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CROSS-BORDER BANKING AND DEPOSITOR MARKET DISCIPLINE IN AFRICA

BY

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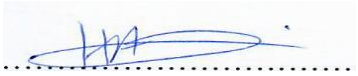
DECLARATION

I hereby declare that this study was conducted by me under supervision. This study has not been presented by anyone for any academic award, in this or any other institution. I have duly acknowledged all references made to work done by other people. In this regard, I take full responsibility for any errors and omissions attached to this empirical research work.



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CERTIFICATION

We hereby certify that this study was supervised under procedures laid down by the University.

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ABSTRACT

This thesis focuses on the effect of cross-border banks on bank risk and market discipline in the presence of explicit deposit insurance and depositor market discipline incentives using a dataset that covers many countries in Africa. Based on different estimation techniques, this thesis provides the following robust results. First, cross-border banks have better: asset quality, liquidity, and diversification mean scores than their domestic counterparts. Simultaneously, cross-border banks also experience higher overhead expenses, higher volatility in earnings, lower capital levels, higher market risk, and lower stability than domestic banks. These findings lend credence to both the diversification hypothesis and market risk hypothesis.

Second, cross-border banks operating in countries with explicit deposit insurance arrangements have higher loan loss provision (lower asset quality), a higher standard deviation of return on assets (higher variation in earnings), higher market risk (lower Sharpe ratio), and lower stability (lower Z-score). This study, therefore, reveals a benign form of regulatory arbitrage hypothesis within cross-border banks in Africa. Third, depositor market discipline via the priced based mechanism and the quantity-based mechanism exist in Africa. This evidence supports a complete test for depositor market discipline. This finding is based on robust evidence from the capital adequacy ratio and the ratio of corporate loans to total loans of cross-border banks. Fourth, the study finds that the capital level of cross-border banks serves as an incentive for depositors to monitor the risk of cross-border banks.

Fifth, the study finds that when depositors monitor and discipline banks for excessive risk-taking, it is strong enough to influence banks to reduce their risk-taking levels among Good Banks. This last evidence supports a true form of test for depositor market discipline in Africa.

This study makes the following contributions to the literature: First, to gain new insights into the effect cross-border banking has on bank risk, it makes use of unexamined samples. The evidence the study provides on depositor market discipline within the cross-border banking context is also new in the literature. Lastly, the finding that the capital level of cross-border banks serves as an incentive for depositors to monitor cross-border bank risk, is also new in the literature.

This study has revealed the important role depositors can play in the monitoring and policing of cross-border bank risk. The Basel Committee on Banking Supervision and bank regulators should, therefore, take note and put in place structures that will enable depositors to have access to cross-border bank information such as capital level and corporate loan concentration level constantly.

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CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Cross-border banks are banks that have transcended from their home countries into host countries. In their host countries, they operate via a branch or subsidiary of the bank (see Beck, Fuchs, Singer & Witte, 2014). They have been the subject of recent studies because the 2007-2009 world financial crisis has to some extent been blamed on them for excessively increasing their on-and-off-balance sheet leverage beyond acceptable levels as a result of inadequate monitoring and regulation. In spite of this monitoring challenges associated with cross-border banks (see Allen, Beck, Carletti, Lane, Schoenmaker & Wagner, 2011; Stephanon, 2010), it remains unknown the extent to which market-based solutions such as depositor market discipline can be used to monitor and discipline the risky activities of cross-border banks. Desli, Schoors, and Meir (2013) conceive market discipline to exist when investors in bank liabilities actively reward or punish banks for their risk-taking behaviour.

Therefore, in a bid to help rein in such excessive risk-taking tendencies, Macey and Garrett as far back as 1988 call for the oversight responsibilities of formal bank supervision to be complemented by a market-oriented approach to bank regulation called market discipline. Numerous studies have therefore tested for market discipline by studying various bank stakeholders, including bank liability holders. A particular group of bank liability holders that have been well researched on in

the study of market discipline is depositors because of the vital role they play in the funding of banks and also because data is more readily available in that regard.

Three key issues, however, stand out about market discipline[1]. The first key issue about market discipline is that its strength is affected by instability issues attached to cross-border banking (henceforth CBB) (Eiseinbies & Kaufman, 2008). These instability issues come from the fact that, although CBB can increase bank stability through diversification (Beck et al., 2014; Sissy, Amidu & Abor, 2017); they can also increase bank risk due to the presence of market risk factors such as differences in regulation (e.g., the presence of explicit deposit insurance) (Berger, Ghoul, Guedhami & Roman, 2016; Goodhart & Schoenmaker, 2009). A lot of evidence exists to this effect from developed countries based on cross-border mergers (CBM) (see Berger, Ghoul, Guedhami & Roman 2016; Carbo-Valverde, Kane & Rodriguez-Fernandez, 2012; Baele, De Jonghe & Vennet, 2007; Beltratti & Paladino, 2016). Despite the extensive level of literature available (see Chapter Two), not much is known about the impact market risk factors such as differences in safety nets, (i.e., regulatory arbitrage opportunities) has on bank risk-taking within Africa. Very little is also known about the ability of depositor market discipline (DMD) to reduce the risk of banks in the presence of cross-border banks.

Most market discipline studies existing within the international banking context, concentrate on, concentrate on interbank discipline, external discipline, and the impact of the market discipline of parent banks, on their subsidiaries (see chapter 2). Thus, a contextual gap exists in banking

[1] In line with Min (2015), this study uses "depositor discipline" and "market discipline" interchangeably.

literature to this regard. Recent global examples of cross-border banks that contributed to the global financial crisis of 2007-2009 due to regulatory arbitrage opportunities available to them are Bear Stearns (now taken over by J.P. Morgan) and the collapsed Lehman Brothers. Before the crises, these banks experienced deterioration in their credit ratings. The legal response the US had for these bank failures was the promulgation of the Dodd-Frank Act (Hett & Schmidt, 2017). However, although it can help rein in the solvency and systemic risk levels of cross-border banks, it is not known if market-oriented approaches to regulation such as the market discipline hypothesis can be used effectively to curb the risk of cross-border banks. Hence, there is the need to urgently understand the effect cross-border banking (CBB) has on depositor market discipline (DMD).

The second issue about market discipline is that most studies ask if it exists. However, most of these studies neglect developing economies from Africa by providing evidence from developed and more mature markets such as North America (United States of America, USA) and emerging economies within Latin America (Chile). For this reason, not much evidence on the ability of depositors to discipline risky banks exists from developing economies (see discussions ahead). Furthermore, most studies produce evidence of market discipline only from the monitoring phase of the phenomenon even though it also has an influencing phase (see Min, 2015).

The third issue about market discipline is that depositors need clear motives to effect market discipline (Llewellyn, 2005). However, as discussed on in Chapter Two of this study, not much is known about the factors that serve as an incentive for bank liability holders like depositors to

discipline cross-border banks with risky fundamentals. Such incentives have been identified in banking literature to include: explicit deposit insurance (EDI); the design feature of an EDI scheme, bank size; bank capital; and bank crisis (see Llewellyn, 2005). Theoretically, these incentives have been explained by using the moral hazard hypothesis, the too-big-to-fail policy, regulatory capital hypothesis, and the wake-up effect theory respectively. The purpose of this study is, therefore, to fill the contextual gap identified above.

This study fills the above-identified gaps in the literature by focusing on the developing continent of Africa. This study focused on cross-border banks within Africa to test for the existence of depositor market discipline because the continent has a monitoring and supervision problem with its cross-border banks. Cross-border banking is still a new phenomenon, and so; more time is needed for it to take a proper structure (Enoch et al., 2015). Its regulatory and supervisory procedures have, therefore not yet been fully developed (Mecagni et al., 2015). Differences in the adoption rate of the International Financial Reporting Standards (IFRS); the adoption rate of explicit deposit insurance (EDI), the adoption rate of the Basel accords, and the compliance level of the Basel Core Principles also exist on the continent (Beck et al., 2014; Enoch, Mathieu & Mecagni, 2015; Nyantakyi & Sy, 2015). Thus, they remain under-regulated and inadequately supervised. This study, therefore, assessed the extent to which a market-oriented approach to bank regulation could serve as a complement or substitute to formal bank supervision of cross-border banks and all banks in generality.

Further to the above, Oversight gaps also exist to cross-border financial groups such as Standard Bank of South Africa because they keep complex and opaque structures that make it difficult for regulators to get a clear, consolidated view of their risky activities (Beck et al., 2014; Enoch, Mathieu & Mecagni, 2015). National secrecy laws further enhance the above discussed regulatory arbitrage opportunities available to African cross-border banks and its ability to increase bank market and insolvency risk, divergent interests, parochial interests, human and financial resource constraints in terms of staff training, etc. (Mecagni et al., 2015; Mlachila, Park & Yabara, 2013; Jones, Woods & Zeitz, 2015; Zajc, 2013). Examples of cross-border banks in Africa that have failed in the past due to the existence of regulatory arbitrage opportunities from ineffective consolidated supervision are Meridian bank and the Bank of Credit and Commerce International (BCCI) (Beck et al., 2014). As a solution to the challenge of inadequate regulation and supervision of cross-border banks in Africa, some African countries have signed on to memorandum of understanding (MoU) regarding CBB. The problem with such a memorandum of understanding is that it does not cover a lot of cross-border banking issues (Beck et al., 2014).

1.2 Problem Statement

Most market discipline studies test for its existence within countries such as Mexico (Tover-Garcia, 2014); Turkey (Disli, Schoors & Meir, 2013); Australia (Yan, Skully, Auram & Vu, 2014); and China (Zhang & She, 2008). These studies find evidence of depositor market discipline (DMD). Additionally, the evidence of the authors shows that depositors do not have an incentive to monitor bank risk-taking. They find that their results significant the presence of bank failure shields such as explicit deposit insurance (EDI) (see also Demiguc-Kunt & Huizinga, 2004;

Yagcilar, 2014; Yan, Stully, Auram & Vu, 2014). However, studies such as Davenport and McDill (2005); Peria and Schmukler (2001), and Forssbeack (2011) provide contrary evidence.

Together though, both sets of studies mentioned above provide evidence on depositor market discipline (DMD) based on the phenomenon's monitoring phase-only even though it also has an influencing phase. Their evidence does not also reveal the ability of depositors to discipline cross-border banks (CBB). Only few depositor market discipline studies exist within the international banking context. These studies focus on interbank discipline- peer to peer discipline (see Allen, Hrychiewicz, Kowalewski & Tumer-Alkan, 2012; Beck, 2015), external discipline (see Huizinga & Nicodeme, 2006; Klemeier, Sander & Heuchemer, 2012; Bourgain, Pieratti & Zang, 2010; Bennet, Hwa & Kwast, 2015), the impact of the market discipline of parent banks, on their subsidiaries (Hasan et al., 2013).

Relatively little evidence on the ability of depositors to monitor and influence the risk of cross-border (CBB) therefore exists. Due to this grey area in the literature, the incentives for depositor monitoring, such as the absence of explicit deposit insurance (EDI) are not known within the CBB context. As implied from earlier sections, a lack of consensus exists in the literature on the impact CBB has on bank stability. Hence, there is a need for more research into this area. Such studies should even take a step further by analysing whether cross-border banks exposed to market risk factors such as differences in regulation (e.g., explicit deposit insurance adoption), experience more risk. Such differences in regulation offer regulatory arbitrage opportunities to banks that could affect their risk level. This study has, therefore addressed these issues.

1.3 Research Questions

Based on the above-stated background and research problem, this study poses the following research questions about cross-border banking, bank risk, bank risk-taking incentives such as explicit deposit insurance (EDI) and depositor market discipline (DMD):

i. What is the effect of CBB on bank risk-taking in Africa, given the explicit deposit insurance (EDI)?
ii. What is the behaviour of depositors towards banks that take excessive risk, especially within the cross-border banking context?
iii. What are the incentives for depositors to monitor and discipline risky banks, especially within the cross-border banking context?
iv. What is the response of banks to depositor monitoring and discipline?

Following Chibundu (2013) this study finds that answering the question (ii) will satisfy a necessary condition for market discipline whiles answering the question (iv) will satisfy a sufficient condition for market discipline.

1.4 Research Objectives

The broad objective of this study is to assess the effect of CBB on bank risk and market discipline in the presence of explicit deposit insurance and depositor market discipline incentives. Specifically, this study is carried out to attain the following objectives:

i. Examine the effect of cross-border banks on bank risk, in the presence of regulatory differences such as explicit deposit insurance (EDI) in Africa.
ii. Test for evidence of depositor monitoring of bank risk, especially cross-border bank risk, via the price-based mechanism and the quantity-based mechanism in Africa.
iii. Assess the factors that serve as an incentive for depositors to monitor and discipline the risky activities of banks, especially cross-border banks in Africa.
iv. Investigate the response of banks, to depositor monitoring and discipline in Africa.

1.5 Significance of the Study

The issue of market discipline has been acknowledged by authors such as Llewellyn (2005) to hold universal importance as signified by the second and third of the Basel Accords. Therefore, considering that this research work complements banking literature with new contextual evidence on the ability of depositors to flag down troubled banks; this study holds global significance because it has revealed the extent to which market discipline by depositors can serve as a useful complement to prompt corrective action (PCA) policies used by authorities in handling problem banks. Policymakers such as the Basel Committee on Banking Supervision (BCBS) and central banks around the world would find such knowledge relevant when making proposals that would help promote safety especially for internationally active banks operating within developing countries. Basel Committee on Banking Supervision will mostly find the outcome of this study critical because the committee has the vital twin objective of ensuring that no bank escapes supervision, and that, banks get adequate supervision. Lastly, this study is significant because it

calls depositors' attention to the important role they can potentially play in the supervision and protection banks.

1.6 Scope of the Study

This study is limited to a discussion on the effect of CBB on bank risk and market discipline in the presence of explicit deposit insurance and depositor monitoring incentives. The study covers sixteen years, starting from the year 2000 to the year 2015. The thesis uses this period due to limitations in bank data readily available from the BankScope- a database compiled by Fitch IBCA. Considering that BankScope reports on only subsidiaries of banks and not branches (the database does not report on branches because branches do not generally report individual balance sheet information), the scope of this study is limited to only banks that have crossed borders via subsidiaries and not branches. To avoid double-counting, the study collects data on only bank subsidiaries and excludes bank holding companies.

1.7 Structure of the Study

This study is in six chapters. Chapter One, which has just been done, is a presentation of the research background, the problem statement, research questions, research hypotheses, and research objectives. Chapter One also presents the significance of the study as well as the scope within which the research was conducted. In Chapter Two, relevant theoretical and empirical literature about cross-border banking; bank risk; market discipline; incentives for depositor monitoring and discipline; and managerial attitude to depositor discipline is reviewed. The chapter also presents

formulated research hypotheses, the conceptual framework for the study, and a summary of the literature review. Chapter Three presents an overview of the African banking environment within which cross-border banks operate in. In Chapter Four, the study discusses the methodological framework adopted for the study. It also explains the study's empirical models. The results of the study are presented in Chapter Five and discussed in relation to studies close to this one. The last section, Chapter Six, provides a conclusion to the study. The study's recommendations for future research work are also presented here.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter of the study reviews the literature on depositor market discipline (DMD), factors that give depositors an incentive to monitor and discipline risky bank behaviour, as well as cross-border banking (CBB). The objective of this review is to put this study in a better perspective by understanding, critiquing, and establishing gaps that exist in the literature. To achieve these objectives, the review is presented in four sections. In the first section, the theoretical framework of the DMD phenomenon as well as the incentives for depositor monitoring, such as explicit deposit insurance, is discussed. In the second section, the review analyses CBB as well as its implications on DMD. In the third section, a discussion is done on the empirical findings of CBB, bank risk, depositor monitoring incentives as well as DMD. The fourth section is a summary of the literature review. The summary highlights the grey areas identified in the review, formulates the research hypotheses, and lastly presents the conceptual framework that guided the study.

2.2 Theoretical Literature

2.2.1 Depositor Market Discipline (DMD) Defined

Based on various definitions that exist, this study conceives of market discipline as existing on a continuum with two extreme ends (reward and punishment- see Desli, Schoors & Meir, 2013). They perceive this phenomenon to exist when investors in bank liabilities actively reward or punish banks for their risk-taking behaviour. Cubillas, Fonseca, and Gonzalez (2012) (in line with

Bushman, 2014; Calomiris & Powell, 2000), however, appear to concentrate on the downside of this continuum by defining depositor market discipline (DMD) as a mechanism whereby bank depositors show their displeasure to high bank risk-taking by requiring higher interest rates (price effect mechanism of market discipline) or by withdrawing deposits (quantity effect mechanism of market discipline). Min (2015) defines DMD in a similar way. Other authors also basically see this phenomenon as a process in which depositors can identify and monitor riskier banks and react in consequence by putting pressure on the management of such banks via withdrawing their deposits or demanding an increase in the interest rates banks pay on their bank deposits (Moe, 2006; Tover-Garcia, 2014). Maechler and McDill (2006) note that in its extreme form though, DMD can lead to a bank run[2]; which Garten (1986) finds sometimes to be an apt demonstration of the effectiveness of market discipline. Such an extreme or severe form of market discipline does not, however, allow management to respond to this sign of displeasure shown by depositors.

Evanoff (1993) explains that bank depositors take class actions such as bank run as a result of speculation regarding the deterioration of a bank's deposit account; and because of concerns about the opaque assets of banks (Flannery, 1998). Therefore, given this potential to cause a bank run, Macey and Millar (1988) and Flannery (1998) posit that government of countries that have chosen to rely on DMD as a mechanism to curb or rein in the excessive risk-taking behaviour of banks should offer some form of deposit protection and lender of last resort protection, to curb potential bank runs.

[2] Macey and Millar (1988) describe bank runs as a problem resulting from a class action taken by depositors.

Therefore, based on the above definition of DMD, Bushman (2014), similar to Macey and Garrett (1988), sum up the DMD hypothesis as a market-based incentive; that has its roots in the efficient market hypothesis because it relies on the market to reach efficient outcomes (Min, 2015). More precisely, the author notes that the DMD hypothesis corresponds with the semi-strong form of the efficient market hypothesis because it can reach efficient outcomes when there are no transaction costs, no informational asymmetry, and no government interference. To this effect, the author takes note of how interest rates quoted by banks adjust as and when the public gets information about bank risk levels. DMD hypothesis, however, makes an implicit assumption that bank shareholders tend to have a moral hazard to take excessive risk thereby leading to principal-agency conflict between bank creditors (principal/depositors) and bank owners (agents/shareholders).

Monitoring Phase and Influencing Phase of Market Discipline

The DMD hypothesis has it that, the ability of depositors to monitor and discipline risky bank behaviour should influence the behaviour of bank managers towards risk by curbing their risk-taking appetite. This idea has therefore led to literature recognising two phases of DMD: monitoring phase and an influencing phase (Bliss, 2001; Tover-Garcia, 2014; Min, 2015). It is expected that true tests for DMD should provide results for these two phases (see: Barajas & Steiner, 2000; Bliss, 2001; Maechler & McDill, 2006; Chibundu, 2013; Arnold, Grobi & Kozoil, 2016; Min, 2015) because these two phases make up a necessary and sufficient condition for market discipline (Chibundu, 2013). Min (2015) and Flannery (2012) capture these two phases as an ex-post market discipline and ex-ante market discipline, respectively.

Direct Discipline and Indirect Discipline

Note that when depositors monitor and discipline risky banks, their actions can directly influence the actions of bank managers and indirectly influence the actions of banking supervisors. Due to this, direct discipline/influence and indirect discipline/influence exists. Banking literature notes that when depositor monitoring and discipline causes managers to react by trying to avoid paying higher interest expenses, then the direct discipline has occurred by way of Direct Influence (Flannery, 2012; Bliss, 2001). The authors further explain that when bank supervisors can exploit information about a bank that they have extracted from depositor monitoring and discipline, then the indirect discipline has occurred by way of Indirect Influence (Flannery, 2012; Decamps, Rochet & Roger, 2004). Llewellyn (2005) captures the indirect influence phase of market discipline as ‘policy influence'. Other authors, however, caution that the term indirect discipline does not only apply when regulators and supervisors use risk signals from depositors to discipline risky banks, but it also applies to other interested parties that may use the signals from direct disciplinary actions taken by depositors (Hamalainen, 2006).

Under indirect discipline or indirect influence, bank supervisors extract information about bank fundamentals from depositor behaviour (Desli, Schoors & Meir, 2013). The authors find that this happens because, information asymmetry exists between bank regulators and banks (Desli, Schoors & Meir, 2013). Altogether, i.e., direct discipline and indirect discipline, Decamps, Rochet, and Roger (2004) opine that direct market discipline works as a substitute for prudential supervision while indirect market discipline works as a complement to prudential supervision. Flannery (2012) provides a table on these aspects of market discipline as Elements of Market

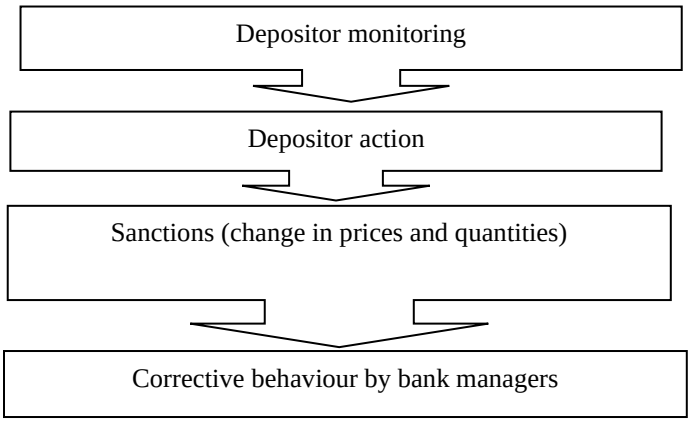
Discipline. An aspect of that table that falls within the scope of this research work is presented below in Table 2.1.

Table 2.1: Elements of depositor market discipline

	Monitoring	**Influence**	
		Direct	**Indirect**
Banking Firms	Bank liability prices are good estimates of a firm's true value and risk exposures	Actually, or anticipated changes in security prices signal appropriate actions to managers	Supervisors use security price changes to identify banks that might require oversight or corrective action

Source: Flannery (2012)

This study, however, finds that Flannery's (2012) elements of market discipline (monitoring, direct influence, and indirect influence) sit within Mayes (2005) four regimes of market discipline. The true test for DMD (monitoring and directly influencing the actions of bank managers) as summed up in Flannery's (2012) however appears to be captured in the second, third, and fourth regime of Mayes's (2005) regimes of market discipline. In support of this true test for DMD, Llewellyn (2005) presents a schematic of the market discipline process. It is displayed below in figure 2.1.



Source: Llewellyn (2005)

Figure 2.1: The process of market discipline.

The first stage of Llewellyn (2005) market discipline process, as shown in Figure 2.1, is depositor monitoring. Based on this activity of monitoring the risk-taking activities of banks, it is expected that depositors will react to bank risk-taking in the second stage. Such action will reflect in the third stage through changes in the price of bank deposits and the quantity of bank deposits supplied by depositors. These changes in price and quantity effects create the price-based mechanism and quantity-based mechanism for market discipline (Llewellyn & Mayes, 2003; Febrian & Herwany, 2011; Tover-Garcia, 2014). In the last stage of Figure 2.1, it is expected that the sanctions depositors will impose on a bank for taking a risk (ex-post market discipline) will correct the behaviour of bank managers by causing them to reduce bank risk levels (direct influence/direct discipline).

