors of capital structure have been examined, namely, profitability, assets tangibility, size, growth opportunities, debt tax shield, non-debt tax shield, and risk theoretically and empirically.

As a result, two leading theories are the trade-off theory by Kruas and Litzenberger (1973) and the pecking order theory by Myers and Majluf (1984), which explains the aforementioned factors. Kruas and Litzenberger (1973) claim that the trade-off theory stresses the sense of balance between the benefits of debt and the costs of obligation to look at the firm's optimal capital structure. In contrast, the pecking order theory contends that the information asymmetry among managers and shareholders distresses the cost (Myers & Majluf, 1984). However, new factors, namely government debt, growth opportunity, liquidity and earning volatility, influence firms' capital structure (Akkoyun, 2018; Barry, Diabate & Tarazi, 2018 & Demirci, Huang & Sialm, 2019). Therefore, in this chapter, the study develops three central hypotheses of this research.

4.2 Hypothesis

This section discusses the research hypothesis of this study. In confirmatory research, hypotheses are typically derived from theories and predictions about the conclusions that are made earlier than the measurement point initiated (Odhiambo, 2015). This provides a relationship between the literature review and the methodology chapter. This research aimed to investigate the effect of earnings volatility, government borrowing and liquidity on capital structure. Therefore, the research objectives of this study were as follows:

- To investigate the effect of earnings volatility on the capital structure of registered commercial banks in South Africa from 2012 to 2012.
- To examine the relationship between government borrowing and the capital structure of registered commercial banks in South Africa from 2012 to 2021.
- To investigate the relationship between the liquidity and capital structure of registered commercial banks in South Africa from 2012 to 2021.

The objectives, as mentioned earlier, are then developed into a research hypothesis that are then empirically tested.

- H_1: There is a significant effect of earnings volatility on the capital structure of registered commercial banks in South Africa
- H_2: Banks' capital structure is significantly influenced by its level of total government debt, internal government debt and external government debt
- H_3: There is a significant effect of growth opportunity on the capital structure of registered commercial banks in South Africa.
- H_4: There is a significant effect of liquidity mismatch index (LMI) on the capital structure of registered commercial banks in South Africa

- **Hypothesis 1: There is a significant effect of earnings volatility on the capital structure of registered commercial banks**

According to the trade-off theory, company leverage and risk have a negative connection. In other words, a company with highly volatile cash flows should minimise debt financing (Sibindi & Makina, 2018). This is based on the assumption that vastly volatile cash flows may lead to financial trouble (Frank & Goyal, 2009). Enterprises with significant amounts of fluctuating cash flows should avoid debt financing to prevent bankruptcy (Sibindi & Makina, 2018). Furthermore, Antoniou *et al*. (2008) claimed that companies with excessive

earnings volatility risk generating earnings falling under their debt-service obligations.

On the contrary, the pecking order theory expects a positive association between risk and company leverage (Frank & Goyal, 2009). It should be based on the assumption that cash flow volatility equals earnings volatility (Sibindi & Makina, 2018:4). As a result, the company is forced to fund retained earnings. To circumvent the moral hazard problem, it must acquire money from external markets, commencing with the debt markets. Frank and Goyal (2009) claim that organisations with fluctuating stock prices are likely to have volatile views in line with this viewpoint. Assuming that these businesses are subjected to even more perverse incentives seems reasonable. If this is the case, the pecking order theory predicts that riskier enterprises will have more leverage. Furthermore, according to Frank and Goyal (2009), enterprises with fluctuating cash flows may have to regularly engage the external capital markets.

Utilising panel data approaches, Sheikh and Wang (2011) studied the drivers of capital structure for a sample of 160 listed companies on the Karachi Stock Exchange in Pakistan from 2003 to 2007. They looked at many contingent capital structure theories, such as trade-off theory, pecking order theory, agency theory, and free cash flow theory, to develop testable hypotheses about the factors that influence capital structure in manufacturing organisations. The result of the study demonstrated a negative association between earnings volatility and total assets and debt ratio, as evaluated by the percentage of the standard deviation of the first variance of profit before depreciation, interest and taxes. Furthermore, the study results suggest that the debt ratio has a negative impact on profitability, liquidity and tangibility (asset structure). In contrast, company size has a positive effect on the debt ratio. As a result, the study's findings are compatible with the assumptions of trade-off theory, pecking order theory, and agency theory, demonstrating that capital structure models developed from western contexts can aid in analysing business financing behaviour in Pakistan.

Similarly, in Umer (2013), the result of the study shows a negative association between earnings volatility and leverage ratio, as measured by one over the square root of operating income (EBIT) standard deviation. According to the researcher, this means that larger taxpayer-owned enterprises with significant operating income volatility keep a low level of leverage in their capital structure. The study results support the trade-off and agency cost hypothesis, which indicates that earning volatility and firm leverage have a significant negative connection.

On the contrary, Sofat and Singh (2016) investigated the factors that influenced the capital structure of manufacturing companies in India from 2002 to 2012. They examined the aforementioned issue using a sample of 100 top industrial companies using a multiple regression model as a statistical technique. The study looked at many contingent capital structure theories, including trade-off, pecking order, and agency theories, to develop testable hypotheses on capital structure determinants. The result of the study demonstrated that company risk, as assessed by the standard deviation of earnings before interest and tax (EBIT), is positively associated with the debt ratio. They argued that a positive link between business risk and debt ratio is in line with the trade-off theory (Sofat & Signh, 2016). In addition, they find a positive but significant effect of asset composition and return on assets on the leverage ratio. In contrast, the size of the company and the debt provision dimensions are negatively associated with the leverage ratio.

Using a panel data analysis, Saif-Alyousfi, Md-Rus, Taufil-Mohd, Taib, and Shahar (2020) studied drivers of the capital structure of listed non-financial companies in Malaysia from 2008 to 2017. According to their finding's profitability, growth potential, tax shield, liquidity, and cash flow volatility all have a negative but significant impact on metrics. Nevertheless, they discovered that earning volatility has a positive but significant influence on all debt book and market value metrics, implying that the higher the profit volatility, the more outstanding the debt. They argue that this is because

Malaysian businesses do not employ innovative financing to shield themselves from financial trouble and insolvency (Saif-Alyousfi et al., &, 2020).

As a result, they cannot pay interest on debt instruments at maturity. The findings contradict the trade-off and pecking order hypotheses, claiming that enterprises reduce debt to prevent financial difficulty or insolvency (Akhtar, 2012). The findings also contradict previous scholars Sheikh and Wang (2011) and Umer (2013), who found a negative relationship between earning volatility and debt. It is, therefore, aligned with the agency cost of debt, which asserts that riskier enterprises borrow more (Fama & French, 2002 & Moradi & Paulet, 2019).

Several studies used risk as a determinant of capital structure in banks (Gocmen & Sahin, 2014; Tiexeira, Silva, Fernandes & Alves, 2014 & Assfaw, 2020). Gocmen and Sahin (2014) utilised earning volatility to measure risk. They maintain that companies with high earnings volatility run the danger of not being able to pay the debt burden due to a lack of resources. If such an issue arises, companies may be forced to restructure their capital at a high cost or face insolvency. As a result, companies with significantly fluctuating earnings are likely to reduce their indebtedness (Antoniou, Guney & Paudyal, 2008). The risk coefficient predictions are negative but significant for all three stages in the regression model, whereby total liabilities are utilised to construct the leverage ratio in their analysis (Gocmen & Sahin, 2014).

However, Tiexeira, Silva, Fernandes, and Alves (2014) argue that the buffer view for the positive impact of asset risk on a 'bank's equity capital would be that the size of buffers should indeed be expected to rely on the likelihood of falling underneath the regulatory capital adequacy. More risky banks may have more capital in surplus of this reasonable level. As a result, asset risk is calculated by multiplying the annualised standard deviation of daily stock price returns by the market value of equity and over the bank's market value (Tiexeira, et al., 2014).

Using a sample of ten private commercial banks, Assfaw (2020) studied the drivers of capital structure choices made by private commercial banks in

Ethiopia from 2010 to 2018. A clustered robust random effect regression model was used to analyse the panel data. The study results show a positive but significant effect on bank leverage and earnings volatility. The researcher claimed that the above outcome is compatible with the pecking order theory's assumptions but contradicts the trade-off theory's reasons.

In conclusion, the results of the aforementioned empirical research differed, as evidenced by the preceding analysis. Some of the findings back up the trade-off theory, while others back up the pecking order theory; neither is clearly superior.

The following section discusses the influence of government borrowing on capital structure, resulting in a crowding-out effect.

- **Hypothesis 2: 'Banks' capital structure is influenced by government borrowing, resulting in a crowding-out effect.**

If investors in capital markets like to have a comparatively steady balance of debt and equity assets in their portfolios, public debt may crowd out company debt (Demirci, et al., 2019: 338). They contend that increasing government debt supply would raise the return rate on government bonds and other direct alternative debt products. As a result, Demirci et al. (2019) suggest that companies may cut debt funding due to fixed-income assets advanced funding costs, leading to public debt crowding out company debt. Public debt and its effects have been contentious worldwide since the global financial crisis, mainly in the Eurozone (Ayturk, 2017). As a result, while government borrowing may be necessary to deal with the worldwide global recession in the short term, this could crowd out private investment in the long run. According to Ayturk (2017), the Eurozone credit crisis has demonstrated that government borrowing could influence the operation of all sectors of the economy and business funding events.

The use of debt to fund budget shortfalls has resulted in non-recoverable financial problems and economic and political uncertainty (Demirel, Erdem &

Eroglu, 2017). Due to rising interest rates. They claimed that public debt had pushed corporate investments out of the market, resulting in a danger known as the crowding-out effect in literature. Crowding out arises whenever excessive debt is ideal for funding big-budget and government deficits, limiting the money available to the private industry and severely affecting corporate investment's impact on output (Demirel et al., 2017).

The primary aspect of studies centres on the crowding-out effect of government actions, particularly from the side of funding. The first comprehensive definition of the crowding-out effect was developed by Spencer and Yohe (1970). Based on a fixed and restricted number of resources like credit and labour, government expansion on the funding or spending side will alter the micro-environment in which diverse companies operate using re-allocation, rivalry and other mechanisms. Friedman (1978) also claims that debt-financed government deficits induce inflation since prices are defined by the sum of the supply of money and existing interest-bearing government borrowing. As a result, government borrowing surpluses can crowd out interest-intuitive private-sector expenditure. Mahmoudzadeh, Sadeghi, and Sadeghi (2013) describe the Keynesian model of financial crowding and found that government expenditure matched credit supply. They discovered that deficits positively impact the corporate sector by increasing investment in the economy. As a result, employing a Keynesian strategy should increase bank credit and expenditures in the economy.

On the contrary, when Balcerzak and Rogalska (2014) evaluated data for dissimilar economies utilising the Keynesian investment-reserves, liquidity-money (IS-LM) framework. They concluded that the model did not produce reliable findings. Therefore, econometric elements relevant to particular countries led to diverse conclusions. Furthermore, they found conflicting results from the same state when using other approaches or employing altered data periods, leading them to conclude that the Keynesian framework is not a trustworthy instrument for studying financial crowding out.

Furthermore, Graham, Leary, and Roberts (2015) claim that public debt practice explains the constantly growing trend of company leverage in the unlicensed sectors of the United States during the last century. They found that government borrowing production in the USA considerably impacts the company's financial regulations and balance sheets into its effect on investor's portfolio optimisation techniques and the comparative pricing of various assets, utilising data from 1920 to 2012. On the contrary, Traum & Yang (2015) investigated whether government borrowing crowds out capital in the U.S. economy, using an updated new Keynesian model with detailed fiscal conditions and accounting for macroeconomic interconnections. They suggest that policy shocks that cause debt increase determine if an investment is crowded in but out in short to medium term. As a result, increased debt can attract investment for capital tax rate reductions or continuous public investment. Nevertheless, as expected, there is no definite link between real interest rates and capital, explaining why compressed regressions are suspect in crowding out. Furthermore, they believed distortionary financing is required at long horizons for the negative investment reaction to debt.

From 1989 to 2014, Ayturk (2017) studied the impact of government debt on firm finance choices in 15 developed European countries. The study used both a country-level aggregate and a fixed-effects panel data model with aggregate flow data. The results of the study indicate a significant negative association between government debt and firm debt but no correlation between government borrowing and equity. According to the researcher, these conclusions are reliable when combined with the flow and stock data (Ayturk, 2017). In industrialised European economies, other public debt ratios mostly lead to significant financial crowding out of the influence on firm debt. Furthermore, their research revealed that significant lending companies' long-term debt seems more complex than government debt compared to tiny, financially strained businesses. As a result of the initial findings, long-term corporate debt issued by lending companies is a faster alternative to government bonds. As a result, these companies can help established European countries to deal with supply disruptions in government borrowing (Ayturk, 2017).

On the contrary, Demirel *et al*. (2017) used a Keynesian model to examine the impact of government borrowing, government spending, interest rates, and growth rate on company capital in 14 Euro countries from 2000 to 2015. Their findings revealed that public debt, public expenditure, interest rates and budget deficits impact corporate investment negatively, and the effect of economic development was positive. Ayturk's (2017) findings, which also found a negative influence on government and business debt, are similar to the prior result. As such, the study results support the proclamation that public debt has directed to the crowding-out effect in certain Eurozone countries. They propose the product originates mainly from the growth in public debt stock.

Using three divergent linear firm debt demand formulas, such as the country-year panel data with collective standards at level, country-year panel data with aggregate flow standards, and firm-year panel data with firm-precise financial data for big and small firms. Demirci, *et al*. (2019) examined the effect of government debt on corporate capital structure choice using data on 40 countries from 1990 to 2014. They utilised internal government debt-to-GDP_{t-1} and external government debt-to-GDP_{t-1} as proxies of government debt. Yet our study used total government borrowing, local government borrowing and external government borrowing because we aim to test the crowding-out effect of government on financial institutions in emerging economies, specifical banks in South Africa. As a result, they proposed that the government securities market be extended further, providing a signal to the business world and a standard yield curve. After controlling for country and year-fixed impacts and national-level controls, they show a negative effect of public debt and firm leverage in terms of debt levels and fluctuations. According to their findings, the crowding-out impact is indeed significant for better and higher-returning companies and enterprises in economies with much more established equity markets with lower bank reliance. They claimed that these companies would be more willing to switch between different sources of finance. Furthermore, their results demonstrate that the crowding-out impact is substantial for local government borrowing and whenever financial honesty is poor. Therefore, in

both instances, local investors need to grip more government debt shock, leaving not as much financing for domestic firm debt (Demirci et al., 2019).

In comparison to GDP, Gamber and Seliski (2019) assert that the reduced-form-regression findings revealed that anticipated interest rates had countered positively to projected contractual liability and shortfalls. According to their results, the average long-run impact of a burden on interest rates varies between 2 and 3 basis points for each percentage point increase in debt as a proportion of GDP. They also used a dynamic stochastic overall stability model to show that interest rate reactions to deficits depend on the type of financial regulation, producing debt swings. In the context of the model mentioned earlier, fiscal procedures that strengthen inducements for households and companies to invest in corporate capital or supply extra labour cause a lesser interest rate retort than the reaction. As a result, condensed-form appraisals, which cannot be adapted to the nature of government budget adjustment, are offered (Gamber & Seliski, 2019). On the contrary, the results show that a budgetary policy that includes few incentives for consumers and businesses to invest in additional private capital or provide labour creates a much more significant interest rate reaction than the concentrated research suggests.

In summary, most studies have found a negative relationship between government borrowing and capital structure in the above empirical analysis, which aligns with the crowding-out effect theory. However, few studies have found a positive nexus on the issue, consistent with the crowding in effect theory. Although the crowding-out effect hypothesis explains how government borrowing reduces the money supply and raises interest rates, it has not been tested empirically on how the transmission mechanism influences capital structure. As a result, there seems to be a gap in the literature.

The following section discusses the effect of growth opportunity on the capital structure of financial institutions.

- **Hypothesis 3: There is a significant effect of growth opportunity on the capital structure of registered commercial banks in South Africa**

The existing literature has identified a link between growth and capital structure (Vo, 2017). Yet, several ideas suggest that the nature of this relationship is not quite the same. As a result, this link varies depending on the capital structure variables used (Vo, 2017). The agency theory, for instance, is based on the idea that companies with excellent development potential keep their financial capabilities to lend more in the future, predicting a negative link with growth and leverage (Myers, 1977 & La Rocca, La Rocca, Gerace & Smark, 2009). In the same vein, the trade-off theory postulates that growth and debt have a negative association (Khemiri & Noubbig, 2018). It links this and the expenses of the financial crisis. The bigger the company's growth, the higher the cost of financial distress (Khemiri & Noubbig, 2018).

On the contrary, the pecking order theory predicts a positive link between growth opportunities on leverage (Vo, 2017). Financing assets is the recommended method of decreasing the costs of asymmetric information (Myers,1984). Companies would want to initially use retained earnings, followed by low-risk loans, high-risk capital and fresh stock. As a result, if a firm is confronted with better investment prospects without internal cash flow, debt becomes the first alternative for financing, resulting in significant leverage. Companies with great growth prospects can obtain external funding to cover their capital investment needs (Khemiri & Noubbig, 2018).

The empirical research of capital structure tries to investigate such impacts to validate and untangle which influence dominates when both theories predict the same thing. The empirical studies show a negative connection between growth potential and leverage (Silvia & Islam: 2019; Danila, Noren, Azizan, Farid & Ahmed, 2020). In their study, Li, Silvia & Islam (2019) show that growth opportunities are significantly but negatively associated with the market leverage ratio. The result backs up the agency theory interpretation of capital

structure, which asserts that stakeholders of companies with solid growth prospects choose initiatives.

From 2007 to 2017, Danila, Noren, Azizan, Farid, and Ahmed (2020) looked at how growth prospects affected the capital structure and dividend policy of the listed Indonesia Stock Exchange. Their conclusions are based on the contracting theory's capital structure growth possibilities and the Indonesian dividend policy. According to the study, growth potential, debt ratio and dividend yield have a strong but negative relationship. Lack of investment and asset replacement are two reasons enterprises with significant development prospects are prohibited from raising debt. On the contrary, companies with tremendous investment potential are more inclined to pay a small dividend.

On the contrary, if internal capital is inadequate to satisfy its growth objectives, it will borrow from external sources (Michaelas, Chittenden & Poutziouris, 1999). As a result, there appears to be a positive link between company growth and financial leverage. Using the GMM technique, Abdeljawad, Mat-Nor, Ibrahim and Abdul-Rahim (2013) studied the effect of profitability, asset tangibility, growth of companies and size on leverage of 434 companies in Malaysia with data ranging from 1992 to 2009. Their study revealed that growth and asset tangibility have a positive effect on company leverage yet a negative influence on profitability. Moreover, Vo (2017) discovered that the long-term to short-term debt ratio is influenced positively by growth opportunity defined by Tobin's Q. Companies with a higher market value prefer to fund their investments with more debt. Vo (2017) shows that higher-growth companies cannot benefit from fresh share offerings in stock markets. On the contrary, Gormley and Matsa (2013) show that high equity financing and low leverage are associated with growth opportunities.

Furthermore, Khemiri and Noubbigh (2018) used three measures of growth opportunity, such as growth in total assets, growth in tangible assets and growth in intangible assets, to study the drivers of leverage firms from 2006 to 2016. They utilise a sample of five sub-Saharan African nations, including

South Africa, Ghana, Kenya, Nigeria, and Zimbabwe. Their study revealed a negative but significant relationship between total assets growth and long-term debt. Yet, a positive correlation between growing tangible assets (I) and intangible growth assets is measured by Tobin's Q on long-term debt, consistent with trade-offs theory predictions. They argue that this is attributable to companies in sub-Saharan Africa borrowing to fulfil their capital expenditure needs. The findings on the rate of physical investment with Tobin's Q are evidence of the pecking order theory's expectations. Furthermore, their research findings show a positive but not statistically significant link between tangibility (TANG) and long-term debt (Khemiri & Noubbigh, 2018).

From the banking perspective, studies that have used growth opportunity as one of the determinants of capital structure (Gocmen & Sahin, 2014; Sibindi & Makina, 2018). Gocmen and Sahin (2014) studied the capital structure drivers of Turkish deposit banks from the period 2004 to 2011. Thirty Turkish banks were subjected to the panel data analysis. The total sample period is separated into two threads: the 2004-2007 timeframe was utilised to assess the capital structure drivers of Turkish deposit banks before the global financial crisis. In contrast, the 2008-2010 timeframe was used to examine the impact of the crisis on these drivers.

The data reveal that growth is positively and strongly associated with the leverage ratio for all periods. Besides the pre-crisis period of 2004 to 2007, since growth is negatively but not substantially connected to long-term leverage, the parameter estimates for the regression were short-term and long-term leverage ratios are employed as dependent variables are the same. As per the pecking order theory, when a rising corporation's internal resources are insufficient to fund projects with a positive net present value, the company could be required to give debt instead of equity. Therefore, this suggests that development prospects and leverage are mutually beneficial. This study indicates that Turkish banks with more robust growth choose to fund their investments through debt rather than equity. Furthermore, Sibindi and Makina's (2018) findings supported this theory, as the typical firm-level

determinants of the capital structure had solid explanatory power in the form of the leverage measure. However, bank leverage was positively associated with growth prospects, risk and size characteristics. They argue that this proves that South African banks' financing behaviour is compatible with the pecking order theory.

In summary, most studies have found a positive relationship between growth opportunity and capital structure in the foregoing empirical analysis, which is in line with the pecking order theory. However, as mentioned earlier, few studies have found a negative nexus on the issue, which is consistent with the trade-off theory. Besides, the results found in the aforementioned studies do not demonstrate any consensus regarding the impact of growth opportunity capital structure. Therefore, how growth opportunity influences the capital structure of South African financial institutions in general and the banking industry, in particular, is still unclear. Consequently, this study is inspired by the above motivation to investigate how growth opportunity influences South African banks' capital structure.

The following section discusses the effect of the liquidity mismatches index (LMI) on the capital structure of financial institutions.

- **Hypothesis 4: There is a significant effect of the liquidity mismatch index (LMI) on the capital structure of registered commercial banks in South Africa**

According to trade-off theories of capital structure, firms choose optimal leverage by trading off the net cost of equity and net cost of debt, which is influenced significantly by tax shield. Holding other elements constant, if a component that raises the equity cost, for example, a reduction in liquidity, should make financing by equity not as attractive as financing by debt, and therefore in higher leverage of firms (Dang, Ly Ho, et al., 2019).

Hence, an increasing body of scholars supports the aforementioned theoretical prediction. In Thailand, Udomsirikul *et al*. (2011) investigated the

impact of liquidity on financial leverage. Bank credit seems to be more frequent, and company shareholding is significantly entrenched wherever capital markets are less efficient. They claim that corporations with too much cash have less leverage. On the contrary, Sharma and Paul (2015) examined the relationship between liquidity and capital structure in India from 2003 to 2011. They employed Amihuds' (2002) illiquidity, modified turnover ratio and modified liquidity ratio to measure liquidity. As a result, they used market and book leverage to measure financial leverage. The results of their research indicated no evidence of a link between financial leverage and liquidity of the company stock. As a result, they refute the theoretical assumption that enterprises with more liquid equity will prefer to raise capital using equity rather than debt issuance. Furthermore, their findings contradict the conclusions of Udomsirikul et al. (2011), who claimed that enterprises with strong liquidity have lower leverage.

Using the simultaneous equations and two stages least square method, Umar and Sun (2016) investigated the association between bank leverage and stock liquidity of listed banks in BRICS economies from 2007 to 2014. According to their findings, a reduction in leverage leads to a decrease in bank stock liquidity. Even though bank leverage is a significant component of stock liquidity, fluctuations in stock liquidity do not enlighten differences in bank leverage. On the contrary, uptrend liquidity leads to decreased leverage for small banks. Yet, bank leverage and stock liquidity are mutually exclusive for large banks. Their study partially supports the results of Udomsirikul *et al*. (2011) that companies with high liquidity have significantly lower leverage. They stated that as leverage declines, banks' stock liquidity suffers; hence the new Basel III rules must be implemented gradually and methodically to avoid stock market upheaval (Umar & Sun, 2016).

Sidhu (2018) investigated the influence of leverage on the stock liquidity of Indian companies listed in the S and P 500 index from 2009 to 2013 using a panel data regression model. Because stock liquidity is difficult to evaluate due to its many aspects, the study used the Amihud liquidity estimate to

capture it (Sidhu, 2018). The study calculated leverage by dividing total debt by total debt plus equity. The study's finding backs up the stock liquidity suggestions of leverage, namely, that a lower amount of debt enhances the company's stock liquidity level. Furthermore, the study results found a negative association between stock liquidity measured by the Amihud proxy and company leverage. Again, Sidhu (2018) recommends that future studies could be simulated to investigate the effect of leverage on the stock market liquidity of financial institutions and unlisted companies.

On the contrary, there are few scholars who have tried to address the issue of the correct liquidity measure that incorporates both assets and liability side (Berger & Bouwman's, 2009; Brunnermeier et al., 2013; Bai, Krishnamurthy, & Weymuller, 2018; Daneil & Shachar, 2018). Notably, no study is known that investigated the effect of liquidity on capital structure in the context of asset-liability mismatches (Marozva, 2017; Bai, Krishnamurthy, & Weymuller, 2018).

The International Monetary Fund (IMF) anticipated that a systemic liquidity risk index (SLRI) would be the most appropriate indicator of liquidity risk. As a result, the SLRI regulates the shared threat of contemporaneous liquidity shortages based on the NSFR outlined in Basel III. The SLRI is used as a proxy for funding and market liquidity risks embedded in assets such as equity prices and the cost of funds in their volatility (IMF, 2011). The SLRI has been used to stress test systemic liquidity risk in the context of funding and market liquidity risk modelling, using actions discovered during the global financial crisis from 2007 to 2009. In this context, the pressure of assessing systemic liquidity risk also included considering the bank's shared cause of asset weakness. Furthermore, the system impact and market-wide contagion are exacerbated by liquidity spirals fuelled by the pressure to sell assets quickly to fulfil obligations as they become due.

Utilising quarterly data for U.S bank holding firms Khan, Scheule and Wu (2017) studied the impact of funding liquidity on bank risk from 1986 to 2014. They indicate that banks with lesser financing liquidity risk are riskier as

measured by larger deposit ratios. As a result, as demonstrated by more considerable risk-weighted assets, more liquidity generation, and lesser Z-scores, a decrease in bank funding liquidity risk increases the bank's risk. As a result, banks' size and capital buffers frequently prevent them from taking on additional risk while their funding liquidity risk is less. Moreover, banks with little funding liquidity risk during the international financial crisis bought fewer shares. Furthermore, the study results have inferences for bank regulations supporting higher liquidity and capital requirements for banks under Basel III.

Bia, et al. (2018) assert that the Basel III committee established the basic liquidity rules for commercial banks, such as the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR). Daniel and Shachar(2018) argue that under difficult liquidity strain conditions, an organisation's LCR is defined as its holdings of high-quality liquid assets (HQLA) divided by the total expected net cash outflows (ENCO30) in the next 30 days. On the contrary, the Basel Committee on Bank Supervision (BCBS) (2010) claims that NSFR is measured by dividing the available constant funding by the required stable funds. As a result, the LSR and NSFR were presented to advance banks' liquidity management within the framework of asset-liability mismatches (IMF, 2011). On the contrary, Bai et al. (2018) suggest that the Basel III Liquidity Proxies have outpaced research and highlight fundamental problems that researchers must address. As a result, they lack a common framework for assessing whether private liquidity decisions must be regulated and what mechanisms should be used to execute liquidity requirements. They also said that there is a lack of a non-controversial methodology for quantifying financial institution liquidity (Bai et al., 2018:52). As a result, there is no consensus on the correct measure and definition of liquidity. Yet, it is essential to develop a new liquidity proxy that will apprehend all the sources of liquidity risk (Bia, Krishnamurthy & Wymuller, 2016 & Marozva, 2017).

The liquidity mismatch index (LMI) developed by Brunnermeier, Gorton and Krishnamurthy (2013) is one of the liquidity proxies that seeks to evaluate assets-liability mismatches, the mismatch between market and funding liquidity, which is the liability side of the statement of position. Taking on the

expressions in Brunnermeier *et al*. (2013) and Daniel and Shachar (2018), the LMI proxies the mismatch between the market liquidity of assets and the funding liquidity of liabilities.

Theoretical and empirical finance literature has paid little attention to improving a liquidity proxy from the perspective of asset-liability mismatches. Notably, no known study investigated the effect of liquidity on capital structure in asset-liability mismatches (Marozva, 2017; Bai *et al*., 2018; Marozva & Makina, 2020). Brunnermeier *et al*. (2013) suggest LMI as the new liquidity proxy incorporating the divergence between assets and liabilities. The LMI is assumed to advance the way we capture the critical risks in assessing systemic risk meaningfully (Marozva, 2017). Therefore, the new liquidity proxy anticipated will form a fragment of new overall balance models. This study aims to adopt Marozva and Makina's (2020) Bank Liquidity Mismatch Index (BLMI) and test its effect on capital structure within the context of assets-liability mismatches.

4.3 Chapter Summary

This chapter developed and discussed the four hypotheses: (i) The bank capital structure is influenced by government borrowing, resulting in a crowding-out effect. Based on the foregoing hypothesis, several studies indicated a negative association between government borrowing and capital structure, consistent with the crowding-out effect theory. Yet, few researchers have identified a positive link between the abovementioned issues, supporting the crowding-in-effect argument. Whereas the crowding-out effect theory outlines how government borrowing lowers the money supply and raises interest rates, empirically, it has yet to validate how the transmission mechanism affects capital structure. As a result, the literature appears to be lacking. (ii) The effect of growth opportunity on the capital structure of banks. Regarding the above hypothesis, many studies find a positive association between growth potential and capital structure, consistent with the packing hypothesis. Meanwhile, few studies have discovered a negative nexus on the issue, aligned with the trade-off hypothesis.

The findings of the studies show that there is no consensus on the influence of growth opportunity capital structure. As a result, it is yet unknown how growth opportunities affect the capital structure of South African banks in general and the banking industry. (iii) The effect of liquidity mismatch index (LMI) on the capital structure of banks in South Africa. In the context of asset-liability mismatches, the theoretical and empirical finance literature has given minimal attention to improving a liquidity proxy. There is yet to be a study examining the impact of liquidity on capital structure in the setting of asset-liability mismatches (Marozva, 2017; Bai et al., 2018; Marozva & Makina, 2020). Therefore, this study aims to adopt Marozva and Makina's (2020) BLMI for asset-liability mismatches and see how it affects capital structure. Lastly, the effect of earnings volatility on the capital structure of banks in South Africa has been discussed. As the preceding analysis shows, the empirical findings vary. Some studies support the trade-off idea, while others support the pecking order theory; there is no definite victor. As such, the discussion assigns a background for the following chapter. The subsequent chapter elucidates the research methodology that is utilised in this research.

CHAPTER 5: RESEARCH METHODOLOGY

5.1 INTRODUCTION

Chapter one focused on the introduction and background, problem statement, research objectives and contribution to new knowledge. Chapter two focused on the definitions of key concepts such as earnings volatility, government borrowing, growth opportunities, liquidity, and capital structure. Moreover, Chapter two discussed capital structure theories, trade-off theory, pecking order theory, market timing theory, signalling theory, agency theory, and crowding-out effect theory. Chapter three also discusses the empirical issues of earnings volatility, growth opportunities, government borrowing and liquidity on capital structure. Furthermore, chapter three examines other firm-specific determinants of capital structure. The study also discusses other-macro-economic determinants of the capital structure in chapter three. Lastly, chapter four discusses the hypothesis development of earnings volatility, growth opportunities, government borrowing and liquidity on the capital structure. This chapter describes the methodologies employed in addressing the research objectives.

The sections begin with the research paradigm's rationalisation, which will guide the anticipated research design. Also, the study discusses the population and sample size. The chapter followed with a discussion of the data source and variables employed in this study. Furthermore, the proposed empirically model is specified and followed by the model specification—lastly, this chapter ends with a conclusion.

5.2 Research paradigm and design

Research design is defined by Monette, Sullivan and Jong (2008:9) as the plan viewing how clarifications were made and how the researcher continued. Cooper and Schindler (2014:125) define research design as a framework of what the researcher will do, from writing hypotheses and their processes to the data's ultimate analysis. The study used quantitative research to investigate the nexus between credit rating, government borrowing, liquidity

and capital structure. According to Tustin, Ligthelm, Martins and Van Wyk (2010:89), quantitative research is a logical way of collecting primary data from a more significant number of individuals to superior the results to a broader population.

The study used quantitative research because of its emphasis on numerical data and an interpretation of outcomes to glean as much information as possible from the observed numerical values (Dimitrov, 2008:9). Saunders, Lewis and Thornhill (2016:166) claim that quantitative research is typically related to the positivist approach, mainly when used with predetermined and incredibly structured data collection techniques. In social science, the traditional positivism method is not substantially diverse from that in the natural sciences (Della Porta & Keating, 2008). They argue that the world exists as an unbiased and independent object, independent from its viewer (Porta & Keating, 2008). This research aims to explain more in-depth relationship between credit rating, government borrowing, liquidity, and capital structure. Because the positivist approaches undertake that, in nature, by way of social sciences, the researcher can be liberated of the purpose under study. In this study, the relationship between earnings volatility, growth opportunities, government borrowing, liquidity and capital structure is analysed using secondary data in an unbiased way and without any disproportionate effect on the data. Denscombe (2008:14) contends that positivism as an approach to social research that pursues to apply the natural science model of study to examinations of social phenomena and clarifications of the social world. In addition, positivists believe that an objective reality occurs outside of personal practice. The fundamental laws and instruments can disclose basis and effect associations (De Vos, Strydom, Fouche & Delport, 2011:6).

In line with the preceding discussion, the study adopted a positivist epistemology. The research aimed to determine the relationship between earnings volatility, government borrowing and liquidity on capital structure. We also used the deductive approach in this study to disclose the correlation

between earnings volatility, government borrowing, liquidity and capital structure.

5.3 Population and Sample

This study population consisted of all 16 registered domestic banks in South Africa (as indicated in Table 5.1). However, this study sample consisted of 11 registered banks in South Africa from 2012 to 2021, drawn from a population of 16 registered banks in South Africa. These 11 registered banks in South Africa include First Rand Bank Limited, Absa Bank Ltd, Nedbank Ltd, Investec bank Ltd, Capitec Bank Ltd, Standard Bank of South Africa, Grindrod Bank Ltd, Bidvest Bank Limited, Albaraka Bank Ltd, Sasfin Bank Ltd and HBZ Bank Ltd. These banks were included in this research because bank-specific data on the measures under investigation were available. Five small banks, namely African Bank Limited, Deutsche Bank AG, Ubank Limited, Grobank Limited, and Habib Overseas Bank Ltd, were excluded because financial data was not available for the period of the study. These firms are considered sufficiently illustrative of the registered banks' population in South Africa from 2013 to 2021. The exclusion of small banks is acknowledged as one of the limitations of this study. Nevertheless, the analysis remains robust as several studies used samples with similarities to the current one, and their results were robust (See, for example, Ifeacho & Ngalawa, 2014; Akande & Kwenda, 2017; Nyoka, 2019).

These registered banks' sample size consists of 11 banks over ten years, leading to 110 observations for the banking sample. Therefore, the sample is a short panel where the number of banks under investigation is more than the time of analysis, N >T (Marozva & Makina, 2020). The selection of the registered banks in South Africa was identified for this research, and it is acknowledged that there were differences in the sampled registered banks' procedures, as mentioned earlier.

Table 5.1: South African banks registered in terms of the Banks Act 94 of 1990 as of December 31, 2020, and their rankings

Name of Banks	Total Assets as of December 31, 2020 (R000) Thousands	Ranking of Banks by Total Assets
First Rand Bank Limited	1444	1
ABSA Bank Ltd	1281	2
Nedbank Ltd	1162	3
Investec Bank Ltd	501	4
Capitec Bank Ltd	151	5
Standard Bank of S.A.	37	6
African Bank Limited	25	7
Deutsche Bank AG	14	8
Grindrod Bank Ltd	12	9
Bidvest Bank Limited	12	10
Albaraka Bank Ltd	9	11
SASFIN BANK Ltd	9	12
HBZ Bank Ltd	7	13
UBANK LIMITED	6	14
Grobank Limited	3	15
Habib Overseas Bank Ltd	1	16

Source: South African Reserve Bank (2020)

5.4 Data and variables

This study used monthly, and annual financial and economic data extracted from the iress database, the South African Reserve Bank (SARB), Bankscope-Bureau van Dijk, Compustat database of Wharton Research Data Services (WRDS), and the World Bank Database Emerging Markets Development Indicators and Global Developmental Finance. The panel data regression analysis was then used to analyse the relationship between credit rating, government borrowing, liquidity, and capital structure. Our study was based in South Africa; therefore, one country's data was utilised. This research

investigated panel research using time-series and cross-sectional data on the selected banks in South Africa. Therefore, the approach was both longitudinal and cross-sectional.

5.4.1 Dependent variables

In this study, capital structure is employed as the dependent variable. Siaf-Alyousfi, Md-Rus, Taufil-Mohd, Taib, and Shahar (2020) suggest different capital structure metrics in empirical research. According to Rajan and Zingales (1995), short-term, long-term, and total debt over total assets ratios are much more adequate indicators of financial leverage than the ratio of liabilities to total assets since they provide a more precise sense as to whether the company is at the probability of insolvency in the near future and present a much more realistic assessment of previous sources of finance. In contrast, other studies argue that the result is the same whether market leverage or book leverage is used (see scholars such as Frank & Goyal, 2004; Antoniou, Guney & Paudyal, 2008 & Gropp & Heider, 2010). They confirmed that the findings are robust irrespective of whether market or book leverage measures are employed.

However, this study used book value to measure capital structure following studies such as Gropp and Heider (2010) and Sibindi (2018); they also employed book leverage as a dependent variable. According to Sibindi (2018), the book leverage measure (BLE) is a broad proxy of leverage and is described as one minus the ratio of the book value of equity to the book value of assets. Khan, Bashir and Islam (2020:8) argue that the reason for choosing book leverage as a measure of leverage is based on the fact that capital regulation of banks is imposed on book value, not market value. In addition, following other scholars, the current study used three measurements of leverage such as total debt ratio (TDR), short-term debt ratio and long-term debt ratio (LDR) (Degryse, De Goeij & Kappert, 2012; Palacin-Sanchez, Ramirez-Herer & Di Pietro, 2013; Ayturk, 2017). The total debt ratio at book value (TDR_B) is defined as the ratio of the book value of total debt to book value of total assets (Siaf-Alyousfi et al., 2020). On the contrary, the long-term debt ratio (LTDR) is measured as the ratio of long-term liabilities over total

assets (Handoo & Sharma, 2014). Other researchers that used long-term debt ratio (LTDR) include scholars like Frank and Goyal, 2009, Palacin-Sancez, et al., (2013) and Siaf-Alyousfi et al., (2020). The short-term debt ratio (STDR) is the ratio of short-term debts divided by total assets (Vo, 2017). Several studies also used short-term debt to measure capital structure (Psillaki & Daskalakis, 2009 ; Chipeta et al., 2013 & Siaf-Alyousfi et al., 2020). Hence, this study investigates the nexus between earnings volatility, growth opportunities, government borrowing, liquidity, and capital structure.

5.4.2 Independent variables

The independent variables are the new factors that impact leverage, such as earnings volatility, government borrowing, growth opportunity and liquidity. The proxies to capture these measurements used in this study are explained next.

5.4.2.1 Earnings volatility

The standard deviation of operating income to total assets is used to determine earnings volatility in this study. Other studies calculated the standard deviation using data from the previous five years, including the current year (Koksal & Orman, 2015; Harris & Roark, 2019 & Saif-Alyousfi; Md-Rus, Taufil-Mohd; Taib & Shahar, 2020). However, this study calculated the standard deviation using data from the previous three years, including the current year. Earnings volatility is a system integration metric for assessing the company's capacity to achieve fixed costs (Siaf-Alyousfi, 2020). This proxy reflects the unpredictability of open revenue sources and the risk. Moradi and Paulet (2019) expect that earnings volatility is adversely connected with capital structure since revenue is a significant determinant in the capacity to satisfy interest payments and pay dividends.

According to Moradi and Paulet (2019), when earnings volatility is significant, companies are generally unable to raise debt and equity since lenders and investors are reluctant to set their funds into a company with a substantial possibility of losing or insolvency. Moreover, Siaf-Alyousfi (2020) asserts that companies with significant earnings volatility face the danger that their profits

stream could fall under borrowing commitments, re-arranging capital at a more substantial cost or risking insolvency. As a result, the company's cost of borrowing has no significant impact on the measure because the appropriate debt burden reduces earnings volatility (Khemiri & Noubbigh, 2018). Empirical investigations substantiate the viewpoint as mentioned above, including Khemiri and Noubbigh (2018) and Moradi and Paulet (2018). (2019). However, research such as Kim and Sorensen's (1986) and Fama and French's (2002) found a clear association compatible with agency cost of debt, which leads to companies to borrow excessively.

5.4.2.2 Government borrowing

Government borrowing practices portray a significant part in enlightening the continuously improving inclination of a company's leverage in unregulated sectors (Graham, Leary & Roberts, 2015). Agca and Celasun (2012) argue that enhancing external debt by public entities is expected to cause a reconsideration of country risk. Countries with tricky hazards of the sovereign debt crisis for a particular hostile economic blow and sovereign debt disasters are proclaimed to widen through the economy and weaken private creditworthiness (Agca & Celasun, 2012). The study used total government debt-to-GDP ratio, internal debt and external debt to measure government borrowing, following other studies which also used total government debt-to-GDP ratio, internal debt and external debt (Agca & Celasun, 2012; Demerci, *et al*., 2016). The government debt to GDP ratio is defined as the total government debt as a percentage of the gross domestic product GDP in-country (Demirci et al., 2016). External government debt is the government's debt when borrowing from foreign countries or institutions (Black, Calitz & Steenekamp, 2003). On the contrary, internal debt is calculated by deducting external government debt from total government debt outstanding (Demerci *et al*., 2016).

Throughout the last century, government borrowing has significantly impacted firm financing choices in the United States (U.S) (Graham, Leary & Roberts 2014a & b). They interpret aggregate company obligation balance as when excessively inelastic demand and supply curves intersect. Moreover, they

contended that the greatest significant consequence of an unduly inelastic demand curve for a cumulative firm obligation is to induce a negative effect of government borrowing on company obligation. Furthermore, they contended that because government borrowing is an imperfect alternative for those other commodities in the capital sector, variations in public debt issuance can affect the yields on those other assets. Similarly, Graham *et al*. (2014 b) contends that changes in the supply of public debt might alter the relative returns of competitive investments in a sense whereby the supply of nearer alternatives (firm obligations) seems to be more sensitive to variations in public debt as the supply of inferior options (equity).

Recent empirical studies that have been conducted on the relationship between capital structure and government borrowing include investigations such (Ayturk, 2017 & Demirci, Huang & Sialm, 2019). Using government debt over total assets and change in government debt over total assets (t-1) to measure government debt, Ayturk (2017) studied the impact of government debt on firm financing in 15 advanced European nations from 1989 to 2014. The study found a negative effect on government debt with the firm obligation. Similarly, Demirci *et al*. (2019) used the total government debt-to-GDP ratio, internal government debt and external government debt as a 'measurement's government debt to study the effect of government borrowing on firm financing in a global perspective on 40 countries from 1990 to 2014. They claim that improving the availability of government debt may diminish investor sentiment for corporate debt compared to equity because the government is a more robust alternative for corporate debt over equity (Demirci *et al*., 2019). As a result, firms may need to change their financial structure and decrease their leverage. After adjusting for the nation and year-fixed effects and country-level variables, the researchers discovered a negative influence on government borrowing and firm leverage in terms of balance and fluctuations in debt. Furthermore, they show that the crowding-out impact is higher for more significant and successful enterprises in nations with more established equity markets or less reliance on banks.

On the contrary, Ahmad, Aamir and Quddoos (2020) used a sample of seven non-financial enterprises in Pakistan from 2009 to 2018 to explore the crowding-out effect of internal public borrowing on firm leverage. Their findings reveal that internal public debt negatively but significantly impacts firm leverage. They contended that a 1% decrease in domestic public borrowing lowers 0.23 percent of firm borrowing. As a result, internal public debts and firm debts are alternatives, and lenders in Pakistan, mainly commercial banks, are investing in public debt instruments that are more stable and provide a greater return over firm obligations.

5.4.2.3 Growth opportunity

Following in the footsteps of Titman and Wessels (1998), Anarfor (2015) and Sibindi and Makina (2018), the growth parameter in this study is described as the annual growth rate of total assets. The argument for describing the growth parameter is that the greater the growth rate, the greater the company's growth chances (Sibindi & Makina, 2018). On the contrary, Titman and Wessels (1988) argue that future growth opportunities can indeed be treated as value-adding capital assets but cannot be collateralised. Nevertheless, researchers discovered no statistically significant association of growth with leverage. Rajan and Zingales (1995) observed a negative association between leverage and the market-to-book ratio to measure growth potential.

Gropp and Heider (2010) employed the market-to-book ratio as a growth measure and found it negatively associated with the book and market leverage. Shibru, Kedir and Mekonnen (2015) discover a negative yet not statistically significant link between growth and leverage. Furthermore, Sheikh and Qureshi (2017) showed that growth was negatively connected to the book leverage of the commercial banks in Pakistani, which they hypothesised was due to higher enterprises' reduced expenses associated with each funding choice. However, Koksal and Orman (2015) found a positive association between growth opportunities with leverage within their research. Danso, Lartey, Fosu, Owusu-Agyei and Uddin (2019) buttress that firms with substantial growth potential are much more leveraged. Growth mainly

suggests more burden on internal financing, which motivates firms to seek external funding to finance such prospective chances. As a result, these findings are compatible with the pecking order hypothesis. Yet, given the lack of market value data, the study could not replicate the preceding study's use of the market-to-book ratio as a proxy for growth opportunity.

The following section discusses liquidity measures such as liquidity coverage ratio (LCR) and bank liquidity mismatch index (BLMI).

5.4.3 Liquidity

In this study, four measures of liquidity, namely current ratio (CURR), liquidity coverage ratio (LCR) and BLMI were used as independent variables to measure liquidity.

5.4.3.1 Current ratio (CURR)

CURR is the current assets over current liabilities. This study used the current ratio as a proxy of liquidity following studies such as Yang, Albaity, and Hassan (2015), Joshi and Khurana (2017) and Draugele and Burksaitiene (2018) to study the effect of liquidity on capital structure. Draugele and Burksaitiene (2018) posit that the current ratio is primarily employed to assess a firm's capability to repay its liabilities, debt and accounts payable, including its assets cash, marketable securities, inventory, and accounts receivable. As a result, the current ratio can be utilised to reasonably estimate a firm's financial performance (Draugele & Burksaitiene, 2018). They argue that the more excellent current ratio indicates that a firm seems more capable of fulfilling its debts since its liabilities have a more significant asset value. Guney, Li and Fiarchild (2011) revealed that more liquidity decreases debt as assessed by the current ratio.

In contrast, more collateral indicates more significant debt for Chinese enterprises. Yang, Albaity, and Hassan (2015) investigated the effect of liquidity utilising the current ratio, cash from operations, and cash and marketable securities to explain such conflicting results. They show that the current ratio and cash from operations have negative and statistically significant signs, whereas cash and marketable securities have insignificant

but negative effects. On the contrary, Rao, Joshi and Khurana (2017) discover a significant but positive link between the debt and current ratios. They find that one unit rise in the company's current ratio produces an 0.019-unit upsurge in the leverage ratio predicated on the significant positive association between liquidity with debt ratio. This can also infer that companies with more liquid assets possibly need to enhance their debt ratio to support company liquidity (Rao *et al*., 2017).

5.4.3.2 Liquidity coverage ratio (LCR)

The Basel Committee on Banking Supervision (BCBS) proposed the liquidity coverage ratio (LCR) in December 2010 and amended it in January 2013 as part of the Basel III Accord. The LCR is the ratio mainly required to implement to endorse short-term resilience (BCBS, 2009). As of 2015, banks have been required to hold liquid assets over expected net liquid withdrawals over a 30-day testing period (Marozva, 2017). Furthermore, according to BCBS (2013), the numerator of the LCR indicates high liquid assets (HQLA). The LCR rule in the United States defines HQLA assets as non-financial assets with a low-risk profile and a big market. No rapid previous price decreases can be easily appraised and turned into cash in times of crisis (Roberts, Sarkar, & Shachar, 2018:7). According to BCBS (2013), HQLA is asset that banks may quickly liquidate without losing significant value. Liquid assets mainly consist of cash, short-term interbank loans, central bank reserves, marketable securities, and any financing to the central bank (Marozva, 2017). The denominator is the predicted net cash outflow within 30 days, which is the discrepancy between the bank's expected cash inflow and estimated cash outflow.

$$\text{LCR} = \frac{High\ quality\ liquid\ assets}{Cash\ outflows - Cash\ inflows} > 100\% \qquad (5.1)$$

Roberts et al. (2018:7) claim that LCR was developed to ensure that the stakeholders in the banking industry maintained sufficient liquid assets in the event of a theoretical 30-day period of excessive pressure on the liabilities side of the balance sheet. The committee attempted to resolve transmission risk induced by liquidity constraints at systemically essential institutions during the 2007-2008 financial crisis by implementing this liquidity measure and the related compliance standards (Roberts *et al*., 2018). The margin requirements

with each asset establish the liquidity weights of HQLA (BCBS, 2013). Moreover, BCBS (2013), the number of haircuts is the margin required for each asset and is defined by the central bank. As a result, asset liquidity weights are calculated as 100 less the haircut, indicating the amount a bank is strained, leading to a shortage of market liquidity (Marozva, 2017). The specified cash outflows are restricted to run-off rates intended to capture the likelihood of depositors or shareholders withdrawing existing funds and assets (BCBS, 2013). This aspect of LCR assesses a specific institution's funding liquidity risk.

5.4.3.3 Liquidity mismatch index (LMI)

This study used a liquidity mismatch index (LMI) to measure liquidity. The LMI was initially suggested and developed by Brunnermeier, Gorton and Krishnamurthy (2012). They describe the LMI as the "cash equivalent value" of a company in a given state, assuming that:

> Counterparties act unfavourably; parties, so long as they have contracts with the company, take out as much cash as likely from the company under the expression of their deals. The liquidity assured signifies the liability-side liquidity.

To withstand the cash withdrawals, given the anticipated strain occurrence, the company works out how ample cash can increase from assets sales, pre-existing agreements such as credit lines, and collateralised loans as repo supported by assets currently held by the company. This calculation assumes that the company cannot raise unsecured debt or equity. As such, the overall cash elevated signifies the asset-side liquidity.

The LMI is the net of the calculations: asset-side liquidity less liability-side liquidity. Krishnamurthy, *et al*. (2016) contend that the LMI measures the mismatch between assets' market liquidity and the funding liquidity of liabilities. This measure integrates both the asset and liability sides of the financial position statement (Brunnermeier, 2013). Hence, the LMI for an entity *i* at a given time *t* is the net of the asset and liability liquidity, defined as the assets side and liabilities side of the statement of financial position items that changes over time depending on their asset class or liability class (Marozva,

2017; Makina & Marozva, 2020). Following the model of Bia *et al*. (2018), the earliest proxy of LMI at the bank level is calculated as follows:

$$BLMI^{i}_{t} = \sum_{k} \lambda_t A_{k,} X^{i}_{t} A_k + \sum_{k} \lambda_t L_{k,} X^{i}_{t} L_k \quad (5.2)$$

Where assets ($X^{i}_{t} A_k$*), as well as liabilities* ($X^{i}_{t} L_k$*),* are a statement of financial composition components that diverge over time depending on their asset or liability class *(k,k).* On the assets side, the liquidity weights are then more significant than zero, and on the liabilities, the side is less than zero are the main elements that are computed (Bai *et al*., 2016).

On the bank's financial position, the asset side comprises furniture, property, fittings and intangible assets, trading assets, leases, loan securities, and cash. Hence, the asset liquidity weight postulates the volume of liquidity a bank could acquire by utilising a particular investment over a specific short time. Bia et al. (2018) suggest asset weights ranging from 0 to 1 depending on the asset class, which changes over time. The data used from the statement of banks of financial position, the computed asset liquidity weight is set at $\lambda_t A_k = 1$ to represent cash and cash equivalent. They argue that fixed and intangible assets are challenging or time-consuming to change into liquid funds they set $\lambda_t \alpha_k = 0$ (Bia et al., 2018). The additional assets allocated weights in the middle of 0 and 1; hence, the asset liquidity weights for these assets were set at $0 < \lambda_t A_k < 1$ (Valverde, Solas & Fernandez, 2016). Moreover, the asset liquidity weight is allocated to cash and cash equivalents as these assets are very liquid and can be changed into cash for a very short-term period related to other assets (Valverde, *et al*., 2016).