Other discussions on the third stage of the market discipline process proposed by Llewellyn (2005) shows that to have a comprehensive and complete test of market discipline; there is the need to examine both the price-based mechanism and the quantity-based mechanism (see Peria & Schmukler, 2001). The authors reveal that such a joint examination of DMD helps to distinguish market discipline from alternative hypotheses such as regulatory discipline.

As a build-up on the quantity-based mechanism of market discipline, Tover-Garcia (2014) discovers that the maturity-based mechanism can also exist. In this case, depositors will decide to swap their long-term maturing deposits for short-term maturing deposits. Bourgain, Pieretti, and Zanaj (2010) also build upon the quantity-based mechanism of DMD with their discussion on

"external discipline". Here the authors share that external discipline by depositors exists when depositors reallocate their savings from a home bank to a less risky external foreign one.

The above discussion on DMD establishes that depositors discipline risky banks by using price adjustments and quantity adjustments which are driven by the theory of demand and supply for deposits (Park, 1995; Tover-Garcia, 2014). Kobayashi and Bremer (2007) explain these quantity and price adjustments within a bank liability management framework. In that framework, they consider two types of deposits (insured deposits and uninsured deposits) as the only liability held by banks. They perceive deposits from these perspectives because general literature reveals that the cost of using insured deposits is cheaper for risky banks. Furthermore, they assume that banks have only loans as their assets and that the demand for such bank loans is fixed. Based on these assumptions, they capture the demand curve for bank deposits and the supply curve of bank deposits. To do this, they assume that banks operate at a particular level of lending. Consistent with the literature, they demonstrate that riskier banks tend to shift from uninsured deposits to insured deposits to reduce the cost of uninsured deposits. Their demonstration, however, shows that an endogeneity problem exists in their framework due to an interactive effect between the interest cost of bank deposits and the supply of bank deposits.

Therefore, other authors such as Park (1995), Peria and Schmukler (2001), Disli, Schoors, and Meir (2013), Aysan Disli, Ozturk, and Turhan (2015), and Kobayashi and Bremer (2007) recommend that to analyse the interactive effect, a reduced form equation of the demand and supply schedules should be used to specify the parameters to be estimated in a DMD study. They

conclude that it is only such combined information that will enable them to disentangle depositor discipline from demand shifts (demand effect) and regulatory shocks (See Kobayashi & Bremer, 2007; Park, 1995; Peria & Schmukler, 2001).

To ensure that DMD exists and is effective in reining in the excessive risky tendencies of banks, Crockett (2002), Evanoff (2003), and Llewellyn (2005) demonstrate that some pre-requisites should be fulfilled. Crockett (2002) captures four of such pre-requisites whiles Llewellyn (2005) proposes nine of them. Evanoff (2003), on the other hand, discusses five conditions for an effective depositor discipline. In Crockett's (2002) view, to make DMD effective, the following needs must be met. Depositors must: have access to sufficient information about bank fundamentals; be able to process the sufficient information provided; have incentives to process the information correctly; and have available to them, a mechanism to discipline risky bank behaviour.

Llewellyn's (2005) pre-requisites for an effective market discipline are, however, more comprehensive and cover a broader scope than Crockett (2002). The author presents these pre-requites as the need for information on bank fundamentals; large bank depositor market with the ability to interpret information on bank fundamentals, incentives to make depositors monitor bank fundamentals; a reaction from depositors based on the information they have received on the fundamentals of the bank; a thriving banking market for depositors to react in; depositor reaction to information on bank fundamentals should lead to efficient bank deposit cost; depositor reaction to bank fundamentals should be objective; depositor reaction to should lead to a lead to a market-clearing point, and depositor reaction to information on bank fundamentals need to influence the

behaviour of bank managers. A comparison of the above-discussed pre-requisites shows that Llewellyn (2005) appears to be a build-up of Crockett (2002) because all four of Crockett (2002) pre-requisites for efficient market discipline, can also be found in Llewellyn (2005). These are: (1) the need for sufficient information, (2) the need for depositors to be able to analyse information disclosed, (3) the need for depositors to have an incentive to monitor and discipline risky banks, and (4) the need for a market through which price and quantity adjustments can be made. Unlike Llewellyn (2005), Crockett (2002), appears to be silent on the influencing phase of DMD. The important role information disclosure plays in the DMD process is further discussed below.

Andres and Vallelado (2008) discuss that as banks grow more complex, information flow reduces, and this affects the ability of stakeholders to monitor managerial decisions. A key ingredient for successful depositor discipline is that depositors should have full and accurate information about bank fundamentals (Doty, Mahaffey & Goldstein, 1991). This way, they can immediately withdraw their deposits if a bank is taking on too much risk (Mishkin, 1996). Information disclosed is considered ‘adequate' if it is meaningful, accessible, and regular since sporadic disclosure can cause bank instability.

High asymmetric information has been known to increase uncertainties and reduce the credibility of financial contracts (De Bandt, Hartmann & Peydro, 2012). It has also been known to cause depositors to even run on a solvent bank. It is for this reason that Flannery (1998) points out that, regulators are sometimes reluctant to disclose the CAMEL ratings of banks because they fear that such disclosures about the bad status of banks could become self-fulfilling prophesies by causing

such troubled banks to face even greater troubles. Information disclosure and transparency are therefore expected to generate strong market discipline provided depositors who have an incentive to use this information exists (Danielsson, Embrechets, Goodhart, Keating, Mvennich, Renault & Shin, 2001). Bourgain, Pieretti, and Zanaj (2010) also draw similar conclusions on the positive impact a transparent banking system has on depositor discipline. In reality, though, banks and their assets are described as being opaque because they generate their assets by using private information about borrowers and projects that are not available to those outside the bank (Bushman, 2014).

In spite of the discussions had so far on the DMD process and the pre-requisites that will make it effective, this research finds that the entire process for market discipline as shown in figure 2.1 may not start at all if depositors have to incur a private cost to monitor bank risk-taking behaviour. Additionally, if such monitoring costs are perceived by depositors to be greater than the potential cost, they will bear in case of bank failure, then they will not have an incentive to monitor at all (Llewellyn, 2005). This means that to make the DMD process work as captured in Figure 2.1; bank policymakers should seek to lower depositors' private cost of monitoring whiles raising their private cost of bank failure (Llewellyn, 2005; see also Karas, Pyle & Schoors, 2009). Raising the cost of bank failure (this includes loss of deposits or the risk of losing deposits), improves depositor monitoring by serving as an incentive to monitor (see also Macey & Miller, 1988; Kane, 2001). Further to this, policymakers can lower the cost of private monitoring by formulating a public policy that will enhance bank disclosure requirements.

Situations that raise the private cost of failure depositors, and thereby serve as an incentive for depositors to monitor bank risk are: explicit deposit insurance scheme adoption; the design features of an explicit deposit insurance scheme, banks' asset size, prompt-corrective action (PCA); the level of bank capital, and the existence of bank crises. These incentives for depositors to monitor and discipline risky banks are discussed next.

2.2.2 Incentives of Depositors to Discipline Risky Banks

The first of the incentives for depositors to monitor bank risk-taking is deposit insurance. Deposit insurance can exist explicitly or implicitly. This is a modern state legislative intervention that makes regulators/governments formally commit to guarantee up to a pre-set limit some or all of the deposits of failed banks (Okeahalam, 2003; McCoy, 2008; Demirguc-kunt & Sobaci, 2001; Kane, 2001). The guarantee in this is usually funded from ex-ante premiums or ex-post assessments imposed on eligible institutions (Kane, 2001). Earlier studies such as Calomiris and White (1994), and Okeahalam (2003) take note of an increment in the rate of introduction of EDI schemes.

The number of EDI adopting countries has been increasing over the years due to its benefits. One main benefit given for adopting EDI is that it increases the stability of the banking industry. From the banking literature, this study gathers that this stability effect of EDI can be analysed from a macro perspective due to its effect on an economy; and from a micro perspective due to its effect on depositors. From the economy-wide perspective, EDI offers a stability effect by protecting the fragile banking system and reducing the incidence and cost of financial system breakdowns

(Demirguc-Kunt & Huizinga, 2004, 2008; Demirguc-kunt, Karacaovali & Laeven, 2005); preserve public confidence in banks (Corrigan, 1982); make the closure of an insured bank to be less consequential (Goodhart, 2008); encourage competitive neutrality (Okeahalam, 2003); and ensures bank safety and soundness (Angkinand & Wihlborg, 2010). From the micro-perspective of depositors, EDI can cause bank stability by preventing depositors especially small depositors, from collectively running on a bank since the scheme protects their deposits (Goodhart, 2008; Evanoff, 1993; Garcia, 1999).

On the other hand, EDI can be costly because it has a direct moral hazard effect on: (1) bank shareholders; and (2) bank depositors. Just as in other insurance programs (McCoy, 2008), the moral hazard of deposit insurance makes people who are protected against a risk under the scheme, have less incentive to take precautions against it (Boyce & Ndikumana, 2001; Garcia, 2000; McCoy, 2008). With bank shareholders, the moral hazard effect of EDI gives insured banks the incentive to increase asset risk and leverage (Keeley, 1990; Angkinand & Wihlborg, 2010; McCoy, 2008; Forrssbaeck, 2011). These authors find that EDI has this effect on shareholders because, under these circumstances, they can keep all the upside benefits while shifting the losses to the deposit insurance fund, and taxpayers/government. Banks can shift risk to the deposit insurance fund and taxpayers/government because their businesses are limited in liability. Their risk-shifting actions, therefore, expose depositors as well as guarantors to loss (Carbo-Valverde, Kane & Rodriguez-Fernandez, 2012; Forrssbaeck, 2011; Amihud, Delong & Sanders, 2002; McCoy, 2008; Mousuand & Romec, 2013).

In the instance of depositors, the moral hazard effect of deposit insurance reduces their incentive to monitor and discipline risky banks especially if they are fully insured to the point that they do not face any bank failure costs (See Doty, Mahaffey & Goldstein, 1991; Llewellyn & Mayes, 2003; Park, 1995; Senbet, 2001; Merton, 1977; Lang & Robertson, 2002). In Garcia's (1999) view, the moral hazard of EDI makes depositors less careful when initially selecting their bank and even deters them from moving their funds to a safer haven as a means of disciplining their banks for taking excessive risk. Thus, the threat of depositors collectively acting to cause a bank run is removed (Evanoff, 1993). The removal of a bank run threat, however, serves as an incentive for bank owners and managers to take on additional risk in their asset portfolios (Garcia, 1999). The implication of the stability effect and the moral hazard effect of EDI is that it reduces the probability of a bank run whiles simultaneously, it can also contribute to systemic bank failure by positively affecting bank risk level (see: Angkinand & Wihlborg, 2010; Merton, 1977; McCoy, 2008; Anginer, Demirguc-kunt, & Zhu, 2014; Delong & Suanders, 2011). Calomiris and Jaremski (2016), therefore conclude that deposit insurance offers a trade-off between a reduction in liquidity risk (stability effect) and an increase in insolvency risk (moral hazard effect).

As earlier indicated, implicit deposit insurance also exists. It is however said to offer depositor assurance after an event, unlike EDI which helps to generate investor confidence before an event. It manifests itself in the form of regulatory forbearances, subsidized loans, and unfunded defacto coverages that exceed the formal limits specified in a nation's laws and regulations (Kane, 2001).

A summary of the discussion had so far on deposit insurance, shows that EDI can increase a bank's risk through its moral hazard effect (implicit insurance that has been issued by a credible government can have a moral hazard effect of reducing depositor sensitivity to bank risk). However, its stability effect can prevent depositors from showing their displeasure to such risky bank behaviour through a bank run. The extent to which the stability property of EDI will work to neutralize the moral hazard effect will depend on the level of trust depositors have in the deposit insurer, or the level that large depositors perceive themselves to be exposed.

The second factor that can serve as an incentive for depositors to discipline banks is the design feature that should be included in EDI schemes to make market discipline effective. The Core Principles for Effective Deposit Insurance systems published in November 2010, also recommends that the moral hazard effect of deposit insurance should be mitigated by ensuring that the deposit insurance system contains appropriate design features.

A third factor that can serve as an incentive for depositors to monitor bank risk is Prompt corrective (PCA) action schemes (or bank insolvency regimes). These schemes allow bank regulators to immediately close problem banks (Goodhart, 2008). When this happens, depositors stand the chance of losing part or all of their deposits in a risky bank since such banks are not likely to be rescued by the government (Llewellyn, 2005; Min, 2015).

Banks with large asset sizes are the fourth factor identified in the literature to serve as a disincentive to depositor monitoring and discipline. Large banks believe that they will be rescued by the government if they face insolvency[3]. So, this implicit protection in the form of too-big-to-fail policy gives banks the moral hazard to increase risk (Miskin, 1996; see also Godlewski, 2006). Therefore, to give depositors, the incentive to monitor the risky behaviour of banks, this "too-big-to-fail" policy needs to be modified (Doty, Mahaffey & Goldstein, 1991). Such a modification will lead to the existence of "too-large-to-save" banks, whereby countries will commit to a no-bailout policy, especially within the cross-border banking context (Moe, 2006). It is expected that this will improve market discipline.

A fifth factor in serving as an incentive for depositors to discipline risky banks is the bank capital level. Banks are by their nature risky, and so they are mandated to maintain a certain level of capital to absorb some of the losses they may make from their risky business (Andres & Vallelado, 2008). The authors discuss that the tag "risk" attached to banks emanates from the fact that they fund their long-term opaque assets with short-term maturing deposits that have to be paid on demand. Due to this lack of congruence in the maturity periods for their assets and liabilities, they therefore typically face a maturity mismatch problem. Although safety-net mechanisms exist, the above-identified funding problem also means that banks need to hold capital as a cushion against unexpected changes in asset or earnings values (Evanoff, 1993). Lee and Hsieh (2013) note that a positive relationship between capital and risk is referred to as "regulatory hypothesis". Altunbas et al. (2007) however provide that a negative relationship between capital and risk (i.e., bank risk

[3] A bank becomes insolvent when its assets, as valued by a supervisor, are less than its liabilities- Horvitz (1975)

increases as capital declines) will mean the presence of the moral hazard hypothesis- that banks will have an incentive to exploit existing flat deposit insurance schemes. Another school of thought also has it that capital regulation instead increases the risk-taking incentives of banks (see Chen, Hwang, Lin & 2012). This is because banks view the capital requirement as a restriction on their ability to earn an optimum return because of the reduction in their leverage levels.

A sixth factor serving as an incentive for depositors to discipline risky banks is banking crises Maechler and McDill (2005) simply define a banking crisis as a case of large and numerous bank failures. The Bank crisis period is said to have a ‘wake up' call the effect on uninsured depositors by increasing their exposure levels to potential loss of deposits (Peria & Schmukler, 2001).

The immediate section above shows that factors such as explicit deposit insurance, explicit deposit insurance design schemes, prompt corrective action policies, bank asset size, bank capital, and bank crises serve as an incentive for depositors to discipline risky banks. The efficacy with which depositors’ discipline will work on curbing bank risk is, however, affected by instability issues emanating from the cross-border banking context (Eiseinbies & Kaufman, 2008). This context is, therefore discussed in the next section.

2.2.3 Theoretical Review of Cross-border Banking (CBB)

Klemeier, Sander, and Heuchemer (2012) understand the term cross-border banking to refer to both banks as well as banking customers that have transcended their countries' borders with their

banking business. For this study, however, cross-border banks are banks that conduct their banking business beyond their home country's borders through the establishment of at least a subsidiary or a branch (Beck, Fuchs, Singerand & Witte, 2014). Whiles some studies use the home-field advantage hypothesis and the global advantage hypothesis to explain cross-border banking and finance, other studies such as Klemeier et al. (2012) use the gravity model found in international trade to explain this phenomenon. In this instance, the authors find that Newton-inspired gravity variables such as economic size can be used as an indicator for masses needed in international trade since financial products are weightless. In addition to economic size, the gravity model also uses distance to explain cross-border finance and banking.

Other studies use other hypotheses such as the client pull hypothesis to explain cross-border banking. Here, the explanation given for cross-border banking is that as the clients of banks go international, their banks also develop a motivation from this to go international. In a related view, Claessens (2006) find that the existence of cross-border banking is determined by a country's credit quality, institutional quality, growth opportunities, and regional or proximity bias, including clustering. Other studies also explain cross-border capital flows by using the global "push" factors for capital from the country-specific "pull" factors (Bruno & Shin, 2015; Beck et al., 2014).

Worldwide, cross-border banks have widely increased. This is indicated by Figure 2.2 below which captures the end of quarter values for claims and liabilities for banks in all Locational banking statistics countries (LBS) for the Bank for International Settlements in billions of United States dollars from the period 2000-2016. From that figure, it can be seen that cross-border claims

had consistently been increasing until they dipped over the 2007-2009 financial crisis periods. Cross-border claims then rose again after the crisis periods. This upward trend in CBB is a general trend worldwide because of financial globalization, regional and economic integration, financial liberalization, and financial deregulation as a result of the industry's structural adjustment process in the 1990s and early 2000s in Africa, the introduction of the euro, the Single Market Program in Europe, the elimination of capital controls and advances in information technology, the Riegle-Neal Act, the Gramm-Leach Bliley Act in the United States, the end of apartheid in South Africa in the mid-1990s; changing market dynamics as well as a reduction in government ownership of financial institutions; and the need to follow bank clients abroad (Arena, Reinhart & Vazquez, 2010; Berger, DeYoung, Genay & Udell, 2000; Huizinga & Nicodeme, 2006; Claessens, Dell'Ariccia, Igan & Laeven 2010; Olaka & Osoro, 2015; Beck et al., 2014; Enoch, Mathieu & Mecagni, 2015). Based on these reasons, Schoenmaker and Wagner (2011); and Claessens (2006) state that CBB has various benefits and costs for financial stability.

From Berger et al. (2016), this study finds that the benefits and cost of cross-border banking can be explained by the diversification hypothesis, and market risk hypothesis. The authors find that international banks reduce their risk because by diversifying through expansion in other markets and access to global capital markets. At the same time, international banks may increase their risk due to market-specific factors (local market competition, culture, regulatory complexity, economic and political instability, the disadvantage of being foreign, etc.). They refer to this as the market risk hypothesis. Beck et al. (2014) therefore call for a debate on the academic and policy implications of CBB. The next section of the thesis, therefore, discusses the benefits and costs of CBB.

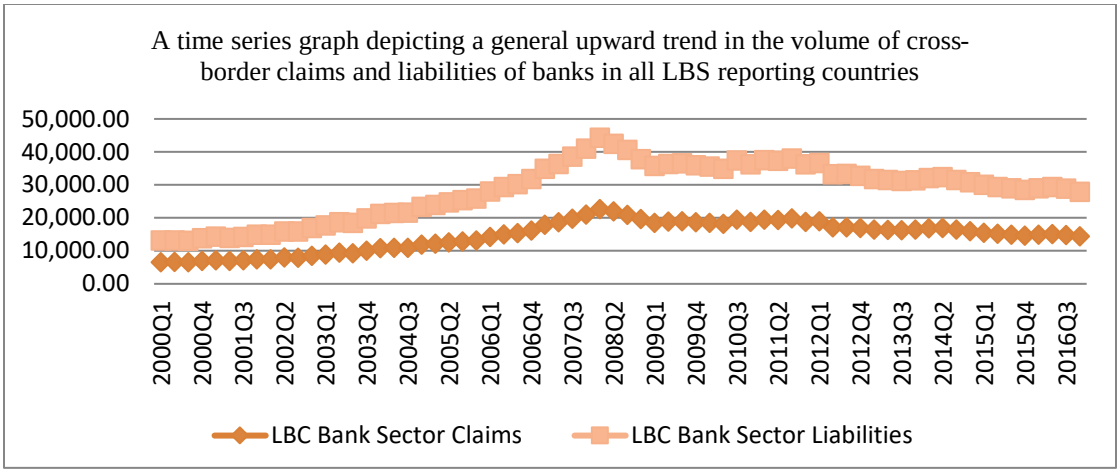


Figure 2.2: Cross-border positions of Banks in all Locational Banking Statistics reporting countries.

Cross-border claims and liabilities are ends of quarter figures in billions of US dollars.
Source: Bank for International Settlements (BIS) website.

Benefits of Cross-border Banking (CBB)

In line with standard portfolio theory, a key benefit of CBB is that such banks enjoy the "diversification impact" because their nature makes them less exposed to a single domestic shock, foreign shock, local business cycle, or credit market conditions (Schoenmaker & Wagner, 2011; Vennet, DeJonghe & Baele, 2004). This may, in turn, reduce the volatility of lending. Thus, CBB also contributes to a better sharing of an economy's risks with other countries. Lee (1999) also discovers that cross-border banking enables banks to diversify the sources of income and improve upon their profit margins.

Other benefits of CBB include the fact that it leads to an increase in cross-border bank flows just as seen in figure 2.3 above. CBB also helps to propagate global liquidity, enhance bank competition, foster credit growth, lower volatility, and help to implement best practice in terms of supervision and regulation from their home country (Claessens & van Horen, 2013; Bruno & Shin,

2014; Allen et al., 2011). They have also helped to create large pan-European banks and pan-African banks (PABs) (Goodhart & Schoenmaker, 2009;), which through the financing they obtain from their home, has been able to help countries, to be able to stabilize the supply of credit and deposits in a host country (Arena et al., 2010).

Cost of Cross-border Banking (CBB)

Berger, Ghoul, Guedhami, and Roman (2016) also find that when banks go international, they open themselves up to market risk (market risk hypothesis). The authors find that support for this hypothesis can be found in the home-field advantage hypothesis mentioned in earlier sections through factors such as local market competition, culture, regulatory complexity, economic and political instability, the disadvantage of being foreign, etc.

Key among these market risk factors is the issue of regulatory complexity and its associated consequences of regulatory arbitrage (regulatory arbitrage hypothesis). These market risk factors, therefore, lead to an increase in the systemic risk of cross-border banks. Berger et al. (2000) defines systemic risk as "the risk that credit or liquidity problems of one or more financial market participants will create substantial credit or liquidity problems for participants elsewhere in the financial system"; De Bandt, Hartmann, and Leydro (2012) find that at the heart of systemic risk is contagion). Therefore, in the same way, that cross-border banking inures to the benefit of a "diversification impact" for a country, it also exposes a country to foreign shocks (Goodhart & Schoenmaker, 2009). Cross-border banks can increase the systemic risk of banks by taking

advantage of regulatory arbitrage available to them (Alverz, Garcia & Gouvela, 2016). The authors find that this means that cross-border banks circumvent stricter regulations by taking advantage of differences among regulations and oversight provisions of various countries. When regulatory arbitrage exists, cross-border banks can shift risk to other countries to bear the losses that result from their risk-taking activities. Lee (1999) supports this by uncovering that cross-border banking can increase cross-border fraud.

Thus, the availability of regulatory arbitrage is a concept some global banks consider when analysing which country to expand to (Alverz, Garcia & Gouvela, 2016). Regulatory arbitrage has, therefore, become a subject of concern because of the fragility danger they can increase in financial systems around the world (Carbo-Valverde, Kane & Rodriguez Fernandez, 2012). Alverz, Garcia, and Gouvela (2016), therefore advise that regulatory harmonization needs to be highlighted if a comparative advantage is to be made unavailable to countries.