Nevertheless, the liquidity weights in this study have been adjusted and diverged from weights provided by Bunnermeier *et al*. In 2012, Bia et al. (2014) and Krishnamurthy *et al*. (2016) employed asset haircuts as a metric of asset weights. In contrast, the haircut metric appears hazardous since it is not universal across all money market traders when various participants utilise the same sort of collateral (Corrigan & De Teran, 2007). Furthermore, Krishnamurthy et al. (2016) contend that the repo haircut data for every bank is unattainable in a perfect scenario because the banks are unwilling to reveal it.

The study employs JSE All Index across the period under consideration, and the assets are estimated using a mix of spread and volume, following the lead of Marozva and Makina (2020). The absolute spread, or the discrepancy between the bid and ask prices, is used in the calculation (Holden, 2009). The amount transacted on a given day determines the actual bid-ask spread. Numerous researchers have suggested using the spread as a proxy for market liquidity (see for instead Huberman & Halka, 2001; Roll, 1984 & Glosten & Milgrom, 1985). The stock trading activity reflects the market breadth or how accessible it is to buy or sell a vast amount, indicating market pricing. The average daily turnover and Amihud's (2002) illiquidity ratio (ILLIQ), according to Danyliv, Bland, and Nicholas (2014), is the most extensively utilised liquidity metrics in the sector. Equity trading activity, volatility and price are essential liquidity variables. Danyliv et al.'s (2014) reversed liquidity index was used in this investigation (LIX). The LIX is written as follows:

$$\text{Liquidity} = \frac{\text{Volume x Price}}{\text{High}-\text{Low}} \tag{5.3}$$

Although this ratio can be pretty significant, logarithms are used to decrease it to more manageable numbers.

$$\text{LIX}_t = \log_{10}\left(\frac{V_t P_{Close}}{P_{High,T}-P_{Low,T}}\right) \tag{5.4}$$

The LIX liquidity measure captures the most critical aspects of market liquidity as the calculation includes components that pertain to the market's breadth, depth, resilience and immediacy (Danyliv *et al*., 2014). If one is to have a long-run view, spreads are seen to increase significantly with the onset of the crisis (Shin, 2012). As such, the asset liquidity weight is then determined in the following formula:

$$\mathrm{m} = \left[1 - \frac{1}{\mathrm{LIX_t}}\right] \quad (5.5)$$

Where $\frac{1}{\mathrm{LIX_t}}$ is the inverse of LIX. The calculated weight is adjusted by π, the coefficient allocated to the assets depending on the level of liquidity. The coefficients are adapted from previous studies by Krishnamurthy *et al*. (2016) and Bia *et al*. (2014), and follow guidelines conceptualised by Brunnermeier et al. 2012. The assets took the weights between 0 and 1, implying that asset liquidity weight for these assets was also $0 < \lambda_t A_k < 1$

On the contrary, calculating the liability side weight of the LMI the connection between the LMI and liquidity constraint must be captured (Marozva & Makina, 2020:85). Endogenous funding liquidity dimension is determined by Bai *et al*. (2014) as a mix of market price estimate and aggregate LMI.

$$FL_t = (1-\alpha)TOIS_t + \alpha(\upsilon LMI_t), \quad (5.6)$$

The scaling mechanism (υ) reduces the amplitude of aggregate LMI to a level comparable to the spread between treasury bills and the South African lending rate (SABOR). Rather than the OIS-T-Bill spread used by Bai et al. (2014), the study employs the spread between the treasury bill rate with SABOR. According to Nagel (2014), this metric adequately represents the time fluctuation of a money market instrument. Because the SABOR-Treasury bill spread (STBS) is believed to depict the liquidity position accurately, we remove the α (υLMI_t) in the empirical study. The STBS can capture the liquidity position in a specific market. As a result, this study follows Marozva and Makina (2020), who empirically quantify liability weights by modifying the government funding component and arriving at the funding component in the next question.

$$FL_t = [\,1 - STBS]\,\pi' \quad (5.7)$$

STBS_t denotes the spread between treasury bills and the SABOR. The estimated weight is changed by π', the coefficient assigned to liabilities based on their maturity term. Despite Krishnamurthy et al. (2016), the assigned π' captures the period to maturity of a responsibility.

The aggregate liquidity mismatch index is a sum of all the bank's liquidity mismatch indexes, as shown in equation 5.7.

$$ALMI_t = \frac{\sum_i \sum_k x_t^i, \mathrm{A}_k \left(1 - \frac{1}{LIX_{K,t}}\right) + \sum_i \sum_{k'} x_t^i, L_{k'} \left(\bar{\lambda}_{L'_K} + (1 + \bar{\lambda}_{L'_K}) \beta_{L'_K} (1 - \alpha) STBS_t \right)}{1 - \sum_i \sum_{K'} x_t^i, L_{K'} (1 + \bar{\lambda}_{L'_K}) \beta_{L'_K}} \quad (5.8)$$

Previous studies were conducted between capital structure and liquidity (DeYoung, Ditinguin & Tarazi, 2018; Dang, Ho, Lam, Tran & Vo, 2019 & Nguyen, Alpert & Faff, 2021). Having used pre-Basel III data, DeYoung *et al*. (2018) explored the liquidity behaviour of commercial banks through reaction to harmful capital disruptions utilising ungoverned liquidity and governed capital as alternatives. Despite external factors to the statutory capital ratios, the banks deviated from loans, loan obligations, and dividend pay-outs, which restored and improved overall capital ratios. They observe scant corresponding activity at central banks. As a result, they determined that a capital requirement limit inherently alleviates liquidity risk at local banks, supporting their exclusion from the Basel III liquidity criteria. On the contrary, Dang et al. (2019) studied the impacts of stock liquidity on firm capital structure choice, built on the hypothesis that the equity market offers valuable information for business decision-making. From 2000 to 2011, they employed a broad worldwide dataset of 19939 businesses from 41 countries. According to their research findings, firms with better stock market liquidity tend to have lower leverage.

A recent study by Nguyen *et al*. (2021) investigated whether the comparative liquidity of a company's bonds versus its share's influences capital structure selection. They gathered information on bond trades in the Advanced Trade Reporting and Compliance Engine (TRACE) database from 1 July 2002 to 30 June 2017. Because financing decisions entail weighing the costs and benefits of various financing options, the comparative liquidity of bonds against the stock may be necessary. A proportional liquidity disparity may result in one type of fund being considerably (essentially) lower than the other. Furthermore, they discovered strong indications that all else being similar,

companies with substantially more liquid bonds than stock have significant capital. On the contrary, the link between bond-stock comparative liquidity and leverage is statistically significant, the data implies that it is indeed of minor economic significance.

However, no notable research specifically looked into the impact of liquidity on capital structure in the setting of asset-liability mismatches (Marozva, 2017; Bai et al., 2018; Marozva & Makina, 2020). Brunnermeier et al. (2013) propose LMI as a new liquidity proxy incorporating asset-liability divergence. The LMI is expected to improve how we capture significant risks when assessing systemic risk (Marozva, 2017). As a result, the projected new liquidity proxy will be a component of new overall balance models. Therefore, this study aimed to use Marozva and Makina's (2020) BLMI and evaluate its impact on capital structure in the context of assets-liability mismatches.

5.4.4 Macro-economic and other firm-specific factors

The present study examined macroeconomic and other firm-specific factors to establish the nexus between earning volatility, government borrowing, growth opportunities, liquidity, and capital structure. The macroeconomic factor includes the GDP, inflation and interest rate, while firm-specific factors will cover bank size and none performing loans.

5.4.4.1 Gross domestic products (GDP)

The real GDP growth rate was used to measure economic growth consistent with other studies. Kayo and Kimura (2011) articulate that the extension of GDP is appraised to add to a specific country and offer good investment possibilities; therefore, financial leverage is minimised. Moreover, Tsaganesh (2012) claims that the real GDP signifies overall economic growth. On the contrary, countries with more GDP growth offer better growth opportunities for their companies, yet they are, at the same time, more profitable (Zeitun, Temimi & Mimouni, 2017).

Hanousek and Shamshur (2011) and Zeitun et al. (2017) use GDP growth as the control variable to measure economic growth. They found a positive relationship between GDP growth and corporate capital structure. However,

Joeveer (2013) and Dincergok and Yalciner (2011) and Awadh and Burair (2019) also use GDP growth as the control variable to measure economic growth and found a negative relationship between GDP growth and firm leverage.

5.4.4.2 Bank size

This study used the natural logarithm of total assets to measure bank size. Companies with advanced assets tend to borrow more than less significant companies since they have a less default risk (Kannadhasan, Thakur, Gupta & Charan, 2018). The older companies have more debt ability and good standing in the debt market, which leads to borrowing more to make the best use of the interest tax shields. It also cuts the agency costs related to asset replacement and underinvestment (Chung, 1993). On the contrary, smaller companies are likely to have a less leverage ratio due to agency costs (Kannadhasan, 2018). Many studies have used the proxy mentioned above to measure firm size, including investigations by Goyal (2009), Oztekin and Flannery (2011), Joeveer (2013) and Bandyopadhyay and Barua (2016). However, Abor (2005) used a sale log to measure the firm size and find a positive relationship between firm size and profitability. A positive relation underpinning size is the theory established by Warner (1977), which states that large firms have lower transaction costs of financing externally than small firms, making it easier for large firms to access debt externally.

On the contrary, some studies use bank size as a control variable Tchuigoua, (2014) and Shibru, Kedir and Mekonnen (2015) on leverage. For instance, Tchuigoua (2014) found a significant but positive relationship between bank size and external debt. Furthermore, Tchuigoua (2014) perceived that microfinance organisations appreciate healthier status, accomplish their risk and are not at risk. Similarly, Shibru et al. (2015) found a positive relationship between bank size and leverage. Therefore, the study was induced to utilise the total assets variable, as this measure, on the other hand, had banks' loan affairs and investment tasks.

5.4.4.3 Inflation Rate

Inflation is the rate at which the cost level of products and services in a country rises over time (Ali, 2019). The current study used the consumer price index (CPI) to measure the inflation rate. Other studies that also used the CPI as a measure of inflation (Saif-Alyousfi, Md-Rus, Taufil-Mohd, Taib & Shahar, 2020; Harris & Roark, 2019; Khemiri & Noubbigh 2018 & Frank & Goyal, 2009).

Frank and Goyal (2009) revealed that when firms anticipate inflation to be relatively high or recognise that prevailing inflation is low, they will incur the most debt. Yet, expected inflation trends are determined by domestic economic growth and external forces, known as imported inflation. Suppose corporate executives anticipate a more significant increase in the future. Therefore, Mokuoane (2016) argues that they would issue the most debt to benefit from the declining net cost of borrowing. Nevertheless, this assertion supposes businesses are increasing fixed-rate financing from banks rather than debt securities in the financial markets, even though variable interest rates typically fluctuate in response to significant changes.

In the context of macroeconomic turmoil measured by the inflation rate, its regression coefficient has a positive and significant sign of 1%. (Khemiri & Noubbigh, 2018). This is due to the high amount of tax deductions (tax savings) throughout periods of inflation (Memon, Rus & Ghazali, 2015). Similarly, Phooi M'ng, Rahman, and Sannacy (2017) revealed a positive but significant relationship between inflation and leverage in Malaysia and Thailand but an insignificant association in Singapore. According to Phooi M'ng *et al*. (2017), increases in expected inflation decrease the actual amount of the cost of debt, therefore enhancing the value of the tax shield. Moreover, Saif-Alyousfi *et al*. (2020) also found a positive association between inflation and both book and market value of leverage. On the contrary, using the inflation rate as a control variable Khan, Bashir and Islam (2020) found a negative association between the inflation rate and book leverage.

5.4.4.4 Interest rate

The rate at which a bank charges a client for using an asset during a specific commercial term is the interest rate (Valogo, Shafiwu & Adabugah, 2018). However, interest rate variations should not impact management financing choices. Therefore, according to Modigliani and Miller's (1958) research, a company's value is independent of its capital structure. Meanwhile then, many theories have emerged to refute their hypothesis. The trade-off hypotheses assumptions are based on whether companies aim for a particular debt burden or a certain debt-to-asset ratio (Karpavicius & Yu, 2017). According to the theory, companies choose a debt level at which the net advantages of debt are most significant. The debt tax shelter is one of the debt's perks. The expected insolvency expenses, or the direct and indirect costs of servicing the debt, are referred to as the cost of debt. They argued that a higher interest rate means more significant interest payments and reduced profits over time, increasing the likelihood of a corporation defaulting and incurring insolvency charges. On the contrary, market timing theory postulates that companies typically issue debt while interest rates fall and are hesitant to issue debt securities if interest rates increase (Karpavicius & Yu, 2017).

To measure the real interest rate, Zani, Leites, Macagnan and Portal (2014) used the prime rate by specific settlement for custody (SELIC) interest rate fluctuation divided by the expanded national consumer price index (IPCA). Their investigation did not show a statistically significant relationship with the interest rate on the book debt model. Nevertheless, they found a positive association with the interest rate for the market debt model. Furthermore, they contended that this result could be explained by a further rise in interest rates that could result in a further rise in the quantity of debt for such firms which had acquired debt. Karpavicius and Yu (2017), on the contrary, employ a dynamic partial equilibrium model to show that relatively high leverage adjustment costs may reflect the weak and negative relationship between interest rates and the company's leverage. Their finding aligns with the trade-off theory, suggesting a negative link between interest rates and firm leverage.

Table 5.2 Summary of variables and proxies

Variables	**Proxies and definitions**	**Proxies by**	**The expected sign of the coefficient**
Capital structure proxies (Dependent variable)			
Total debt ratio at book value (TDR_B)	TDR_B is defined as the ratio of total debt's book value to total assets' book value.	Siaf-Alyousfi *et al*. (2020).	
The long-term debt ratio (LTDR)	LTDR is measured as the ratio of long-term liabilities over total assets	Frank and Goyal (2009), Palacin-Sancez, *et al*. (2013), Handoo and Sharma (2014) and Siaf-Alyousfi et al. (2020).	

The short-term debt ratio (STDR)	STDR is measured as the ratio of short-term debts divided by total assets.	Chipeta *et al*., (2013), Vo (2017) and Siaf-Alyousfi et al., (2020).	
Independent variables			
Earnings volatility	Earnings volatility is measured as the standard deviation of operating income to the total asset.	Harris and Roark, (2019) and Saif-Alyousfi; Md-Rus, Taufil-Mohd; Taib and Shahar (2020).	Negative
Total Government borrowing (GTB)	The government debt to GDP ratio is defined as the total government debt as a percentage of the gross domestic product (GDP) in-country.	Demirci *et al*., (2017).	Negative
Local Government borrowing (GLB)	The percentage of gross domestic product (GDP) is used to determine local government debt	Ahmad, Aarmir and Quddoos, (2020), Demirci *et al*., 2019 and Liang, Liang, SHI, Wang and Xu (2017).	Negative

Foreign Government borrowing	The foreign government debt-to-GDP ratio refers to government debt due to non-residents.	Demirci et al., 2019	Negative
Growth opportunity (Grow)	The growth variable (*Grow*) is the annual growth rate of total assets.	Sibindi and Makina, 2018 and Anarfor (2015).	Negative
Current ratio (CURR)	CURR is measured as the current assets over current liabilities.	Yang, Albaity, and Hassan (2015), Joshi and Khurana (2017) and Draugele and Burksaitiene (2018)	Negative or positive
Liquidity coverage ratio (LCR)	LCR = $\frac{High\ quality\ liquid\ assets}{Cash\ outflows - Cash\ inflows}$	Daniel, Sarkar and Or (2018)	Negative or positive
Bank liquidity mismatch index (BLMI)	BLMI measures the mismatch between the market liquidity of assets and the funding liquidity of liabilities.	Marozva and Makina (2020).	Negative or positive
Control variable's			

Economic growth is measured by Gross domestic product (GDP).	GDP: The growth rate of real domestic product.	Hanousek and Shamshur (2011); Dincergok and Yalciner (2011); Tsaganesh, (2012); Joeveer (2013); Dincergok and Zeitun, Temimi and Mimouni, 2017.	Positive or negative
Inflation rates	Annual consumer price index (CPI)	Frank and Goyal (2009); Khemiri and Noubbigh (2018); Harris and Roark, (2019); Khan, Bashir and Islam (2020) and Saif-Alyousfi, Md-Rus, Taufil-Mohd, Taib and Shahar, (2020)	Positive or negative
Interest rates	Effective interest rate	Karpavicius and Yu, (2017)	Negative
Size	Size – the natural logarithm of total assets	Goyal (2009); Oztekin and Flannery (2011); Joeveer (2013) and Bandyopadhyay and Barua (2016).	Positive or negative

5.4.5 Econometric Model specifications

A panel data analysis was used in this study to investigate the relationship between earning volatility, government borrowing, liquidity, and capital structure. This study used four leverage measures: book value, total, long-term, and short-term debt. This methodology was similar to other earlier studies (see, for example, Kisgen, 2006, Kemper & Rao, 2013, Sajjad & Zakaria, 2018, Demirci et al., 2017 & Bia *et al.*, 2018) which investigated the determination of capital structure. However, they employ data extracted from various countries. These studies have used both market value and book value to measure leverage, while others have used total, short-term, and long-term debt. Yet, this study used four leverage measures: book value leverage, total debt, short-term debt and long-term debt. The significant advantage of this study is that it will be possible to compare leverage measurements across four leverage groups.

This study adopts a panel data analysis approach, most important using GMM model method. In a discussion of the benefits and shortcomings of a panel data, Baltagi (2008; 2009) shows that panel data analysis has numerous advantages. Because panel data narrates to banks (N) over a period of time (T), there is the possibility of heterogeneity in these banks (Marozva, 2017). The benefit of panel data advocates that banks, individuals or countries are heterogeneous. Yet time-series and cross-sectional studies do not control heterogeneity; therefore, they might risk obtaining biased findings (Hsiao, 2003). If heterogeneity is ignored, the non-controlling of the individual company-specific measurements leads to the model (Baltagi, 2008). Other benefits of panel data provide better informative data, better variability, less collinearity between the variables, and better degrees of freedom and extra efficiency (Baltagi, 2008). With the pooled approach, the panel data can better detect and measure outcomes that are not merely identified in pure cross-sections or time-series data (Baltagi, 2008). Panel data also permits

the suppression of the unnoticeable heterogeneity that can aggravate biased results by the essence of the problems (Neves, 2018).

On the contrary, panel data design as well as collection problems. These comprise coverage issues, non-response, frequency of interviewing and reference period (Baltagi, 2009). Another disadvantage of panel data is the distortion of measurement errors. Measurement errors might arise, such as bad reactions due to uncertain questions, recall mistakes and deliberate distortion of responses (Baltagi, 2009). It also has a short time-series dimension. Distinctive micro panels consist of annual data covering a short period for each individual. Moreover, panel data consist of selectivity problems such as self-selectivity, non-response and attrition. Another shortcoming of panel data is that studies that long time series on countries yet do not reflect the impact of cross-country dependence frequently result in incorrect inferences being tired (Baltagi, 2009). The study will not likely face such challenges where all the bank's specific data retrieved from the South African Reserve bank (SARB) are required to submit monthly returns. Also, the macroeconomic data were extracted from the SARB database.

This study also ran the random and fixed effects models for comparison purposes. Mundlak (1978) claims that the REM assumes the exogeneity of all the regressors and the random individual effects. Gujarati and Porter (2009) later added more weight to this claim, uttering that the REM is created on the belief that there is a correlation between the regressors and the individual or cross-section precise intercept. On the contrary, FEM allows the intercept in a regression model to vary across sectionally but not over time. However, all the slope estimates are fixed cross-sectionally and over time (Brooks, 2008:490). Moreover, Chakrabarti and Chakrabarti (2019) added weight to this argument assert that the FEM model accounts for individual companies or a unit composed by providing each company with an intercept, although assuming that real data, the slope coefficients are persistent. In a panel data approach, the Hausman test can help choose whether to use REM or FEM (Baltagi, Bresson & Pirotte, 2003).

In this research, the researcher used Hausman's (1978) estimation test to decide which model to employ.

However, as earlier stated, the central estimation that this study used is the GMM. The generic GMM dynamic model has the following form:

$$\boldsymbol{y_{it}} = \boldsymbol{\alpha y_{i\,t-1}} + \boldsymbol{\beta x_{it}} + \mu_i + \boldsymbol{\varepsilon_{it}} \quad (5.9)$$

Where:

y_{it} represents the book value of the leverage measures for banks *i* in time *t*;

x_{it} is the vector of the independent variable for banks and assets managers firms *i* for time *t,* representing the banks and assets managers firms-specific variable;

α_0 denotes a constant term;

β is the elasticity of the explanatory variables, i. e. slope of variables;

μ_i denotes fixed effects in banks and assets managers firms;

ε_{it} is a random error term, the subscript *i* denotes the cross-section, and *t* represents the time-series dimension.

According to Marozva (2017), to eliminate bank-specific effects, the first variance of the above GMM model is presented as follows:

$$\Delta y i\ t = (\alpha - 1)\Delta \boldsymbol{y_{i\,t-1}} + \boldsymbol{\beta}\Delta \boldsymbol{x_{it}} + \Delta \boldsymbol{\varepsilon_{it}} \quad (5.10)$$

Yet, the differenced model is not effective as it does not eradicate the correlation between the error factor as well as the lagged variables since $y i, -1$ and ε_{it} remain correlated (Arellano & Bove, 1995). Therefore, the study also ran the model utilising the GMM estimation method through lagged values of the regressors as instruments. According to Sajjad and Zakaria (2018), the dynamic panel data model plays an essential role in corporate finance. The GMM is utilised

broadly for estimating dynamic capital structure choice (Antoniou et al., 2008; Oztekin & Flannery, 2012 & Cheng, 2014).

Specifically, this study used the System two-step GMM. Sajjad and Zakaria (2018:5) argue that the GMM is the greatest estimation technique for the dynamic panel data as well as mostly be used in these that is, there is heteroskedasticity and autocorrelation. Moreover, Cheng (2014) avers that there is a fixed individual effect; the independent variables are not entirely exogenous and can be linked to past events. The error term and the data sample have a small T time and large individual N.

Based on the aforementioned discussion, the following section specified equations for the study. Lag value of the dependent variables, which is the leverage (LAG - TDR_B, LAG-, LAG-STDR and LAG-LTDR are also included in the models resulting in a dynamic model as the capital structure is persistent (Khemiri & Noubbigh, 2018 & Saif-Alyousfi *et al*., 2020).

5.4.6 Model specification

The objective to examine the critical determinants of leverage in South African registered banks was achieved by regressing the leverage (TDR_B, STDR and LTDR) against the determinants in the following questions. Specifically, the relationship between capital structure and explanatory variables of bank-specific determinants; macroeconomic determinants was expressed quantitatively in questions 6.1 to 6.3 for empirical analysis.

$$\Delta \mathrm{TDR}_{\mathrm{B}_{\mathrm{it}}} = (\alpha - 1)\, \Delta \mathrm{TDR}_{\mathrm{B}_{\mathrm{it}-1}} + \beta_1\, \Delta \mathrm{EV}_{\mathrm{it}} + \beta_2\, \Delta \mathrm{GO}_{\mathrm{it}} + \beta_3\, \Delta \mathrm{GOVB}_{\mathrm{it}} + \beta_4\, \Delta \mathrm{LIQ}_{\mathrm{it}} + \beta_5 \Delta \mathrm{Size}_{\mathrm{it}} + \beta_{\mathrm{j}}\, \sum_{j/t=1}^{n} \Delta X_{ij} + \Delta\, \varepsilon_{\mathrm{it}} \quad (5.11)$$

$$\Delta \mathrm{LTDR}_{\mathrm{B}_{\mathrm{it}}} = (\alpha - 1)\, \Delta \mathrm{LTDR}_{\mathrm{B}_{\mathrm{it}-1}} + \beta_1\, \Delta \mathrm{EV}_{\mathrm{it}} + \beta_2\, \Delta \mathrm{GO}_{\mathrm{it}} + \beta_3\, \Delta \mathrm{GOVB}_{\mathrm{it}} + \beta_4\, \Delta \mathrm{LIQ}_{\mathrm{it}} + \beta_5 \Delta \mathrm{Size}_{\mathrm{it}} + \beta_{\mathrm{j}}\, \sum_{j/t=1}^{n} \Delta X_{ij} + \Delta\, \varepsilon_{\mathrm{it}} \quad (5.12)$$

$$\Delta \mathrm{STDR}_{\mathrm{B}_{\mathrm{it}}} = (\alpha - 1)\, \Delta \mathrm{STDR}_{\mathrm{B}_{\mathrm{it}-1}} + \beta_1\, \Delta \mathrm{EV}_{\mathrm{it}} + \beta_2\, \Delta \mathrm{GO}_{\mathrm{it}} + \beta_3\, \Delta \mathrm{GOVB}_{\mathrm{it}} + \beta_4\, \Delta \mathrm{LIQ}_{\mathrm{it}} + \beta_5 \Delta \mathrm{Size}_{\mathrm{it}} + \beta_{\mathrm{j}} \sum_{j/t=1}^{n} \Delta X_{ij} + \Delta\, \varepsilon_{\mathrm{it}} \quad (5.13)$$

Since liquidity (LIQ) is proxied by BLMI, LCR, and CR, these are permutated against the three government borrowing measures: TGB, LGB and FGB. The permutations result in 9 outputs.

Where:

$TDR_{B_{it}}$ represents total debt ratio at book value for banks *i* in time *t*, measured by the ratio of the book value of total debt/book value of total assets,

$STDR_{it}$ represents the total debt ratio for banks *i* in time *t,* measured by short-term/ book total assets,

$LTDR_{it}$ represent the long-term debt ratio for banks i in time *t,* measured by long-term/ total assets,

EV_{it} represents earnings volatility for banks *i* in time t, measured by the standard deviation using earnings,

GTB_{it} donates government debt to GDP ratio for bank i in time *t*, measured by total government debt as a percentage of gross domestic product (GDP) in-country,

GLB_{it} is the percentage of gross domestic product (GDP) is used to determine local government debt,

GFB_{it} is the foreign government debt-to-GDP ratio referring to government debt due to non-residents,

$CURR_{it}$ is the current ratio measured by the current assets over current liabilities,

LCR_{it} Is the liquidity coverage ratio for bank *i* banks *t*,

$BLMI_{it}$ is the bank liquidity mismatch index for bank *i* banks *t*

$Size_{it}$ is the size of the i[th] banks on year *t* measured by the natural logarithm of total assets,

X_{ij} It is a panel of macroeconomic control variables measurements at the end, including interest and inflation rates.

GDP_{it} represents the GDP growth of South Africa in year t,

ε_{it} is the error term

α is the auto-regression coefficient,

β is a coefficient which represents the slope of variables.

Antoniou et al. (2008) proposed that the GMM estimator employs all past enlightenment of dependent variables through instrument variables and first takes divergences to eliminate the individual effects. To measure earnings volatility, the researcher has used the standard deviation of operating income to total assets. The impact of government debt studied has used internal government debt-to-GDP_{t-1} and external government debt-to-GDP_{t-1} as proxies of government debt. However, we use total government debt -to GDP_{t-1}, internal government debt-to GDP_{t-1} and external government debt-to GDP_{t-1} to measure government debt since we aim to test the crowding-out effect of government on bank capital structure in South Africa. On the contrary, the growth opportunity is measured as the annual growth rate of total assets. Therefore, the justification for specifying the growth parameter is that the higher the growth rate, the larger the company's growth possibilities (Sibindi & Makina, 2018). Furthermore, the study utilised four measures of liquidity, namely the current ratio (CURR), liquidity coverage ratio (LCR), and bank liquidity mismatch index (BLMI), to examine the effect of liquidity on capital structure. While there is plenty of literature, theoretical and empirical finance has paid little recognition to improve a liquidity proxy in the assets-liability mismatches perspective. Hence, our study adopts Marozva and Makina's (2020) BMLI to test its effect on capital structure.

5.4.7 Tools for data analysis

This study comprises the statistical correlation and regression analysis methods utilising Stata and Eviews software package to investigate the nexus between credit rating, government borrowing, liquidity, and capital structure. Also, descriptive, and inferential statistics were used to analyse data. Descriptive statistics sharp raw data into a form to offer evidence which defines a set of characteristics in a situation. This phase provides the spreading of scores and fundamental inclination methods such as mean, median and mode (Salkind, 2014). Although descriptive statistics are employed to explain a sample's characteristics, inferential statistics are utilised to infer something about the population. The sample was extracted based on the features frequently articulated with descriptive statistics of the sample (Salkind, 2014).

5.4.8 Limitations of the study

The research is limited to a sample of 11 registered banks operating in South Africa, such as First Rand Bank Limited, Absa Bank Ltd, Nedbank Ltd, Investec bank Ltd, Capitec Bank Ltd, Standard Bank of South Africa, Grindrod Bank Ltd, Bidvest Bank Limited, Albaraka Bank Ltd, Sasfin Bank Ltd and HBZ Bank Ltd. Five small banks, namely, African Bank Limited, Deutsche Bank AG, Ubank LIimited, Grobank Limited, and Habib Overseas Bank Ltd, were excluded because financial data was not available for the period of the study.

5.4.9 Delimitations of the study

The study used secondary data from the period 2012 to 2021. The reason for using the period from 2012 to 2021 is that the researcher wanted to use the short-term panel. We wanted to exclude the influence of the global financial crises. We also used only registered commercial banks in South Africa so that police issues would not taint our analysis relating to a different jurisdiction.

5.4.10 Reliability

Reliability is a matrix of the consistency of evaluated parameters determined in multiple testing within the same conditions utilising the same measurement tool (Surucu & Maslakci, 2020). They argued that reliability is a characteristic of the measurement tool and only a characteristic of the measurement tool but also of the gauging instrument's findings. A signal's reliability and conclusions are determined by how well they stand up to evaluation. The precision of the standard measure is determined by its reliability. For example, this study extracted data from the South African Reserve Bank (SARB) and the *iress* database. The data obtained from the SARB and *iress* databases were stored. For instance, any emulation of the research was needed to confirm the original reliability of the study.

5.4.11 Validity

The accurate and meaningful assessment of the information acquired from the measurement tool as a result of the analysis governs validity (Surucu & Maslakci, 2020). On the other hand, Whiston (2012), defined validity as data gathering suitable for the intended use of the measuring tools. Validity tests, which determine if the level of utterances determines the most appropriate metrics for the research aim, take centre stage in this particular instance. The research was conducted with respondents from all registered commercial banks in South Africa to confirm its validity. So, the positivistic paradigm highlights the thorough essence of a unit of measure and the capacity to replicate the test continuously. There is constantly the threat that the validity may be less than the findings. For example, the higher the reliability, the lesser the validity.

5.5 Summary and conclusion

This chapter's main aim was to substantiate the identified best suitable approach and research design theoretically. Moreover, the chapter systematically explained the primary method and the methodologies used in this research. The discussion linked this study’s research objectives and questions to identified

empirical models. The estimation models were used to test the association between bank capital structure and regressors. The link to finding the association between earnings volatility, government borrowing and liquidity on bank capital structure is linked. The GMM model was implemented, and the Hausman test was also used to choose the most suitable model between the random effects (REM) and fixed effects (FEM) models. The next chapter presents the empirical analysis findings since it associates panel data investigations to the carefully chosen registered banks in South Africa.

CHAPTER 6: DATA ANALYSIS AND DISCUSSION

6.1 INTRODUCTION

This chapter presents and discusses the findings of the research procedures covered in Chapter 5. The two-step system GMM approach was utilised to empirically assess the capital structure determinants, including earnings volatility, government borrowing, growth opportunity, and liquidity. Three measures of capital structure, total debt ratio, long-term debt ratio and short-term debt ratio, were put into perspective. Moreover, the determinants of the capital structure were tested empirically by regressing the different capital structure proxies against bank-specific and macroeconomic factors. The analysis focuses on the three main determinants of the capital structure of a bank's government borrowing, measured by total government debt, domestic government debt and foreign government debt; liquidity is measured by the BLMI, current ratio (CR) and liquidity coverage ratio, and earnings volatility.

This study's main aim was to test the earnings volatility empirically, government borrowing and liquidity on the capital structure of banks in South Africa. Numerous capital structure determinants have been studied theoretically and empirically, including profitability, asset tangibility, size, growth opportunities, debt tax shield, non-debt tax shield, and risk. As a result, two main hypotheses that address the factors described earlier are the trade-off theory proposed by Kraus and Litzernberger (1973) and the pecking order theory proposed by Myers and Majluf (1984). According to Kraus and Litzenberger (1973), the trade-off approach emphasises the proportion between the advantages of debt and costs when evaluating the firm's optimal capital structure. The pecking order theory postulates that knowledge asymmetry between managers and shareholders depresses the cost of capital (Myers & Majluf, 1984). Nevertheless, there seems to be unique features influencing firms' capital structure, including earnings volatility, government debt, growth opportunity and liquidity (Akkoyun, 2018; Barry, Diabate & Tarazi, 2018 & Demirci, Huang & Sialm, 2019). Therefore, this

study sought to investigate the effect of earnings volatility, government borrowing, and liquidity on the capital structure of banks in South Africa.

The chapter is organised as follows: Section 6.2 discusses the descriptive statistics of the investigated variables. Section 6.3 discusses the correlation analysis. Section 6.4 discusses estimation results; Section 6.5 discusses the summary of the results on the effect of earnings volatility on capital structure. Section 6.6 discusses the summary of the results on the effect of government borrowing on capital structure. Section 6.7 discusses the results of the effect of liquidity on the capital structure. Lastly, section 6.8 discusses the summary of the chapter.

6.2 Data and Descriptive Statistics

The study assesses the data sources and samples utilised throughout the ongoing investigation under this section. The following section discusses descriptive statistics.

6.2.1 Data

Much of the data in this study was obtained from SARB regarding macroeconomic variables and BA900 returns of South African registered banks. Each month, each bank's BA900 statement of financial position should be published with the central bank supervision division. Additional bank-specific data was obtained directly from the yearly financial statements of the banks examined in this study. The study utilised data from a sample of 11 registered banks in South Africa, as detailed in the methodology in Chapter 5, yet obtained from 2012 to 2021. Due to some bank's data availability constraints, the study used a short panel data analysis, and balance panel data was employed for the period under investigation.

6.2.2 Descriptive Statistics

The statistical results of variables utilised in the estimations for the complete sample of banks were considered in this section. The section covers the statistical results of the data obtained on the variables employed in this research data set. Three proxies of capital structure are used: total debt of debt ratio, long-term debt ratio, and short-term debt ratio. In addition, Table 6.1 summarises the descriptive statistics for the measures employed in this research.

Table 6.1: Summary of the descriptive statistics

Variables	Mean	Median	Maximum	Minimum	Std, Dev,	Skewness	Kurtosis	Jarque-Bera
TDR	2,19	0,92	145,70	0,56	13,81	10,34	108,00	52 493,33
LTDR	0,48	0,21	33,57	0,00	3,18	10,33	107,83	52 319,88
STDR	0,75	0,53	25,70	0,02	2,40	10,30	107,35	51 851,47
TGB (000 000)	2 537 683,00	2 355 385,00	4 230 630,00	1 334 110,00	916 717,60	0,53	2,11	8,74
LGB (000 000)	506 517,60	283 956,50	1 827 764,00	64 746,00	569 005,10	1,44	3,54	39,11
FGB (000 000)	2 031 165,00	2 038 478,00	2 602 757,00	1 202 942,00	459 239,90	-0,41	1,91	8,60
CR	1,38	1,41	2,56	0,01	0,27	-0,02	12,25	391,81
LCR	1,67	1,61	3,91	1,04	0,40	2,37	12,66	530,74
NSFR	0,24	0,29	0,50	0,01	0,12	-0,34	2,09	5,93
BLMI	-0,18	0,17	0,85	-39,61	3,80	-10,31	107,52	52 017,69
EV (000)	1 321 350,00	523 426,70	8 383 046,00	1 204,91	1 712 737,00	1,52	5,12	63,20
GO	0,81	0,09	78,85	-0,98	7,51	10,34	107,88	52 376,91
TOTAL ASSETS (000)	424 000 000,00	66 849 693,00	1 660 000 000,00	2 997 923,00	508 000 000,00	0,77	2,12	14,41
INF	4,60	4,70	5,60	3,10	0,85	-0,42	1,92	8,68
IR	3,89	3,71	5,89	2,31	1,09	0,39	2,27	5,26
GDPG	0,95	1,37	4,90	-6,43	2,77	-1,60	5,58	77,24

The mean for the bank's total debt ratio (TDR) capital structure measure was 2,19 for the period under review, demonstrating the average proportion of a bank's assets funded by deposits and non-deposit debts. The mean of TDR was lower than similar empirical studies regarding banks in developed countries; Gropp and Heider (2010) and da Gama, de Castro and Lopes (2021) have a mean for the bank book leverage of 64.10% and 91. 33%, respectively. Similarly, the mean for a bank's TDR as a proxy for capital structure is lower when compared to a similar empirical study regarding banks in South Africa by Sibindi (2017), who reported a mean for bank book leverage of 86.10%. The standard deviation was 13,1. The

minimum total debt ratio (TDR) was 0,56 while the maximum TDR was 145,70 resulting in a range of 145,14.

With regards to long-term debt (LTDR), it was observed that the average was 0,48, and the standard deviation was 3,18. The mean of LTDR of 0,48 was higher when compared to the empirical study by Anarfo (2015), who reported a mean of 12,52% regarding banks in sub-Sahara Africa. The minimum long-term debt ratio (LTDR) was 0,00; on the contrary, the maximum LTDRA was 33,57. The mean for the short-term debt ratio (STDR) was 0,75 and the standard deviation was 2,40. Similarly, the mean for STDR of 0,75 was the same as the empirical study by Anarfo (2015), which reported a mean of 74,76 concerning banks in sub-Sahara Africa. The minimum STDR was 0,02 while the maximum STDR was 25,70. This suggests that certain banks may keep as few as 2% of their obligations as short-term debt. On the contrary, banks may maintain as much as 26% of their liabilities as short-term debt.

The average total government borrowing (TGB) is reported as 2 537 683 000 000,00, while the standard deviation is 916 717,60. The minimum total government debt was 1 334 110 000 000,00. However, the maximum TGB was 4 230 630 000 000,00. The maximum percentage of TGB was 0.78 percent relative to GDP. So is as good as the country has borrowed about 78 percent of its GDP. Seventy-eight percent of TGB relative to GDP is high, compared to a similar study by Demirci, Huang and Sialm *et al*. (2019:340), who has a maximum of 73 percent of the TGB relative to GDP in 40 countries such as the European Monetary Union (EMU) and non-EMU countries. An increase in government debt supply might decrease investor demand for corporate debt compared to equity because government debt is a superior alternative for company debt to equity (Demirci et al.,2019). Therefore, firms might alter their capital structure and lessen their leverage.

According to the descriptive data, throughout the period under consideration, the mean of the local government borrowing (LGB) was 506 517 000 000,60. The mean of LGB was 20%. This implies that government borrows 20% from domestic companies. The 20% of LGB relative to GDP is lower compared to a similar study by Ahmad, Aamir and Umer (2020) with a mean of 39% relative to the GDP of non-financial firms in Pakistan. In contrast, the standard deviation of LGB was 569 005,00.

On the contrary, the minimum local government borrowing (LBG) was 64 746,00, and the maximum LGB was 1 827 764,00. The higher the local government borrowing, the more cost of debt in local banks. This means that an increase in local government borrowing leads to a crowding-out effect in South African banks.

The mean for foreign government borrowing (FGB) was 2 031 165 000 000,00. The mean of FGB was 80% relative to GDP. This means that government borrowing is about 80% in foreign markets. The 80% of FGB relative to GDP is higher than a study by (Demirci et al., 2019), which has a mean of 20 percent of FGB relative to GDP of firms in 40 countries such as the European Monetary Union (EMU) and non-EMU countries. In contrast, the standard deviation for the FGB was 459 239,90. However, the minimum foreign government borrowing (FGB) was 1 202 942,00, and the maximum FGB was 2 602 757 000 000,00. The higher the foreign government borrowing, the less cost of debt in local banks. This means an increase in the FGB leads to a crowding-in effect in South African banks.

The current ratio (CR) mean value was 1,32 as a liquidity proxy. This is lower than a similar empirical study of non-financial firms in the United Kingdom (UK), which is regarded as a developed country. Van den Berg (2020:41) reported a CR mean of 2,05. On the other hand, the standard was 0.27. A lower standard deviation level than the mean result suggests fewer changes in the liquidity variable data of the banks. The average amount indicates that the banks have a current ratio of 132%.

Conversely, the minimal current ratio (CR) of 0.01 implies that South African banks had the lowest current ratio of 1% during the study period. The maximum CR was 2,56, suggesting that banks can pay the short-term debt up to 256%. The greater the total current ratio, the fewer short-term obligations a bank has related to its current assets.

The average LCR was 1,67 during the evaluation period. Even when the financing gap was expected to be positive, the average LCR ratio revealed that banks kept a significant number of high-quality liquidity assets. On the contrary, other banks were risk-averse, holding higher than 333% HQLA after anticipating a negative imbalance in their financing structure. In contrast, Marozva and Makina (2017) argue that banks might retain many high-quality assets even though they expect a positive financing stance.

The mean value of the liquidity variable measured by BLMI was negative 0,18, which suggests that the banks are in poor condition liquidity-wise. No notable studies could be found on the effect of bank liquidity mismatch index and capital structure to compare the mean of this study with the mean value of other studies in developed, developing, and South Africa. On the other hand, the standard deviation was 3,80. The liquidity mismatch index measures the bank's funding and asset liquidity. The LMI evaluates the mismatch between asset market liquidity with liability funding liquidity (Bia et al., 2014). The greater the ratio, the better the bank; the lower the ratio, the weaker the bank becomes. The minimum BLMI was -39,61, while the maximum BLMI was 0,85.

Regarding earning volatility (EV), measured by the standard deviation of operating income to total assets, the mean value was 1 321 350 000,00, and the standard deviation was 1 712 737 000,00. This means South African banks' average profit before interest and tax growth rate over the study period was 1 321 350 000,00. On the contrary, the minimum value was 1 204 000,91, and the maximum value was 8 383 046 000,00.

The annual percentage growth rate of total assets was used to estimate the growth opportunity (GO), with a mean value of 0.81 percent. The mean value of GO of 0,81 percent is higher than a similar empirical study by Sheikh and Quresh (2016), who reported a mean of 20 percent of the growth rate of commercial banks in Pakistan. This means that the average growth rate over the study period was 0.81 percent. The standard deviation for growth opportunity was 7,51. This means that banks throughout South Africa have a better chance of growing with much less risk. At the same time, total asset growth for the analysis period ranged from -0,98 percent to 78,98 percent, translating to a range of 79,96. This demonstrates that the growth rates of South African banks vary significantly higher than when variation is looked at from the standard deviation perspective.

Bank size for the current research is measured by the logarithm of total assets for the bank firms. The mean value for the bank size (Total assets) was 424 0000 000 000,00, and the standard deviation was 508 000 000 000,00. The minimum value of the bank size was 2 997 923 000,00, and the maximum value was 1 660 000 000 000,00.

The average inflation rate (INF) was 4,60; the mean of INF was higher than similar empirical studies regarding banks in a developed country; Abbas and Masood (2020:593) have a mean of 1,92 percent. However, compared to a similar study in a developing country Assfaw (2020) has a mean of 12,77 percent for inflation. Assfaw (2020) studied the determinants of bank capital structure in Ethiopia. The standard deviation for the inflation rate (INF) was 0,85 during the period of this study. On the contrary, the minimum inflation rate (INF) was 3,10, and the maximum inflation rate (INF) was 5,60. Inflation demonstrates the country's economic capacity to maintain prices stable. A larger scale suggests consumer price uncertainty, which is especially harmful to impoverished people and small enterprises since they possess a hedging strategy against external shocks.

With regards to the interest rate, the mean was 3,89. The mean of IR was lower than similar empirical studies regarding banks in Sub-Sahara Africa by Anarfo (2015), who has a mean of 9,80 percent. The standard deviation of the interest rate (IR) was 1,09. The minimum interest rate (IR) was 2,31 and the maximum interest rate (IR) was 5,89. The tax benefit of debt leads companies to maintain higher debt, according to trade-off theory and Frank (2009). As a result, companies' capital structures should be modified to compensate for the financial distress and the high cost of borrowing. This argument highlights the positive relationship between interest rates and leverage.

The average rate of gross domestic product growth (GDPG) was observed at 0,95. In comparison, Abeysekara (2020) find a mean of 5,52 percent for the GDP growth rate in the Colombo Stock Exchange in Sri Lanka. Abeysekara (2020) studied the determinants of bank capital structure. On the contrary, in a similar study on banks in a developing country, Assfaw (2020) found a mean of 9,67 for the GDP. Assfaw (2020) studied the determinants of bank capital structure in Ethiopia. The standard deviation was 2,77. On the contrary, the minimum GDPG was -6,43, and the maximum GDPG was 4,90.

All the variables under investigation exhibit some degree of skewness and excess kurtosis. The Jarque Bera supports these results on the normal distribution test as the variables are not normally distributed. The following section discusses the correlations between the variables.

6.3 Correlation analysis

The correlation analysis portrays the correlations between dependent and independent variables utilised for the banking sector, as reported in Table 6.2.

Table 6.2: Correlation matrix for the variables

Correlation																
Probability	TDR	LTDR	STDR	TGB	LGB	FGB	CR	LCR	NSFR	BLMI	EV	GO	SIZE_TOTAL_ASSETS_	INF	IR	GDPG
TDR	1,0000															
LTDR	0,9996***	1,0000														
STDR	-0,0181	-0,0218	1,0000													
TGB	0,1783*	0,17578*	-0,0807	1,0000												
LGB	0,2239**	0,2214**	-0,0693	0,9137***	1,0000											
FGB	0,0785	0,0764	-0,0753	0,8640***	0,5849***	1,0000										
CR	0,0410	0,0604	-0,0350	-0,2282**	-0,2230**	-0,1791*	1,0000									
LCR	-0,0176	0,0042	-0,0769	-0,0587	-0,0232	-0,0884	0,7836***	1,0000								
NSFR	0,0205	0,0464	-0,2046**	0,0574	0,0571	0,0437	0,5858***	0,7432***	1,0000							
BLMI	0,0113	0,0150	-0,9980***	0,0867	0,0737	0,0817	0,0280	0,0761	0,2091**	1,0000						
EV	-0,0718	-0,0621	0,0301	0,1524	0,1335	0,1388	0,0766	0,1217	0,4599***	-0,0013	1,0000					
GO	-0,0101	-0,0065	-0,0280	-0,0592	-0,0767	-0,0232	0,0778	0,1183	0,1585*	0,0249	0,0201	1,0000				
SIZE_TOTAL_ASSETS_	-0,0757	-0,0643	-0,0705	0,1916**	0,1654*	0,1776*	-0,0241	0,0739	0,5436***	0,1006	0,4110***	-0,0103	1,0000			
INF	-0,1706*	-0,1697*	0,1171	-0,5521***	-0,5634***	-0,6311***	0,1697*	-0,0030*	-0,1031	-0,1213	-0,1271	0,0921	'-0,1572*	1,0000		
IR	-0,0121	-0,0113	-0,0265	0,0951	-0,1886**	0,4235***	-0,0079	-0,0347	0,0311	0,0324	0,1104	-0,0217	0,0287	-0,1348	1,0000	
GDPG	0,1371	0,1377	0,0220	-0,2781***	-0,1637*	-0,3524***	-0,0074	0,0239	-0,0071	-0,0184	0,0505	0,0124	-0,0646	0,1964**	0,2971***	1,0000

The total debt ratio (TDR) was positively correlated with the long-term debt ratio (LTDR), and the finding was highly significant. The total debt ratio (TDR) was also positively associated with total government borrowing (TGB), and the result was statistically significant. This implies that a decrease in total government borrowing will reduce the cost of bank debt resulting in the crowding-in effect. This is consistent with the crowding-in-effect theory (Saidjada & Jahan, 2018). The total debt ratio (TDR) was positive but significant correlated with the local government borrowing (LGB). On the contrary, the inflation rate (INF) was negatively but significantly correlated with the total debt ratio (TDR). The aforementioned result is aligned with Hortlund's (2005) assertion that it raises bank debt, resulting in a decrease in bank capital.

The long-term debt ratio (LTDR) was positively correlated with total government borrowing (TGB), which was significant. This means that a reduction in local government borrowing decreases the debt cost, leading to a crowding-in effect in

the long term. Similarly, the long-term debt ratio (LTDR) was positively associated with local government borrowing, and the finding was significant. A positive correlation is consistent with the crowding-in-effect theory. On the contrary, the inflation rate (INF) was negatively correlated with the long-term debt ratio (LTDR), and the finding was significant.

Concerning liquidity measures, the result shows a positive but significant correlation between net stable fund rate (NSFR) and short-term debt (STD). Similarly, the short-term debt (STD) was positively correlated with BLMI, which was significant. Since the correlation coefficients were less than 0,7, the potential multicollinearity problem was dismissed (Siddik, Kabiraj & Joghee, 2017). Moreover, all the independent variables to be used in the same equation were not highly correlated. Other variables were not discussed since their results were insignificant.

6.4 Econometric model estimation results, discussion and analysis

In this section, the study discusses the results of the determinants of capital structure in South African registered banks by regressing the capital structure (TDR_B, STDR and LTDR) against the determinants in the equations that were discussed in detail in Chapter 5. Several diagnostic tests were conducted before running the final models. These included the tests for joint validity of individual cross-sectional effects and the Breusch Pagan (1980) LM test for random effects and Hausman's (1978) specification test for heteroscedasticity and cross-sectional interdependence. The results from these tests are presented in Appendix 1 to Appendix 9. Some of the models exhibited a problem of cross-sectional interdependence and heteroskedasticity problems. The models were then run with Driscoll and Kraay Standard Errors (see, for example, Hoechle, 2007). Nevertheless, using fixed effects or random effects models will be inconsistent and biased as the model is dynamic.

The GMM was adopted instead of the other panel data models to address the possible problems of endogeneity and specification errors. The GMM was introduced by Holtz-Eakin, Newey, and Rosen (1988) and Arellano and Bond (1991) to address endogeneity and specification errors in panel data which other panel data models could not solve. The study, therefore, adopts the dynamic panel GMM estimator, which creates a matrix of internal instruments to capture the endogeneity of the lagged dependent variable and the independent variables of this study (see Arellano and Bond, 1991; Arellano and Bover, 1995; and Blundell and Bond, 1998). The GMM models in this study were not weakened by many instruments, as the number of banks in the panel is greater than the number of instruments used. Moreover, the models are deemed robust as Sargan, and Hansen statistics were not significant. There was no autocorrelation problem as the AR(1) and AR(2) were insignificant.

The findings of various estimating methods are offered for comparison and are part of the robust assessment of the primary model. As such, the detailed results are presented in tables 6.3-6.11. The relationship between capital structure and explanatory variables of bank-specific determinants; macroeconomic determinants was expressed quantitatively in questions 6.1 to 6.3 for empirical analysis. The relevant findings are shown in tables 6.3 to 6.11.

$$\Delta \mathrm{TDR}_{\mathrm{B}_{\mathrm{it}}} = (\alpha - 1)\,\Delta \mathrm{TDR}_{\mathrm{B}_{\mathrm{it-1}}} + \beta_1\,\Delta \mathrm{EV}_{\mathrm{it}} + \beta_2\,\Delta \mathrm{GO}_{\mathrm{it}} + \beta_3\,\Delta \mathrm{GOVB}_{\mathrm{it}} + \beta_4\,\Delta \mathrm{LIQ}_{\mathrm{it}} + \beta_5 \Delta \mathrm{Size}_{\mathrm{it}} + \beta_{\mathrm{j}} \sum_{j/t=1}^{n} \Delta X_{ij} + \Delta\,\varepsilon_{\mathrm{it}} \quad (6.1)$$

$$\Delta \mathrm{LTDR}_{\mathrm{B}_{\mathrm{it}}} = (\alpha - 1)\,\Delta \mathrm{LTDR}_{\mathrm{B}_{\mathrm{it-1}}} + \beta_1\,\Delta \mathrm{EV}_{\mathrm{it}} + \beta_2\,\Delta \mathrm{GO}_{\mathrm{it}} + \beta_3\,\Delta \mathrm{GOVB}_{\mathrm{it}} + \beta_4\,\Delta \mathrm{LIQ}_{\mathrm{it}} + \beta_5 \Delta \mathrm{Size}_{\mathrm{it}} + \beta_{\mathrm{j}} \sum_{j/t=1}^{n} \Delta X_{ij} + \Delta\,\varepsilon_{\mathrm{it}} \quad (6.2)$$

$$\Delta \mathrm{STDR}_{\mathrm{B}_{\mathrm{it}}} = (\alpha - 1)\,\Delta \mathrm{STDR}_{\mathrm{B}_{\mathrm{it-1}}} + \beta_1\,\Delta \mathrm{EV}_{\mathrm{it}} + \beta_2\,\Delta \mathrm{GO}_{\mathrm{it}} + \beta_3\,\Delta \mathrm{GOVB}_{\mathrm{it}} + \beta_4\,\Delta \mathrm{LIQ}_{\mathrm{it}} + \beta_5 \Delta \mathrm{Size}_{\mathrm{it}} + \beta_{\mathrm{j}} \sum_{j/t=1}^{n} \Delta X_{ij} + \Delta\,\varepsilon_{\mathrm{it}} \quad (6.3)$$

Since liquidity (LIQ) is proxied by BLMI, LCR and CR, these are permutated against the three government borrowing measures: TGB, LGB and FGB. The permutations result in nine outputs presented in tables 6.3 to 6.11.