Situations that contribute to regulatory arbitrage include oversight gaps due to understaffed regulators, limitations in the national regulatory system and information set (Kane, 2006; Mayes, 2005); and immature effective coordination mechanisms (Hardy & Nieto, 2011). Moskow (2003) adds that the problem of supervision associated with CBB mainly arises during times of crisis.

Eisenbeis and Kaufman (2008) add to the downside effect of CBB by suggesting that it creates instability within the banking system that may affect the provision of deposit insurance, the

effectiveness of prudential regulation, and even the strength of the market discipline. Such instability could even become a systemic risk by helping to spread around the credit or liquidity problems of some financial market participants (Berger, DeYoung, Genay & Udell, 2000). Lee (1999) also shares a similar view. Based on Schoenmaker and Wagner (2011), this study finds that another related cost of CBB is that, in times of an adverse event in a domestic economy, foreign banks may decide to "cut and run", especially, if they have been established in the form of a subsidiary. Lee (1999) also finds that cross-border banking brings about issues of extraterritoriality whereby, countries are not sure of the extent to which they should use their national regulations to govern foreign persons or transactions. Monitoring cross-border banks have, therefore become a critical regulatory issue especially given that they are usually large and systemically interdependent, as it is in the Nordic and Baltic regions (Allen et al., 2011).

Numerous suggestions have, therefore, been made as solutions to overcoming the monitoring and supervision problem associated with CBB. The first suggestion is that, just like the Nordic (Norway, Finland, and Sweden) and Baltic regions, countries should commit to a burden-sharing as part of Memorandum of Understanding (MoUs) in cases of cross-border financial failures to share better the costs associated with CBB, among countries (Goodhart, 2008; Allen et al., 2011).

The second suggestion is that countries should commit to MoUs (Beck et al., 2014); which will enable them to share information on cross-border banks (Mayes, 2005).

The third suggestion to the under-supervision problem of cross-border banking is that a College of Supervisors (CoS) should be used to enhance the effectiveness of consolidated supervision of cross-border banks (Beck et al., 2014).

However, the above-suggested solutions to the monitoring and supervision problem associated with CBB may not fully work because: member countries to an MoU or CoS on cross-border banking have their parochial interests. Moskow (2006), therefore suggests that there may be times when the goals of foreign banks conflict and their interests diverge to the point that this divergence could be greater during a crisis. Schuler (2003) shares similar sentiments. Considering that there are monitoring and supervision problems associated with CBB and that market discipline has been suggested as a mechanism of controlling risky bank behaviour, then there is the need to study how market discipline can be used to curb the risky behaviour of CBB that emanates as a result of inadequate supervision (see Moe, 2006).

In support of the idea of having market discipline as a complement to formal bank supervision, Evanoff (1993) finds that regulatory discipline is not only expensive, but events of the 1980s also indicate that it is occasionally ineffective. Danielsson, Embrechts, Goodhart, Keating, Muennich, Renault, and Shin (2001) also add that market discipline can reduce the potential of credit risk in banks. Garten (1986) opine that market discipline has the power to induce effective risk management by banks, which would reduce the number of bank failures and thereby help to create safer banks. Therefore, as part of that reform, the United States Congress attempted to increase the role of the depositor as a source of market discipline to supplement regulatory discipline. Flannery

(1998) discusses that the ability of market forces to supervise financial firms has become an important policy question as financial firms evolve within increasingly global financial markets.

Other authors such as Min (2015) also uncover that there are calls in the Basel Accords, the Dodd-Frank Wall Street Reform and Consumer Protection Act (the Dodd-Frank Act) of the U.S., and various other measures the federal banking regulators of U.S. have unveiled, to make market discipline effective. Effective market discipline will yield benefits such as a reduction in the moral hazard incentives of cross-border banks to take risk due to the presence of government guarantees; (2) improve the efficiency of cross-border banks by pressuring inefficient banks to become efficient or exit the industry; (3) the social cost of supervising banks may be lowered if regulators cede greater control to market forces that can distinguish between good and bad banks (Peria & Schmukler, 2001; Hamalainen, 2006). This point is particularly made relevant by Rugemintwari (2011).

2.3 Empirical Literature

2.3.1 The Interactive Impact of Regulatory Arbitrage Opportunities and Cross-Border Banking (CBB) on Bank Risk

A relationship between bank risk and cross-border banking (CBB) has been established in the literature based on the diversification hypothesis, and market risk hypothesis (see Berger, Ghoul, Guedhami & Roman, 2016; Goodhart & Schoenmaker, 2009). The market risk hypothesis, however, appears to have generated a lot of interest with some studies explaining their results with

market risk factors such as regulatory arbitrage (regulatory arbitrage hypothesis). These studies include Berger, Ghoul, Guedhami, and Roman (2016). In their study, the authors analyse the Z-score levels of 15,988 banks from the United States that have gone international with their activities as against their domestic counterparts. They find that their results on the impact of international expansion on bank risk support the market risk hypothesis and not the geographical diversification hypothesis.

Carbo-Valverde, Kane, and Rodriguez-Fernandez (2012) also study international banks and risk. However, they focus on banks that have gone international via cross-border mergers (CBM) as against their domestic counterparts. Based on data they collect from 15 European Union (EU) countries, they find that banks in the EU that have engaged in CBM are more leveraged and able to extract larger safety-net subsidies than other EU banks. They find their results consistent with the regulatory arbitrage hypothesis. Kudrna (2012) also highlight the role gaps in the regulation of cross-border European banks played in the 2007 financial crisis. Amihud, Delong, and Saunders (2002) also contribute to the discussion on international banking and bank risk by studying 214 cross-border bank mergers, of which only South Africa is an African country. Unlike other authors such as Carbo-Valverde, Kane, and Rodriguez-Fernandez (2012), Amihud, Delong, and Saunders (2002) find that CBM does not change the risk of acquiring banks in any significant way. They interpret this result to mean that CBM has a bank dependent or idiosyncratic effect on risk. Based on stock market data, Baele, De Jonghe, and Vennet (2007) study the return/risk profile of financial conglomerates with different degrees of functional diversification and find that the relationship is non-linear.

In Sissy, Amidu, and Abor (2017), the authors show results from developing countries to support the diversification hypothesis unlike other studies on cross-border banking which provide evidence from developed regions (see Berger, Ghoul, Guedhami & Roman, 2016; Carbo-Valverde, Kane & Rodriguez-Fernandez, 2012). In their study, however, the authors do not acknowledge the impact regulatory arbitrage opportunities such as differences in explicit deposit insurance adoption rate available to cross-border banks in developing countries can have on the solvency and market risk of cross-border banks.

Bruno and Shin (2015) show that within international banks, leverage levels build up in booms and fall in busts. Based on a sample of 89 low-and lower-middle-income countries, Claessens and van Horen (2013) conclude that foreign bank presence is negatively related to private credit. Schoenmaker and Wagner (2011) also study CBB. However, they do so to develop forward-looking metrics that will help measure the resilience of a country's banking system in the face of a domestic or foreign shock. Moe (2006) also notes that as cross-border banks expand overseas, their risk exposure increases. In a review provided by Beck et al. (2014), the authors also note that countries such as India and China are not positively affected by the presence of international banks.

The above discussion on the relationship between banks that have gone international and their risk levels shows that there is a lack of consensus in the literature. It also shows that evidence on international banking and bank risk exits mostly from developed regions such as Europe and the United States of America and not from developing regions like Africa. Another issue from the review is that existing knowledge on the relationship between international banks and risk,

concentrate on banks that have gone international via cross-border mergers (CBM), or by forming conglomerates and not via cross-border banking. Although few studies such as Sissy et al. (2017) consider cross-border banking and bank risk, they do not account for the impact regulatory arbitrage opportunities may have on the solvency of such banks. The review, therefore, shows that a contextual gap exists in the level of knowledge available on the interactive impact of regulatory arbitrage opportunities and international bank expansion via CBB has on bank solvency.

Empirical evidence of the above-stated relationship is needed from developing countries. This because variations in regulation exist within there. These variations in regulation include the adoption rate of explicit deposit insurance, the adoption rate of the Basel Accords and the adoption rate of the International Financial Reporting Standards- IFRS. Therefore, considering that cross-border banking exposes a bank to the market risk of other countries (Motelle & Biepke, 2015), this study formulates the following hypotheses:

H_1: Cross-border banking increases the market risk of cross-border banks.

H_2: Cross-border banks operating in countries with explicit deposit insurance have a higher market risk than their counterparts that in countries without explicit deposit insurance.

2.3.2 The Response of Depositors to Bank Risky Behaviour: Evidence from Complete Tests of Market Discipline

As earlier mentioned in Chapter One of this study, Macey and Garrett discuss the market discipline phenomenon as far back as 1988. However, Kobayashi and Bremer (2007) note that the advent of Basel II has led to renewed research interest in it. One core interest of most of these studies has been to conduct a "complete" and comprehensive test for the existence of market discipline by employing both the price-based mechanism and the quantity-based mechanism (see Demirguc-Kunt & Huizinga, 2004; Peria & Schmukler, 2001; Kobayashi & Bremer, 2007). One reason provided by Aysan, Disli, Ozturk and Turhan (2015) for the need for a complete test is that it can enable researchers to discern between discipline by depositors, from changes in demand and regulatory shocks (see earlier section on theoretical discussion). Jackson and Perraudin (2002), therefore provide a simultaneous application of both the price-based mechanism and the quantity-based mechanism in their market discipline study. Tover-Garcia (2014) also does the same but only finds weak evidence of DMD in Mexico over the 2008-2012 periods. Kobayashi and Bremer (2007) however focus on contributing to the methodological discussion of market discipline by also explaining that the price-based mechanism and the quantity-based mechanism should be studied simultaneously because an interactive effect exists between bank demand for deposits and customers' supply of deposits. They, therefore, recommend that future studies should consider this interactive effect in their test methodology for market discipline by using reduced-form equations.

Disli, Schoors, and Meir (2013) also conduct a complete test for depositor discipline, but they do so within the context of political connections in Turkey and show that Turkish depositors discipline

their banks through the capital ratio. They also show that indeed political connections affect market discipline. Aysan et al. (2015) also provide a complete test of market discipline and use reduced-form equations methodology to study the DMD phenomenon. They, however, conduct their study within a Profit and Loss (PLS) arrangement under Islamic finance. They also empirically analyse the impact deposit insurance reforms have on market discipline. They gather enough evidence to show that the capital levels of Islamic banks are positively related to the deposit growth rate. They do not, however, find that the capital ratio is used for price disciplining.

Most DMD studies also analyse the impact of explicit deposit insurance (EDI) on market discipline because they find that such bank failure resolution strategies impact on DMD because their presence shields depositors from the private cost of failure they may have to bear. If these bank failure resolution strategies protect them fully from bearing any private cost of failure, then depositors will not be willing to bear any monitoring cost (see Demirguc-Kunt & Huizinga, 2004). Demirguc-Kunt and Huizinga (2004) find evidence that deposit insurance indeed weakens market discipline through interest rates. Davernport and McDill (2005) provide contrary evidence. Also, they examine whether market discipline in terms of the growth rate of bank deposits is affected by explicit deposit insurance for a broader set of 51 countries (sample includes both developed and developing countries). For this hypothesis, they do not find consistent evidence. They estimate all specifications by OLS. Yagcilar (2014) find evidence from 26 banks in Turkey that explicit deposit insurance (EDI) undermines depositor market discipline.

Peria and Schmukler (2001) conduct a complete test of market discipline but within the deposit insurance, and banking crises context of Argentina, Chile, and Mexico over the 1980s and 1990s. However, contrary to theory and the finding of Yagcilar (2014), they do not find any evidence that EDI diminishes the degree of market discipline. These results are also empirically corroborated by Forssbeack (2011). Kobayashi and Bremer (2007) therefore conclude that insured and uninsured depositors should both be studied in tests for market discipline. Arnold, Grobel, and Kozoil (2016) also make it their objective to answer the standard question asked about DMD in the literature. They, however, concentrate on finding evidence in Germany. The authors are further concerned about the specific governance structures that can measurably explain depositor behaviour in different banking groups in periods of a financial crisis. Given the above questions they pose, their analysis provides evidence on DMD via the quantity-based mechanism and the maturity-based mechanism discussed in Tover-Garcia (2014).

This study, however, notes from the literature that the maturity-based mechanism for effecting depositor discipline is a build-up on the quantity-based mechanism (See earlier sections). Arnold, Grobel, and Kozoil (2016) however name the evidence they provide on DMD via the quantity channel as Type 1 market discipline whilst they name the evidence, they provide on DMD via the maturity-based mechanism and the price-based mechanism as a market discipline of Type 2. The authors estimate reduced form equations in their study because of its ability to help them find equilibrium responses of depositors to bank risk-taking. From their data analysis, they find enough evidence to support the presence of Type 1and Type 2 market discipline in Germany.

Yan, Skully, Auram, and Vu (2014) study market discipline within the Australian banking system and its 2008 deposit guarantee scheme. The authors gather enough evidence to show that deposit guarantee dampens depositor discipline by both households and non-households.

The above review indicates that a lot of studies on depositor market discipline exist. Most of these studies, however, have not analysed the depositor market discipline phenomenon within the cross-border banking context. The current level of knowledge existing on market discipline within the international banking context shows that such studies concentrate on interbank discipline, external discipline, and the impact of the market discipline of parent banks on their subsidiaries. For instance, in their research of market discipline within the interbank market, Allen, Hrychiewicz, Kowalewski, and Tumer-Alkan (2012) investigate whether subsidiary and parent bank characteristics explain the behaviour of deposits and deposit rates. The authors, therefore, study 51 MNC banks from twenty developed countries and all their subsidiaries in the world. They find evidence that parent banks that have deteriorating conditions lead to a reduction in the lending activities of their subsidiaries. These results confirm to them that a subsidiary channel exists in the interbank market. To the best of their knowledge, their study is the first to investigate the market discipline in an international transmission context. Beck (2015) also study market discipline within the international transmission context by focusing on the interbank market. They document that foreign banks that rely on interbank markets reduce their lending during periods of crisis in the home country.

In other market discipline studies that have been conducted within an international banking context, Huizinga and Nicodeme (2006) focus on external discipline by investigating whether explicit deposit insurance system with different features affects international bank liabilities differently. Their regression results do not provide them with any evidence that international depositors discriminate among deposit insurance schemes based on particular design features. They attribute this finding to the fact that developed country deposit insurance systems can maintain a high degree of credibility regardless of their exact institutional design. Klemeier, Sander, and Heuchemer (2012) study the relationship between the banking crisis and international banking by focusing on customers who have gone abroad to deposit or borrow before, during, and after financial crises episodes. Their research results show that depositors conduct more cross-border banking during crisis periods because they perceive going abroad to be a haven "Flight to quality (safety)". Klemeier, Sander, and Heuchemer (2012) findings, therefore, contribute to the literature on external discipline. To arrive at their research results, the authors define cross-border banking as "the practice in which a bank in one country makes a loan to or receives a deposit from a customer who resides in another country". Their definition of CBB is thus based on residence and not the nationality of the bank or customer.

Bourgain, Pieretti, and Zanaj (2010) study the interaction between transparency in bank risk-taking and the disciplinary role of depositors in the context of international bank competition. After building a bank disclosure index, they empirically test the impact of disclosure and financial openness on bank risk-taking. They empirically study the Middle East and North Africa (MENA) countries and Turkey. They collect individual financial data for 288 banks throughout 2005-2008. In another study, Bennet, Hwa, and Kwast (2015) test the hypothesis that creditors can monitor

and discipline risky banks via alternative methods, including moving their funds to safer banks during crisis periods. They produce enough results to indicate the presence of market discipline during bank crisis periods.

Hasan et al. (2013) study depositor market discipline within the international banking context by focusing on new aspects of market discipline in transition countries from Central Europe (CE) by asking how depositors of foreign-owned banks react to rumours surrounding parent banks. They collect data from commercial banks operating in 11 emerging economies and their parent companies during the 1994-2011 periods. Their results support evidence of monitoring by depositors.

Hadad, Agusman, Monroe, Gasbarro, and Zunwalt (2011) study market discipline in Indonesia and find evidence of DMD via the price-based mechanism. Specifically, they find that depositors react to bank risk measures such as asset quality and liquidity risk, and an inverse relation is found between depositor interest rates and government bank regulation. This is consistent with the evidence that market discipline is more pronounced in listed and foreign banks.

In summary of the above discussion, it appears that most DMD studies tend to concentrate on developed countries and not developing countries. This is because they have more mature and relatively transparent, conventional banking sectors and markets; and also, because they meet the

pre-requisites for effective market discipline (Disli, Schoors & Meir, 2013; Karas, Pyle & Schoors, 2009; Aysan, Disli, Ozturk & Turhan, 2015).

In connection to emerging markets and developing markets, Yeyati, Peria, and Schmukler (2004) however suggest that not much evidence on the market discipline of risky bank fundamentals exists from emerging markets because emerging economies respond more to risk from a wider pool which usually emanates from macroeconomic conditions. The authors further provide that market discipline studies conducted within emerging markets should take into account the following two crucial details: (1) institutional constraints and its delimiting effect on market discipline incentives as well as the quality of information; (2) the second key broader risk factor that may drive depositor discipline is systemic risk. For these two key reasons, Yeyati, Peria, and Schmukler (2004) critique that market discipline has so far been narrowly defined mostly for emerging economies because within these economies, depositors are sensitive to both idiosyncratic and systemic risk factors. Therefore, both risk factors should be considered together. The study, however, acknowledges that the sensitivity of depositors to systemic risk may be mutually exclusive from their attitude to risk of bank fundamentals. Therefore, under this scenario, when depositors discipline banks for systemic risk, it influences managers to reduce the level of exposure they have to systemic factors.

In furtherance to the discussion above, Caprio and Honohan (2004) discuss that due to the perception that market discipline does not work in immature environments, most studies recommend that such markets should rely more on pillar I and pillar II of the Basel Accords. However, the authors find that low-income countries are best positioned to exercise market

discipline as long as the governments of these countries (especially credible governments) avoid issuing blanket guarantees and actively using a lender of last resort facility in systemic crises; this is likely to reduce depositor sensitivity towards risky bank behaviour. It is thought that depositor discipline will work best in low-income countries because banks within these countries usually hold deposits mobilized from a small number of large elite depositors who easily satisfy the information required for depositor market discipline.

A gap of evidence of DMD within developing countries, therefore, exists in the literature. Furthermore, the effect of explicit deposit insurance on depositor market discipline within developing countries and the cross-border banking context is also still not known. A contextual gap in DMD studies, therefore, exist in this regard. Evidence of depositor market discipline (DMD) within the cross-border banking (CBB) context is, however much needed now from developing regions such as Africa because of the following reasons discussed below.

The African continent's financial services industry has undergone significant transformation through reforms. To a large extent, these reforms occurred post the financial crises period of the continent in the 1980s and 1990s. These reforms have affected the level of competition within banks, the efficiency levels of bank operations, the innovativeness of banks and even how banks are regulated and supervised (Nyantakyi & Sy, 2015). As a result of these reforms, the rate of banking crises has decreased, and more countries are gradually adopting explicit deposit insurance (EDI), the international financial reporting standards (IFRS) as well as international regulation for banks: Basel I, II, and III. The banking sector of SSA has deepened in recent years with access to

finance increasing at an increasing rate mainly due to the extensive usage of mobile money technology (Stijns, 2015; see figures 3.4 of Chapter three).

However, although the above discussion shows that the financial services industry has seen some improvement post-implementation of financial reform, it should be noted that some weakness still exists within the banking industry. Given that cross-border flows have increased on the continent and that regulatory arbitrage exists to cross-border banks (see chapter 3), these pockets of fragility could pose a systemic danger to the continent's banking sectors. The study further finds that considering that EDI adoption is increasing, it can have a moral hazard effect on shareholders to engage in risk and shift losses thereof to the deposit insurer; whiles serving as a disincentive for depositors to monitor risky bank behaviour. It is for some of these reasons that Stephanou (2010) discuss that due to inadequate monitoring by cross-border bank supervisors, market discipline is needed. Comprehensive and complete test for market discipline should provide joint evidence via price-based mechanism and quantity-based mechanism (Llewellyn, 2005). Such joint examination will help distinguish market discipline from alternative hypotheses such as regulatory discipline or demand effect (see Peria & Schmukler, 2001). Given the above stated risky conditions banks face in Africa, this study formulates the following hypotheses on cross-border banks, bank risk, explicit deposit insurance, and depositor market discipline:

H_3: Depositor market discipline of excessive risky bank behaviour exists via the price-based mechanism and the quantity-based mechanism within the developing continent of Africa.

Instability issues attached to cross-border banking affects the strength of market discipline. These instability issues affect the strength of market discipline depending on the availability of bail out expectations. Some studies, therefore, note that depositor market discipline will only exist to cross-border banks if there is no bail-out (Stephanou, 2010). Bail-out expectations in the form of implicit and explicit deposit insurance only exist to the extent that depositors find them credible. Until recently, most African countries have operated under implicit deposit insurance in the absence of explicit deposit insurance. Based on this premise, this study hypothesises that:

H_4: in the presence of cross-border banking, bank risk influences depositor market discipline via the price-based mechanism and the quantity-based mechanism in Africa.

The study further puts forth that:

H_5: Explicit deposit insurance interacts with cross-border banking and bank risk to influence depositor market discipline via the price-based mechanism and the quantity-based mechanism in Africa.

Studies close this one within the international banking space on direct depositor discipline is the study of Hasan et al. (2013). However, the evidence these authors provide is on how depositors react to parent bank risk. Furthermore, their test on depositor discipline is not a complete test of market discipline because they do not consider the simultaneous impact of the quantity effect and the price effect of deposits. The authors do not also consider how depositor market monitoring

incentives affect the ability of the depositor to discipline cross-border banks for excessive risky behaviour. This study, therefore, extends the findings of Hasan et al. (2013) by examining bank risk, CBB, and depositor monitoring incentives such as EDI, on DMD. The study's test on depositor discipline within the cross-border banking context is, therefore, a complete test of DMD, unlike Hasan et al. (2013). This is because it provides evidence on depositor monitoring via the price-based mechanism and the quantity-based mechanism.

Reduced form equations are used since it enables the study to discern between market discipline and other types of discipline, such as regulatory discipline. It also allows the research to understand the effect of changes in bank fundamentals on the equilibrium quantity of demand for deposits and supply of deposits. Altogether, the study's results reveal the state of depositor market discipline (DMD) within the cross-border banking context in Africa. It also reveals the incentives for depositor monitoring.

2.3.3 CBB, Bank Risk, Asset Size and DMD

Banking literature takes note of how the too-big-to-fail (TBTF) effect, too-big-to-save effect (TBTS) effect, and the too-many-to-save (TMTS) effect of bank size affects the incentives of bank depositors to discipline an insured bank. However, not much evidence in the literature exists on these effects the size of a bank has on depositor monitoring and discipline of bank risk within the CBB context. Bertay, Demirguc-Kunt, and Huizinga (2013) study how the size of a bank affects market discipline. They conduct this study because they believe that a bank with a too-big-to-save

status may have its interest cost and deposit growth rate become more sensitive to bank risk. In their study, they distinguish between absolute size and systemic size. They measure absolute size as the logarithm of a bank's total assets, and its systemic size as a bank's liabilities–to-GDP ratio. Their international sample of publicly listed banks from 90 countries, therefore, enables them to analyse whether banks with absolute size are considered TBTF, as evidenced by reduced market discipline. Their main regression results show that the sensitivity of a bank's interest cost to its capitalization rate rises with the bank's systemic size. They find this consistent with the too-big-to-save effect.