Table 6.3: Determinant's capital structure: Effects of TGB and BLMI

Variables	2-Step System GMM TDR	2-Step System GMM LTDR	2-Step System GMM STDR
L.TDR	-0.622*		
	(0.254)		
L.LTDR		-0.603	
		(0.276)	
L.STDR			-1.090*
			(0.429)
EV	-4.500	-5.836	-4.635
	(2.850)	(3.638)	(2.949)
GO	-0.263	-0.345	-0.180
	(0.124)	(0.168)	(0.114)
TGB	80.16**	99.37**	91.22**
	(23.05)	(27.80)	(26.07)
BLMI	5.749**	7.227**	6.545**
	(1.751)	(2.047)	(1.639)
LSIZE	-107.0**	-133.4**	-123.6**
	(31.39)	(36.56)	(32.32)
GDPG	-0.323*	-0.426*	-0.340*
	(0.121)	(0.162)	(0.127)
IR	1.867	2.504	1.863*
	(0.865)	(1.192)	(0.755)
INF	2.497	3.250	2.048***
	(1.317)	(1.497)	(0.365)
COVID_19	2.379	3.445	1.679
	(2.767)	(3.505)	(2.254)
N	88	88	88
Groups	11	11	11
Instrument	9	9	9
AR(1)	-1.19	-0.19	-2.19
AR(2)	-0.66	-0.88	-0.87
Sargan Test	13.04	16.04	18.04
Hansen test	17.13	14.14	17.14

Driscoll and Kraay robust standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

$$\mathrm{TDR}_{\mathrm{B}_{\mathrm{it}}} = -0.622\mathrm{TDR}_{\mathrm{B}_{\mathrm{it-1}}} - 4.500\mathrm{EV}_{\mathrm{it}} - 0.263\ \mathrm{GO}_{\mathrm{it}} + 80.16\ \mathrm{TGB}_{\mathrm{it}} + 5.749\mathrm{BLMI}_{\mathrm{it}} - 107.0\mathrm{Size}_{\mathrm{it}} - 0.323\mathrm{GDPG}_{\mathrm{it}} - 1.867\mathrm{IR}_{\mathrm{it}} + 2.497\mathrm{INF}_{\mathrm{it}} - 2.379\mathrm{COVID\_19}_{\mathrm{it}}$$

$$\mathrm{LTDR}_{\mathrm{B}_{\mathrm{it}}} = -0.603\mathrm{LTDR}_{\mathrm{B}_{\mathrm{it-1}}} - 5.836\mathrm{EV}_{\mathrm{it}} - 0.345\ \mathrm{GO}_{\mathrm{i}} - 99.37\mathrm{TGB}_{\mathrm{it}} + 7.227\mathrm{BLMI}_{\mathrm{it}} - 133.4\mathrm{Size}_{\mathrm{it}} - 0.426\mathrm{GDPG}_{\mathrm{it}} + 2.504\mathrm{IR}_{\mathrm{it}} + 3.250\mathrm{INF}_{\mathrm{it}} + 3.445\mathrm{COVID\_19}_{\mathrm{it}}$$

$$\mathrm{STDR}_{\mathrm{B}_{\mathrm{it}}} = -1.090\mathrm{STDR}_{\mathrm{B}_{\mathrm{it-1}}} - 4.635\mathrm{EV}_{\mathrm{it}} - 0.180\mathrm{GO}_{\mathrm{it}} + 91.22\mathrm{TGB}_{\mathrm{it}} + 6.545\mathrm{BLMI}_{\mathrm{it}} - 123.6\mathrm{Size}_{\mathrm{it}} - 0.340\mathrm{GDPG}_{\mathrm{it}} + 1.863\mathrm{IR}_{\mathrm{it}} + 2.048\mathrm{INF}_{\mathrm{it}} - 1.679\mathrm{COVID\_19}_{\mathrm{it}}$$

Results from Table 6.3 showed a negative and significant relationship between total (TDR) and short-term debt ratio (STDR), and their lagged values. However, there is a negative but not significant relationship between the long-term debt ratio (LTDR) and its lagged value. The negative relationship between capital structure and its lagged value means the bank capital structure is negatively persistent. Descriptive statistics showed that, on average, banks are heavily geared; therefore, subsequently, they would thrive on lowering their debt ratios. The result is consistent with the earlier study by Gropp and Heider (2010), who found a negative yet significant effect on bank capital structure and its lagged values. However, the results are not consistent with the findings of Abbas and Masood (2020). They find a positive but significant association between bank capital structure and its lagged values in the USA.

There is a positive but significant relationship between total government borrowing (TGB) and capital structure. The results are contrary to the theory where the researcher thought that government borrowing would crowd out the local market. The more the government is borrowing, the higher the firms are leveraged. Saidjada and Jahan (2018) claim that, under the Keynesian paradigm, an increase in government spending could be favourable to private sector investment provided the government invests in infrastructure, and capacity-

building initiatives, particularly human resource development. These public initiatives guarantee private investment by increasing productivity and, as a result, causing a crowding-in effect (Saidjada & Jahan, 2018).

Similarly, there was a positive and significant relationship between BLMI and capital structure. The LMI assesses the misalignment of asset market liquidity and obligation funding liquidity (Bia et al., 2014). The larger the ratio, the stronger the bank; the lesser the ratio, the weaker it becomes. In the context of asset-liability mismatches, the theoretical and empirical finance literature has paid minimal attention to improving a liquidity proxy. Interestingly, no previous research has examined the impact of liquidity on capital structure in the context of asset-liability mismatches (Marozva, 2017; Bai et al., 2018; Marozva & Makina, 2020).

There was a negative and significant relationship between size and capital structure. The findings support the assumption of the pecking order hypothesis, which postulates that capital structure has a negative association. Since there is less asymmetrical information on the more prominent companies, the chances of undervaluation of the new equity issue are dropped, encouraging big companies to utilise equity financing (Assfaw, 2020). The findings, on the other hand, contradict the expectations of the trade-off hypothesis, which posits that the bigger the company, the higher the potential of issuing debt, resulting in a positive link between indebtedness and size. Large corporations have greater debt market credibility and a reduced likelihood of insolvency. As a result, their loan cost is reduced related to small, unfamiliar companies (Assfaw, 2020). This study contradicts the findings of Guizani (2020), who discovered a positive link between bank size and capital structure.

There was a negative but significant relationship between gross domestic product growth (GDPG) and capital structure. This implies that increased economic development stimulates banks to strengthen capital buffers rather than borrow (Guizani, 2020). The negative relationship is in line with the findings of

(Guizani, 2020), who found a negative link between GDP growth with conventional banks' capital structure.

Interest rates (IR) and short-term debt ratio (STDR) have a positive and significant relationship. The higher the interest rates, the higher the capital structure. A positive relationship between IR and STDR implies that companies borrow more short-term relative to long-term with the anticipation that interest rates will fall in the future. This argument resonates with the expectation theory. According to expectations theory, long-term interest rates ought to be equal to the sum of current and future short-term interest rates (Callaghan, 2019). As a result, the yield on a bond of a given duration should reflect the average of predicted short rates from now until maturity. The results are consistent with Mokhova and Zinecker's (2014) findings, who found a positive but significant link between interest rates and firms' short-term debt.

Contrary to the results of Muthee, Adudah and Ondigo (2016), who found a negative nexus between interest expense and the gearing ratio of firms. Similarly, a positive relationship between inflation and STDR might imply that companies borrow in the short-term relative to the long-term as inflation is sticky downs. Therefore, borrowing short-term is profitable. The results are consistent with Phooi M'ng, Rahman and Sannacy (2017), who found a positive but significant association between inflation rate and firm capital structure.

The result of determinants of capital structure and the effects of local government borrowing (LGB) and BLMI is indicated in Table 6.4.

Table 6.4: Determinant's capital structure: Effects of LGB and BLM

	2-Step System GMM TDR	2-Step System GMM LTDR	2-Step System GMM STDR
L.TDR	0.144		
	(0.191)		
L.LTDR		0.135	
		(0.327)	
L.STDR			4.151
			(2.484)
EV	12.64	10.56	-8.647
	(14.42)	(7.134)	(4.396)
GO	0.555	0.589	0.350
	(0.476)	(0.374)	(0.231)
LGB	10.99**	13.18**	8.862*
	(3.178)	(3.606)	(3.343)
BLMI	3.676*	4.298**	1.654*
	(1.576)	(1.349)	(0.737)
LSIZE	-75.07*	-85.68**	-32.50*
	(30.29)	(24.99)	(12.14)
GDPG	-0.234	-0.359*	-0.322*
	(0.129)	(0.129)	(0.105)
IR	1.243	2.259*	2.707**
	(1.660)	(1.017)	(0.698)
INF	0.616	1.477	1.532
	(1.995)	(1.122)	(0.992)
COVID_19	3.484	5.551	3.642
	(4.183)	(3.688)	(2.702)
N	88	88	88
Groups	11	11	11
Instrument	8	9	9
AR(1)	-0.66	-0.67	-1.61
AR(2)	-0.53	-0.50	-0.51
Sargan Test	1.71	9.51	2.04
Hansen test	0.00	0.52	1.46

Driscoll and Kraay robust standard errors in parentheses* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

$$\mathrm{TDR}_{\mathrm{B}_{\mathrm{it}}} = 0.144\mathrm{TDR}_{\mathrm{B}_{\mathrm{it-1}}} + 12.64\mathrm{EV}_{\mathrm{it}} + 0.555\mathrm{GO}_{\mathrm{it}} + 10.99\mathrm{LGB}_{\mathrm{it}} + 3.676\mathrm{BLMI}_{\mathrm{it}} + 75.07\mathrm{Size}_{\mathrm{it}} + 0.234\mathrm{GDPG}_{\mathrm{it}} + 1.243\mathrm{IR}_{\mathrm{it}} + 0.616\mathrm{INF}_{\mathrm{it}} + 3.484\mathrm{COVID\_19}_{\mathrm{it}}$$

$$\mathrm{LTDR}_{\mathrm{B}_{\mathrm{it}}} = 0.135\mathrm{LTDR}_{\mathrm{B}_{\mathrm{it-1}}} + 10.56\mathrm{EV}_{\mathrm{it}} + 0.589\mathrm{GO}_{\mathrm{it}} + 13.18\ \mathrm{LGB}_{\mathrm{it}} + 4.298\ \mathrm{BLMI}_{\mathrm{it}} + 85.68\mathrm{Size}_{\mathrm{it}} - 0.359\mathrm{GDPG}_{\mathrm{it}} - 2.259\mathrm{IR}_{\mathrm{it}} + 2.497\mathrm{INF}_{\mathrm{it}} + 5.551\mathrm{COVID\_19}_{\mathrm{it}}$$

$$\mathrm{STDR}_{\mathrm{B}_{\mathrm{it}}} = 4.151\mathrm{STDR}_{\mathrm{B}_{\mathrm{it-1}}} + 8.647\mathrm{EV}_{\mathrm{it}} + 0.350\mathrm{GO}_{\mathrm{it}} + 8.862\mathrm{LGB}_{\mathrm{it}} + 1.654\mathrm{BLMI}_{\mathrm{it}} - 32.50\mathrm{Size}_{\mathrm{it}} - 0.322\mathrm{GDPG}_{\mathrm{it}} + 2.707\mathrm{IR}_{\mathrm{it}} + 1.532\mathrm{INF}_{\mathrm{it}} + 3.642\mathrm{COVID\_19}_{\mathrm{it}}$$

There was a positive but significant relationship between local government borrowing (LGB) and all capital structure measures. The results are in line with those in Table 6.3. Theoretically, local government borrowing would crowd out the local market. The higher the provincial government is borrowing, the higher the companies are leveraged. This result is consistent with the findings of Laing, *et al*. (2017). They find that China's local government borrowing has a significant crowding-in effect on non-state-owned enterprises. Contrary to the recent findings of Zhang *et al*. (2022) showed a negative association between LGB and firm leverage. The results between BLMI, size, GDPG and capital structure are the same as in Table 6.3.

Table 6.5 shows the result of the determinants of capital structure and their effects on FGB and BLMI.

Table 6.5: Determinant's capital structure: Effects of FGB and BLMI

	2-Step System GMM TDR	2-Step System GMM LTDR	2-Step System GMM STDR
L.TDR	-0.320		
	(0.206)		
L.LTDR		12.98***	
		(2.643)	
L.STDR			0.0874
			(0.436)
EV	109.0*	-87.43*	-11.43*
	(40.09)	(33.18)	(4.990)
GO	2.639*	-0.709*	-0.221
	(1.005)	(0.272)	(0.111)
FGB	497.7*	194.0*	40.42***
	(193.1)	(78.94)	(7.53)
BLMI	10.59*	2.748**	0.857*
	(4.434)	(1.004)	(0.384)
LSIZE	212.3***	-23.34	-17.34*
	(8.38)	(16.46)	(6.899)
GDPG	-1.641*	0.464	0.110
	(0.651)	(0.270)	(0.125)
IR	-1.045	5.414*	0.0225
	(0.952)	(2.111)	(0.937)
INF	-11.49*	7.843*	0.177
	(4.247)	(3.086)	(0.987)
COVID_19	-25.48*	-14.14*	0.902
	(9.997)	(5.614)	(2.697)
N	88	88	88
Groups	11	11	11
Instrument	8	7	7
AR(1)	-0.43	-0.88	-1.53
AR(2)	-0.50	-0.63	-1.53
Sargan Test	0.24	3.49	2.35
Hansen test	0.29	0.00	3.55

Driscoll and Kraay robust standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

$$TDR_{B_{it}} = -0.320TDR_{B_{it-1}} + 109.0EV_{it} + 2.639GO_{it} + 497.7FGB_{it} + 10.59BLMI_{it} + 212.3Size_{it} - 1.641GDPG_{it} - 1.045IR_{it} - 11.49INF_{it} - 25.48COVID\_19_{it}$$

$$LTDR_{B_{it}} = 12.98LTDR_{B_{it-1}} - 87.43EV_{it} - 0.709GO_{it} + 194.0FGB_{it} + 2.748BLMI_{it} - 23.34Size_{it} + 0.464GDPG_{it} + 5.414IR_{it} + 7.843INF_{it} - 14.14COVID\_19_{it}$$

$$STDR_{B_{it}} = 0.0874STDR_{B_{it-1}} - 11.43EV_{it} - 0.221GO_{it} + 40.42FGB_{it} + 0.857BLMI_{it} - 17.34Size_{it} + 0.110GDPG_{it} + 0.0225IR_{it} + 0.177INF_{it} + 0.902COVID\_19_{it}$$

There is a negative but insignificant relationship between the total debt ratio (TDR) and its lagged value of TDR. However, there is a positive, insignificant relationship between the short-term debt ratio (STDR) and its lagged value of STDR. On the contrary, there is a positive but significant relationship between the long-term debt ratio (LTDR) and its lagged value of LTDR. The result is consistent with Aremu, EKPO, Mustapha and Adedoyin (2013), who found a positive but significant relationship between all bank capital structure measures.

There is a positive but significant between earnings volatility (EV) and capital structure measured as total debt ratio (TDR). This contradicts the prediction of the capital structure trade-off theory, which asserts that there is a negative link between earnings volatility and capital structure. According to this hypothesis, companies employ less debt to minimise costs of financial distress whenever earnings volatility is significant because greater volatility is associated with a greater likelihood of insolvency (Ghasemzadeh, Heydari & Mansoufar, 2021). However, there is a negative but significant link between earnings volatility (EV) and both capital structure measures, that is, long-term debt ratio (LTDR) and short-term debt ratio (STDR). The findings are consistent with the prediction of the trade-off theory of capital structure, which claims that there is a negative link between earnings volatility and capital structure. Hence, firms with predictable revenues might borrow more because of their capacity to achieve contractual

demands on time and reap tax benefits (Sheikh & Qureshi, 2017). When a company's earnings volatility rises, so do its leverage ratio.

Similarly, there was a positive but significant association between growth opportunity (GO) and capital structure measures that are TDR and STDR. The result is consistent with the pecking order theory, which postulates a positive relationship between growth opportunity and capital structure. This shows that the conventional banks with more investment opportunities increase their use of debt financing when internal funding is depleted (Guizani, 2020). This result is inconsistent with the finding of Jadah, Hasan and AL-Husainy (2021). The latter found a negative but significant relationship between growth opportunity and capital structure. However, a negative but insignificant relationship exists between GO and capital structure measured as a long-term debt ratio (LTDR).

A positive but significant relationship exists between FGB and capital structure. The greater the foreign government borrows, the more the firms are leveraged. The reason could be that an average of 80% of the total government borrowing is financed by foreign borrowing. This situation can result in a crowding-in effect as FGB does not crowd out a local market. Local companies can increase their gearing ratio if the FGB provides foreign currency liquidity. According to Saidjada and Jahan (2018), a rise in public investment can benefit capital funding if the government invests in facilities, and capacity-building initiatives, especially the advancement of human resources. These governmental initiatives guarantee private investment by increasing productivity, resulting in a crowding-in effect (Saidjada & Jahan, 2018).

On the contrary, there is a positive but significant association between BLMI and capital structure. According to Kamil, Haron and Ramly (2021), a rise in bank capital could lead to a drop in liquidity, allowing banks to remain in business while avoiding financial difficulties. However, the researcher could not find any study that investigated the BLMI and capital structure, especially in the banking sector in South Africa, to compare the results.

There was a positive yet significant relationship between size and capital structure measured as total debt ratio (TDR). The positive relationship is consistent with trade-off theory expectations which maintain big companies lend more because of the capacity to factors significantly affect and are thought to be too big to be unsuccessful (Sheikh & Qureshi, 2017). The result is consistent with the finding of Jadan *et al*. (2021), who found a positive relationship between bank size and capital structure. However, a negative but insignificant relationship exists between size and capital structure measured as long-term debt ratio (LTDR). Moreover, there was a negative link between size and capital structure measured as a short-term debt ratio (STDR). The results contradict the trade-off theory prediction, which postulates a positive association between size and capital structure.

Regarding the macroeconomic variable GDPG, there was a negative but significant association between GDPG and the capital structure measured by TDR. Guizani (2020) contends that unfavourable macroeconomic conditions can significantly modify a company's and bank's statement of financial position, restricting its access to capital markets. The result contradicts the trade-off theory that better economic growth is related more significant company's propensity to use debt to finance capital spending due to the higher tax benefits of debt funding (Guizani, 2020). However, the results contradict the prediction of the pecking order theory which indicates a positive effect on economic growth and capital structure (Guizani, 2020:6). Furthermore, the result is consistent with the study of Guizani (2020) who found a negative link between GDPG and conventional bank's capital structure. However, there was a positive but insignificant relationship between GDPG and capital structure measured with LTDR and STDR.

There was a negative but insignificant association between the interest rate (IR) and capital structure measured by TDR, yet a positive but no significant relationship between IR and capital structure measured by STDR. The result is

consistent with the trade-off theory prediction, which states a negative link between interest rate and capital structure (Karpavicius & Yu, 2017). The result is in line with the findings of Karpavicius and Yu (2017), who found a negative effect on interest rates with capital structure. However, a positive but significant relationship between the interest rate (IR) and capital structure is measured as the long-term debt ratio (LTDR).

Regarding the inflation rate as measured by the consumer price index (CPI), there was a negative but significant link between the inflation rate (INF) and capital structure measured by TDR. Its coefficient value is negative 11,49, which means that if inflation decreases by 1%, the book leverage will also reduce by 11,49%. The result is consistent with the finding of Khan, Bashir and Islam (2020:15), who found a negative association between inflation rate and capital structure.

Lastly, there was a negative yet significant relationship between COVID-19 and capital structure. According to Arianpoor and Tajdar (2022), when there is a lack of cash flow due to COVID-19 pandemic, the need for foreign money accelerates because practically all economic activity must be halted to prevent the disease from spreading. Consequently, the COVID-19 epidemic is detrimental to businesses, and they are asking for extra finances to address their liquidity constraints (Arianpoor &Tajdar, 2022). The result is consistent with the finding of Mohammad (2021). The latter found a negative association between COVID-19 and capital structure. On the contrary, there is a positive but no significant effect on the COVID-19 capital structure. This implies that the recent pandemic affected the capital structure.

Table 6.6 shows the result of the determinants of capital structure and their effects on TGB and current ratio (CR).

Table 6.6: Determinant's capital structure: Effects of TGB and CR

	2 Step System GMM	2 Step System GMM	2 Step System GMM
Variables	TDR	LTDR	STDR
L.TDR	1.690*		
	(0.315)		
L.LTDR		1.660*	
		(0.349)	
L.STDR			1.701**
			(0.324)
EV	16.54*	5.346	16.34*
	(6.148)	(3.823)	(6.107)
GO	0.190*	0.0711	0.196*
	(0.0764)	(0.0758)	(0.0859)
TGB	11.30	18.98	12.49
	(10.70)	(16.00)	(10.86)
CR	61.63***	57.67***	60.89***
	(2.15)	(5.12)	(1.95)
LSIZE	-1.648	1.121	-2.358
	(7.731)	(9.239)	(7.573)
GDPG	1.783***	1.574*	1.803***
	(0.300)	(0.294)	(0.302)
IR	-0.940	0.740	-1.120
	(0.733)	(0.706)	(0.788)
INF	2.441*	4.304*	2.158*
	(0.911)	(1.698)	(0.843)
COVID_19	7.620***	10.68***	6.831***
	(1.681)	(3.073)	(1.562)
N	88	88	88
Groups	11	11	11
Instrument	9	9	9
AR(1)	-1.29	-1.00	-1.28
AR(2)	-0.87	0.66	-0.92
Sargan Test	0.87	0.77	0.45
Hansen test	0.07	3.21	0.04

Driscoll and Kraay robust standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

$$\begin{aligned}\mathrm{TDR}_{\mathrm{B}_{\mathrm{it}}} = {} & 1.701\mathrm{TDR}_{\mathrm{B}_{\mathrm{it-1}}} + 16.34\mathrm{EV}_{\mathrm{it}} + 0.196\mathrm{GO}_{\mathrm{it}} + 11.30\mathrm{TGB}_{\mathrm{it}} - 61.63\mathrm{CR}_{\mathrm{it}} \\ & - 1.648\mathrm{Size}_{\mathrm{it}} + 1.783\mathrm{GDPG}_{\mathrm{it}} - 0.940\mathrm{IR}_{\mathrm{it}} + 2.441\mathrm{INF}_{\mathrm{it}} \\ & + 7.620\mathrm{COVID\_19}_{\mathrm{it}}\end{aligned}$$

$$\begin{aligned}\mathrm{LTDR}_{\mathrm{B}_{\mathrm{it}}} = {} & 1.660\mathrm{LTDR}_{\mathrm{B}_{\mathrm{it-1}}} + 5.346\mathrm{EV}_{\mathrm{it}} + 0.0711\mathrm{GO}_{\mathrm{it}} + 18.98\mathrm{TGB}_{\mathrm{it}} + 57.67\mathrm{CR}_{\mathrm{it}} \\ & + 1.121\mathrm{Size}_{\mathrm{it}} + 1.574\mathrm{GDPG}_{\mathrm{it}} + 0.740\mathrm{IR}_{\mathrm{it}} + 4.304\mathrm{INF}_{\mathrm{it}} \\ & + 10.68\mathrm{COVID\_19}_{\mathrm{it}}\end{aligned}$$

$$\begin{aligned}\mathrm{STDR}_{\mathrm{B}_{\mathrm{it}}} = {} & 0.0874\mathrm{STDR}_{\mathrm{B}_{\mathrm{it-1}}} - 11.43\mathrm{EV}_{\mathrm{it}} - 0.221\mathrm{GO}_{\mathrm{it}} + 12.49\mathrm{TGB}_{\mathrm{it}} + 60.89\mathrm{CR}_{\mathrm{it}} \\ & - 2.358\mathrm{Size}_{\mathrm{it}} + 1.803\mathrm{GDPG}_{\mathrm{it}} - 1.120\mathrm{IR}_{\mathrm{it}} + 2.158\mathrm{INF}_{\mathrm{it}} \\ & + 6.831\mathrm{COVID\_19}_{\mathrm{it}}\end{aligned}$$

There is a positive but significant relationship between TDR, LTDR and STDR and their lagged values of capital structure. Similarly, there is a positive yet significant association between EV and capital structure measured by TDR and STDR. The results are inconsistent with the prediction of the capital structure trade-off theory, which postulates that there is a negative connection between earnings volatility and capital structure. However, there is a positive but insignificant association between EV and capital structure measured by LTDR.

Moreover, there was a positive but significant relationship between GO and capital structure measured by TDR and STDR. The results are in line with the pecking order theory, which contends that there is a positive relationship between growth opportunity and capital structure. The results are inconsistent with those of Abeysekara (2020), who found a negative relationship between GO and bank capital structure. On the contrary, there was a positive but no significant relationship between capital structure as measured by LTDR. Furthermore, there is a positive but no significant relationship between TGB and all capital structure measures, namely TDR, LTDR and STDR. In addition, there is a negative but no significant association between the interest rate (IR) and capital structure as measured by TDR. However, there is a positive but no significant association between IR and capital structure measured by LTDR and STDR. Moreover, there is a negative but insignificant relationship between size and capital structure measured by TDR and STDR.

Regarding the current ratio as measured (CR) of liquidity, the results indicate a positive but significant relationship between CR and all capital structure measures. Rao, Joshi, and Khurana (2017) argued that corporations with higher liquid assets might need to increase their debt ratio to enhance corporate liquidity. The results are consistent with Rao et al.'s (2017) findings of a positive association between debt and current ratios.

Regarding the macroeconomic variable GDPG, there was a positive but significant association between GDPG and capital structure measures. The findings are consistent with the trade-off theory, which postulates that faster economic growth is associated with a more prominent company's propensity to utilise debt to fund capital spending. Due to the higher tax benefits of debt funding (Guizani, 2020). Similarly, the findings are consistent with the prediction of the pecking order hypothesis, which argues that economic growth and capital structure have a positive relationship (Guizani, 2020).

There was a positive but significant association between INF and all measures of capital structure. These results are contrary to Almanaseer's (2019) argument that during periods of high inflation, banks tighten their policies to avoid the impact of inflation on interest rates, therefore reducing their borrowing. Also, these results are inconsistent with the finding of Bilgin and Dinc (2019), who found a negative but significant association between INF and capital structure.

Lastly, there was a negative but significant association between COVID-19 and all capital structure measures. The findings resonate with those of Mohammad (2021), who discovered a negative relationship between COVID-19 and capital structure. This means that the pandemic had a negative impact on capital structure. Banks could have resorted to safer capital due to uncertainty.

Table 6.7 shows the result of the determinants of capital structure and their effects on LGB and current ratio (CR).

Table 6.7: Determinant's capital structure: Effects of LGB and CR

Variables	2 Step System GMM TDR	2 Step System GMM LTDR	2 Step System GMM STDR
L.TDR	0.704*		
	(0.313)		
L.LTDR		0.814*	
		(0.269)	
L.STDR			0.250
			(0.214)
EV	15.69*	18.08*	13.54*
	(5.667)	(8.129)	(5.889)
GO	0.273	0.363*	0.458*
	(0.136)	(0.128)	(0.207)
LGB	2.130	3.043	2.506
	(1.774)	(2.200)	(1.839)
CR	54.15*	66.53*	33.83*
	(18.68)	(27.03)	(12.23)
LSIZE	-1.251	-1.499	-7.137
	(3.183)	(4.049)	(4.461)
GDPG	0.651*	0.773*	0.503*
	(0.228)	(0.300)	(0.205)
IR	-0.482	-0.429	-1.373
	(0.496)	(0.638)	(0.872)
INF	2.295*	2.929*	0.0435
	(1.012)	(1.236)	(0.919)
COVID_19	7.835*	9.754	1.420
	(3.506)	(4.724)	(3.136)
N	88	88	88
Groups	11	11	11
Instrument	8	9	8
AR(1)	-1.56	-1.50	-0.80
AR(2)	-0.88	-0.63	-1.29
Sargan Test	0.37	0.64	2.26
Hansen test	0.59	0.29	0.81

Driscoll and Kraay robust standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

$$\begin{aligned}\mathrm{TDR}_{\mathrm{B}_{\mathrm{it}}} = {} & 0.704\mathrm{TDR}_{\mathrm{B}_{\mathrm{it-1}}} + 15.69\mathrm{EV}_{\mathrm{it}} + 0.273\mathrm{GO}_{\mathrm{it}} + 2.130\mathrm{LGB}_{\mathrm{it}} + 54.15\mathrm{CR}_{\mathrm{it}} \\ & - 1.251\mathrm{Size}_{\mathrm{it}} + 0.651\mathrm{GDPG}_{\mathrm{it}} - 0.482\mathrm{IR}_{\mathrm{it}} + 2.295\mathrm{INF}_{\mathrm{it}} \\ & + 7.835\mathrm{COVID\_19}_{\mathrm{it}}\end{aligned}$$

$$\begin{aligned}\mathrm{LTDR}_{\mathrm{B}_{\mathrm{it}}} = {} & 0.814\mathrm{LTDR}_{\mathrm{B}_{\mathrm{it-1}}} + 18.08\mathrm{EV}_{\mathrm{it}} + 0.363\mathrm{GO}_{\mathrm{it}} + 3.043\mathrm{LGB}_{\mathrm{it}} + 66.53\mathrm{CR}_{\mathrm{it}} \\ & - 1.499\mathrm{Size}_{\mathrm{it}} + 0.773\mathrm{GDPG}_{\mathrm{it}} - 0.429\mathrm{IR}_{\mathrm{it}} + 2.929\mathrm{INF}_{\mathrm{it}} \\ & + 9.754\mathrm{COVID\_19}_{\mathrm{it}}\end{aligned}$$

$$\begin{aligned}\mathrm{STDR}_{\mathrm{B}_{\mathrm{it}}} = {} & 0.250\mathrm{STDR}_{\mathrm{B}_{\mathrm{it-1}}} + 13.54\mathrm{EV}_{\mathrm{it}} + 0.458\mathrm{GO}_{\mathrm{it}} + 2.506\mathrm{LGB}_{\mathrm{it}} + 33.83\mathrm{CR}_{\mathrm{it}} \\ & - 7.137\mathrm{Size}_{\mathrm{it}} - 1.373\mathrm{GDPG}_{\mathrm{it}} - 1.373\mathrm{IR}_{\mathrm{it}} + 0.0435\mathrm{INF}_{\mathrm{it}} \\ & + 1.420\mathrm{COVID\_19}_{\mathrm{it}}\end{aligned}$$

There is a positive but significant association between TDR, LTDR and its legged values of TDR and LTDR. The findings are congruent with Aremu, EKPO, Mustapha, and Adedoyin (2013), who discovered a positive but not statistically significant association between all bank capital structure metrics. On the contrary, there is a positive but no significant relationship between STDR and its lagged value of STDR.

There was a positive but significant between EV, and all capital structure measures. The findings support the pecking order assumption that there is a positive relationship between EV and capital structure. However, the findings contradict the trading-off theory forecast that there is a negative relationship between EV and capital structure (Assfaw, 2020). The results are consistent with the conclusion of Assfaw (ibid), who found a positive but significant link between earnings volatility and bank capital structure.

With regards to growth opportunity (GO), there was a positive but significant association between GO capital structure measured by TDR, LDTR and SDTR. The findings support the pecking order theory, which maintains a positive association between development opportunity and capital structure. The findings

contradict the result of Abeysekara's (2020) that there is a negative link between GO and bank capital structure.

With regarding local government borrowing as a measure of government borrowing, there was a positive but insignificant association between LGB and all capital structure measures. On the contrary, there was a negative but insignificant link between size, interest rate (IR) and all capital structure measures. There was a positive but significant relationship between GDPG and all the capital structure measures. The results are similar to the results discussed in Table 6.6.

There is a positive but significant association between CR and capital structure measured by TDR, LTDR and STDR. Mayes (2019) claims that the greater the total ratio, the more likely a firm would be capable of paying its expenses. So, higher is preferable from the perspective of the creditor. Nevertheless, from an investor's perspective, this has not been the scenario. Because current assets often have a lesser projected yield than capital assets, investors should prefer that the bare minimum of the firm's capital is spent on current assets (Mayes, 2019). The findings are congruent with those of Rao *et al*. (2017). The latter discovered a positive relationship between financial leverage and the current ratio.

On the contrary, the inflation rate (INF) measured by the annual inflation rate revealed a positive connection between INF and capital structure measures by TDR and LTDR. Bilgin and Dinc (2019) argue that when inflation decreases, companies raise their debt level; nevertheless, companies decrease their debt level when inflation is high. The result is inconsistent with the finding of Almanaseer (2019), who found a negative association between INF and the capital structure of banks. However, there was a positive but insignificant association between INF and capital structure measured as the STDR.

With regards to COVID-19, there was a positive association between COVID-19 and capital structure measured as TDR. The result is inconsistent with the finding

of Mohammad (2021), who find a negative association between Covid-19 and capital structure. On the other hand, there was a positive but no significant relationship between COVID-19 and capital structure measured as LTDR and STDR.

Table 6.8: Determinant's capital structure: Effects of FGB and CR

	2 step System GMM	2 step System GMM	2 step System GMM
Variables	TDR	LTDR	STDR
L.TDR	1.048		
	(0.522)		
L.LTDR		0.646	
		(0.400)	
L.STDR			-6.863
			(3.376)
EV	2.251	4.545	14.13*
	(4.294)	(3.727)	(5.295)
GO	-0.158	-0.0682	0.183*
	(0.143)	(0.139)	(0.0827)
FGB	66.70	57.26	-41.87*
	(46.37)	(37.78)	(18.51)
CR	75.16*	71.71**	42.42*
	(30.96)	(22.27)	(13.76)
LSIZE	-6.453	-4.714	-5.293
	(10.29)	(10.74)	(6.347)
GDPG	1.177	1.147	0.485
	(0.619)	(0.562)	(0.224)
IR	-0.692	-1.253	-1.683
	(1.202)	(1.715)	(1.206)
INF	4.787*	3.511**	-4.593
	(1.737)	(0.929)	(2.636)
COVID_19	13.66**	10.62**	-1.379
	(4.238)	(2.959)	(2.992)
N	88	88	88
Groups	11	11	11
Instruments	9	8	10

AR(1)	-1.23	-1.88	-0.62
AR(2)	-0.99	-0.96	-077
Sargan Test	16.40	8.02	0.03
Hansen test	1.63	0.17	0.13

Driscoll and Kraay robust standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

$$\begin{aligned}\mathrm{TDR}_{\mathrm{B}_{\mathrm{it}}} = {} & 1.048\mathrm{TDR}_{\mathrm{B}_{\mathrm{it-1}}} + 2.251\mathrm{EV}_{\mathrm{it}} - 0.158\ \mathrm{GO}_{\mathrm{it}} + 66.70\mathrm{FGB}_{\mathrm{it}} + 75.16\mathrm{CR}_{\mathrm{it}} \\ & - 6.453\mathrm{Size}_{\mathrm{it}} + 1.177\mathrm{GDPG}_{\mathrm{it}} - 0.692\mathrm{IR}_{\mathrm{it}} + 4.787\mathrm{INF}_{\mathrm{it}} \\ & + 13.66\mathrm{COVID\_19}_{\mathrm{it}}\end{aligned}$$

$$\begin{aligned}\mathrm{LTDR}_{\mathrm{B}_{\mathrm{it}}} = {} & 0.646\mathrm{LTDR}_{\mathrm{B}_{\mathrm{it-1}}} + 4.545\mathrm{EV}_{\mathrm{it}} + -0.0682\mathrm{GO}_{\mathrm{it}} + 57.26\mathrm{FGB}_{\mathrm{it}} + 71.71\mathrm{CR}_{\mathrm{it}} \\ & - 4.714\mathrm{Size}_{\mathrm{it}} + 1.147\mathrm{GDPG}_{\mathrm{it}} - 1.253\mathrm{IR}_{\mathrm{it}} + 3.511\mathrm{INF}_{\mathrm{it}} \\ & + 10.62\mathrm{COVID\_19}_{\mathrm{it}}\end{aligned}$$

$$\begin{aligned}\mathrm{STDR}_{\mathrm{B}_{\mathrm{it}}} = {} & -6.863\mathrm{STDR}_{\mathrm{B}_{\mathrm{it-1}}} + 14.13\mathrm{EV}_{\mathrm{it}} + 0.183\mathrm{GO}_{\mathrm{it}} - 41.87\mathrm{FGB}_{\mathrm{it}} + 42.42\mathrm{CR}_{\mathrm{it}} \\ & - 5.293\mathrm{Size}_{\mathrm{it}} + 0.485\mathrm{GDPG}_{\mathrm{it}} - 1.683\mathrm{IR}_{\mathrm{it}} - 4.593\mathrm{INF}_{\mathrm{it}} \\ & - 1.379\mathrm{COVID\_19}_{\mathrm{it}}\end{aligned}$$

Table 6.8 shows a positive but insignificant relationship between TDR and LTDR, and it is lagged at the values of capital structure. However, there is a negative but insignificant relationship between STDR and its lagged capital structure values. Similarly, there is an insignificant relationship between size, GDPG, IR and COVID-19 with capital structure.

There was a positive but no significant association between EV and capital structure measured by TDR and LTDR. On the contrary, there is a positive but significant link between EV and capital structure measured by STDR. The results support the pecking order hypothesis that EV with capital structure has a positive relationship. Yet, the result contradicts the trading-off theory prediction that EV and capital structure have a negative association (Assfaw, 2020).

On the contrary, there is a negative but no significant association between GO and capital structure as measured by TDR and LTDR. However, the study indicates a positive but significant link between GO and capital structure measured by STDR. Guizani (2020) argues that when internal funds are low, banks with more investment options enhance their usage of debt funding. The result is in line with the prediction of the pecking order theory, which postulates

that there is a positive association between GO and capital structure (Myers & Majluf,1984). The findings contradict Abeysekara's (2020) claim of a negative link between GO and bank capital structure.

Similarly, there was a negative and significant association between FGB and capital structure measured by STDR. This implies that since there is a foreign currency that the government has borrowed, the private sector now borrows short-term to buy the cheap foreign currency the government would have borrowed to sustain the exchange. The results are consistent with Demirci et al. (2019), who found a negative but significant connection between FGB and capital structure. However, this study revealed a negative but significant link between FGB and STDR.

The current ratio and the results are similar to those in Table 6.7. There is a positive and significant association between CR and all capital structure measures. Regarding the inflation rate (INF), there is a positive but significant association between INF and capital structure measured by TDR and LDTR. Anarfo (2015) argues that when banks can predict the degree of the rate, they can alter their interest rate and improve their burden of spending. Nevertheless, because central banks track inflation and modify interest rates in response to its development, more excellent inflation rates will result in higher interest rates, causing banks to borrow less and raise their level of equity (Smaoui, Salah & Diallo, 2019). The findings contradict those of Almanaseer (2019), who discovered a negative association between INF on bank capital structure. However, there is a negative but insignificant relationship between INF and capital structure measured by STDR.

On the contrary, there was a positive association between COVID-19 and capital structure as measured by TDR and LTDR. The result is not consistent with the finding of Mohammad (2021), who find a negative link between COVID-19 and capital structure. However, there was a negative but insignificant connection between COVID-19 and capital structure as to STDR.

Table 6.9 indicates the result of the determinants of capital structure and their effects on TGB and liquidity coverage ratio (LCR).

Table 6.9: Determinant's capital structure: Effects of TGB and LCR

	2 step System GMM TDR	2 step System GMM LTDR	2 step System GMM STDR
L.TDR	-0.780***		
	(0.188)		
L.LTDR		-0.440*	
		(0.200)	
L.STDR			-1.031*
			(0.492)
EV	-16.95***	-23.00**	-17.34**
	(4.226)	(7.272)	(6.520)
GO	-0.214	-0.161	-0.929*
	(0.108)	(0.128)	(0.437)
TGB	2.324	36.19**	-191.7*
	(5.183)	(13.80)	(94.55)
LCR	13.89*	-17.67	46.77
	(5.651)	(14.24)	(34.07)
LSIZE	1.942	-4.099	76.79*
	(3.861)	(4.342)	(36.43)
GDPG	-0.381***	-0.0734*	-4.543*
	(0.038)	(0.035)	(2.224)
IR	4.134*	-0.207	19.82*
	(1.513)	(1.783)	(9.539)
INF	3.523*	-1.631	24.89*
	(1.420)	(2.723)	(12.70)
COVID_19	10.74*	-9.332	105.9*
	(4.052)	(8.180)	(52.27)
_cons	17.87		
	(28.81)		
N	99	88	88
Groups	11	11	11
Instrument	10	10	10
AR(1)	-1.42	-0.32	-1.22
AR(2)	-1.56	-1.44	-0.79

Sargan Test	0.88	30.57	14.63
Hansen test	0.00	0.85	4.01

Driscoll and Kraay robust standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

$$\mathrm{TDR_{B_{it}}} = -0.780\mathrm{TDR_{B_{it-1}}} - 16.951\mathrm{EV_{it}} - 0.214\mathrm{GO_{it}} + 2.324\mathrm{TGB_{it}} + 13.89\mathrm{LCR_{it}} + 1.942\mathrm{Size_{it}} - 0.381\mathrm{GDPG_{it}} + 4.134\mathrm{IR_{it}} + 3.523\mathrm{NF_{it}} + 10.74\mathrm{COVID\_19_{it}}$$

$$\mathrm{LTDR_{B_{it}}} = -0.440\mathrm{LTDR_{B_{it-1}}} - 23.00\mathrm{EV_{it}} - 0.161\mathrm{GO_{it}} + 36.19\mathrm{TGB_{it}} + 46.77\mathrm{LCR_{it}} - 4.099\mathrm{Size_{it}} - 0.0734\mathrm{GDPG_{it}} - 0.207\mathrm{IR} - 1.631\mathrm{INF_{it}} - 9.332\mathrm{COVID\_19_{it}}$$

$$\mathrm{STDR_{B_{it}}} = -1.031\mathrm{STDR_{B_{it-1}}} - 17.34\mathrm{EV_{it}} - 0.929\mathrm{GO_{it}} - 191.7\mathrm{TGB_{it}} + 46.77\mathrm{LCR_{it}} + 76.79\mathrm{Size_{it}} - 4.543\mathrm{GDPG_{it}} + 19.82\mathrm{IR_{it}} + 24.89\mathrm{INF_{it}} + 105.9\mathrm{COVID\_19_{it}}$$

There is a negative but significant association between TDR, LTDR and STDR and their legged values of TDR, LTDR and STDR. The findings are inconsistent with Aremu *et al*. (2013), who revealed a positive but not statistically significant link between all bank capital structure measures. On the contrary, there is a negative but significant association between EV and capital structure measured by TDR, LTDR, and STDR. This indicates that when earnings volatility is significant, firms are generally incapable of issuing debt or stock since banks and investors are reluctant to put their funds in a company with a substantial chance of failure or insolvency (Moradi & Paulet, 2019). The findings support the trade-off theory's assumption that there is a negative relationship between earnings volatility and capital structure (Assfaw, 2020). The findings contradict Assfaw's (ibid) conclusion of a positive but not statistically significant link between earnings volatility and bank capital structure.

There was a negative but insignificant relationship between GO and capital structure measured by TDR and LTDR. On the contrary, there is a negative but significant link between GO and capital structure measured by STDR. The finding

supports the trade-off theory as a framework, which claims that more excellent a company's growth entails more significant financial distress expenditures (Saif-Alyousfi, MD-Rus, Taufil-Mohd Taib & Shahar, 2020). Nevertheless, the outcome contradicts the pecking order theory, which postulates that companies with significant growth potential have access to external financing to fulfil their capital expenditure needs (Myers & Majluf,1984). The results are consistent with those of Gropp and Heider (2010) and Sheikh and Qureshi (2017), who revealed a negative association with debt ratio. However, this is inconsistent with the finding of Khan et al. (2020), who found a positive effect on GO and the capital structure of banks.

With regards to total government borrowing, the study found a positive but no significant association between TGB and capital structure measured by TDR. Similarly, the study indicates a positive but significant relationship between TGB and capital structure measured by LTDR. The findings contradict the researcher's hypothesis that anticipated government borrowing would crowd out the domestic market. The more the government borrows, the more leveraged the companies become. On the contrary, the study revealed a negative but significant link between TGB and capital structure measured by STDR. The result is consistent with the researcher's hypothesis that anticipated government borrowing would crowd out the domestic market. The more the government borrows, the more leveraged the companies become. The result is consistent with the finding of Ayturk (2017), who revealed that government borrowing has a negative effect on investment.

A positive but significant relationship exists between LCR and capital structure measured by TDR. However, there is a negative but insignificant association between LCR and capital structure measured by LTDR. Yet, there is a positive but insignificant link between LCR and capital structure measured by STDR.

As far as the control variable was concerned, the study found a positive but no significant connection between size and capital structure measured by TDR. Yet,

a negative but insignificant association between size and capital structure as measured by LTDR. On the contrary, the study revealed a positive but significant relationship between capital structure measured by STDR. A unit upsurge in bank size enhances the short-term debt ratio (STDR) by 0.77. Other factors are equal, larger banks in terms of total asset utilisation with short-term debt in their capital structure than small banks (Ali, 2019). The positive relationship is aligned with trade-off theory predictions, which hold that large organisations spend more since they have the potential to influence critical factors and are perceived to be too large to fail (Sheikh & Qureshi, 2017). The results are consistent with the findings of Gropp and Heider (2010) and Sibindi and Makina (2018) who found a positive relationship between bank size and capital structure. However, the result contradicts the findings of Abeysekara (2020), who showed a negative association between bank size and capital structure.

Regarding GDPG as measured by the annual growth rate, the study found a negative but significant relationship between capital structure measured by TDR, LTDR and STDR. Guizani (2020) acentuates that adverse economic indicators can drastically alter a company's and bank's statement of financial position, limiting sources of financing. The findings contradict the trade-off theory, which indicates that enterprises in a rapidly rising economy may confront financial difficulties and the problem of debt overhang (Demirguc-Kunt & Maksimovic, 1996). The study's findings also contradict the pecking order theory's prediction of a positive relationship between growth rate and capital structure (Guizani, 2020). The results align with the finding of Abeysekara (2020), who found a negative nexus between economic growth and capital structure.

There is a positive but significant relationship between IR and capital structure measured by TDR and STDR. This implies that an increased IR increases the TDR and STDR by 0,04134 and 0,1982. The result contradicts the trade-off theory prediction, which indicates a negative link between interest rates and capital structure (Karpavicius & Yu, 2017). The finding is inconsistent with the

result of Karpavicius and Yu (2017), who found a negative influence on interest rates with capital structure. However, the study revealed a negative but insignificant association between IR and capital structure measured by LTDR.

Concerning INF, the study shows a positive but significant link between capital structure as measured by TDR and STDR. A positive coefficient in inflation rates raises the TDR and STDR by 0.04 and 0.25 , respectively. Ali (2019) argues that when inflation is high, companies' debt rises; yet, while the cost of debt increases with inflation, the rate of return after tax remains more significant than the cost of debt. An increase in inflation stimulates the need for banking services from investment account holders to receive more substantial interest, which assists in balancing the effect of inflation (Rosli, 2017). The results are consistent with the trade-off theory, which indicates a positive association between inflation and capital structure (Ali,2019). The results are inconsistent with those of Almanaseer (2019), who found a negative link between INF on bank capital structure. However, a negative but insignificant association between INF and capital structure as measured by LTDR.

Lastly, the study indicates a positive but significant association between COVID-19 and capital structure measured by TDR and STDR. The findings are inconsistent with the result of Mohammad (2021), who shows a negative connection between COVID-19 and capital structure. However, a negative yet insignificant association between COVID-19 and capital structure as measured by LTDR.

Table 6.10 indicates the result of the determinants of capital structure and their effects on LGB and liquidity coverage ratio (LCR).

Table 6.10: Determinant's capital structure: Effects of LGB and LCR

	2 step System GMM TDR	2 step System GMM LTDR	2 step System GMM STDR
L.TDR	-2.619		
	(1.424)		
L.LTDR		-2.054	
		(1.861)	
L.STDR			-2.798
			(2.334)
EV	-22.32*	-25.46	-5.581
	(8.041)	(14.64)	(4.532)
GO	1.875*	0.678	-0.917
	(0.809)	(0.361)	(0.562)
LGB	29.97*	14.81*	-8.338
	(12.28)	(7.484)	(6.816)
LCR	-109.8*	-63.61	35.86*
	(46.15)	(32.84)	(15.08)
LSIZE	-45.65*	-17.61**	19.02
	(20.13)	(6.816)	(12.83)
GDPG	0.0937	-0.156	-0.179
	(0.121)	(0.105)	(0.193)
IR	-5.436	-0.681	3.302*
	(2.862)	(0.901)	(1.549)
INF	-13.99	-6.224*	5.646*
	(6.364)	(3.043)	(2.226)
COVID_19	-43.91*	-18.23	17.14*
	(19.53)	(9.331)	(7.775)
_cons	620.5*	357.0*	
	(252.3)	(143.3)	
N	99	99	88
Groups	11	11	11
Instrument	9	10	10
AR(1)	-0.62	-0,66	-0.47
AR(2)	-0.66	-0.44	-0.53
Sargan Test	56.74	0.02	0.88
Hansen test			

	0.00	0.01	1.63

Driscoll and Kraay robust standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

$$\begin{aligned}\mathrm{TDR}_{\mathrm{B}_{\mathrm{it}}} = &-2.619\mathrm{TDR}_{\mathrm{B}_{\mathrm{it-1}}} - 22.32\mathrm{EV}_{\mathrm{it}} - 1.875\mathrm{GO}_{\mathrm{it}} + 29.97\mathrm{LGB}_{\mathrm{it}} - 109.8\mathrm{LCR}_{\mathrm{it}} \\ &- 45.65\mathrm{Size}_{\mathrm{it}} + 0.0937\mathrm{GDPG}_{\mathrm{it}} - 5.436\mathrm{IR}_{\mathrm{it}} - 13.99\mathrm{INF}_{\mathrm{it}} \\ &- 43.91\mathrm{COVID\_19}_{\mathrm{it}}\end{aligned}$$

$$\begin{aligned}\mathrm{LTDR}_{\mathrm{B}_{\mathrm{it}}} = &-2.054\mathrm{LTDR}_{\mathrm{B}_{\mathrm{it-1}}} - 25.46\mathrm{EV}_{\mathrm{it}} + 0.678\mathrm{GO}_{\mathrm{it}} + 14.81\mathrm{LGB}_{\mathrm{it}} \\ &- 63.61\mathrm{LCR}_{\mathrm{it}} - 17.61\mathrm{Size}_{\mathrm{it}} - 0.156\mathrm{GDPG}_{\mathrm{it}} - 0.681\mathrm{IR} - 6.224\mathrm{INF}_{\mathrm{it}} \\ &- 18.23\mathrm{COVID\_19}_{\mathrm{it}}\end{aligned}$$

$$\begin{aligned}\mathrm{STDR}_{\mathrm{B}_{\mathrm{it}}} = &-2.798\mathrm{STDR}_{\mathrm{B}_{\mathrm{it-1}}} - 5.581\mathrm{EV}_{\mathrm{it}} - 0.917\mathrm{GO}_{\mathrm{it}} - 8.338\mathrm{LGB}_{\mathrm{it}} \\ &+ 35.86\mathrm{LCR}_{\mathrm{it}} + 19.02\mathrm{Size}_{\mathrm{it}} - 0.179\mathrm{GDPG}_{\mathrm{it}} + 3.302\mathrm{IR}_{\mathrm{it}} \\ &+ 5.646\mathrm{INF}_{\mathrm{it}} + 17.14\mathrm{COVID\_19}_{\mathrm{it}}\end{aligned}$$

The study revealed a negative but insignificant association between TDR, LTDR and STDR and its legged values of TDR, LTDR and STDR. The study also indicated a positive but insignificant connection between GDPG and the capital structure measured by TDR. However, there is a negative but insignificant relationship between GDPG and capital structure measured by LTDR and STDR.