Imai (2006) also focuses on the TBTF policy in its deposit insurance and market discipline study. They conduct their study in an era after Japan had reformed its deposit insurance scheme by lifting blanket guarantees on all deposits and; reducing the coverage of time deposits. They add novelty to their study by measuring market discipline using posted interest rates as opposed to implicit interest rates most studies use. They find that Japan's deposit insurance reform affected market discipline by raising the sensitivity of deposit rate and deposit growth to bank default risk; increasing the interest rate differentials between partially insured large time deposits and fully insured ordinary deposits. These differences in interest rate, therefore, reflected the difference in their perceived risk, hence a sign of market discipline. The reform had thus succeeded in positively influencing market discipline; increasing deposit attraction to large banks at a lower liability rate than for small banks. Imai (2006) considers this a sign of the too-big-to-fail (TBTF) policy and therefore concludes that; the TBTF policy had an important role to play in the allocation of deposits in the banking sector. However, while Imai (2006) provide evidence of market discipline that supports the TBTF policy, Bertay et al. (2013) support the TBTS policy. In their study, Bertay,

Demirguc-Kunt, and Huizinga (2013) show that the ROA and the ROE of banks increase with its absolute size, but declines with its systemic size, neither absolute nor systemic size is significantly associated with bank risk as implicit in their Z-score calculation.

Cubillas, Fernandez, and Gonzales (2016) provide new evidence on the relevance of the Too big to fail (TBTF) and too big to save (TBTS) effect. Unlike Imai (2006) who studies only Japan, Cubillas et al. (2016) use a sample of banks from 104 countries for 1989-2007 periods. They use a two-step system-GMM to analyse their data because they find that, to their knowledge, it has never been used to analyse the TBTF and TBTS effects. They find that consistent with the TBTF effect, a stronger presence of market discipline through the growth of deposits exists in smaller banks than in large banks. The evidence of Cubillas et al. (2016) is, however, limited to countries that have suffered a banking crisis in the past. Park (1995) examines bank size to understand if the "too-big-to-fail" policy-induced depositors to prefer large banks. The author finds that bank size does not significantly affect a depositor's choice of a bank. This finding is, however inconsistent with Imai (2006); Bertay et al. (2013); and Cubillas et al. (2016). Moe (2006) study the concept of "too large to save" within cross-border banks. They argue that if the cross-border banking group is larger to its home country, the home country may be unwilling to support the foreign parts of the groups, should they require support. Mishkin (1996) finds that the desire of regulators to prevent bank failures has created a moral hazard problem amongst them. The author considers that this desire emanates from the fear that a systemic financial disruption will follow from depositors who will be exposed to the private cost of failure.

Therefore, to avoid this, regulators pursue a too-big-to-fail (TBTF) policy in which no depositor suffers a loss. The TBTF policy, however, has a moral hazard effect on large banks to take an excessive risk (Mishkin, 1996). In a related study, Houston, Lin, Lin, and Ma (2010) find an inverse U-shape relationship between bank size and bank risk-taking. They also find that banks with higher growth rates and those classified as too-big-to-fail engage in more risk-taking. Based on the above, this study, therefore, hypothesizes that:

H_6: Bank asset size interacts with bank risk and cross-border banking to influence the strength of depositor discipline.

2.3.4 CBB, Bank Risk, Capital, and DMD

Aysan, Disli, Ozturk, and Turhan (2015) find evidence of the existence of DMD in their study of Islamic banks. Notably, their analysis suggests that depositors adjust the level of their funds in Islamic banks based on the banks' capital adequacy. Konishi and Yasuda (2004) find that the impact of capital on bank risk remains an empirical question since it has a two-sided effect on bank risk (see also Chen, Hwang & Lin, 2012). In addition to the above, McCoy (2008) finds that the impact of the moral hazard of EDI on banks is stronger in inadequately capitalized banks. Therefore, based on the above discussion, this study puts forth that:

H_7: Bank capital interacts with bank risk and CBB to influence depositor market discipline (DMD).

2.3.5 The Influencing Phase of Market Discipline on Bank Risk

As earlier stated, the general question in the literature about market discipline is the question of whether market discipline exists or works. For it to exist, studies such as Barajas and Steiner (2000) believe true tests for market discipline should be performed. In other words, the authors expect that a test on DMD should provide results for both the monitoring phase of the DMD hypothesis and the influencing phase of the DMD hypothesis (see discussion in theoretical review). Based on this expectation, the authors, therefore, make it their objective to develop a test for this influencing role depositors may play in a bank by studying Columbia.

In Min's (2015) view the question on the existence of market discipline further raises two key questions: First, are bank depositors able to accurately monitor risky bank behaviour and inculcate their assessments into prices and quantity changes? Second, the authors ask if the actions depositors take based on their estimates of bank risk influence the behaviour of bank managers in a way that reduces risk. Min (2015) does not empirically answer these questions, but they find from general literature that documentary evidence exists on DMD for banks that begin to exhibit clear signs of trouble. However, in the author's view, there is a dearth of evidence and significant dispute around the question of whether DMD affects bank risk-taking (influencing phase of DMD). They find that this gap exists in the literature because DMD has an ex-post nature. DMD exists in an ex-post nature in the sense that it is typically exerted after the bank's solvency has been threatened. This ex-post nature of DMD, therefore, makes it difficult to observe the influence depositor behaviour will have on the ex-ante behaviour of bank managers.

In spite of the concerns raised by Min (2015), some evidence exists on the influencing phase of DMD. For instance, Maechler and McDill (2006) focus on the ability of risky banks to raise uninsured deposits in the United States. They further use sub-samples to examine the possibility that depositor discipline may differ depending on the bank risk level/ the health status of the bank. Thus, they hypothesize that, for lower-risk banks that are healthy, the cost of using uninsured deposits may be moderate. On the other hand, they opine that for weak banks, the cost of raising uninsured deposits may reach prohibitive levels as bank risk increases. A key objective in their study is to answer the question of how higher funding costs effectively reduce the desire of a bank to take higher risks. To achieve their research objectives, they use generalized-method-of-moments (GMM) estimators developed by Arellano and Bond (1991) for dynamic panel data. They find evidence of market discipline in their sample. The authors additionally find that the degree to which uninsured depositors discipline banks depend on whether a bank has a ‘good bank' risk status or a ‘bad bank' risk status. Their findings suggest to them that when depositors' discipline banks for excessive risk-taking, it effectively constrains managers' behaviour.

In the view of Maechler and McDill (2006), a lot more studies have been conducted into how depositors react to excessive risk-taking as opposed to how bank managers respond to or prevent higher funding costs. They attribute this state to ‘practical limitations. Chibundu (2013), just as in Maechler and McDill (2006), also ask the following questions which they find relevant for the regulatory framework: (1) Do depositors respond to bank risks as standard theories predict? (2) If they do, are such responses strong enough to deter banks from excessive risk-taking? In other words, when depositors demand a risk premium from risky banks by way of higher deposit rates,

does it prevent banks from taking risks? To answer this second question, the authors adopt the process of mean reversion.

In addition to the above, Calomiris and Powell (2001) argue that banks avoid disciplinary withdrawals of funds by depositors by reducing their asset risk or increasing their capital. They test this theory by using time series data. In a related study, the prima facie evidence Bliss and Flannery (2002) provide does not support the hypothesis that managers respond to disciplinary actions taken by the stock and bond market. Based on the above discussion, this study hypothesizes that:

H_8: Depositor response to bank risk-taking influences banks to reduce their risk-taking levels.

2.4 Summary of Literature Review

The purpose of this section of the research work is to offer a summary of the theoretical and empirical literature. Based on various definitions offered on market discipline by multiple authors, this thesis perceives that market discipline sits on a continuum that ranges from the pleasure of depositors when the risk of bank fundamentals is low, to initial deposits withdrawals when bank risk start increasing until depositors show their extreme form of displeasure by running on the bank. This is illustrated below in figure 2.3. The continuum is based on market discipline via the quantity-based mechanism (i.e., changes in a bank deposit). This is because Caprio and Honohan (2004) find it to be the major route for deposit withdrawal.

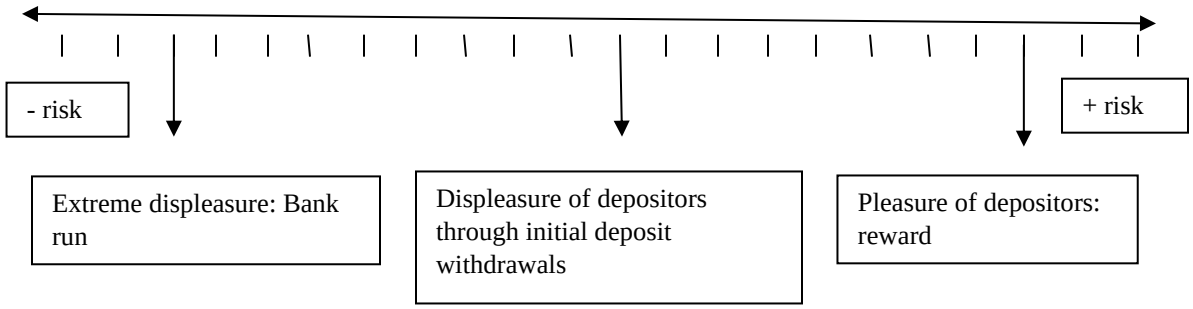


Figure 2.3: Market discipline continuum.

The continuum shows that market discipline can manifest itself from two extreme sides as defined by Desli, Schoors, and Meir (2013).
Source: Author's Construction

When market discipline uses both the price-based mechanism and the quantity-based mechanism as a test, the test is "complete". It is "true" when it can indicate the effect of depositor action on influencing managers' risk-taking appetite. The review also shows that market discipline is effective when depositors have incentives to monitor and discipline banks for risky behaviour. These incentives include the absence of explicit deposit insurance, explicit deposit insurance design schemes such as co-insurance, the lack of implicit protection from a too-big-to-fail policy for big banks, the capital level of a bank, the presence of a prompt corrective action regime (PCA), and the presence of banking crisis.

Empirically, the review further shows that DMD works through the price-based market mechanism, quantity-based mechanism, and maturity- based mechanism. The empirical literature reveals that the strength of market discipline is affected by cross-border banking. Cross-border banking can either cause bank risk to increase or reduce based on the market risk hypothesis and the diversification hypothesis, respectively. Regulatory arbitrage opportunities, an aspect of

market risk, however, exists within CBB in Africa. These regulatory arbitrage opportunities include cracks in the regulation of financial safety nets like explicit deposit insurance, financial reporting standards, and international banking regulations represented by the Basel Accord. These cracks in regulation could lead to an increase in the risk of banks through a reduction in lending standards. Some grey areas, however, still exist in the literature. For example, not many studies consider the impact regulatory arbitrage opportunities available to cross-border banks, affect bank solvency. Not many studies also consider the ability of depositors to rein in the excessive risk of cross-border banks. Therefore, not much evidence exists in depositor market discipline within the cross-border banking context. Due to this gap in the literature, the factors that serve as an incentive of depositors to monitor and discipline risky banks within the CBB context of African economies are also still not known. The literature on DMD also shows a dearth of literature exists on the ability of depositors to influence the actions of managers. Based on these gaps in the literature, this chapter of the study has produced eight hypotheses. It includes a test on the effect of regulatory arbitrage opportunities existing to banks in Africa, has on bank risk. These hypotheses were therefore tested in the study to establish the relationship between cross-border banking, regulatory arbitrage opportunities, depositor monitoring incentives, bank risk, and market discipline. The next section discusses the framework of the study.

2.4 Conceptual Framework

This study, therefore, uses Figure 2.4 as the conceptual framework to guide the test of the above-enumerated hypotheses. The study thus adds to knowledge on cross-border banking, bank risk, and depositor market discipline.

Conceptual Framework

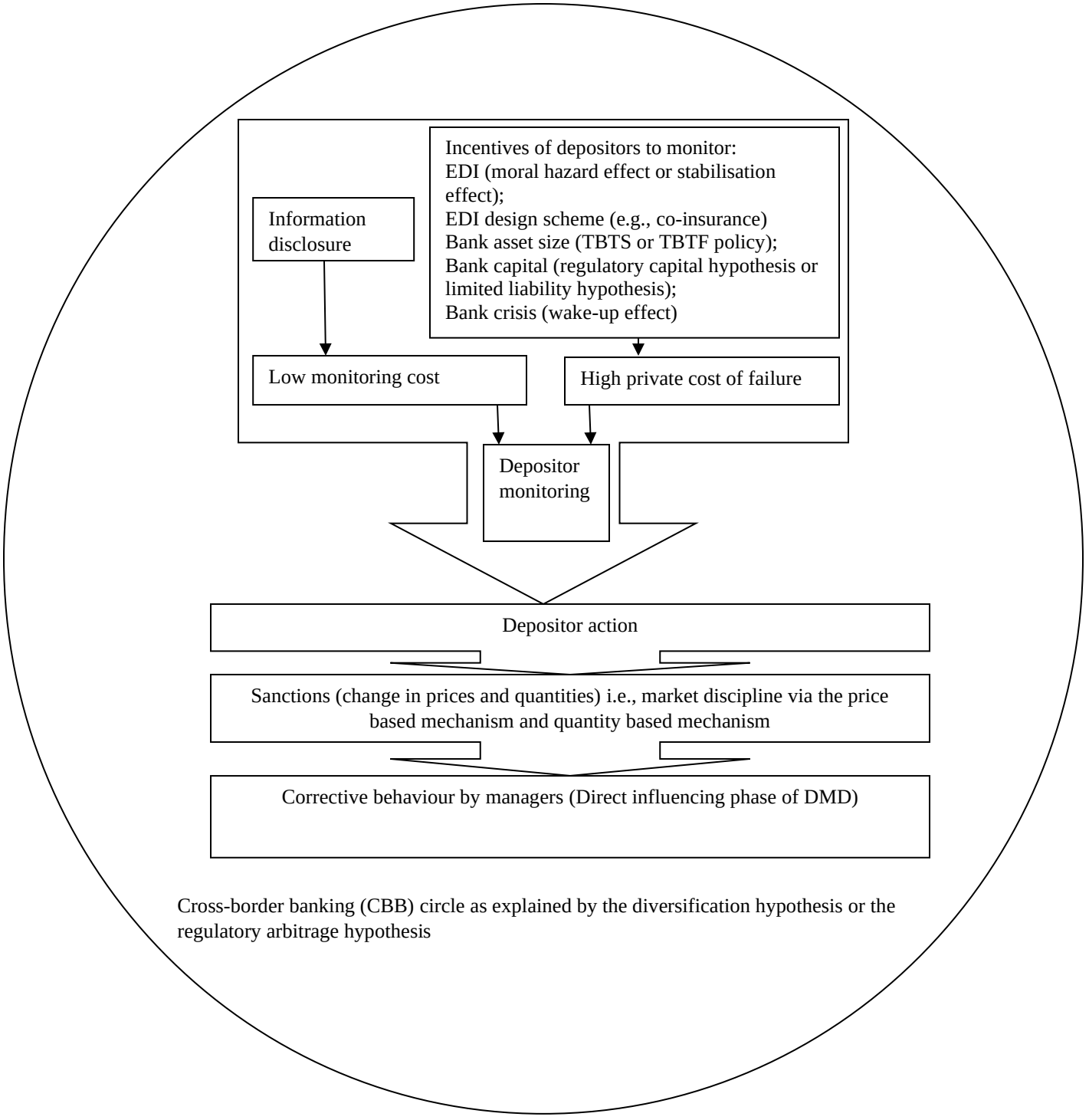


Figure 2.4: The depositor market discipline (DMD hypothesis) process explained within the cross-border banking context

Source: Llewellyn (2005) and author's addition

CHAPTER THREE

AN OVERVIEW OF AFRICA'S CROSS-BORDER BANKING ENVIRONMENT

3.1 Introduction

The African banking environment has over the years become integrated economically and financially in its march towards the formation of the African Economic Community (AEC) between the periods of 2027 to 2033 (Njinkeu & Fosso, 2006). In its wake, economic and financial integration has increased cross-border banking (CBB) in Africa and worldwide. Considering that they played a key role in exacerbating the world financial crises of 2007-2009 (see Hasan et al., 2013), there is a need to, therefore, understand how systemically important cross-border banks in Africa are. This chapter provides an in-depth analysis of the environment in which all banks, especially cross-border banks, operate in, in Africa.

3.2 The Integrated African Environment of Banks and its Challenges

African cross-border banks operate in an environment that varies starkly in terms of social demographic features such as population (Mlachila, Park & Yabara, 2013). Africa mainly has five regions. These are Central, Eastern, North, Southern, and West Africa. The continent has three main customs union and a common monetary area. These are the Southern African Customs Union (SACU), West African Economic and Monetary Union (WAEMU), and the Central African Economic and Monetary Community (CEMAC). It also has at least two regional central banks which are the Banque Central des Etats d'Afrique de l'Ouest (BCEAO) and the Bank of Central

African States (BEAC). The WAEMU and CEMAC regions both operate under the CFA franc zone. However, the main issues with integration on the continent are that the membership of some countries to the various sub-regional blocs overlap to the extent that they reduce opportunities for synergy. Furthermore, the continent is operating alongside a timetable for an EPA program that will make the African continent more integrated into the world economy; and more exposed to risk. Pockets of fragility exist that have led the continent to experience severe financial distress in the past. Table 3.1, depicted below, provides examples of such financial distress.

Table 3.1: *Past banking crises in Africa from the 1980s to 2015*

African Country	Year of Crises	African Country	Year of Crises
South African Region			
South Africa (SACU)	1985, 1989, 2014	Zambia (SADC)	1995
East African Region			
Angola (SADC & ECCAS)	1991	Swaziland (SACU)	1995
Ethiopia (COMESA)	1994	Rwanda (COMESA)	1991
Kenya (EAC)	1992, 1993, 1996	Tanzania (SADC)	1988-1997
West African Region			
Cape Verde (ECOWAS)	1993	Nigeria (ECOWAS)	1991-1997, 2009
Ghana (ECOWAS)	1997	Sierra Leone (ECOWAS)	1990
Mali (WAEMU)	1987-1989	Togo (WAEMU)	1993
Central African Region			
Northern African Region			
Algeria (AMU)	1990	Tunisia (AMU)	1991

Note. SACU is the Southern African Customs Union. SADC is the Southern African Development Community. COMESA is the Common Market of Eastern and Southern Africa. EAC is the East African Community. ECOWAS is the Economic Community of West African States. WAEMU is the West African Economic and Monetary Union.
Source: Author's construction based on information from Cubillas, Fonseca and Gonzalez (2012); Demirguk-Kunt and Detragiache (2002); Nyantakyi and Sy (2015)

The Table, however, shows that only Nigeria registered a systemic crisis after the world financial crisis of 2007-2009. Other weaknesses noted for the banking industry of Africa is that for the entire SSA region, the market structure of SSA banks remains typically oligopolistic because three large

banks account for a large share of total assets (Mlachila, Park & Yabara, 2013). On the issue of African bank efficiency, Nyantakyi and Sy (2015) develop various measures of bank efficiency. Their results show that on average, West African banks are relatively less efficient because they spend slightly more to generate an extra income relative to those in other sub-regions such as North Africa. The authors attribute this in part to the cost associated with electricity usage. Other authors such as Mlachila, Park, and Yabara (2013) also take note of how banks in SSA typically operate at a high cost. The African banking environment, therefore, has low competition, and high banking operating cost with the ECOWAS sub-region being the most competitive yet inefficient region.

Further to the above, Mlachila, Park, and Yabara (2013) estimate that about 60 percent of bank loans have short-term maturities. Nyantakyi and Sy (2015) uncover similar findings. They conclude that a problem of maturity mismatch, which could lead to liquidity shocks exists for banks operating in Africa (see Table 3.2 below).

Table 3.2: Percentage of Banks by Loan Tenure in Africa

Region	0-12 months	13-36 months	37-60 months	Over 60 months
Central Africa	12.50%	75.00%	12.50%	0.00%
East Africa	31.58%	35.09%	28.07%	5.26%
North Africa	28.57%	19.05%	14.29%	38.10%
Southern Africa	34.55%	23.64%	29.09%	12.73%
West Africa	44.63%	27.27%	22.31%	5.79%
Total	37.40%	29.01%	24.05%	9.54%

Table 2.4 depicts the percentage of banks by Loan Tenure in Africa. The Table shows that some banks give long term maturing loans even though their core funding constitute short term maturing deposits.

Source: Nyantakyi and Sy (2015)

Mecagni et al. (2015) and Nyantakyi and Sy (2015) further find that Africa's banking environment remains shallow with insufficient depth and instruments. Zajc (2013) makes a similar conclusion. The authors suggest that the use of a credit registry that will track the repayment history of

borrowers will improve the financial depth of the continent's financial sector. Financial intermediaries will, however, need to share information on the repayment history of clients. Mecagni et al. (2015) find that Ghana's central bank has licensed credit referencing bureaus such as Hudson Price Data and issued a provisional license to Dun and Bradstreet in 2011 to operate alongside the existing XDS Data Ghana. Within the global context, several authors note that although the global financial crisis of 2007-2009, did not trickle down to the continent's banks, indirectly the continent was affected by international trade linkages by feeding into a reduction in exports and slowing domestic economic growth. This indirect effect of the crisis contributed to rising levels of non-performing loans on the continent by adversely affecting borrowers (Mlachila, Park & Yabara, 2013; Arieff, Weiss & Jones, 2010).

The consensus is that the continent's banking environment has been relatively stable with the minimum implemented capital adequacy ratio (CAR) of most countries exceeding 8 per cent (Mecagni et al., 2015). Additionally, the authors find that the SSA ratio of liquid assets to total assets exceeds 25 per cent. Banks in Africa keep this excess liquidity because they find it challenging to identify lending opportunities (see also Mlachila, Park & Yabara, 2013). Although the level of bank penetration in Africa is low, the banking sector of SSA has deepened in recent years with access to finance increasing at an increasing rate primarily due to the usage of mobile money technology (Stijns, 2015). Nyantakyi and Sy (2015) also explain the cause of this stable nature of Africa's banking industry to be due to Africa's limited integration in international financial markets and improved governance from structural adjustment policies (SAP) initiated by IMF and World Bank. In addition to others, the structural adjustment program led to financial reforms in the adoption rate of the deposit insurance scheme; and cross-border banking (CBB)

(Nyantakyi & Sy, 2015). The next section discusses explicit deposit insurance and cross-border banking in Africa.

3.2.1 Explicit Deposit Insurance (EDI) in Africa

The financial reforms of Africa have influenced the rate at which African countries are adopting explicit deposit insurance. These countries adopt it as part of modern banking approach to formal bank regulation and supervision (Nyantakyi & Sy, 2015) because of the several benefits it has (see theoretical review in chapter 2). Its absence means that African banks are not being adequately regulated and supervised, and so they are likely to face financial instability and systemic risk (Aryeetey, 2003). Twenty-five countries have adopted an explicit deposit insurance scheme in Africa at the end of the year 2016 (see Table 3.3). Interestingly, although EDI is supposed to play a stabilizing role in the banking industry, Table 3.1 and Table 3.3, of this study shows that countries such as Nigeria and Kenya, who have had an EDI scheme in place since 1988, still record financial crises later. Horvitz (1975) also finds that after the establishment of the Federal Deposit Insurance Corporation (FDIC), about 500 banks still failed in the United States of America (U.S. A) (Horvitz, 1975). The author, however, notes that this failure rate was an improvement over the past.