As measured by TDR, there is a negative but significant relationship between EV and capital structure. The results align with the trade-off theory, which indicates a negative link between EV and capital structure. Companies with volatile earnings could reduce their lending ability since, by issuing debt, the company formally commits to making borrowing obligations (Khan et al., 2020). As a result, if the company's earnings are still unreliable, such expenditures may cause financial difficulties. However, the findings are inconsistent with Sheikh and Qureshi (2017) and Khan et al. (2020) on bank capital structure, who found a positive relationship between EV and capital structure. Yet, there is a negative but insignificant association between EV and capital structure measured by LTDR and STDR.

On the contrary, there is a positive but significant link between GO and capital structure as measured by TDR. The findings support the pecking order theory's

prediction of a positive relationship between GO and leverage (Myers & Majluf, 1984). The results, however, contradict the trade-off theory, which asserts that there is a negative relationship between GO and leverage (Assfaw, 2020). Moreover, the findings are consistent with the results of Assfaw (2020), who found a positive but significant association with the bank capital structure. However, there is a positive but insignificant association between GO and capital structure measured by LTDR. Yet, a negative but insignificant relationship exists between GO and capital structure measured by STDR.

There is a positive but significant association between LGB and capital structure measured by TDR and LTDR. The findings contradict the researcher's hypothesis that government borrowing would crowd out the domestic market. The greater the government's borrowing, the more leveraged the corporations become. The results are contradictory to the results of Ahmad, Aamir and Quddoos (2020), Demirci et al. (2019), and Ayturj (2017), who found a negative link between LGB and capital structure. However, a negative but insignificant relationship exists between LGB and capital structure measured by STDR.

With regard to liquidity measured by LCR, the study found a negative but significant relationship between LCR and capital structure measured by TDR. On the contrary, the study shows a positive but significant association between LCR and capital structure measured by STDR. Yet, there is a negative but insignificant association between LCR and capital structure measured by LTDR.

The study revealed a negative but significant nexus between size and capital structure measured by TDR and LTDR. The results contradict the proposition of the trade-off theory, which contends that as a firm grows in size, it can broaden its lines of activity and be less vulnerable to financial distress, inducing it to issue additional borrowing to benefit from the tax benefits of borrowed funds (Assfaw, 2020). The findings contrast Abeysekara's (2020) results, which found a negative

effect on bank size and capital structure. However, a positive but insignificant relationship between size and capital structure as measured by STDR.

The study shows a negative but insignificant relationship between IR and capital structure measured by TDR and LTDR. On the contrary, the study revealed a positive but significant association between IR and capital structure measured by LTDR. This means that an increased interest rate increases the STDR by 0,03302. The findings do not align with the trade-off theory assumption of a negative nexus between interest rate and leverage (Karpavicius & Yu, 2017).

Regarding inflation, there is a negative but insignificant association between INF and capital structure measured by TDR and LTDR. However, there is a positive but significant link between INF and capital structure measured by STDR. Lastly, there was a negative but significant relationship between COVID-19 and capital structure measured by TDR. Yet, there was a positive but significant link between COVID-19 and capital structure measured by STDR. The results correlate with Mohammad's (2021) findings, which reveal a negative nexus between COVID-19 and capital structure. At the same time, the study showed a negative but insignificant association between COVID-19 and capital structure measured by LTDR.

Table 6.11: shows the result of the determinants of capital structure and their effects on FGB and LCR.

Table 6.11: Determinant's capital structure: Effects of FGB and LCR

	2 step System GMM TDR	2 step System GMM LTDR	2 step System GMM STDR
L.TDR	-0.783		
	(1.084)		
L.LTDR		-2.745*	
		(1.295)	
L.STDR			0.956
			(0.698)
EV	-16.93**	-26.49**	-47.99*
	(5.616)	(8.504)	(19.39)
GO	-0.227*	-0.451**	-0.904*
	(0.0943)	(0.162)	(0.427)
FGB	4.246	74.83*	88.91*
	(9.055)	(29.73)	(44.66)
LCR	14.18**	-48.35*	-27.87
	(5.269)	(19.92)	(22.59)
LSIZE	1.860	-7.615	-1.505
	(3.611)	(5.832)	(9.815)
GDPG	-0.351*	0.597	0.318
	(0.149)	(0.315)	(0.317)
IR	4.009**	-4.597	-0.664
	(1.421)	(2.537)	(2.208)
INF	3.489**	-6.688*	-3.207
	(1.263)	(3.370)	(3.866)
COVID_19	10.82**	-18.24*	-8.772
	(3.680)	(8.952)	(9.999)
_cons	6.606	-110.4	-224.7
	(45.80)	(66.86)	(128.5)
N	99	99	99
Groups	11	11	11
Instrument	10	10	10
AR(1)	-1.44	-0.21	-.1.16
AR(2)	-1.68	-1.39	-1.35

Sargan Test	51.76	0.76	3.04
Hansen test	0.00	0.00	0.00

Driscoll and Kraay robust standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

$$\mathrm{TDR}_{\mathrm{B}_{\mathrm{it}}} = -0.783\mathrm{TDR}_{\mathrm{B}_{\mathrm{it-1}}} - 16.93\mathrm{EV}_{\mathrm{it}} - 0.227\mathrm{GO}_{\mathrm{it}} + 4.246\mathrm{FGB}_{\mathrm{it}} + 14.18\mathrm{FCR}_{\mathrm{it}} + 1.860\mathrm{Size}_{\mathrm{it}} - 0.351\ \mathrm{GDPG}_{\mathrm{it}} + 4.009\mathrm{IR}_{\mathrm{it}} + 3.489\mathrm{INF}_{\mathrm{it}} + 10.82\mathrm{COVID\_19}_{\mathrm{it}}$$

$$\mathrm{LTDR}_{\mathrm{B}_{\mathrm{it}}} = -2.745\mathrm{LTDR}_{\mathrm{B}_{\mathrm{it-1}}} - 26.49\mathrm{EV}_{\mathrm{it}} - 0.451\mathrm{GO}_{\mathrm{it}} + 74.83\mathrm{FGB}_{\mathrm{it}} - 27.87\mathrm{LCR}_{\mathrm{it}} - 7.615\mathrm{Size}_{\mathrm{it}} + 0.597\mathrm{GDPG}_{\mathrm{it}} - 4.597\mathrm{IR} - 6.688\mathrm{INF}_{\mathrm{it}} - 18.24\mathrm{COVID\_19}_{\mathrm{it}}$$

$$\mathrm{STDR}_{\mathrm{B}_{\mathrm{it}}} = 0.956\mathrm{STDR}_{\mathrm{B}_{\mathrm{it-1}}} - 47.99\mathrm{EV}_{\mathrm{it}} - 0.904\mathrm{GO}_{\mathrm{it}} + 88.91\mathrm{FGB}_{\mathrm{it}} + 35.86\mathrm{LCR}_{\mathrm{it}} - 1.505\mathrm{Size}_{\mathrm{it}} + 0.318\mathrm{GDPG}_{\mathrm{it}} - 0.664\mathrm{IR}_{\mathrm{it}} - 3.207\ \mathrm{INF}_{\mathrm{it}} - 8.772\mathrm{COVID\_19}_{\mathrm{it}}$$

There is a negative but insignificant association between TDR and its lagged value of TDR. Yet, there is a positive relationship between STDR and its lagged value of STDR. On the contrary, there is a negative but significant association between LTDR and its lagged value of LTDR.

A negative but significant association exists between EV and all capital structure measures. This indicates that companies with fluctuating earnings may limit their lending capacity because raising debt formally commits the company to make borrowing obligations (Khan et al., 2020). As a result, if the company's earnings continue to be uncertain, such expenditures may pose financial problems. The findings are consistent with the trade-off theory, which claims a negative relationship between EV and capital structure. The findings, on the other hand, contradict the pecking order assumption of a positive link between EV and capital structure (Assfaw, 2020). Moreover, the results are inconsistent with Sheikh and Qureshi (2017) and Khan et al. (2020), who indicate a positive association between EV and capital structure.

Similarly, the study shows a negative but significant association between GO and all capital structure measures. According to Jensen and Meckling (1977), these negative associations imply that significant South African firms with more excellent growth opportunities tend to be funded primarily using funds. The firm's managers prevent utilising external funding and incurring agency costs, giving the firms access to funds and enabling them to ultimately capitalise on new growth prospects (Neves, Serrasqueiro, Dias, and Hermano, 2019). In addition, the results are consistent with the trade-off theory, which asserts that GO and leverage have a negative connection (Assfaw, 2020). However, the results contradict the prediction of the pecking order theory of a positive link between GO and leverage (Myers & Majluf, 1984). The results align with Neves et al. (2019), who find a negative association between GO and capital structure. Yet, they contradict the conclusions of Assfaw (2020), who found a positive but significant nexus between GO and bank capital structure.

With regards to FGB, the study indicates a positive but insignificant relationship between FGB and capital structure measured by TDR. However, the study shows a positive but significant association between FGB and capital structure measured by LTDR and STDR. The findings contradict the researcher's premise that foreign government borrowing would crowd out domestic banks. The more a foreign government borrows, the more indebted the firms become. The results contradict Demirci *et al*., (2019) finding of a negative association between external government and capital structure.

On the contrary, there is a positive but significant relationship between LCR and capital structure as measured by TDR and LTDR. Yet, there is a negative but insignificant association between LCR and capital structure measured by STDR. Regarding the control variable, there is a positive but no significant association between size and capital structure measured by TDR. However, there is a negative but insignificant relationship between size and capital measured by LTDR and STDR.

As far as the macroeconomic variable was concerned, the study showed a negative but significant association between GDPG and capital structure measured by TDR. In intense economic times, banks reduce their debt levels (Assfaw, 2020). The finding also defies the assumption of the pecking order hypothesis, which argues that economic growth and capital structure have a positive relationship (Guizani, 2020). The findings are congruent with those of Guizani (2020), who discovered a negative relationship between GDPG and the capital structure of traditional banks. On the contrary, there is a positive but no significant association between GDPG and capital structure as measured by LTDR and STDR.

With regard to IR, the study shows a positive but significant relationship between IR and capital structure as measured by TDR. The results contradict the trade-off theory's prediction, which claims a negative connection between the interest rate (IR) and capital structure (Karpavicius & Yu, 2017). Yet, the study indicates a negative but insignificant relationship between IR and capital structure measured by LTDR and STDR.

On the contrary, there is a positive but significant association between INF and capital structure as measured by TDR. However, the study revealed a negative but significant association between INF and capital structure measured by LTDR. Companies enhance their leverage ratio whenever inflation is low and vice versa (Bilgin & Dinc, 2019). The results align with the findings of Bilgin and Dinc (2019), who found a negative but significant association between INF and capital structure. Moreover, there is a negative but insignificant relationship between INF and STDR.

Lastly, the study shows a positive but significant association between COVID-19 and capital structure measured by TDR; however, a negative but significant relationship between COVID-19 and capital structure as measured by LTDR.

Furthermore, the study indicates a negative but insignificant association between COVID-19 and the capital structure measured by STDR.

6.5 Chapter summary

In this chapter, the researcher intended to analyse the nexus between earnings volatility, government borrowing and liquidity in South African bank capital structure. The researcher looked at the relationship between earnings volatility and capital structure. We also looked at the relationship between government borrowing and capital structure. Furthermore, we looked at the relationship between liquidity and capital structure. The main results indicated that capital structure depends on earnings volatility. As such, the study results show a positive but significant relationship between earnings volatility and capital structure. This implies that the more volatility, the more indebtedness. On the contrary, the crowding in effect was confirmed as the capital structure was positively related to government borrowing. Keynes (1936) "pushed for the notion that government borrowing does not crowd out private debt." It is argued that government expenditure increases private investment due to the beneficial impact of government borrowing on investor expectations; therefore, crowding-in-effect occurs. Moreover, the liquidity issue was not confirmed since there was a positive relationship between liquidity measured by BLMI and capital structure measured by TDR, LTDR and STDR. According to Kamil, Haron and Ramly (2021), an increase in bank capital would result in a decline in liquidity, allowing banks to continue operating while avoiding financial issues.

CHAPTER 7 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

7 INTRODUCTION

The primary goal of this chapter is to provide concluding thoughts on this research's theoretical and empirical findings. Second, it summarises the study's contribution to the existing body of knowledge on the influence of earnings volatility, government borrowing and liquidity on capital structure.

The empirical analysis began by investigating the effect of earning volatility on the capital structure. Then, the government borrowing measures such as total government borrowing, local government borrowing and foreign government borrowing were regressed against determinants of capital structure using a panel of 11 banks from 2012 to 2021. Furthermore, the liquidity measures, namely, the bank liquidity mismatch index (BLMI), current ratio (CR) and liquidity coverage ratio (LCR), were tested against the capital structure. The two-step GMM models were used to estimate the relationships.

Therefore, this chapter proceeds as follows: section 7.1 discusses the conceptual framework and policy implications of the findings; section 7.3 summarises the study's main empirical findings. Section 7.3 discusses the study's theoretical and empirical methodological or empirical contributions. Finally, section 7.4 acknowledges the study's flaws and makes recommendations for future research.

7.1 The conceptual framework

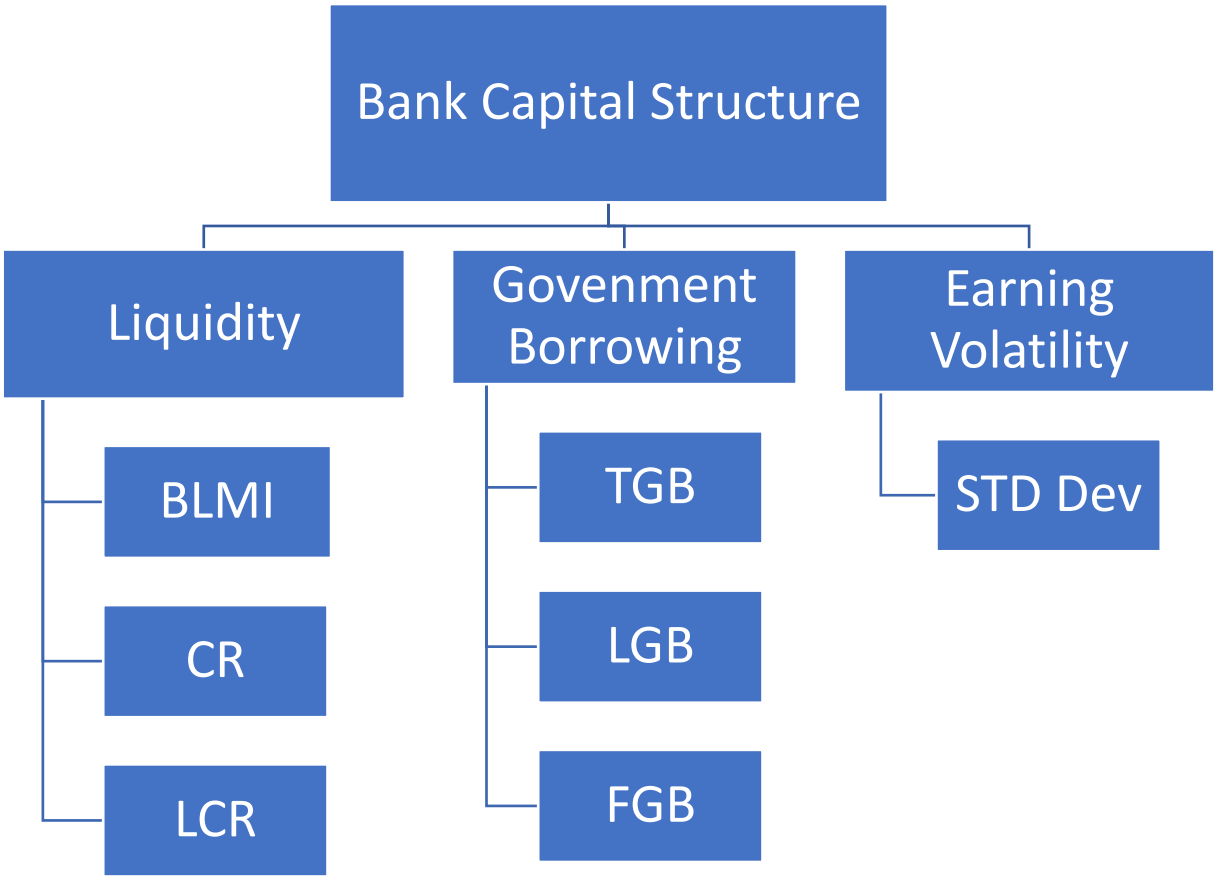
The aim of the study was to investigate the effect of earnings volatility, government borrowing and liquidity on South African bank capital structure.

The objectives of the study were as follows:

- To determine the effect of earnings volatility on the capital structure of registered commercial banks in South Africa from 2012 to 2021.
- To examine the effect of government borrowing on the capital structure of registered commercial banks in South Africa from 2012 to 2021.

- To investigate the effect of liquidity on the capital structure of registered commercial banks in South Africa from 2012 to 2021.

Figure: 7.1 Conceptual framework



Source: 'Researcher's own compilation

This study used the standard deviation of operating income to total assets as a proxy of earnings volatility. Other scholars use the past five years to measure standard deviation, including the current year (Harris & Roark, 2019 & Saif-Alyousfi; Md-Rus, Taufil-Mohd; Taib & Shahar, 2020). Yet, this research measured standard deviation, utilising data from the previous three years, including the current year. This indicator depicts the unpredictability of future income streams and the risk (Saif-Alyousfi et al., 2020). The study predicted a negative influence on earnings volatility (EV) and firm leverage because income is a critical component in the capacity to achieve interest costs and dividend

payments. Whenever the EV is significant, firms are generally inefficient in raising capital because lenders and shareholders are hesitant to invest in a company with a substantial likelihood of default or insolvency (Moradi & Paulet,2019).

The trade-off hypothesis assumes a negative link between EV and capital structure. The negative relationships show that increasing EV increases the likelihood of a corporation going bankrupt (Saif-Alyousfi et al., 2020). According to the experts, this occurs because a rise in EV concurrently puts the firm to risk of being unable to settle the interest on borrowing. In contrast, Khemiri and Noubbigh (2018) contend that a company's debt burden had no direct impact on this index because the ideal amount of financing reduced profits volatility. Studies that support the foregoing prediction of trade-off theory include scholars such as Khemiri and Noubbigh (2018) and Moradi and Paulet (2019).

However, the pecking order theory anticipates a positive relationship between risk and firm leverage (Frank & Goyal, 2009). It should be based on the idea that the volatility of cash flows matches the volatility of earnings (Sibindi & Makina, 2018:4). As a result, the firm must finance its operating income. To address the dilemma, it would have to raise funds from outside markets, beginning with the debt markets. According to Frank and Goyal (2009), companies with volatile stock values are more inclined to have turbulent sentiments. At the same time, Assfaw (2020) supports the prediction of the pecking order theory that there is a positive link between EV and bank leverage.

When excessive debt is perfect for funding large budgets and government deficits, crowding out occurs. It restricts the cash accessible to corporate companies, lowering the impact of business investments on development (Demirel, Erdem & Erooglu, 2017). They contend that the government could finance government shortfalls by lending, central bank reserves, or privatisation. According to Graham, Leary, and Roberts (2013), the linkages between public debt and industry standards may indicate swings in average alternative

investments, which their regressions inefficiently capture. They argue that when financial distress develops and market opportunities are limited during difficult times, firms do not require as much external finance and spend less. The varied impact of government borrowing on firm debt and equity is symptomatic of crowding out. Hence, it does not alleviate this issue if firms get a preference for borrowed funds due to tax benefits (Miller, 1977).

However, crowding in effect reacts oppositely to crowding out effect, as an increase in public spending would encourage private investment (Kueh *et al*., 2021). This is due to increased government expenditure stimulating the local market, which raises capital investment. According to Keueh et al. (2021), an increase in Malaysian investment suggests a strong return on investment for the domestic economy. Reliance on external capital rather than internal investment would limit local financial assets expansion (Keueh et al., 2021). As a result, encouraging domestic investment is vital for ensuring long-term stability.

Therefore, to determine the impact of government borrowing capital structure, the study used three measures of government borrowing. Since the study aimed to test the crowding-out effect of government on financial institutions in emerging economies, specifical banks in South Africa, however, other studies only used internal government borrowing to measure government borrowing (Laing et al., 2017 & Jinxiang, Shinong & Yuhui, 2020). Yet, Demirci et al. (2019) employed LGB and FGB to measure government borrowing.

The study used three measures of liquidity, namely current ratio (CR), liquidity coverage ratio (LCR) and BLMI, to investigate the effect of liquidity on capital structure. Firms select appropriate gearing through trading off of the net cost of stock with net cost debt, which is strongly impacted by tax shield, according to capital structure trade-off theories. Considering other factors remain constant, an element which enhances the equity cost, such as a decline in liquidity, could render equity financing less appealing than borrowed funds, resulting in more external debt (Dang, Ly Ho, Lam Tran & Vinh Vo, 2019).

There is a growing number of academics who support the aforementioned original hypothesis. From 2003 to 2011, Sharma and Paul (2015) examine India's link between liquidity and capital structure. They used Amihud's (2002) illiquidity, modified turnover ratio and modified liquidity ratio to assess liquidity. As a result, they measured financial leverage using market and book leverage. Their findings revealed no indication of a relationship between financial leverage and corporate stock liquidity. As a result, they disprove the conventional notion that firms with much more liquid equity choose to secure financing through equity instead of subordinated debt.

Although stock liquidity is challenging to evaluate due to its numerous facets, the study used the Amihud liquidity estimator as a parameter to represent stock liquidity (Sidhu, 2018). In contrast, the study estimated leverage by dividing total debt by total debt and equity. The findings of the study support the stock liquidity implications of gearing, indicating that a lesser degree of debt improves the industry's share price. The study also discovered a negative relation between stock liquidity evaluated by the Amihud indicator and corporate indebtedness. Likewise, Sidhu (2018) proposed that future studies may be simulated to study the effect of leverage on finance companies and unregistered corporate stock market liquidity.

7.2 The summaries of the main empirical findings

This section discusses the summaries of the main results, which proceed as follows: section 7.2.1 discusses the summary of the results on the effect of earnings volatility and capital structure. Section 7.2.2 summarises the impact of government borrowing and capital structure. Moreover, the outline of results on the impact of liquidity and capital structure was discussed in section 7.2.3. Lastly, section 7.2.4 discusses the summary of other determinants of capital structure.

7.2.1 The summary of the results on the effect of earnings volatility and capital

The study shows a positive but significant association between EV and capital structure measured by TDR. This suggests that the more outstanding the volatility, the greater the debt. The positive association contradicts the trade-off theory's assumptions that postulate that companies with stable earnings prefer to lend more than those with fluctuating earnings. Sheikh and Qureshi (2017) argue that the positive link, though reasonably surprising, could be attributed to fluctuations in interest rates, as the State Bank of Pakistan (SBP) publishes monetary policy every two months rather than annually. Moreover, the results are in line with those by Saif-Alyousfi et al. (2020). They found a positive but significant influence on earnings volatility and non-financial firm capital structure. Similarly, the study's results are consistent with those of Sheikh and Qureshi, (2017), who found a positive connection between EV and bank capital structure.

On the contrary, the study found a negative but significant link between EV and capital structure measured by LTDR and STDR. The findings are consistent with the trade-off and pecking-order hypothesis, which predicts that companies with greater earnings volatility should seek internal funding and a conservative capital-structure strategy to prevent bankruptcy costs since excessive volatility is linked with a greater likelihood of insolvency (Ghsemzadeh, Heydari & Mansourfar, 2021). Furthermore, companies with greater income volatility maintain their lending capacity to avoid a more significant cost of capital given the high earnings volatility (Ghsemzadeh et al., 2021). The study results align with the finding of Khemiri and Noubbigh (2018), who found a negative association between EV and capital structure for non-financial firms. However, the study results are inconsistent with the findings of earlier studies by Gropp and Heider (2010), Sheik and Qureshi (2017) and Khan, Bashir and Islam (2020:), who found a positive but significant effect on bank capital structure.

7.2.2 The summary of the results on the effect of government borrowing and capital structure

The crowding-out effect theory explains the transmission mechanism when government borrowing reduces the money supply and increases interest rates. However, it has not been tested empirically on how the transmission mechanism affects the capital structure. Therefore, the study sought to bridge this gap by investigating the relationship between government borrowing measured by total government borrowing, internal government borrowing and foreign borrowing on the capital structure of banks in South Africa. The study results show a positive but significant relationship between TGB and capital structure measured by TDR, LTDR and STDR. The findings contradict the theory that the researcher thought government borrowing would crowd out the domestic market. The greater the government's borrowing, the greater leveraged the firms become. Demirci et al. (2019) argue that a rise in government debt supply might decrease investor's demand for corporate debt compared to equity because government debt is a superior alternative for company debt to equity. Therefore, firms might alter their capital structure and lessen their leverage. The results contradict the findings of Ayturk (2017) and Demirci et al. (2019), who found a negative association between government debt and the capital structure of non-financial. However, the researcher could not find any study on the effect of government debt on banks' capital structure, specifically in South Africa, to compare the results with the non-financial firms.

Similarly, the study revealed a positive but significant association between LGB and capital structure measured by TDR, LTDR and STDR. The results contradict the crowd-out theory. According to Graham, Leary and Roberts (2014), when the supply of treasuries rises, firms decrease long-term capital and debt issuance, negatively impacting firm leverage and firm debt crowd-out effect. However, Keynes (1936) "gave the drive for the idea that government spending does not crowd out private spending." It is assumed that government expenditure increases private investment due to the beneficial effect of government spending

on investor expectations; therefore, crowding-in-effect occurs. Moreover, the results are inconsistent with the findings of Laing et al. (2017) and Jinxiang, Shinong and Yuhui (2020), who find a negative association between LGB and capital structure. However, the researcher could not find any study on the effect of local government debt on banks' capital structure, specifically in South Africa, to compare the results with the non-financial firms.

Regarding the FGB, the study shows a positive but significant association between FGB and all the capital structure measures. The rationale could be explained by the fact that foreign borrowing accounts for around 80% of overall government borrowing. As FGB does not crowd out a local market, this condition may result in a crowding-in effect. Moreover, local firms can enhance their gearing ratio if the FGB offers foreign currency liquidity. Demirci *et al*. (2019) argue that if resources are underutilised, public expenditure might promote investment and boost private spending, resulting in a "crowding in" effect. The more the amount borrowed by a foreign government, the more indebted the companies become. The findings contradict the findings of Demirci et al. (2019), who discovered a negative relationship between external government and capital structure. Yet, the researcher could not find any study on the effect of local government debt on banks' capital structure, especially in South Africa, to compare the results with the non-financial firms.