Table 3.3: *Countries that have adopted explicit deposit insurance in Africa*

Country name and Country code	Regional group country is attached to	Income group: WB classification	Name of DGS or Fund	Date of inception of EDI
		South African Region		
Nil	Nil	Nil	Nil	Nil
		East African Region		
1.Kenya (KEN)	EAC, COMESA	LMI	Deposit Protection Fund Board of Kenya	1985
2. Tanzania (TZA)	SADC, EAC,	LIC	Deposit Insurance Board	1994
3. Uganda (UGA)	EAC, COMESA	LIC	Bank of Uganda	1994
4. Zimbabwe (ZWE)	SADC, COMESA	LIC	Deposit Protection Board of Zimbabwe	2003
		West African Region		
5.Nigeria (NGA)	ECOWAS WAMZ	LMI	Nigeria Deposit Insurance Corporation	1988
6. Ghana (GHA)	ECOWAS WAMZ	LMI	Ghana Deposit Protection Corporation	2016
7. Benin	WAEMU, ECOWAS	LIC	WAMU Deposit Insurance Fund	2014
8. Burkina Faso	WAEMU, ECOWAS	LIC	WAMU Deposit Insurance Fund	2014
9. Guinea-Bissau	WAEMU, ECOWAS	LIC	WAMU Deposit Insurance Fund	2014
10. Cote d'Ivoire	WAEMU, ECOWAS	LMI	WAMU Deposit Insurance Fund	2014
11. Mali	WAEMU; ECOWAS	LIC	WAMU Deposit Insurance Fund	2014
12. Niger	WAEMU; ECOWAS	LIC	WAMU Deposit Insurance Fund	2014
13. Senegal	WAEMU; ECOWAS	LIC	WAMU Deposit Insurance Fund	2014
14. Togo	WAEMU; ECOWAS	LIC	WAMU Deposit Insurance Fund	2014

Table 3.3 continued

Country name and Country code	Regional group attached	Income group: WB classification	Name of DGS or Fund	Date of inception of explicit EDI
		Central African Region		
15. Central African Rep. (CAF)	CEMAC, ECCAS	LIC	FOGADAC	2011
16.Chad (TCD)	CEMAC, ECCAS	LIC	FOGADAC	2011
17. Republic of Congo	CEMAC, ECCAS	LIC	FOGADAC	2011
18.Equatorial Guinea (GNQ)	CEMAC, ECCAS	UMI	FOGADAC	2011
19.Gabon (GAB)	CEMAC, ECCAS	UMI	FOGADAC	2011
20.Cameroon (CMR)	CEMAC, ECCAS	LMI	FOGADAC	2011
		Northern African Region		
21.Algeria	AMU	UMI	Bank Deposit Guarantee Fund	1997
22.Mauritania (MRT)	AMU	LMI	Fonds de Garantie des Dépôts	2008
23.Libya (LBY)	AMU	UMI	Depositors insurance fund	2010
24.Morocco (MAR)	AMU	LMI	Moroccan Deposit Insurance Corporation	2015
25.Sudan (SDN)	COMESA	LMI	Bank Deposit Security Fund of Sudan	1996

Note. African countries that have adopted Explicit Deposit insurance (EDI) as of 2017. Countries have been arranged according to the main sub-regions identified in Africa, i.e., Southern Africa, East Africa, West Africa, Central Africa, and North Africa. MIC=middle-income country; LIC=lower-income country; UPI= upper-middle-income; LMI=lower-middle-income. FOGADAC= Fonds de Garantie des Dépôts en Afrique Centrale. WAMU= West African Monetary Zone. EAC= East African Community; COMESA= Common Market of Eastern and Southern Africa; SADC=Southern African Development Community; ECOWAS= Economic Community of West African States; WAMZ= West African Monetary Zone; ECCAS= Economic Community of Central African States; and AMU= The Arab Maghreb Union

Sources: Author's construction based on information from Demirguc-Kunt, Kane, and Laeven (2014); Demirguc-Kunt, Kane and Laeven (2008), and Bank of Ghana Website, International Association of Deposit Insurers website.

Altogether it appears that, given the upward trend in the number of countries adopting it (see figure 3.2 below), more countries are in favour of explicit deposit insurance (EDI) as concluded by Okeahalam (2003); and Demirguc-Kunt and Huizinga (2004). Also, Table 3.2 reveals that the number of EDI adopting countries has increased by over 100%, following the 2008/2009 financial

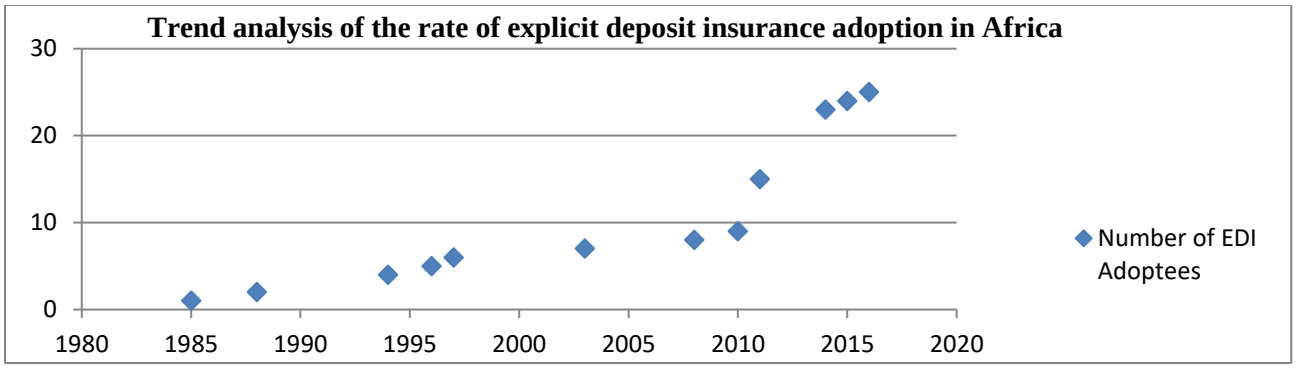


Figure 3.1: A Trend of the rate of adoption of explicit deposit insurance in Africa.
Source: Author's construction based on information from Demirguc-Kunt, Kane, and Laeven (2014); Demirguc-Kunt, Kane, and Laeven (2008), and the website of the International Association of Deposit Insurers.

crises. It also indicates that countries that adopt deposit insurance fall within the different income groups defined by the World Bank. Even upper income earning countries such as Algeria and Libya feel vulnerable enough to need explicit deposit insurance protection. Furthermore, the Table reveals that the two CFA franc zones of Africa, CEMAC and WAEMU, have a standard deposit insurance scheme for their members. Enoch, Mathieu, and Mecagni (2015) add that the deposit insurance scheme of WAEMU has a pre-funding design scheme that makes the scheme ready for a crisis. They further note that in Africa, challenges to the design of deposit insurance schemes include coverage range.

3.2.2 Impact of Financial Sector Reforms on CBB

In Olaka and Osoro's (2015) view, financial liberalization has been the main driver of cross-border banks. They form syndicates to give out large bilateral loans needed to finance infrastructure development (Mecagni, Marchettini & Maino, 2015). Cross-border banks have become significant

actors in African countries since foreign banks from Western countries such as France have reduced their presence (Leon, 2016).

Cross-border banking offers several benefits (see Enoch, Mathieu & Mecagni, 2015; Beck, 2015; Laydjiev, Jones & Zeitz, 2015). These benefits include competition; efficiency; Financial deepening; financial inclusion; bank stability; economies of scale; increased financial integration; increased trade integration; increased innovation; lowered bank costs; especially within the EAC region; diversification effects, and the provision of growth opportunities. Adam, Jones, and Woods (2015) additionally find that longer-term financing appears to be more available with the expansion of Pan-African banks. Nonetheless, several studies document a trade-off effect between the benefits and costs of cross-border banking.

The recent rise in the number of cross-border banks in Africa has brought in its wake several challenges for CBB. These challenges, as discussed in the literature, border on regulation, supervision, and resolution during crises periods. The next section examines these challenges.

As earlier suggested, cross-border banking is still a new phenomenon, and so, more time is needed for it to take a proper structure (Enoch et al., 2015). Hence, regulatory gaps and oversight gaps are available to cross-border banks in Africa (Mecagni et al., 2015). The issue of concern here is that some cross-border banks take advantage of these gaps in regulation by increasing their banking business in jurisdictions with less stringent regulations especially, on licensing requirements,

reporting standards, and observance of prudential regulations (Beck et al., 2014). Enoch, Mathieu, and Mecagni (2015) discuss that gaps exist in the reporting standards of cross-border banks in Africa since there is unequal adoption of the Basel Accords on the continent. In the view of Jones, Woods, and Zeitz (2015), most African countries are not able to implement the Basel Accords because of human and financial resource constraints in terms of staff training, etc. The authors find that the implementation of the Basel Accords, especially Basel III, demands that sufficient information should be made available. However, this is not so in reality. The authors further unearth that infrastructure gaps also prevent most African economies from adopting Basel III. The authors, however, caution that since bodies not representative of African economies set the global financial standards, the Basel Accords may not be responsive to the needs of African financial sectors

On other international standards such as the Basel Core Principles (BCPs), Enoch, Mathieu, and Mecagni (2015) reveal that the numbers of African countries that are also complying with it are generally lower than in the rest of the world. The level of compliance is even worse with the principle of the home-host relationship. As such Enoch, Mathieu, and Mecagni (2015) conclude that a threat exists to the national and regional financial stability of banks. Furthermore, Enoch et al. (2015) discover that while some countries have adopted explicit deposit insurance, others have not. In the view of the authors, this has therefore made it a challenge for resolving cross-border PABs that may be in trouble. In giving examples of banks that may be escaping supervision, Mecagni et al. (2015); and Enoch et al. (2015) provide that two large bank holding companies operating within the WAEMU region of West Africa lack formal prudential regulatory oversight and effective consolidated supervision. In a related view, Ouedraogo (2015) discusses that neither

Basel I nor the Banking Law of 2010 provides specific rules for bank groups. So, bank holding companies within WAEMU are not regulated. They are however supervised by the Commission Bancaire (CB) based on a WAEMU council minister's decision of 1991 on Ecobank ETI. Enoch et al. (2015) also find that bank holding companies such as Ecobank Transnational Incorporated are partially supervised by the Banking Commission (BC) voluntarily.

Nissanke (2009) finds that forewarnings of the danger of unregulated market activities in finance usually proceed financial crisis in emerging economies. These warnings, however, have often fallen on deaf ears among politicians and policymakers. Beck et al. (2014) note that Bank of Credit and Commerce International (BCCI) and The Meridian bank as cases of regulatory arbitrage that have happened in Africa where regulators had to intervene. Lee (1999) also finds that in the BCCI scandal, the manipulators used the absence of a cross-border supervisory authority to conduct criminal financial activity (cross-border fraud). After the scandal, the need became apparent for an intergovernmental organization that will unify rules across various jurisdictions. Without the soft law called Basle Accords, the inefficiencies inherent in divergent banking supervisory system may render the international banking system unable to prevent other significant illegal activities such as money laundering (Lee, 1999).

Regulators are not able to adequately monitor cross-border banks because their rapid expansion has created significant cross-border networks (Mecagni et al., 2015). Their structures are complex and opaque; it is therefore not easy for understaffed and inadequately resourced African regulators to offer consolidated supervision to such financial groups. Their paper, therefore, finds that

banking authorities are not able to detect risks hidden within parts of the group. Beck et al. (2014) find that such banks include Standard Bank of South Africa and First Rand.

Furthermore, the authors find that cross-border banks such as Standard Bank Group and Ecobank have high intra-group exposures. Enoch et al. (2015) conclude that this has made cross-border banks increase in systematic importance. The Core Principles for Effective Banking Supervision of 2012 labels a bank as systematically important based on the size, interconnectedness, sustainability, global or cross-jurisdictional activity, and complexity of the bank. National regulators are therefore worried about the contagion effect of a banking crisis between countries given that these banking groups usually have a large regional presence (Beck et al., 2014).

Cross-border banks in Africa are also under supervised because the ownership structure of many banking groups within the region is complicated and so this makes it difficult for supervisors to assess the status of shareholders of PAB (Enoch et al., 2015; Mecagni et al., 2015). Hence, supervisors find it challenging to oversee groupwide activities and monitor the consolidation situation of the bank. In addition to the above, some African cross-border banks can escape supervision because financial data is hardly available for many countries mainly due to national secrecy laws which make it difficult for supervisors to exchange information (Mecagni et al., 2015). Similarly, Mlachila, Park, and Yabara (2013) find that cooperation and information exchanges between regulators are limited in SSA. This lack of data availability and cooperation has therefore made it difficult for regulators to understand potential spill over risk levels. Adam,

Laydjiev, Jones, and Zeitz (2015) opine that home-host cooperation between supervisors may even be affected by conflicting interests.

Enoch, Mathieu, and Mecagni (2015) further note that some banks can escape supervision because some of the supervisory arrangements for cross-border banking are untested. For this reason, the authors find that most African supervisors lack the necessary expertise or skill needed for cross-border supervision, and so, they are wary of committing to joint inspections or activities. The authors take note of the role cross-border banks played in the 2007-2009 world financial crises. Pan-African cross-border banks also face inadequate supervision because they have their networked expansion in areas that encompass nonbank activities like insurance or securities dealing (Enoch, Mathieu & Mecagni, 2015).

Furthermore, the authors discover that these nonbank financial intermediaries do not have access to a lender of last resort. Hence, they put the financial health of cross-border banks which have links with them in danger (Enoch, Mathieu & Mecagni, 2015). Considering that their networked expansion could become systemically important, the authors, therefore, find that concerns about the risk of contagion and financial instability within the region exist. In an attempt to cover up the gaps in the regulation of cross-border banks in Africa, banking literature suggests the following.

The first suggestion is that regulators need to follow the lead of Morocco. They can formally institute a consolidated supervision program for cross-border banks especially operating within the WAEMU region (Enoch, Mathieu & Mecagni, 2015; see also Mecagni et al., 2015).

Secondly, African supervisors need to have an onsite framework for cross-border banking subsidiaries in place to encourage joint inspections (Enoch, Mathieu & Mecagni, 2015). To this effect, the authors find that supervisors of Nigeria and Kenya have each on their own been doing joint inspections for subsidiaries within their sub-regions. They also find that three out of the seven major PABs operating in the continent recently had a supervisory college (the Central Bank of Kenya has organized supervisory colleges for most of its PABs). The supervisory colleges usually involve all host supervisors of the concerned banks. Mecagni et al. (2015) also suggest establishing supervisory colleges as a way of monitoring all pan-African groups. Supervisory colleges, however, have challenges. These include agreement on meeting times, the agenda for the meeting and the decision-making capacity of the supervisory staff attending the meeting. To strengthen this option, the authors suggest the use of a core college of few supervisors from host countries. They also indicate the circulation of the agendas for such supervisory colleges to be made ahead of meeting dates.

The third suggestion is on the usage of a memorandum of understanding (MoUs) as solutions to the inadequate supervision problem of CBBs. MoUs will ensure a full exchange of information between all home and host authorities (Mecagni et al., 2015). The authors find that MoUs may also be used to protect national financial stability. MoUs are however not legally binding, or legally

robust documents (Adam, Laydjiev, Jones & Zeitz, 2015). Nonetheless, Beck et al. (2014) note that the number of MoUs across the region and between host country supervisors within and home country supervisors outside the region has increased.

In other solutions prescribed for the supervision problem associated with CBB, some authors suggest that African supervisors may establish Crises Management Groups (CMGs) for regionally and domestically systemic cross-border banks (Enoch, Mathieu & Mecagni, 2015).

However, even though it has the potential to solve the inadequate monitoring and supervision cross-border banks face from their regulators', it is still not known the extent to which depositor market discipline can help solve this problem.

3.3 Summary of Review on CBB Environment

This chapter of the study has provided an overview of the banking sector in Africa by reviewing the literature on the level of regional, economic, and financial integration in Africa. The chapter also reviewed the literature on prevailing economic conditions in Africa. It then took a look at local and global past financial crises situations, and how they made the economy less than stable. The chapter also discussed why the continent had to undergo financial sector reform. The financial reforms Africa had to go through as part of a World Bank-sponsored financial sector adjustment program affected bank competitiveness and efficiency; bank innovation; bank regulation and

supervision; the adoption rate of deposit insurance scheme; cross-border banking and even the incidence of bank crises. The chapter critiques on how the African banking sector has performed, which is "generally stable". The chapter also takes note of the challenges that plague CBB. The chapter ends with some suggested solutions to the monitoring challenges associated with CBB. Empirical evidence exists to show that depositors monitor bank risk. However, no evidence exists to show that depositors monitor bank risk in the presence of cross-border banks. Hence the need for a study.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Introduction

This chapter presents the research approach (methodology) the study adopts to achieve the research objectives stated in Chapter One. This chapter explains in detail, the study's research design, including the sampling design, used. It also specifies and explains the empirical models. The study's estimation strategy is also data explained.

4.2 Research Design

The activities undertaken to achieve the research objectives are chosen based on the functionalist paradigm. It has shaped the ontological, epistemological, and methodological assumptions of mainstream studies in finance (Ardalan, 2003). According to the author, the functionalist paradigm posits that the world of finance is one of concrete reality; which has a "cause-and-effect mechanism underlying" it (Bettner et al., 1994). A researcher is, therefore expected to play a positivist role in the production of knowledge by objectively uncovering it (Ardalan, 2007).

Key among the theories the functionalist paradigm influences are corporate governance theories. The broader subject area of corporate governance explains the depositor market discipline (DMD) phenomenon. Market discipline is an external corporate governance tool or mechanism used by depositors of depository institutions to continuously monitor and manage the performance of an

institution's directors in efficiently managing corporate resources (Forrssbaeck, 2011; Garcia, 1999; Andres & Vallelado, 2008; Flannery, 1998). Min (2015), therefore discusses that due to this external corporate governance role it plays, depositor market discipline is now one of the core paradigms in banking regulation. Aside from this, the study also finds that cross-border banking is a subject matter in corporate governance. Cross-border banking is a subject matter under corporate governance because questions that border on bank ownership structure are governance variables (Forrssbaeck, 2011; Angkinand & Wihlborg, 2010).

Given the above discussion, this research sums up that the theories on depositor market discipline (DMD) and cross-border banking (CBB) discussed so far in this study, are views that have been shaped by the functionalist paradigm. This study takes a positivist stand to uncover knowledge objectively through a scientific process deductively. Since the methodological approach of a positivist is a quantitative methodology, the study, therefore, used the survey research method as a quantitative methodological tool (Grix, 2002) to uncover the knowledge that is value-free and independent of personal view.

4.3 Target Population, Sample Size, Sampling Period

The target population for this study is all deposit-taking institutions operating within the 54 countries of Africa. The deposit-taking institutions used in the study include commercial banks; cooperative banks; savings banks; investment banks; specialized government credit institutions; real estate, and mortgage banks; and Islamic banks. The study period is sixteen-years (2000-2015).

The study drops all banks that have less than seven years of observation for the variables of interests: mainly bank deposit growth rate and bank deposit cost. In similar yet different circumstances, Houston, Lin, Lin, and Ma (2010) do not include in their study banks with only two years of data or less.

Furthermore, the study's dataset excludes all bank-holding companies to avoid counting a bank twice since both the bank-holding companies and the bank itself is often included in BankScope (see Claessens & van Horen, 2013). The population that remained after these adjustments, therefore, became the research sample. Table 4.1 provides further information on the final sample used in the study for Africa. The final panel dataset is balanced. Other samples used in the study but not reported in the tables below include cross-border banks in EDI countries and cross-border banks in IDI countries; and Good Banks and Bad Banks. The research groups banks as Good Banks and Bad Banks, depending on whether their capital adequacy ratios fall above or below the mean capital adequacy ratio for all banks in Africa.

Table 4.1: *List of African countries in the final research sample and number of banks used in each country*

Country	No. of Banks used	Country	No. of Banks used
1. Kenya	11	20. Mozambique	8
2. Tanzania	19	21. South Africa	11
3. Uganda	12	22. Swaziland	4
4. Nigeria	2	23. Lesotho	3
5. Benin	4	24. Madagascar	5
6. Burkina Faso	5	25. Malawi	6
7. Cote D'Ivoire	10	26. Mauritius	11
8. Mali	5	27. Namibia	5
9. Niger	4	28. Rwanda	4
10. Senegal	9	29. Zambia	9
11. Togo	3	30. Burundi	3
12. Cameroon	7	31. Cape Verde	2
13. Gabon	3	32. Sierra Leone	6
14. Algeria	14	33. Ghana	16
15. Libya	6	34. Angola	9
16. Mauritania	8	35. Egypt	26
17. Morocco	10	36. Tunisia	18
18. Sudan	16		
19. Botswana	8		
Total of banks in the final sample:	304	The total number of countries in the final sample:	36

Table 4.2: *List of African countries in domestic banks only sample and cross-border banks only sample*

Country	No. of domestic banks used in sub-sample	No. of CBB Banks used	Country	No. of domestic banks used in sub-sample	No. of CBB Banks used
Kenya	9	2	Botswana	3	5
Tanzania	7	12	Mozambique		8
Uganda	3	10	South Africa	6	5
Benin		4	Lesotho		3
Burkina Faso		5	Swaziland	1	3
Cote D'Ivoire	3	7	Madagascar		5
Mali	4	2	Malawi	2	4
Niger	1	3	Mauritius	5	7
Nigeria	2		Namibia	1	4
Togo	3		1Rwanda	2	3
Senegal	3	7	Zambia	3	7
Cameroon	3	4	Burundi	2	2
Gabon	2	1	Sierra Leone	4	2
Algeria	7	7	Cape Verde	2	
Libya	6		Ghana	7	9
Mauritania	6	2	Angola	9	
Morocco	7	3	Egypt	21	9
Sudan	13	5	Tunisia	9	9
The total number of banks used in sub-sample altogether:	154	161	The total number of countries used in the sample overall:	29	32

Note. The above research sub-sample is drawn from the final sample-based on cross-border banks only and domestic banks only. Domestic banks refer to banks that have not crossed their country's borders. Due to an overlap in the categories, the total of these sub-samples exceeds the total of the final sample shown in Table 4.1. The overlap in the categories is explained by events such as mergers and acquisitions that may have occurred over the study period. This subsample enabled the study to examine the effect of cross-border banking on bank risk.

Table 4.3: *List of African countries in research sub-sample of banks in EDI countries and IDI countries*

Countries with explicit deposit insurance (EDI)	No. of banks used in EDI sample	Countries with implicit deposit insurance (IDI)	No. of banks used in IDI sample
1. Kenya	11	11. Zambia	9
2. Tanzania	19	12. Burundi	3
3. Uganda	12	13. Cape Verde	2
4. Nigeria	2	14. Sierra Leone	6
5. Algeria	14	15. Ghana	16
6. Mauritania	5	16. Benin	4
7. Morocco	10	17. Burkina Faso	5
8. Sudan	16	18. Mali	5
		19. Niger	4
		20. Cote D'Ivoire	10
Countries with implicit deposit insurance (IDI)	No. of banks used in IDI country	21. Senegal	9
1. Botswana	8	22. Togo	3
2. Mozambique	8	23. Cameroun	7
3. South Africa	11	24. Gabon	3
4. Swaziland	4	25. Angola	9
5. Lesotho	3	26. Egypt	26
6. Madagascar	5	27. Libya	6
7. Malawi	6	28. Mauritania	5
8. Mauritius	11	29. Tunisia	18
9. Namibia	5		
10. Rwanda	4		
Total number of banks in sub-sample of banks in countries with EDI	89	Total number of banks in sub-sample of banks in countries with IDI	215

Note. The research sample has been categorized as shown above because it enabled the researcher to draw sub-samples from the data in order to perform further estimations and robustness checks. The final sample is made up 148 banks from countries that have adopted explicit deposit insurance, and 156 banks from countries that operate with implicit deposit insurance arrangements. Countries making up the EDI country sample are countries that have had explicit deposit insurance arrangements in place for at least seven years. Considering that the research period covers a sixteen year period, seven years enables the study to increase the number of observations whiles maintaining the ability of the study to generalize outcomes from the sample.

4.4 Data Collection

This panel study made use of bank-level and country-level data already collected and recorded (secondary data). The study collected bank-level data on the dependent variables and independent variables for the study's specified empirical models, from BankScope (a database compiled by Fitch IBCA) and Bloomberg (for further discussion on the final dataset see section 4.3 above). Data on the study's cross-border banking (CBB) variable is collected from Claessens and van Horen (2014) database and Bloomberg. Information on deposit insurance data was obtained from the Financial Stability Board Peer Review; and the website of the International Association of Deposit Insurers. Where needed, the World Bank website and the website of the individual Central Banks of African countries were contacted. Additional information on deposit insurance was collected from Demirguc-Kunt and Sobaci (2001); Demirguc-kunt et al. (2005); Demirguc-Kunt, Kane, and Laeven (2008); Demirguc-Kunt, Kane, and Laeven (2014); and Schich (2008).

Country-level data on macroeconomic data and exchange rate data for local currency units (LCU) per the United States dollar (US$) for the study was collected from the International Monetary Fund's (IMF) International Financial Statistics and African Development Indicators. Additional data for the exchange rate in local currency units were collected from the data portal, IndexMundi. Further to this, the study obtained information on bank market concentration and development for each country from the Bank Concentration and Financial Structure and Development Database at the World Bank. Data on the institutional quality of countries and the ease of doing business of banking was collected from World Bank's Doing Business indicators.

4.5 Empirical Model Discussion

4.5.1 The Effect of CBB on Bank Risk, given EDI

The Effect of Cross-border Banking on Bank Risk

Hypothesis one uses two samples. The first sample consists of cross-border banks only while the second sample consists of domestic banks only. The total number of banks and countries constituting the sample is shown above in Table 4.2. the study conducts a time series analysis and One-way Analysis of variance (ANOVA) to assess the risk performance indicators of the two samples. The Bartlett's test helps to establish equality in the variances of the mean value for the two samples.

Cross-border Banking Explicit deposit insurance and Bank Risk

The study makes use of two samples: banks operating in countries with explicit deposit insurance and banks operating in countries with implicit deposit insurance to understand the relationship between cross-border banking, explicit deposit insurance and risk. Following Sissy et al. (2017) and Berger, Ghoul, Guedhami, and Roman (2016), Eq. (1) stated below helps to establish the relationship stated above:

$$Risk_{i,t} = \beta_0 + \beta_1 Risk_{i,t-1} + \beta_2 CBB_{i,t} + \beta_3 Bank_{i,t} + \beta_4 Macro_{j,t} + \varepsilon_{i,t} \quad (1)$$

$$\varepsilon_{it} = \mu_i + v_t + e_{i,t}$$

From the above-stated equation (1), the dependent variable for the study is a vector of six different bank measures: Z-Score; Sharpe ratio; the ratio of nonperforming loans to total loans; the ratio of loan loss allowance (LLA) to total loans; the standard deviation of ROA (σ ROA) and standard deviation of ROE (σ ROE). Z-Score measures the level of insolvency of bank i in year t (see: Sissy et al., 2017; Belanes & Hajiba, 2012; Nui, 2012; Cubillas, Fonseca & Gonzalez, 2012; Tover-Garcia, 2014; Houston, Lin, Lin & Ma, 2010; Berger, Ghoul, Guedhami & Roman, 2016). Based on the discussions of these authors, this study interprets the Z-Score as the number of standard deviations a bank's return on assets (ROA) has to drop below its expected value or mean before equity depletes (i.e., number of steps from default). Thus, this study interprets a high Z-score to represent less risk and more bank stability. In computing the Z-score measure, this study followed Sissy et al. (2017) and Tover-Garcia (2014) by calculating it as a 3-year rolling average of a bank's annual Return on Assets (ROA) plus the 3-year rolling average ratio of the bank's capital adequacy measure (ratio of capital to assets), divided by the standard deviation of ROA (σ ROA) calculated over a three-year rolling window.

The next risk measure is the Sharpe ratio. It measures market risk with a higher number interpreted as less market risk for bank performance. Sissy et al. capture this variable as a risk-adjusted return on equity. The Sharpe ratio the ratio of mean ROE to standard deviation of ROE. The next risk measure is the ratio of nonperforming loans to total loans. Here, total impaired loans take the place of nonperforming loans. LLA is the ratio of loan loss allowance (LLA) to total loans. The standard deviation of ROA (σ ROA) and standard deviation of ROE (σ ROE), are both calculated over a three-year rolling window. ROA is pre-tax profits/total assets whiles ROE is pre-tax profits/equity capital. $Risk_{i,t-1}$ is the first lag of the dependent variable, Risk.

The study's main explanatory variable is $CBB_{i,t}$. It is measured by using a dummy variable that takes on the binary value of one if a bank is a cross-border bank and zero otherwise. $Bank_{i,t}$ is a vector of bank-specific control variables. It includes bank size (US$), income diversification, and management efficiency. Bank size (US$)) is calculated as the natural logarithm of total assets. It measures a bank's ability to compete internationally and absorb risk. Income diversification is measured as 1- | ((Net Interest Income – Other Operating Income)/Total Operating Income) |. Income diversification is used because it influences risk. The income diversification variable shows that firms with equal net interest and non-interest incomes are completely diversified (See Berger, Ghoul, Guedhami & Roman, 2016). The study also controlled for the management efficiency of a bank's operating cost structure. This variable is calculated as overheads to total assets.

$Macro_{i,t}$, is a vector of macroeconomic control variables for each country under study. The study used it to control for the regulatory environment because of its likely effect on the quality of bank assets (see Demirguc-kunt & Kane, 2002). This vector of macroeconomic variables included Log of gross national income (GNI) per capita, real gross domestic product (GDP) growth, inflation. In the panel estimations in Equation (1), $\varepsilon_{i,t}$ captures the error term for the equation. μ_i in the error term captures individual firm heterogeneity. It allows for different intercepts for each cross-sectional unit. The variable v_t above is used in the study to capture time fixed effects. $e_{i,t}$ captures stochastic effects.

4.5.2 A Complete Test for DMD within the Context of CBB in Africa

The empirical model specified in this section of the study, follows the work of Peria and Schmukler (2001) and Kobayashi and Bremer (2007), Arnold, Grobi, and Kozoil (2016) by using reduced-form equations to establish the existence of DMD within the CBB context in Africa. The study builds upon earlier discussions had in Chapter Two on how the theory of demand and supply interacts within the bank liability management framework. Changes in bank-specific risks affect the equilibrium interest rate and the equilibrium quantity because the price function for bank deposits depends on the quantity deposits and vice-versa. Hence, an interactive effect occurs that leads to the establishment of market equilibrium. And so, such an interactive effect makes it difficult to exogenously determine the interest rate variable and the quantity variable in the structural-form equations. From Kobayashi and Bremer (2007), this study finds that depositor discipline hypothetical tests are divided into three effects as follows: an interest rate effect, a quantity effect; and an interaction effect. Therefore, to test for the interactive effect, this study first states the interest rate effect model and the quantity effect model. These models are presented below as equation (2) and (3):

$$\Delta Q_{i,t} = \beta_1 + \beta_2 BR_{i,t-1} + \beta_3 MR_{j,t} + \beta_4 I_{i,t} + \varepsilon_{2,i,t} \quad (2)$$

$$I_{i,t} = \alpha_1 + \alpha_2 BR_{i,t-1} + \alpha_3 MR_{j.t} + \alpha_4 \Delta Q_{i,t} + \varepsilon_{1i,t} \quad (3)$$

In Eq. (2), $\Delta Q_{i,t}$ captures deposit growth rate. $\Delta Q_{i,t} = (Q_{i,t} - Q_{i,t-1})/\, Q_{i,t-1}$. Eq. (2) also measures the quantity effect of depositor market discipline. $BR_{i,t-1}$ is CAMEL, a vector of bank-specific risk factors with a lag because balance sheet information is an ex-post measure for the public. $MR_{j,t}$

measures market Risk. It is a vector of financial market factors affecting each banks' interest rate or growth. whiles $\varepsilon_{1,i,t}$ is an error term. Eq. (2) states that a constant (intercept) term explains changes in bank deposit growth rate, plus a set of bank risk factors, a collection of macroeconomic factors, an error term. The error term captures omitted explanatory variables and measurement errors in the model. It may be decomposed into time, firm, and stochastic effects.

In Eq. (3), $I_{i,t}$ is captured as ((Interest Expense on Deposits)/ (Average Amount on Deposits)) *100%. Basically, Equation (3) states that interest rates on bank deposits are explained by a constant (intercept) term, a set of bank risk factors, a set of macro factors, changes in bank deposits, and an error term. The error term captures omitted explanatory variables and measurement errors in the model. It may be decomposed into time, firm, and stochastic effects.

However, it is difficult to identify the bank deposit cost ($I_{i,t}$) variable and the deposit growth rate ($Q_{i,t}$) variables as exogenous variables from Eq. (2) and Eq. (3) above. This problem is solved by using the reduced form equations method. Following Kobayashi and Bremer (2007) and Min (2015), this study makes four key assumptions concerning the threshold banks have for lending; their main source of liability; the main type of asset they keep; and the risk-sensitive nature of their liability holders. Precisely, this research assumes that banks generally have a threshold for lending; and that the main source of bank liability is deposit whiles, the primary source of bank asset is from their lending activities. Finally, this research assumes that all bank liability holders are always risk-sensitive. This last assumption is in line with Eugene Fama's efficient market hypothesis (Min, 2015).

Algebraically, the above discussed interactive effect between a bank's demand for deposits and supply of deposits is established by first specifying the following linear demand and supply models commonly used for bank lending and deposit: Demand function:

$$q^d = \alpha_1 + \beta_1 i + \gamma_1 MR + u_1 \qquad (\beta_1 < 0,\ \gamma_1 > 0) \tag{4}$$

Supply function:

$$q^s = \alpha_2 + \beta_2 i + \gamma_2 BR + u_2 \qquad (\beta_2 > 0, \gamma_2 < 0) \tag{5}$$

The equilibrium condition or market clearing point is shown below as Equation 5 because, at that point, there is no excess demand over supply:

$$q^d = q^s = q \tag{6}$$

Where i is the interest expense on deposits; BR measures bank-specific risk factors and MR is market risk captured as a vector of financial market factors affecting each bank's interest rate or growth.

Solving for q:

$$\frac{q}{\beta_1} - \frac{\alpha_1}{\beta_1} - \frac{\gamma_1 MR}{\beta_1} - \frac{U_i}{\beta_1} = \frac{q}{\beta_2} - \frac{\alpha_2}{\beta_2} - \frac{\gamma_2 BR}{\beta_2} - \frac{u_2}{\beta_2} \tag{7}$$

Solving for i:

$$\alpha_2 + \beta_2 i + \gamma_2 BR + u_2 = \alpha_1 + \beta_1 i + \gamma_1 MR + u_1 \tag{8}$$

Multiply (7) by $\beta_2\beta_1$

$$q = \frac{\alpha_1\beta_2 - \alpha_2\beta_1}{\beta_2 - \beta_1} + \frac{-\gamma_2\beta_1}{\beta_2 - \beta_1} BR + \frac{\gamma_1\beta_2}{\beta_2 - \beta_1} MR + \frac{u_1\beta_2 - u_2\beta_1}{\beta_2 - \beta_1} \tag{9}$$

Rearrange (8)

$$i = \frac{\alpha_1 - \alpha_2}{\beta_2 - \beta_1} + \frac{-\gamma_2}{\beta_2 - \beta_1} BR + \frac{\gamma_1}{\beta_2 - \beta_1} MR + \frac{u_1 - u_2}{\beta_2 - \beta_1} \quad (10)$$

From (9), let:

$$\pi_{10} = \frac{\alpha_1\beta_2 - \alpha_2\beta_1}{\beta_2 - \beta_1}, \qquad \pi_{11} = \frac{-\gamma_2\beta_1}{\beta_2 - \beta_1}, \quad \pi_{12} = \frac{\gamma_1\beta_2}{\beta_2 - \beta_1}, \quad \upsilon_1 \frac{u_1\beta_2 - u_2\beta_1}{\beta_2 - \beta_1}$$

From (10) let:

$$\pi_{20} = \frac{\alpha_1 - \alpha_2}{\beta_2 - \beta_1}, \quad \pi_{21} = \frac{-\gamma_2}{\beta_2 - \beta_1}, \quad \pi_{22} = \frac{\gamma_1}{\beta_2 - \beta_1}, \qquad \gamma_2 = \frac{u_1 - u_2}{\beta_2 - \beta_1}$$

Based on the above, the reduced-form of the model is then,

$$q = \pi_{10} + \pi_{11} BR + \pi_{12} MR + V_1 \quad (11)$$

$$i = \pi_{20} + \pi_{21} BR + \pi_{22} MR + V_2 \quad (12)$$

$\Pi n_i n_j$ are the reduced form parameters. Other studies that also use reduced-form equations to test for market discipline include Kobayashi and Bremer (2007); Park (1995); Peria and Schmukler (2001); Disli, Schoors, and Meir (2013); Aysan Disli, Ozturk, and Turhan (2015); and Febrian and Herwany (2011). Arnold, Grobel, and Koziol (2016) use reduced-form equations because it enables them to estimate the impact of bank risk on equilibrium combinations of the interest rate and deposit growth.

A Complete Test for DMD in Africa

Following Peria and Schmukler (2001); Demirguc-Kunt and Huizinga (2004); Kobayashi and Bremer (2007), this study rewrites Eq. (11) and Eq. (12) as follows:

$$\Delta Q_{i,t} = \beta_0 + \beta_1 BR_{i,t-1} + \beta_2 MR_{j,t} + \varepsilon_{1\,i,t} \quad (13)$$

$$I_{i,t} = \alpha_0 + \alpha_1 BR_{i,t-1} + \alpha_2 MR_{j,t} + \varepsilon_{2\,i,t} \quad (14)$$

In Eq. (13), the study used changes in deposit growth to estimate DMD via a quantity-based mechanism. Following Disli, Schoors, and Meir (2013), this study uses the growth rate of total deposits rather than the level of deposits to avoid encountering stationary issues.

In Eq. (14), the study uses interest rate changes on bank deposits ($I_{i,t}$) to estimate DMD via the priced based mechanism. $\varepsilon_{1\,i,t}$ is the random error term in equation (13) whiles $\varepsilon_{2\,i,t}$ of Equation (14) is the error term for that equation. It is independently distributed with mean zero and variance $\sigma^2_{i,t}$. i is measured from time 1,…, N, where N is the different number of banks in each year at time t. t is the time dimension of the study, and it is estimated from 1,…,T.

Interest rate changes on bank deposits ($I_{i,t}$) is the implicit interest rate paid by bank i on its deposits at time t. This study uses an implicit measure to capture changes in the cost of bank deposits because unlike Imai (2006), this research work does not have access to the posted interest rates of the research sample. Chibundu (2013) also explains that it is better to use an implicit rate because

banks pay different rates to different customers. In other words, banks do not pay one rate to all their customers. The regression result from this variable is expected to capture DMD via the price-based mechanism. Based on the literature (see Matutes & Vives, 1996), this study expects the relationship between the interest rate on bank deposits and bank risk to be positive in order for the study to conclude that DMD exists within Africa.

$BR_{i,t-1}$ is a vector of bank-specific risk factors. This vector of bank-specific variables is employed to enable the study to understand which of the bank fundamentals may be providing the strongest signal to depositors that, banks are indeed taking a risk (See Barajas & Steiner, 2000). The vector has a lag because balance sheet information is usually available to the public with an unavoidable delay. Min (2015), therefore provides that the ex-post nature of market discipline is exacerbated by the fact that such discipline occurs in response to lagging indicators. Following Disli, Schoors, and Meir (2013), the lag structure of the risk variable discussed above helped the study to solve for endogeneity issues in the model. $BR_{i,t-1}$ is based on the five categories of the CAMEL methodology for rating a bank. CAMEL stands for capital adequacy, asset quality, management quality, earnings, and liquidity. Generally, an inverse relationship exists between a CAMEL indicator and bank risk.

Bank capital adequacy ratio is measured as the capital to total assets ratio. Market discipline studies expect a positive relationship between the capital adequacy ratio of a bank and bank deposits; and a negative relationship between the capital adequacy ratio and the interest rate on bank deposits. Tier 1 capital, as defined in Basel II and III, is used in this study because it is easy to use it to make

comparisons across countries (see Parwada, Ruenzi & Sahgal, 2013). Tier 1 definition of capital is paid-up share capital/common stock plus disclosed reserves. Parwada, Ruenzi, and Sahgal (2013) define share capital to include fully-paid and issued common stock, and non-cumulative perpetual preferred stock whiles disclosed reserves include retained earnings. Parwada, Ruenzi, and Sahgal (2013) find that Tier 1 capital ratio is calculated with risk-weighted assets as the divisor. However, due to data limitations, assets, and not risk-weighted assets are used.

To estimate the Asset Quality CAMEL indicator, two ratios: the ratio of nonperforming loans to total loans, and the concentration of loan portfolios, are calculated. The ratio of nonperforming loans to total loans is used to measure bank risk because it objectively captures bank credit risk by using the percentage of loans a bank might have to write off as losses without managerial influences (Peria & Schmukler, 2001; Belanes & Hajiba, 2012; Nui, 2012). It is expected that this ratio will relate negatively to bank deposits but positively affect the cost of bank deposits. Further to these asset quality measures, the study interrogated the concentration levels of bank loans in the areas of real estate, personal or consumption loans, and corporate loans. Real estate loans are perceived to be risky because their payback period is long, and the size of the loan is usually large. On the other hand, such loans may not be risky because they are backed by security in the form of real estate. Therefore a priori, the study cannot predict the relationship that will exist between the proportion of real estate loans and deposits; and the relationships that will exist between the proportion of real estate loans and interest rates. Based on the literature, this statement is also true for the other types of loans examined.

CAMEL indicator three, bank earnings/bank profitability is measured by following Peria and Schmukler (2001); and Tover-Garcia (2014), Bertay, Demirguc-Kunt, and Huizinga (2013). It is measured as the 12-month return on assets (ROA) ratio and the 12-month return on equity (ROE) ratio. ROA is pre-tax profits divided by total assets, and ROE is pre-tax profits divided by equity. The study expects a positive relationship between ROA and bank deposits; and a negative relationship between ROA and bank deposit interest rate.

This study estimated CAMEL indicator four, Management Quality/Bank Efficiency, as the ratio of 12-month managerial expenses to annual average total assets. The study expects less efficient banks to have high expenditures. On the other hand, some authors explain that a bank may have high managerial expenses because they offer quality services to their clients (Peria & Schmukler, 2001). This study, however, finds from the literature that, it is difficult to control for this (see Peria & Schmukler, 2001). It is therefore difficult for the study to predict the effect this ratio will have on bank risk and hence DMD.

CAMEL indicator five, Bank Liquidity, is the ratio of liquid assets-to-total assets. It is expected that more liquid banks will be less risky because such banks will be able to meet the withdrawal requests from their depositors. This ability will, therefore, positively influence the deposit growth rate and negatively affect the deposit interest rate. Other additional measures of bank liquidity risk the study considers are the ratio of bonds-to-assets. However, bonds can sometimes be illiquid and suffer large price volatility. For this reason, it will be difficult to predict the effect the ratio of bonds-to-assets will have on the study's market discipline measures.

Table 4.4: *CAMEL Risk Measures expected signs*

CAMEL Measure	Calculation	Expected sign: Bank deposit growth rate	Expected sign: Bank deposit cost
1. Capital Adequacy:	capital to total assets ratio	+	-
2. Asset Quality			
2.a. Nonperforming to total loans	Total impaired loans/ total loans	-	+
2.b. Concentration of loan portfolios:			
2.b.(i) Real estate loans	(Residential mortgage loans + other mortgage loans)/total loans	+/-	+/-
2.b.(ii) Personal loans	retail loans/total loans	+/-	+/-
2.b.(iii) Corporate loans	Corporate loan to total loans	+/-	+/-
3. Bank Profitability:			
3.a. Return on assets (ROA)	pre-tax profits/total assets	+	-
3.b Return on equity (ROE)	pre-tax profits/equity capital	+	-
3.c. Bank Efficiency or Management Quality:	Ratio of overheads to total assets	+/-	+/-
4. Bank Liquidity:			
4. a. Liquidity ratio	Liquid assets to assets ratio	+/-	+/-
4.b Bond-to-assets ratio		+/-	+/-

$MR_{j,t}$ is market risk captured as a vector of financial market factors affecting each bank's interest rate or deposit growth. This vector includes Inflation, real GDP growth, and real GNI per capita in $10,000, GDP per Capita (GDP/capita). These variables used to control for macro-economic differences/quality of institutional environment between countries because most studies consider it as a country economic development indicator (see is Demirguc-kunt & Kane, 2002; Brato et al., 2008; Houston, Lin, Lin & Ma, 2010; Ghosh et al., 2011; Claessens & van Horen, 2013; Figuet, Humblot & Lahet, 2015). These studies explain that when compared to gross GDP, the GDP per

Capita is a more useful indicator because it eliminates the size effect of a given country. This empirical inquiry measures inflation as the annual change in consumer prices/annual change in CPI. Inflation is measured because it has been shown to adversely affect financial depth. Higher inflation is expected to lower the real returns to depositors, reduce the saving rate for depositors (Bertay, Demirguc-Kunt & Huizinga, 2013; Disli, Schoors & Meir, 2013). So, the growth in deposits will be less and interest rates will be higher to compensate for the loss in the real value of the deposits (Chibundu, 2013). Similarly, Zhao, Murinde, and Mlambo (2011) discuss that higher inflation distorts decision making, exacerbates information asymmetry, and introduces price volatility; hence, they predict a positive relationship between inflation and bank risk-taking. Therefore, as inflation increases bank risk, market discipline is expected to exist. Based on Lee and Hsieh (2013), this research work used the gross national income (GNI) per capita as a macroeconomic control variable because it helps to distinguish the effect of different economic levels. The vector of macroeconomic variables should be negatively related to market discipline via changes in deposit growth. This would mean that, as the macroeconomic conditions of a country worsen, depositors will have less confidence in that economy (Zhang & She, 2008).