7.2.3 The summary of the results on the effect of liquidity and capital structure

Bia, Krishnamurthy and Wymuller (2018) assert that the Basel III Committee developed the fundamental liquidity criteria for commercial banks, liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR). The LSR and NSFR were introduced to help banks manage liquidity in the face of asset-liability mismatches (IMF, 2011). Yet, according to Bai et al. (2018), the Basel III Liquidity Proxies have outperformed research, underlining critical aspects scholars must solve. As a result, they lack a uniform framework for determining how private

liquidity issues should be controlled and what methods should be employed to carry out liquidity requirements. They also maintain that a non-controversial technique for evaluating financial institution liquidity is lacking (Bai et al., 2018).

In the context of asset-liability mismatches, the theoretical and empirical finance literature has paid minimal attention to improving a liquidity proxy. Interestingly, no previous research has looked into the impact of liquidity on capital structure in the context of asset-liability mismatches (Marozva, 2017; Bai et al., 2018; Marozva & Makina, 2020). Brunnermeier et al. (2013) proposed LMI as a new liquidity proxy that considers asset-liability divergence. The LMI is expected to improve how we capture significant risks when assessing systemic risk (Marozva, 2017). Therefore, the predicted new liquidity proxy will be a component of enhanced overall balance frameworks. This study aimed to apply Marozva and Makina's (2020) BLMI and test its effect on capital structure in the context of assets-liability mismatches. Also, the traditional measure of liquidity (current ratio) and Basel III recommended measure of liquidity (liquidity coverage ratio) were put into perspective.

There is a general result that has indicated that there is a negative relationship between capital structure and liquidity. This implies that increased company liquidity results in decline in debt (Saif-Alyousfi, MD-Rus, Taufil-Mohd Taib & Shahar, 2020). This could be because the company failed to meet its short-term obligations, causing them to seek alternative finance (Saif-Alyousfi et al., 2020). However, results reveal another relationship when focusing on regulatory liquidity and capital structure: the liquidity coverage ratio has a positive effect. This is confirmed by a positive and significant association between LCR and capital structure measured by TDR. Yet, a positive but insignificant relationship exists between LCR and capital structure measured by STDR. However, there is a negative but insignificant association between LCR and capital structure measured with LTDR.

The study shows a positive but significant relationship between BLMI and capital structure. Haron, Kamil and Ramly (2021) argue that a rise in bank capital would lead to a drop in liquidity, allowing banks to stay in business while avoiding financial difficulties. On the contrary, Sharma and Paul (2015) believe that companies with some more liquid equity seem to be more inclined to choose to raise capital through share issuance than loan financing. As a result, organisations with higher liquidity are projected to have a lower debt cost of capital (Sharma & Paul, 2015). No notable studies could be found on the effect of bank liquidity mismatch index and capital structure to justify the results of the current study. The study's conclusions contradict those of Chaabouni, Zouaoui and Ellouz (2018), who show a negative relationship between bank capital and liquidity generation.

With regard to the current ratio (CR) as a measure of capital structure, the study found a positive but significant relationship between CR and all measures of capital structure, namely TDR, LTDR and STDR. There is a positive but significant association between CR and capita structure measured by TDR, LTDR and STDR. Mayes (2019) claims that the greater the total ratio, the more likely a firm would be capable of paying its expenses. So, higher is preferable from the perspective of the creditor. Nevertheless, this has not been the scenario from an investor's perspective. Because current assets often have a lesser projected yield than capital assets, investors should prefer that the bare minimum of the firm's capital is spent on current assets (Mayes, 2019). The findings are congruent with those of Rao et al. (2017). The latter discovered a positive relationship between financial leverage and the current ratio.

7.2.4 Summary of other determinants of capital structure

Other elements influencing the capital structure, in addition to government borrowing, liquidity, and earnings volatility, include company size and growth opportunity. Regarding growth opportunity (GO), there was a positive but not statistically significant relationship between GO and capital structure metrics TDR and STDR. The findings support the pecking order theory, which claims a positive association between GO and capital structure. This demonstrates that conventional banks with more investment options increase their usage of debt financing when internal funding is low (Guizani, 2020). This finding contradicts that of Jadah, Hasan, and AL-Husainy (2021). The latter found a negative but statistically significant association between GO and capital structure. Yet, GO, and capital structure measured by an LTDR has a negative and minor link.

On the other hand, the study revealed a negative but significant association between firm size and capital structure. The results confirm the pecking order hypothesis, which postulates that capital structure has a negative correlation. Because there is less asymmetrical information about the more notable companies, the possibilities of undervaluation of the new equity offering are reduced, enabling major firms to choose equity financing (Assfaw, 2020). However, the findings contradict the trade-off hypothesis, which claims that the larger the organisation, the greater the likelihood of incurring debt, resulting in a positive relationship between indebtedness and size. Large firms have more debt securities trustworthiness and a lower chance of bankruptcy. Consequently, their borrowing cost is lower when compared to tiny, unknown businesses (ibid).

7.3 Contribution of the study and policy implications

Thus far, little is known about the effect of earnings volatility, government borrowing and liquidity on bank capital structure in developing markets, particularly in South Africa. The trading-off theory predicts a negative impact on EV and capital structure. The negative relationships show that increasing EV increases the likelihood of a corporation going bankrupt (Saif-Alyousfi et al.,

2020). However, the pecking order theory assumes a positive association between risk and company leverage (Frank & Goyal, 2009). There is no consensus on the trade-off theory prediction and pecking order theory prediction on EV. The researcher encourages banks to focus on stable earnings because it can provide stability in their capital structure. It means that the higher the volatility earnings, we expect the capital structure to be lower because they are not sure whether they will be able to pay back the debt. Ideally, they should be a negative relationship. However, the current study revealed a negative link between EV and the LTDR and STDR as measures of capital structure. Therefore, banks should aim at more stable earnings in the future if they want to increase their capital structure. Alternatively, banks should keep a low capital structure if they cannot smooth out their earnings.

The study contributes to the literature by examining the effect of government borrowing on capital structure. Traum and Yang (2015) used an updated new Keynesian model with comprehensive fiscal circumstances and accounting for macroeconomic linkages to examine how public debt crowds out capital in the US economy. They contend that legislative disruptions which increase debt decide whether an investment is crowded in but out in the short to medium run. As a result, outstanding indebtedness can encourage investment for lower capital tax rates or ongoing public investment. Nonetheless, there is no clear relationship between real interest rates and capital, which explains why compressed regressions are questionable regarding crowding out. Yet, Ayturk (2017) discovers a significant but negative connection between public debt and firm debt and yet no linkage between government debt and equity. The researcher believes these results are reliable when paired with the flow and stock data (Ayturk, 2017). Other governmental debt ratios in industrialised European nations typically lead to significant financial crowding out of the impact on company debts (Ayturk, 2017).

While other studies have used internal government borrowing to measure government borrowing (Laing et al., 2017 & Jinxiang, Shinong & Yuhui, 2020), Demirci et al. (2019) used both LGB and FGB to measure government borrowing. Yet Laing et al. (2017) employed LGB to measure government borrowing. They maintain that enterprises could obtain local funds even if external investors or international bodies absorbed the public debt supply. As a result, we should expect a lesser crowding-out effect if the public debt is held by global investors rather than local investors (Demirci et al., 2019). However, this study utilised three measures of government borrowing, namely, TGB, LGB and FGB, since the aim was to test the crowding-out effect of government on financial institutions in emerging markets, particularly banks in South Africa. According to the literature, all government debt affects the business debt leverage through the use of the process (Zhang, Brookins & Huang, 2022). However, the study found a positive link between LGB and capital structure. This result is consistent with the findings of Laing, Wang and Xu (2017). They found that China's local government borrowing has a significant crowding-in effect on non-state-owned enterprises (SOEs).

This is contrary to the recent findings of Zhang, Brookins and Huang (2022) which showed a negative association between LGB and firm leverage. The result aligns with the findings of Laing, *et al*., (2017). They demonstrate that borrowing by China's local governments significantly crowding-in effect on non-state-owned companies. In contrast to Zhang's recent findings, Brookins and Huang (2022) found a negative connection between LGB and corporate leverage.

Our study shows that there is a crowding-in effect, and this is a major contribution. The possible reason there is a crowding-in effect is that the nature of the borrowing is actually foreign so much that the government is not crowding out in the short run because they are borrowing from foreign funding institutions. Secondly, the government is already stimulating the financial sector by merely borrowing. This encourages the financial sector to borrow more because they

have more business. The emerging markets governments should increase their borrowing as it results in a crowding-in effect.

Nevertheless, foreign borrowing might have negative implications for the value of the local currency. Therefore, there is a need to strike a balance between government borrowing and the stimulation of the banking environment. The crowding, in effect, implies that as long as the government can still provide services, they can continue to borrow, as this does not affect the banking sector. On the contrary, as long as government seems to be borrowing more foreign than local, the bank should not be worried about the crowding out effect. Therefore, they can still increase their debt ratios without any problems.

Huang, Pagano and Pinazza (2020) proposed that local authority borrowing, aided by government backing, is handled by regional banks. On the contrary, banks' rivalry for the capital ability to bargain with regional public debt and lending causes provincial public debt to crowd-out firm debt using commercial loans, which varies from the influence of federal public debt on firm bonds (Bardoer & James, 2016 & Dermirci et al., 2019). In contrast to Liang et al (2017), the study tested the effects of crowding out and crowding in the impact of local government debt on company leverage using a benchmark econometric model. From 2012 to 2021, the study used a panel data regression model to evaluate the influence of government debt on financial institutions, particularly banks' capital structure in South Africa. The panel data provides more valuable data, higher variability, less collinearity between variables, higher degrees of freedom, and greater efficiency (Baltagi, 2008). Since the descriptive statistics indicated that 80% of the government borrowing comes from FGB. So, the results of the current study will be of great benefit to the police makers and government when they make policies that will assist in the growth of the economy and reduce the unemployment rate in the country.

On the contrary, the impact of liquidity on the capital structure has been disputed for several years (Lipson & Mortal, 2009; Sibilkov, 2009; Udomsirikul et al.,

2011;Dencic-Mihajlov, Malinic, & Grabinski, 2015; Saif-Alyousfi, Md-Rus, Taufil-Mohd, Taib & Shahar, 2020). Some research employed a standard liquidity metric, such as the current and acid quick ratios (Saif-Alyousfi *et al*., 2020 & Dencic-Mihajlov, et al., 2015). However, Sibilkov (2009) has employed asset liquidity to estimate liquidity. On the contrary, Lipson and Mortal (2009) utilised five metrics to gauge stock liquidity. These include Gibbs sample statistic of Roll (1984) trading cost metric suggested in Hasbrouck (2009), Amihud's (2002) illiquidity indicator, which is derived employing stock returns and trading volume, and Share turnover, which is determined utilising the volume of trade and shares issued. Lastly, they employed quoted and effective spreads estimated using trade plus quoted datasets.

In contrast, the study used three liquidity measures: CR, LCR and BLMI. Hence, this study will contribute to the existing literature by using assets and funding liquidity to explore their effect on bank capital structure. Using a panel data regression model, Sidhu (2018) evaluated the impact of leverage on the stock liquidity of Indian companies listed in the S&P 500 index from 2009 to 2013. Based on the study's findings, there is a negative link between stock liquidity, as evaluated by the Amihud proxy and corporate leverage. The current study shows a positive but significant connection between BLMI and capital structure. On the contrary, Adrian and Zhuoyun (2013) found a negative affiliation between bank capital and liquidity creation, which is consistent with the financial fragility-crowding-out hypothesis. Similarly, Chaabouni, Zouaoui and Ellouz (2018) demonstrate a negative connection between bank capital and liquidity creation, which is consistent with the risk absorption model.

Although Barry, Diabate, and Tarazi (2018) found that severe liquidity constraints cause small US commercial banks, but not large US commercial banks, to modify their capital ratio positively. Researchers claim that micro banks change their total capital ratio by optimising, restricting dividend payments, lowering the share of assets with comprehensive risk factors, and accurately ranging lesser loans. The

relationship in the current study can only be explained by the measure BLMI which looks at both sides of assets and liability, considering the liquidity spiral. Therefore, this could affect the nature of the relationship. This implies that banks can still borrow despite worrying about liquidity since there is a positive relationship between BLMI and capital structure. We saw that the more they borrow, the higher their liquidity position.

7.4 Limitations of the study and recommendations for future research

The research was limited to South African registered banks, with data available from 2013 to 2021. As a result of the difficulties in accessing financial data for such banks, a small sample was not included in the study. Since most of the banks omitted had small asset bases, their presence might have offered valuable information about bank liquidity and size. Also, a comparison study between South African and non-South African banks can seek financing aid from their parent corporations in periods of esteem needs. Although banks can seek assistance from their parent firm in moments of catastrophe, an investigation of banks as members of corporate entities may be warranted.

The banks were examined during the COVID-19 outbreak, and the study even adjusted for this with a dummy variable. However, we advocate segmenting the study period into three parts: before, during and after the COVID-19 pandemic. The capital structure was measured using book leverage in this study. As a result, we recommend that future studies employ both book and market value to calculate capital structure.

Evaluating the liquidity trends in every era, particularly in the context of the asset liabilities mismatches, might equip banks to appropriate liquidity approaches for every timeframe. The study discovered a positive but not statistically significant relationship between BLMI and capital structure. According to Kamil, Haron and Ramly (2021), a boost in bank capital could result in a decline in liquidity, causing financial institutions to stay in operation despite preventing economic issues.

Nonetheless, the researcher could not locate any study that explored the BLMI and capital structure, especially in the South African banking sector, to compare the results. We suggest future studies investigating the impact of BLMI and capital structure in the financial and non-financial sectors.

Therefore, there is a need to strike a balance between government borrowing and the stimulation of the banking environment. The crowding in effect implies that as long as the government can still provide services, they can continue to borrow, as this does not affect the banking sector. On the contrary, as long as government seem to be borrowing more foreign than local, the bank should not be worried about the crowding out effect. Therefore, they can still increase their debt ratios without any problems.

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Appendix 1a: Diagnostic tests TDR with TGB & BLMI

Test	Test Statistic	P-Value	Inference
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.73	0.6904	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. The random effects model is preferred.
Heteroscedasticity $H_0: \delta_i^2 = \delta$ *for all i* $H_0: \delta_i^2 \neq \delta$ *for all i*	Chi2 =0.16	0.6855	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.145 F-CSD=-0.015	0.0320 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 1b: Diagnostic tests LTDR with TGB & BLMI

Test	Test Statistic	P-Value	Inference
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.87	0.5645	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity $H_0: \delta_i^2 = \delta$ *for all i* $H_0: \delta_i^2 \neq \delta$ *for all i*	Chi2 =0.08	0.7756	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.155 F-CSD=-0.277	0.0312 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 1c: Diagnostic tests STDR with TGB & BLMI

Test	Test Statistic	P-Value	Inference
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.55	0.8522	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu{}^2 = 0$ $H_A: \delta_\mu{}^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity $H_0: \delta_i{}^2 = \delta$ *for all i* $H_0: \delta_i{}^2 \neq \delta$ *for all i*	Chi2 =0.07	0.7898	The variance of the error term is not constant. Heteroscedasticity is present.

Cross-Sectional dependence Pesaran Frees	P-CSD=-2.172 F-CSD=-0.108	0.0299 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 2a: Diagnostic tests TDR with LGB & BLMI

Test	Test Statistic	P-Value	Inference
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.76	0.6621	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu{}^2 = 0$ $H_A: \delta_\mu{}^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity $H_0: \delta_i{}^2 = \delta$ ***for all i*** $H_0: \delta_i{}^2 \neq \delta$ ***for all i***	Chi2 =0.15	0.7031	The variance of the error term is not constant. Heteroscedasticity is present.

Cross-Sectional dependence Pesaran Frees	P-CSD=-2.204 F-CSD=-0.009	0.0275 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 2b: Diagnostic tests LTDR with LGB & BLMI

Test	**Test Statistic**	**P-Value**	**Inference**
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.89	0.5443	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu{}^2 = 0$ $H_A: \delta_\mu{}^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity $H_0: \delta_i{}^2 = \delta$ for all i $H_0: \delta_i{}^2 \neq \delta$ for all i	Chi2 =0.11	0.7372	The variance of the error term is not constant. Heteroscedasticity is present.

Cross-Sectional dependence Pesaran Fre	P-CSD=-2.202 F-CSD=-0.294	 0.0277 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 2c: Diagnostic tests STDR with LGB & BLMI

Test	Test Statistic	P-Value	Inference
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.56	0.8420	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu{}^2 = 0$ $H_A: \delta_\mu{}^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity $H_0: \delta_i{}^2 = \delta$ for all i $H_0: \delta_i{}^2 \neq \delta$ for all i	Chi2 =0.07	0.7898	The variance of the error term is not constant. Heteroscedasticity is present.

Cross-Sectional dependence Pesaran Frees	P-CSD=-2.201 F-CSD=-0.135	0.0277 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 3a: Diagnostic tests TDR with FGB & BLMI

Test	Test Statistic	P-Value	Inference
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.70	0.7178	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu{}^2 = 0$ $H_A: \delta_\mu{}^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.

Heteroscedasticity ***H₀: $\delta_i^2 = \delta$ for all i H₀: $\delta_i^2 \neq \delta$ for all i***	Chi2 =0.17	0.6798	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.118 F-CSD=0.054	0.0342 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 3b: Diagnostic tests LTDR with FGB & BLMI

Test	Test Statistic	P-Value	Inference
Joint validity of cross-sectional individual effects ***H₀ : $\alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$*** ***H_A: $\alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$***	F=0.83	0.5982	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects ***H₀: $\delta_\mu^2 = 0$*** ***H_A: $\delta_\mu^2 \neq 0$***	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.

Heteroscedasticity ***H₀: $\delta_i^2 = \delta$ for all i H₀: $\delta_i^2 \neq \delta$ for all i***	Chi2 =0.07	0.7898	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.109 F-CSD=-0.270	0.0349 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 3c: Diagnostic tests STDR with FGB & BLMI

Test	Test Statistic	P-Value	Inference
Joint validity of cross-sectional individual effects ***$H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$*** ***$H_A$:*** $: \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.52	0.8705	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects ***$H_0: \delta_\mu^2 = 0$*** ***H_A:*** $\delta_\mu^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.

Heteroscedasticity ***H_0: $\delta_i^2 = \delta$ for all i H_0: $\delta_i^2 \neq \delta$ for all i***	Chi2 =0.07	0.7898	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.142 F-CSD=-0.118	0.0322 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 4a: Diagnostic tests TDR with TGB & CR

Test	**Test Statistic**	**P-Value**	**Inference**
Joint validity of cross-sectional individual effects ***H_0 : $\alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$*** ***$H_A$:*** : $\alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.71	0.7124	Cross-sectional individual effects are valid.

Breusch Pagan (1980) LM test for random effects ***H₀:*** $\delta_{\mu}^{2} = 0$ ***H_A*:** $\delta_{\mu}^{2} \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity ***H₀:*** $\delta_{i}^{2} = \delta$ ***for all i*** ***H₀:*** $\delta_{i}^{2} \neq \delta$ ***for all i***	Chi2 =0.01	0.9148	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.176 F-CSD=-0.096	0.0295 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 4b: Diagnostic tests LTDR with TGB & CR

Test	**Test Statistic**	**P-Value**	**Inference**
Joint validity of cross-sectional individual effects ***H₀ :*** $\alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ ***H_A:*** : $\alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.83	0.6015	Cross-sectional individual effects are valid.

Breusch Pagan (1980) LM test for random effects ***H₀:*** $\delta_{\mu}^{2} = 0$ ***H_A*:** $\delta_{\mu}^{2} \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity ***H₀:*** $\delta_{i}^{2} = \delta$ ***for all i H₀:*** $\delta_{i}^{2} \neq \delta$ ***for all i***	Chi2 =0.45	0.5035	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.186 F-CSD=-0.412	0.0288 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 4c: Diagnostic tests STDR with TGB & CR

Test	**Test Statistic**	**P-Value**	**Inference**
Joint validity of cross-sectional individual effects ***H₀ :*** $\alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ ***H_A:*** : $\alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.61	0.8027	Cross-sectional individual effects are valid.

Breusch Pagan (1980) LM test for random effects ***H₀:*** $\delta_{\mu}^{2} = 0$ ***H_A*:** $\delta_{\mu}^{2} \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity ***H₀:*** $\delta_{i}^{2} = \delta$ ***for all i*** ***H₀:*** $\delta_{i}^{2} \neq \delta$ ***for all i***	Chi2 =0.07	0.7898	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.191 F-CSD=-0.175	0.0284 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 5a: Diagnostic tests TDR with LGB & CR

Test	**Test Statistic**	**P-Value**	**Inference**

Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.71	0.7132	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity $H_0: \delta_i^2 = \delta$ *for all i* $H_0: \delta_i^2 \neq \delta$ *for all i*	Chi2 =0.03	0.8738	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.185 F-CSD=-0.156	0.0289 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 5b: Diagnostic tests LTDR with LGB & CR

Test	**Test Statistic**	**P-Value**	**Inference**

Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.83	0.6006	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity $H_0: \delta_i^2 = \delta$ *for all i* $H_0: \delta_i^2 \neq \delta$ *for all i*	Chi2 =0.44	0.5070	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.200 F-CSD=-0.381	0.0278 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 5c: Diagnostic tests STDR with LGB & CR

Test	**Test Statistic**	**P-Value**	**Inference**

Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.61	0.8034	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity $H_0: \delta_i^2 = \delta$ ***for all i*** $H_0: \delta_i^2 \neq \delta$ ***for all i***	Chi2 =0.07	0.7898	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.201 F-CSD=-0.165	0.0277 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 6a: Diagnostic tests TDR with FGB & CR

Test	Test Statistic	P-Value	Inference
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.71	0.7104	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity $H_0: \delta_i^2 = \delta$ *for all i* $H_0: \delta_i^2 \neq \delta$ *for all i*	Chi2 =0.01	0.9241	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.189 F-CSD=-0.053	0.0286 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 6b: Diagnostic tests LTDR with TGB & CR

Test	Test Statistic	P-Value	Inference
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.83	0.6010	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity $H_0: \delta_i^2 = \delta$ *for all i* $H_0: \delta_i^2 \neq \delta$ *for all i*	Chi2 =0.46	0.4978	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.187 F-CSD=-0.448	0.0288 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 6c: Diagnostic tests STDR with LGB & CR

Test	Test Statistic	P-Value	Inference
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.61	0.8001	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity $H_0: \delta_i^2 = \delta$ *for all i* $H_0: \delta_i^2 \neq \delta$ *for all i*	Chi2 =0.07	0.7898	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.192 F-CSD=-0.175	0.0284 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 7a: Diagnostic tests TDR with TGB & LCR

Test	Test Statistic	P-Value	Inference
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.69	0.7298	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity $H_0: \delta_i^2 = \delta$ *for all i* $H_0: \delta_i^2 \neq \delta$ *for all i*	Chi2 =0.02	0.8831	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.191 F-CSD=-0.236	0.0284 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 7 b: Diagnostic tests LTDR with TGB & LCR

Test	Test Statistic	P-Value	Inference
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.72	0.6992	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity $H_0: \delta_i^2 = \delta$ *for all i* $H_0: \delta_i^2 \neq \delta$ *for all i*	Chi2 =0.87	0.3501	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.197 F-CSD=-0.519	0.0280 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 7c: Diagnostic tests STDR with TGB & LCR

Test	Test Statistic	P-Value	Inference
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.59	0.8134	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity $H_0: \delta_i^2 = \delta$ *for all i* $H_0: \delta_i^2 \neq \delta$ *for all i*	Chi2 =0.05	0.8298	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.909 F-CSD=-0.175	0.0272 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 8a: Diagnostic tests TDR with LGB & LCR

Test	Test Statistic	P-Value	Inference
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.69	0.7298	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity $H_0: \delta_i^2 = \delta$ *for all i* $H_0: \delta_i^2 \neq \delta$ *for all i*	Chi2 =0.02	0.8919	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.179 F-CSD=-0.283	0.0293 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 8b: Diagnostic tests LTDR with LGB & LCR

Test	Test Statistic	P-Value	Inference
	F=0.72	0.7023	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects ***H₀:*** $\delta_{\mu}^{2} = 0$ ***H_A*:** $\delta_{\mu}^{2} \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity ***H₀:*** $\delta_{i}^{2} = \delta$ ***for all i*** ***H₀:*** $\delta_{i}^{2} \neq \delta$ ***for all i***	Chi2 =0.91	0.3402	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.193 F-CSD=-0.451	0.0280 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 8c: Diagnostic tests STDR with LGB & LCR

Test	Test Statistic	P-Value	Inference
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.59	0.8172	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity $H_0: \delta_i^2 = \delta$ *for all i* $H_0: \delta_i^2 \neq \delta$ *for all i*	Chi2 =0.04	0.8426	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.212 F-CSD=-0.135	0.0270 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 9a: Diagnostic tests TDR with FGB & LCR

Test	Test Statistic	P-Value	Inference
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.69	0.7283	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity $H_0: \delta_i^2 = \delta$ *for all i* $H_0: \delta_i^2 \neq \delta$ *for all i*	Chi2 =0.02	0.8859	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.206 F-CSD=-0.190	0.0274 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 9b: Diagnostic tests LTDR with FGB & LCR

Test	Test Statistic	P-Value	Inference
	F=0.73	0.6981	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects ***H_0: $\delta_\mu^2 = 0$*** ***H_A: $\delta_\mu^2 \neq 0$***	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity ***H_0: $\delta_i^2 = \delta$ for all i H_0: $\delta_i^2 \neq \delta$ for all i***	Chi2 =0.02	0.8859	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.204 F-CSD=-0.497	0.0275 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups

Appendix 9c: Diagnostic tests STDR with FGB & LCR

Test	Test Statistic	P-Value	Inference
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=0.60	0.8107	Cross-sectional individual effects are valid.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	Chi2 = 0.00	0.9999	Random effects are present. Random effects model is preferred.
Heteroscedasticity $H_0: \delta_i^2 = \delta$ ***for all i*** $H_0: \delta_i^2 \neq \delta$ ***for all i***	Chi2 =0.05	0.816 2	The variance of the error term is not constant. Heteroscedasticity is present.
Cross-Sectional dependence Pesaran Frees	P-CSD=-2.213 F-CSD=-0.164	0.0269 Alpha=0.10: 0.2828 Alpha=0.05: 0.3826 Alpha=0.01: 0.5811	The is no cross-section dependence amongst the groups