Following Claessens and van Horen (2013), this study controlled for other variables such as host countries institutional quality as related to the ease of doing business of banking. Here this study included institutional quality variables such as Bureaucratic quality; Quality of contract enforcement; and Legal efficiency. They are used to measure the strength of the institutional environment of a country. Bureaucratic quality is a score indicating the quality of insolvency laws that govern relations between debtors, creditors, and the court (The World Bank Group Measuring Business Regulations, 2019). According to the Measuring Business Regulations section of the

World Bank, Bureaucratic quality is calculated based on four other indices such as the commencement of proceedings index. Here, the higher the score, the better the institutional framework within a country. In Barajas and Steiner's (2000) view, including these other variables helps provide an alternative hypothesis regarding depositor behaviour if the market discipline hypothesis is rejected.

A Complete Test for DMD within the CBB context of Africa

To test the study's fourth hypothesis, the study re-estimated equation (13) and equation (14) as equation (15) and equation (16) by including a dummy variable for CBB to interact with the various CAMEL risk measures. These interactions helped the study establish the effect bank risk has on depositor market discipline (DMD) in the presence of CBB.

$$\Delta Q_{i,t} = \beta_0 + \beta_1 BR_{i,t-1} + \beta_2 MR_{j,t} + \beta_3 CBBD_{i,t} + \beta_4 CBBD_{i,t} BR_{i,t-1} + \varepsilon_{1\,i,t} \quad (15)$$

$$I_{i,t} = \alpha_0 + \alpha_1 BR_{i,t-1} + \alpha_2 MR_{j,t} + \alpha_3 CBBD_{i,t} + \alpha_4 CBBD_{i,t} BR_{i,t-1} + \varepsilon_{2\,i,t} \quad (16)$$

4.5.3 The Incentives for DMD within the CBB Context

The study expands equation (13) and equation (14) by including the variable INCENTIVE. INCENTIVE is a vector of variables that have been identified in banking literature to serve as an incentive for depositors to monitor bank risk. The expanded equations are below in their respective order as equation (17) and equation (18).

$$\Delta Q_{i,t} = \beta_0 + \beta_1 BR_{i,t-1} + \beta_2 MR_{j,t} + \beta_3 INCENTIVE_{j.t} + \beta_4 CBBD_{i,t} + \beta_5 INCENTIVE_{j,t} CBBD_{i,t} BR_{i,t-1} + \varepsilon_{1\,i,t} \quad (17)$$

$$I_{i,t} = \alpha_0 + \alpha_1 BR_{i,t-1} + \alpha_2 MR_{j,t} + \alpha_3 INCENTIVE_{j.t} + \alpha_4 CBBD_{i,t} + \alpha_5 INCENTIVE_{j,t} CBBD_{i,t} BR_{i,t-1} + \varepsilon_{2\,i,t} \quad (18)$$

INCENTIVE is a vector of variables expected to give depositors an incentive to monitor bank risk: explicit deposit insurance; bank asset size; and bank capital. They are discussed next.

To measure explicit deposit insurances for the study's INCENTIVE variable, $DEDI_{j.t}$ is specified. It is a dummy variable that differentiates countries that have explicit deposit insurance from those that do not. Therefore, it takes a binary value of one if a country has an explicit deposit insurance scheme in place and zero otherwise. β_3 is the coefficient of the study's $DEDI_{j.t}$. A negative β_3 implies $DEDI_{j.t}$ (explicit deposit insurance) leads to a reduction in bank interest rates. On the other hand, a positive β_3 for $DEDI_{j.t}$ is an indicator that explicit deposit insurance increases bank interest rates. A reduction of required deposit rates on account of deposit insurance suggests that depositors perceive banks to be less risky and demand lower interest rates. In the presence of CBB and DEDI, bank risk may cause bank deposits to grow. It may also cause bank deposit cost to reduce. The study's INCENTIVE variable is also measured as a bank asset size. Bank asset size is the natural logarithm of total bank assets. Following Fonseca et al. (2012), this study expects deposits to cost big banks less if the "too-big-to-fail" hypothesis exists. On the other hand, larger banks may pay

higher deposit rates than small banks if they have better investment options or compete more intensively than smaller banks. It is therefore difficult to predict outright the sign for this variable. Following Bertay, Demirguc-Kunt, and Huizinga (2013), this study finds that a bank's size is potentially endogenous to bank interest expenses and that, this could reduce the potential for reverse causation. The study, therefore, includes lagged values of all bank-level explanatory variables. In connection with the too-big-to-fail effect, Chibundu (2013) expects bank size to be positively related to deposit growth and negatively associated with deposit interest rates.

Lastly, this study measures INCENTIVE as bank capital. Nwosu, Amadi and Mba, (2012); Chen, Hwang, and Lin (2012) and Konishi and Yasuda (2004) share the view that capital has a two-way impact on bank risk-taking incentives. An increase in capital regulation could instead increase bank risk by forcing banks to reconfigure the composition of its portfolio of risky assets, since high bank capital can restrict the risk-return frontier of a bank (Chen, Hwang & Lin, 2012; Konishi & Yasuda (2004). Nwosu, Amadi, and Mba (2012), therefore suggest that the lending patterns of banks with large capital should be guided by effective regulation to prevent the possession of such capital from increasing bank risk.

From equation (17) and equation (18), β_4 and α_4 are parameters estimated for the study's cross-border banking variable. $CBBD_{i,t-1}$ is a dummy variable that is used to study cross-border banking. It takes a value of 1 when a bank is a cross-border bank and 0 otherwise. β_5 and α_5 are used to capture the interactive effect of the study's dummy for cross-border banking and various depositor monitoring incentive measures.

4.5.4 The Influencing Aspect of DMD

This study followed Maechler and McDill (2006) in estimating whether higher funding costs effectively reduce the desire of a bank to take higher risks by using the following reduced-form model. Due to the potential endogenous relationship between bank interest cost and bank deposit growth, the model makes use of the lagged values of the explanatory variables as internal instruments. These internal instruments are appropriate for the model because they are highly correlated with the endogenous variables and not correlated with the error term.

$$D_{i,t} - D_{it-1} = \alpha^1 \sum_{s=1}^{3}\left(D_{i,t} - D_{i,t-s-1}\right) + \beta^1(IM_{it} - IM_{it-1}) + P^1(X_{it-1} - X_{it-2}) + \theta^1(M_{it} - M_{it-1)} + (\varepsilon_{it} - \varepsilon_{it-1}) \quad (19)$$

Equation (19) is the first difference transformation of DMD via the quantity mechanism. D_{it} measures deposit growth rate whiles X_{it-1} is a vector of bank-specific variables included with a lag to account for the fact that balance sheet and income statement information is available to the public with a certain delay. IM_{it} is the interest rate margin between the interest rate on deposits, whiles M_t is a vector of macroeconomic variables. Further to this, Maechler and McDill (2006) split their samples based on asset quality into good banks and bad banks. Their findings reveal that good banks can still raise deposits by raising their deposit cost whiles bad banks cannot. This observation of theirs is interpreted as a constraint on the behaviour of bank managers' who take excessive risk. Other studies, such as Calomiris and Powell (2000) use a process of mean reversion to capture the influencing aspect of DMD.

4.6 Data Analysis

4.6.1 The effect of CBB on Bank Risk, given EDI

The study assesses the relationship between CBB and risk, by conducting a time series analysis on two samples: cross-border banks only sample; and domestic banks only. The findings from the time series analysis are then subjected to an Analysis of variance (ANOVA) test to determine the significance of the mean differences in the two samples

The relationship between cross-border banking (CBB), explicit deposit insurance and bank risk, is examined by following Sissy et al. (2017) and Berger et al. (2016). The study uses a dynamic panel model stated as equation (1) in this study. The parameters of equation (1) are estimated by using the Two-Stage generalized method of moments (GMM) estimator developed for dynamic models of panel data by Arellano and Bond (1991). The GMM technique is used because it can address the following econometric issues that may affect the study's research sample. First, it accounts for the presence of unobserved individual effects such as country-specific effects and bank-specific effects (Beck et al., 2000; Cubillas, Fonseca & Gonzalez (2012). Second, it exploits time-series variation in the data; paradoxically though, exploiting the time-series properties of data also creates a disadvantage concerning the cross-sectional estimator (Beck et al., 2000). Third, GMM takes account of, and controls for the endogeneity of all explanatory variables (Beck et al., 2000). For these reasons, this study adopts GMM under the studies estimation strategy. Similarly, Beck et al. (2000) suggest that usage of the dynamic generalized Method-of-Moments (GMM) panel estimator aids the researchers to extract consistent and efficient estimates. Endogeneity in a panel regression model means that a correlation exists between the explanatory variables of that panel

model and the error term. Such correlation should not exist since it would result in a simultaneity bias (Whidbee, 1997). To resolve such endogenous relationships, and eliminate the issue of fixed effects, instrumental variables (IV) estimators may be used.

GMM uses instrumental variables based on previous realizations of the explanatory variables, referred to as internal instruments (Beck et al., 2000). Whidbee (1997) finds from Arellano and Bond (1991) that the General Method of Moments (GMM) estimator suggests that to first-difference the regression equation to eliminate the country-specific effect, the following should be done:

$$Y_{i,t} - Y_{i,t-1} = \alpha^1\left(X^1_{i,t-1} - X^1_{i,t-2}\right) + \beta^1\left(X^2_{i,t} - X^2_{i,t-1}\right) + (\varepsilon_{i,t} - \varepsilon_{i,t-1})$$

This procedure, however, introduces a correlation between the new error terms, $(\varepsilon_{i,t} - \varepsilon_{i,t-1})$ and the lagged dependent variable, $Y_{i,t} - Y_{i,t-1}$, when it is included in $X^1_{i,t-1} - X^1_{i,t-2}$. To address this correlation and endogeneity problem, Arallano and Bond (1991) propose using the lagged values of the explanatory variables in levels as instruments. Under the assumptions that there is no serial correlation in the error term, ε, and that the explanatory variables X, where: $X = [X^1 X^2]$, are weakly exogenous. The following moment conditions can be used:

$$E[X_{i,t-s} \times (\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \qquad \text{for} \qquad s \geq 2; t = 3, \dots, T$$

Using these moments conditions, Arellano and Bond (1991) propose a two-step GMM estimator. In the first step, the error terms are assumed to be both independent and homoscedastic across countries and over time. In the second step, the residuals obtained in the first step are used to construct a consistent estimate of the variance-covariance matrix.

In addition to the GMM estimation, the partial correlations between the dependent variable and bank-specific variables are also analysed. The validity of the above estimation is checked with two AR_1 and AR_2 test for first and second-order residual serial errors. The lack of second-order serial correlation is used to validate the use of the instruments. Similarly, Andres and Vallelado (2008) find that first-order serial correlation does not invalidate research results. Still, the presence, of second-order serial correlation, is a signal of concern that the study might have omitted some variables.

In line with Beck et al. (2000), the Sargan test is used to determine whether over-identifying instruments are independent of the estimated errors. The Hansen test for overidentifying restrictions is also used to assess the study's instruments (Beck et al., 2000). The authors conduct this test based on the null hypothesis that the instruments are not correlated with the error terms, and that the test has a chi-square distribution with (J-K) degrees of freedom, where J is the number of regressors.

Andres and Vallelado (2008) also test the specification validity of their model by calculating the Hansen/Sargan test of overidentification of restrictions. They conduct this test because they find that the Hansen/Sargan test is useful for examining the lack of correlation between the instruments and the error term.

4.6.2 A Complete Test of DMD in Africa and, within the Context of CBB in Africa

In order to study this section of the research and the remaining sections, a sample consisting of all banks in Africa is used. The method of arriving at the final sample is the same as discussed in earlier sections of this chapter.

A Complete Test for Evidence of Depositor Monitoring of Bank Risk in Africa

To estimate equations (13) and equations (14) of the study, this study employs the approach of Indirect Least Squares (ILS) Regression with robust standard errors. Considering that these two equations are reduced form equations, this study finds that when the Ordinary-least-squares (OLS) Regression technique is applied to estimate their coefficients, the procedure is known as indirect least squares (henceforth ILS), and the estimated structural coefficients are called ILS estimates. As robustness checks, the study also conducts two other forms of linear regression: Prais-Winsten regression with heteroskedastic panels corrected standard errors (henceforth xtpcse)- it presents standard errors that are panel corrected, but only for panel-level heteroscedasticity whereby each company has a different variance of the disturbances whiles allowing for autocorrelation; and the Prais-Winsten (henceforth Prais) AR(1) regression with iterated estimates which makes use of the generalized least-squares (GLS) estimator. Following Pathan (2009), the study used the generalized least squares (GLS) random effect (RE) technique to solve first-order autoregressive (AR (1)) disturbances that may exist in the study's various unbalanced-panel specifications, including other disturbances such as cross-sectional correlation and or heteroscedasticity. Due to a likely presence of an unobserved bank fixed-effect, a panel ‘fixed-effect' (FE) estimation

technique is also used following the suggestion of Wooldridge (2001). The Hausman test is then used to compare the fixed effects and the random-effects model.

Several diagnostic tests are also conducted. The first is the White's heteroskedasticity consistent standard errors Test. It is conducted following Galloway et al. (1997). The White specification test assists the study in testing for Heteroskedasticity. Thus, the test helped the study analyse whether the regression's errors are not independent or not constant.

The study also tests for the first-order autocorrelation in the dataset by using the Durbin-Watson d-statistic to examine whether the regression errors exhibit autocorrelation. In this instance, the study's null hypothesis is that there is zero autocorrelation in the error terms. The study will fail to reject the null hypothesis if the p-value of this test is insignificant (i.e., the p-value is greater than alpha of 5%). Following kaymaz, and Kaymaz (2011); and Galloway et al. (1997), this study also analyses the research data by using a bivariate correlation test/ pairwise correlation test to assess the extent to which two variables correlate to each other. Based on Lee and Hsieh (2013) as in Kennedy (2008), this study concludes on the existence of multicollinearity as a critical problem when the correlation is above 0.80. This study also conducts a test of joint significance on the study's bank fundamental measures as a standard test for market discipline. Following Haq and Heaney (2012), the appropriateness of the study's Indirect Least Squares (ILS) regressions and fixed effect regression is estimated by F-test probability. Andres and Vallelado (2008) also calculate the F-test of joint significance for all their independent variables. This study, therefore,

follows these authors by estimating whether the β's are individually or jointly different from zero by putting forward the following hypothesis:

$H_0: \beta = 0$ versus $H_1: \beta \neq 0$

If the P-value is greater than alpha of 5%, then the study's alternate hypothesis will not be significant, and so the study will fail to reject the null hypothesis. A failure to reject the null hypothesis will mean that there is no market discipline since deposit growth is uncorrelated with bank characteristics. Suppose, on the other hand, the study's P-value is less than alpha of 5%. In that case, the null hypothesis will be rejected, and it will be said that there is market discipline since deposit growth will then be correlated with bank characteristics.

4.6.3 A Complete Test for DMD within the CBB context of Africa

The study runs Indirect Least Squares (ILS) Regression on equation (15) and equation (16), in order to estimate the above relationship. All other relevant tests carried out under equation (13) and equation (14) are also carried out here.

4.6.4 The Incentives for DMD Especially within the CBB Context

To estimate the above relationship, the study employs the approach of Indirect Least Squares (ILS) Regression on equation (17) and equation (18). All other relevant tests carried out under equation (13) and equation (14) are also carried out here.

4.6.5 The Influencing Aspect of Market Discipline

To estimate the parameters of equation (19), this study follows Maechler and McDill (2006). The study employs the use of the Two-stage System Generalized Method of Moments (GMM) estimator developed for dynamic models of panel data by Arellano and Bond (1991). The GMM technique is used because of the nature of the model specified.

The study also splits the sample based on their capital adequacy ratios into good banks and bad banks. All banks whose capital adequacy ratio fall above the mean capital adequacy ratio for all banks are termed good banks. All banks whose capital adequacy ratio falls below the mean capital adequacy ratio for all the banks are termed bad banks. This is done to determine if there are differences in depositor behaviour depending on how excessively risky a bank was.

4.7 Outliers

Extreme outliers may be the main drivers of the results of the thesis. Therefore, to reduce outlier issues that may exist in the study's dataset, this study follows Claessens and van Horen (2015) and Baele, De Jonghe, and Vennet (2007) by dropping outliers at the 1st and 99th percentile thereby winzorizing the sample. Houston, Lin, Lin, and Ma (2010) also trim their data to reduce the influence of outliers.

4.8 Robustness Checks

As a form of robustness checks, this study runs other forms of regressions in addition to the Indirect Least Squares regression. These other regressions are Prais-Winsten heteroskedastic panels corrected standard errors regression and Prais-Winsten AR (1) regression- iterated estimates. Prais-Winsten heteroskedastic panels corrected standard errors regression estimates parameters by controlling for cross-panel correlation and autocorrelation. Its method of estimating autocorrelation is akin to those used in time-series analysis. It can also report standard errors that have been normalized by N- K, where k is the number of parameters estimated, rather than N, the number of observations. Prais-Winsten AR (1) regression- iterated estimates are also reported because it uses the generalized least-squares method to estimate the unknown parameters of a linear model. Here, the model is assumed to follow a first-order autoregressive process. The results therefore presented have been corrected for first-order serial correlation in the residuals. The results are also robust to heteroskedasticity (stata.com).

4.9 Chapter Summary

This chapter is a presentation of the research methodology used for the study. It includes a section on the research design; sampling issues, method of data collection, and sources of data. The empirical models adopted for use in this study are also discussed. The chapter also discusses the method of analysing the research data. These methods include the use of a Two-Stage system GMM estimator as well as the use of Indirect Least Squares (ILS). Checks of robustness in research results are also discussed. These checks in robustness include the use of sub-samples

CHAPTER FIVE

DATA ANALYSIS AND INTERPRETATION OF RESULTS

5.1 Introduction

This section of the research presents and discusses the analysed findings of the data collected on banks in Africa. The results are presented and discussed according to the research objectives of the study. These objectives are to: examine the effect of CBB on bank risk, given the presence of explicit deposit insurance (EDI); study the ability of depositors to monitor the risk of cross-border banks (CBB), and all other banks in Africa; investigate the incentives of depositors to monitor the risk of CBB and all other banks; and lastly, investigate the ability of DMD to influence the risk-taking behaviour of CBB.

5.2 The Effect of CBB on Bank Risk, Given EDI

Table 5.1 below presents the descriptive statistics of the dataset compiled to help establish the relationship between cross-border banks (CBB) and bank risk, and cross-border banks and bank risk in the presence of the difference in the bank regulation- explicit deposit insurance (EDI). The study presents the descriptive summary statistics under the following categories: Aggregate- which refers to descriptive statistics for entire Africa; Cross-border banks only; Domestic banks only; Banks in explicit deposit insurance (EDI) countries only; and Banks operating in implicit deposit

Table 5.1: *Summary statistics for Cross-border Banking, bank risk, given explicit deposit insurance*

Variables		Observations	Mean	SD	Min	Max
The standard deviation of ROA	Aggregate	3,467	0.1007	3.7578	3.00e-08	206.7138
	Cross-border banks only	1,815	0.0126	0.031	3.00e-08	0.5361
	Domestic banks only	1,644	0.0089	0.0178	8.90e-06	0.3122
	Banks in EDI countries	944	0.0087	0.0119	8.90e-06	0.1150
	Banks in IDI countries	2,371	0.0119	0.0292	3.00e-08	0.5361
ROA	Aggregate	3,694	0.0210	0.0343	-0.7517	0.4349
	Cross-border banks only	1,925	0.0230	0.0367	-0.7517	0.4349
	Domestic banks only	1,757	0.0189	0.0315	-0.5401	0.2961
	Banks in EDI countries	996	0.0221	0.0269	-0.1555	0.1648
	Banks in IDI countries	2,560	0.0207	0.0370	-0.7517	0.4349
ROE	Aggregate	3,685	-1.2150	84.2080	-5111.467	9.9609
	Cross-border banks only	1,916	0.1962	0.8118	-29.3333	9.9609
	Domestic banks only	1,757	-2.7630	121.9477	-5111.467	3.4498
	Banks in EDI countries	996	0.1686	0.2429	-3.8041	1.3422
	Banks in IDI countries	2,551	-1.8310	101.2084	-5111.467	9.9609
Management quality	Aggregate	3,694	0.0464	0.0329	-0.0000	0.3161
	Cross-border banks only	1,917	0.04979	0.0334	0.0002	0.3099
	Domestic banks only	1,765	0.0427	0.0318	-0.0000	0.3161
	Banks in EDI countries	990	0.0454	0.0290	0.0001	0.2186
	Banks in IDI countries	2,565	0.0472	0.0347	-0.0000	0.3161
Liquidity	Aggregate	3,693	0.2968	0.1819	0.0000	0.9737
	Cross-border banks only	1,891	0.3085	0.1788	0.003167	0.9737
	Domestic banks only	1,790	0.2850	0 .1846	0.0000	0.9480
	Banks in EDI countries	999	0.2925	0.1717	0.0001	0.9480
	Banks in IDI countries	2,549	0.2970	0.1832	0.0009	0.9737

Table 5.1 continued: *Summary statistics for Cross-border Banking, bank risk, given explicit deposit insurance*

Variable		Observation	Mean	SD	Min	Max
Income Diversification	Aggregate	3,648	0.6465	0.6631	-27.9400	1
	Cross-border banks only	1,903	0.6873	0.2942	-2.7490	1
	Domestic banks only	1,735	0.6013	0.9086	-27.9400	1
	Banks in EDI countries	962	0.6092	0.4764	-11.7724	0.9991
	Banks in IDI countries	2,544	0.6568	0.7345	-27.9310	1
Sharpe ratio	Aggregate	3,279	6.8307	15.1667	-34.6608	411.8486
	Cross-border banks only	1,703	6.6442	13.7535	-34.6608	324.9474
	Domestic banks only	1,570	7.0376	16.5875	-9.0187	411.8486
	Banks in EDI countries	908	7.42432	12.8437	-34.6609	145.4983
	Banks in IDI countries	2,244	6.5107	16.172	-14.3908	411.8486
Non-performing loans	Aggregate	1,775	0.0633	0 .0841	0.0000	0.9171
	Cross-border banks only	1,049	0.0601	0.07561	0.0001	0.8088
	Domestic banks only	724	0.0676	0.0950	0.0000	0.9171
	Banks in EDI countries	500	0.0486	0.05340	0.0001	0.3985
	Banks in IDI countries	1,230	0.0692	0.0941	0.0000	0.9171
Total assets	Aggregate	3,745	2.6824	0.9450	-1.2996	6.1113
	Cross-border banks only	1,932	2.5545	0.9396	-1.2996	6.1113
	Domestic banks only	1,801	2.8181	0.9307	-0.0269	5.6752
	Banks in EDI countries	1,001	2.4183	0.9586	-0.6973	4.6893
	Banks in IDI countries	2,599	2.7608	0.9378	-1.2996	6.1113

Table 5.1 Continued: *Summary statistics for Cross-border Banking, bank risk, given explicit deposit insurance*

Variable		Observation	Mean	SD	Min	Max
Z-Score	Aggregate	3,090	1.3826	0.5353	-1.9961	2.9774
	Cross-border banks only	1,575	1.3289	0.5188	-1.9961	2.9774
	Domestic banks only	1,510	1.4378	0.5465	-0.8814	2.8878
	Banks in EDI countries	723	1.4747	0.5299	-1.0788	2.8878
	Banks in IDI countries	2,240	1.342081	0.5236	-0.8814	2.9774
Loan loss allowance	Aggregate	3,244	0.0350	0.2837	-4.4530	5.1289
	Cross-border banks only	1,720	0.0135	0.1500	-4.4530	2.4432
	Domestic banks only	1,513	0.0596	0.3819	-0.5779	5.1289
	Banks in EDI countries	867	0.0230	0.2225	-1.5772	4.0363
	Banks in IDI countries	2,287	0.0253	0.1923	-4.4530	4.5476
The standard deviation of ROE	Aggregate	3,502	0.2089	2.8867	0.0001	157.2108
	Cross-border banks only	1,814	0.3213	4.002775	0.0006	157.2108
	Domestic banks only	1,679	0.0883	0.2148	0.0001	3.4421
	Banks in EDI countries	983	0.0815	0.1583	0.0001	2.3085
	Banks in IDI countries	2,363	0.2439	3.4004	0.0003	157.2108

Note. Summary statistics presentation on bank-level variables. It presents summary statistics on various bank risk measures and other selected bank fundamentals. The study's risk measures are the Z-Score ((return on assets + capital adequacy ratio)/ the standard deviation of ROA; Standard deviation of ROA calculated over a three-year rolling window); Standard deviation of ROE is calculated over a three-year rolling window; and the Sharpe ratio (Mean ROE/ standard deviation of ROE). Asset quality measures are also used to measure risk. These are Non-performing loans (total impaired loans to total loans); and Loan loss allowance (loan loss allowance to total loans). The other bank fundamentals are capital adequacy ratio (capital/total assets), earnings/bank efficiency, and bank liquidity. Bank earnings include ROE- pre-tax profits divided by equity capital); and ROA- annual pre-tax profits/total assets. Bank management quality/Bank efficiency (overheads to total assets ratio). Bank liquidity is Liquidity 1(liquid assets to total assets). Other bank control variables are Income Diversification (it is measured as 1-| (net interest income - other operating income)/ operating income) |; Total assets (logarithm of the US Dollar value of total Assets value). Cross-border banks are banks that have crossed their county's borders. Domestic banks are banks that have not crossed their country's borders. Banks in EDI countries refer to Banks operating in countries with explicit deposit insurance. Banks in IDI countries refer to cross-border banks operating in countries with implicit deposit insurance

insurance (IDI) countries only. Here, Table 4.1 reveals that CBB has a lower level of non-performing loans than their domestic counterparts. Furthermore, the non-performing loans for banks in explicit deposit insurance countries are lower than their counterparts operating in countries with implicit deposit insurance (IDI). In line with this finding, other asset quality measures such as loan loss allowance show that CBB in Africa makes lower provision for loan loss allowances than domestic banks in Africa. Also, banks operating in countries with EDI

arrangements tend to make lower provision for loan loss allowances than banks in IDI countries. These asset qualities in cross-border banks and banks operating in EDI countries imply that cross-border banks and banks in EDI countries have better asset quality and hence lower risk than their counterparts. Table 4.1 of this study finds that cross-border banks report a higher mean average for bank earnings (ROA and ROE) than their domestic counterparts. Banks that find themselves in countries that have adopted explicit deposit insurance (EDI) tend to have higher earnings (ROA) than their counterparts in countries that have implicit deposit insurance. This is expected, considering that the state of their asset quality is better than their peers. When the ROE ratio is used as an alternative measure for bank earnings, it is also realized that CBB still records higher profits than their domestic counterparts. This finding is the same for banks in EDI countries as against banks in IDI countries. Based on the mean values of the summary statistics, it appears that cross-border banks and banks operating in EDI countries have higher profit levels than their counterpart. This result is, therefore expected to decrease their risk.

In Table 5.1, Standard deviation of ROA shows that banks that have crossed their country's borders experience higher volatility in their profit's levels than their domestic counterparts. However, banks that find themselves operating in jurisdictions with EDI arrangements, they tend to experience lower volatility in their earnings (Standard deviation of ROA) than their counterparts who operate in countries with implicit deposit insurance (IDI) arrangements. Perhaps this is due to the stabilizing effect of explicit deposit insurance (EDI) as captured in the conceptual framework for this study (see the conclusion section of Chapter Two). The study conducts a t-test on this difference and finds it significantly different from zero. Just as in the case of the standard deviation for ROA variable, cross-border banks report higher volatility in their earnings when volatility in

their earnings is measured by the standard deviation of ROE. However, banks operating within EDI countries experience lower volatility in their ROE than banks operating in IDI countries. This is evidenced by their mean and maximum scores for the standard deviation of the ROE variable.

Bank management quality is calculated as overhead expenses to total assets. Here, Table 5.1 shows that cross-border banks (CBB) tend to have higher overhead expenses than their domestic counterparts, as revealed by both the mean and maximum scores. A look at the performance of this variable with banks in EDI countries versus banks in IDI countries shows that banks in EDI countries also have higher overhead expenses than their counterparts operating in IDI countries. For CBB, the fact that they record higher overhead expenses than their domestic counterparts could be feeding into the volatility of their profits. Banks in EDI countries also have higher overhead costs than their peers. Yet, they experience lower volatility in their earnings than their counterparts in IDI countries.

Liquidity, the study's measure of liquidity (liquid assets to total assets) shows that, as evidenced by their maximum and mean figures in Table 5.1, CBB report higher liquidity levels than their domestic counterparts. Table 5.1 also shows that banks that operate in countries with explicit deposit insurance (EDI) tend to keep lower liquidity levels than banks that operate in IDI countries. This is evidenced by the minimum and mean levels recorded for this measure of bank liquidity. Based on these statistics, it appears that banks in EDI operating countries could be keeping lower levels of liquidity due to the reassuring presence of a deposit insurer.

In Table 5.1, Income diversification measures the extent to which banks have been able to diversify their sources of income away from the traditional known one- net interest income. Table 5.1 shows that cross-border banks (CBB) have done a better job at diversification than their domestic counterparts. However, Table 5.1 further indicates that banks in EDI countries achieve fewer results with their diversification strategies than their counterparts that operate within IDI countries. This is evidenced by the mean and maximum figures recorded for this variable. The study's mean and maximum figure for market risk, as measured by the Sharpe ratio, shows that CBB tends to have a higher market risk (lower Sharpe ratio) than domestic banks.

Further to this, Table 4.1 reveals that the market risk of banks in EDI countries is lower than their counterparts who operate in IDI countries. The Z-Score is the study's measure of bank stability. It is generally accepted that, as the Z-Score increases, the number of steps a bank takes away from bank insolvency also increases. Based on this, Table 4.1 reveals that CBB has lower levels of stability, as shown by the low mean score recorded for CBB against domestic banks. This study finds this is in line with the higher level of market risk that they carry. However, in the case of banks that operate in either EDI countries or IDI countries, it appears that banks operating in EDI countries experience higher stability scores than their counterparts in IDI countries. This study also finds this observation in line with the observation that CBBs in EDI countries have lower market risk than their counterparts operating in countries with IDI.

The Effect of Cross-Border Banking (CBB) On Bank Risk

A year-by-year analysis of the averages for the descriptive statistics on Table 5.1 shows that cross-border banks have had higher peaks in their Non-performing loans than domestic banks in some years. Figure 5.2 shows that cross-border banks have always kept their loan loss allowance provision on a lower level as compared to their domestic counterparts. These trends observed in these bank asset quality measures indicate that CBB generally has better asset quality (hence less risk) than domestic banks. There is, however, the concern of a general upward trend of the ratio of total impaired loans to total loans, and the ratio of loan loss allowance in Africa.

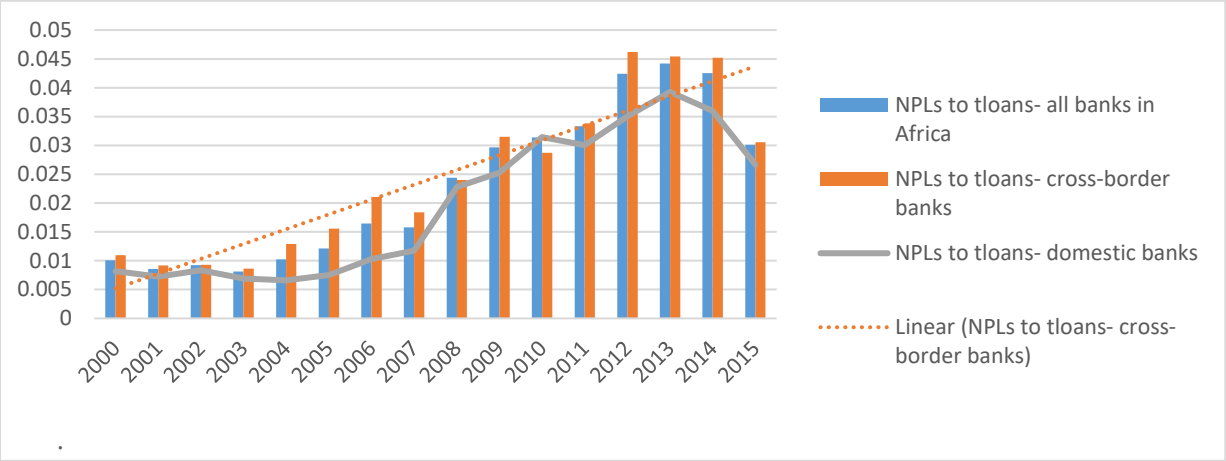


Figure *5.1*: Trend analysis of Non-performing loans (NPLs to tloans) of banks in Africa

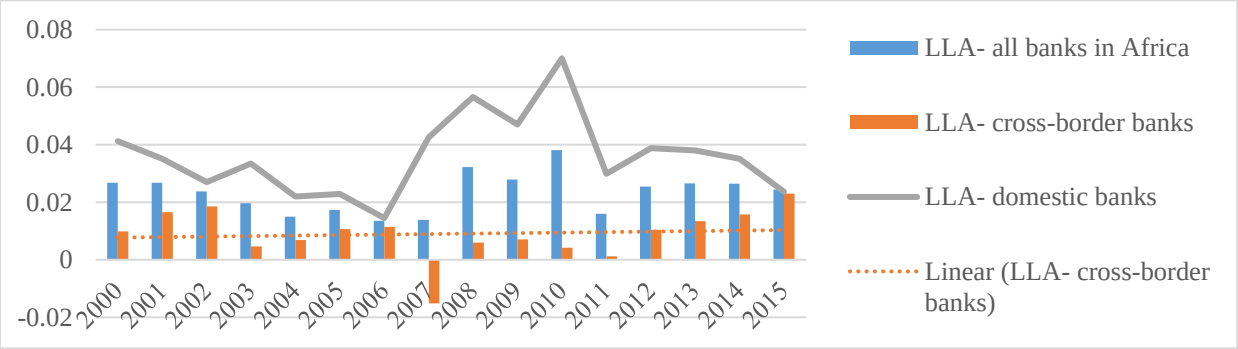


Figure 5.2: Trend analysis of Loan loss allowance figures for banks in Africa

In Figure 5.3, this study finds that the standard deviation of ROA for cross-border banks show very high peaks throughout the world financial crises of 2007-2009. The Figure generally indicates that the standard deviation of ROA is higher for CBB than for domestic banks. Figure 5.4 shows that although the volatility in the ROE of cross-border banks has been on the decline, the performance for this group of banks continues to be worse for them than for domestic banks. In most cases, this study observes higher volatility in the ROE of cross-border banks than for all banks in Africa. At this point, it appears that CBB increases bank risk via the standard deviation in their ROA and the Standard deviation of their ROE.

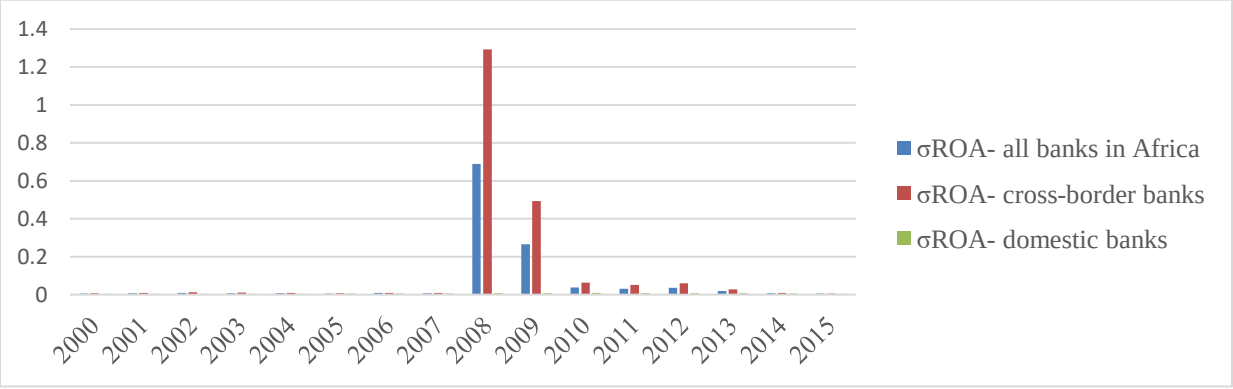


Figure 5.3: Trend analysis of the Standard deviation of ROA (σROA) of banks in Africa.

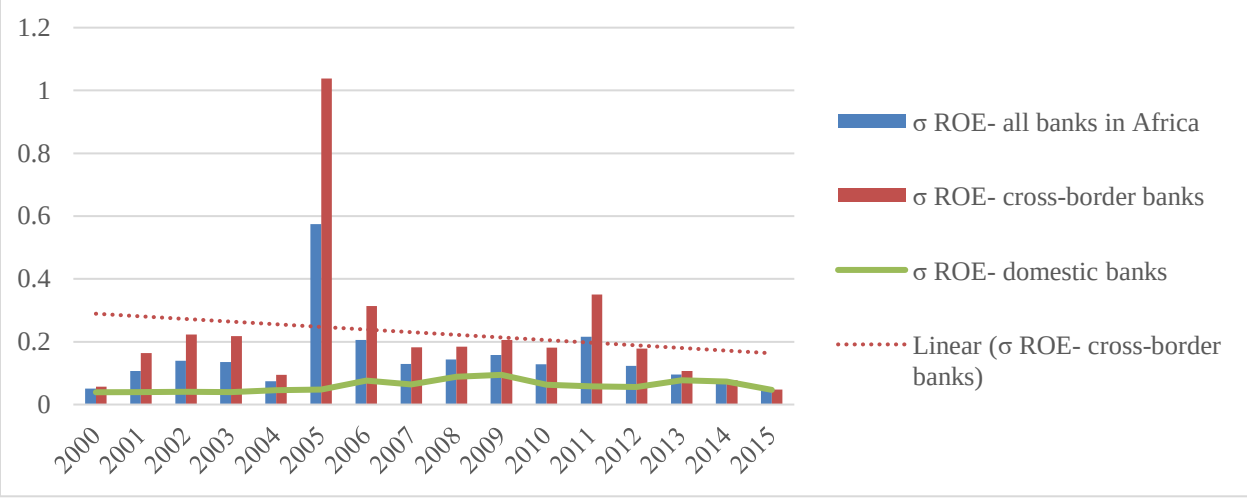


Figure 5.4: Trend analysis of the Standard deviation of ROE (σ ROE) of banks in Africa.

Figure 5.5 shows that consistently, cross-border banks have had lower stability, hence lower steps to default than their domestic counterparts. Figure 5.6 presented shows that the Sharpe ratio for CBB has consistently been on an upward trend from the year 2000 to 2015, and even peaks in the 2008 period of the world financial crisis. The rising trend in the Sharpe ratio of CBB means that the market risk of CBB has been lowering over the sixteen-year study period. However, this trend line is below the trend line of the Sharpe ratio for domestic banks. Thus, CBB exhibit higher market risk (lower Sharpe ratio) than domestic banks. The trend exhibited by this ratio on this graph is in line with the summary statistics.

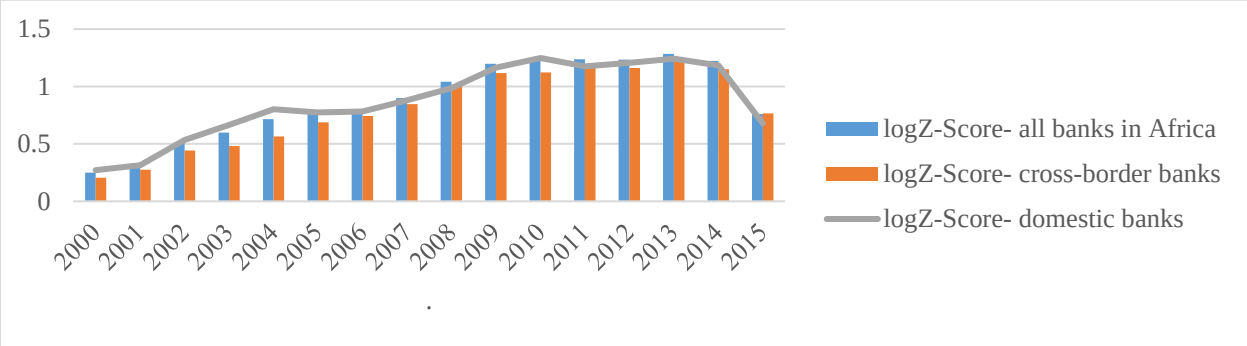


Figure 5.5: Trend analysis of the Log of Z-Score of banks in Africa

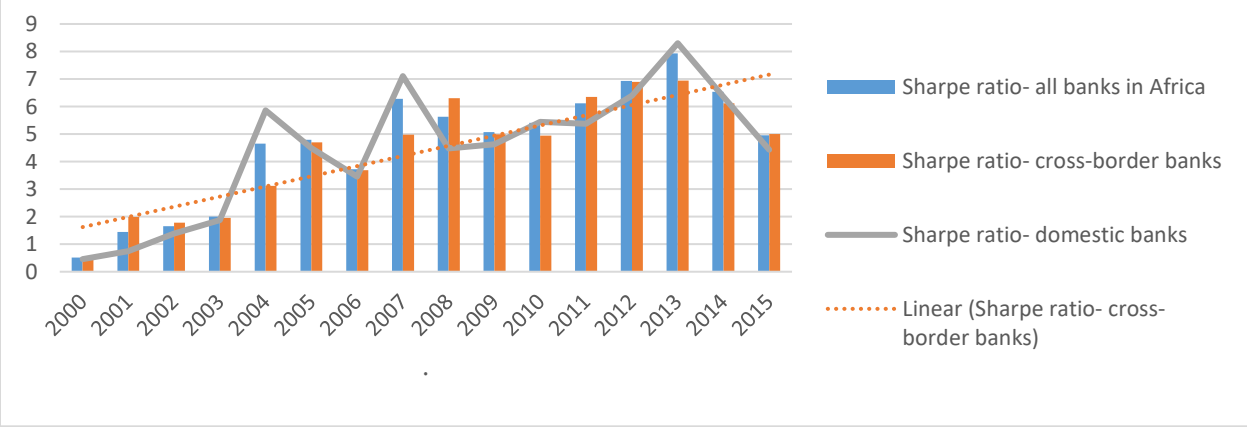


Figure 5.6: Trend analysis of the Sharpe ratio of banks in Africa

In addition to the above time series analysis, this study further finds the following. Cross-border banks appear to keep lower capital levels than their domestic counterparts (see Figure 5.7 below). Generally, however, the graph depicts the capital levels for cross-border banks to be on an upward trend. Figure 5.8 below shows that the total assets of cross-border banks and domestic banks appear to move in tandem. Noticeable differences, however, exist from the year 2000 to 2007, where the asset size of cross-border banks seems to be lower than that of domestic banks. During this period that the above findings pertain to, this study finds that except for inflation which deteriorated after 2007, favourable macro-economic, financial development indicators and institutional developments existed (see Figure 5.9, Figure 5.10, Figure 5.11 shown below).

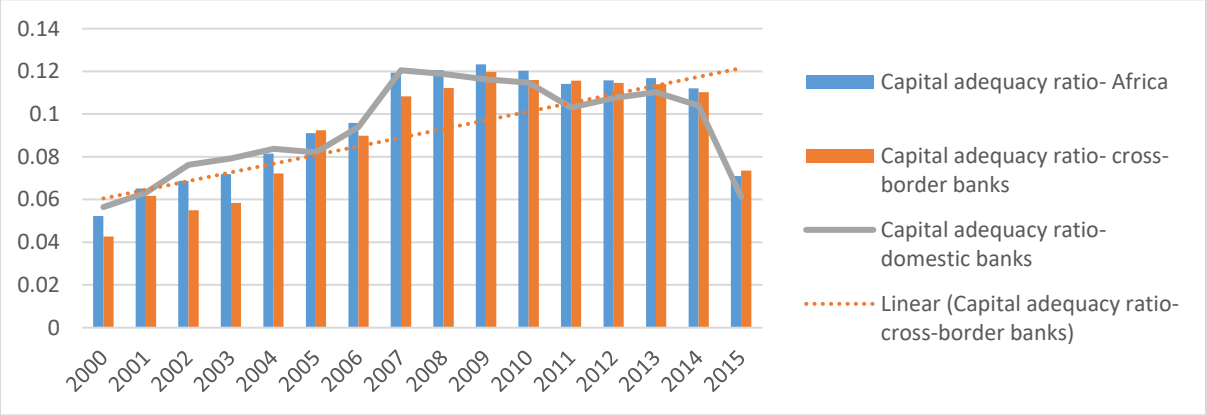


Figure 5.7: Trend analysis of the Capital adequacy ratio of banks in Africa.

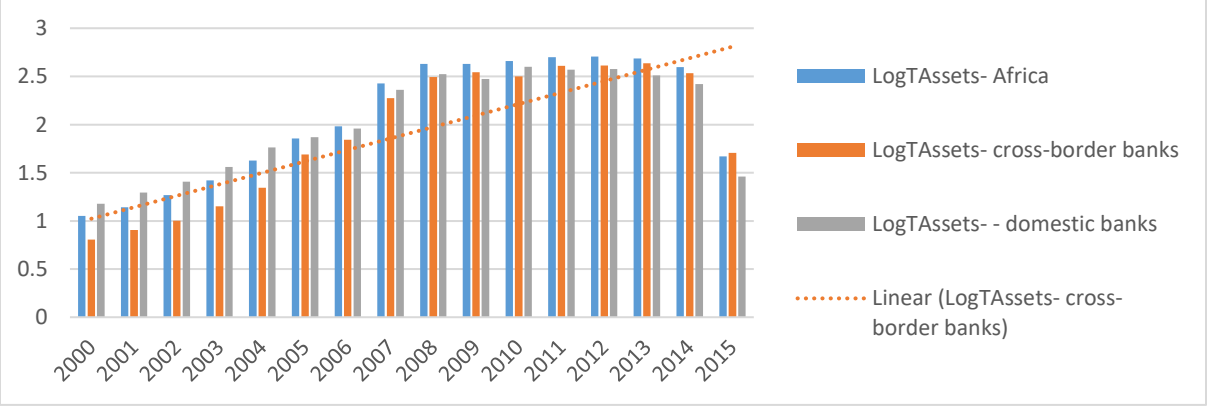


Figure 5.8: Trend analysis of Total assets (logTAssets) of banks in Africa.

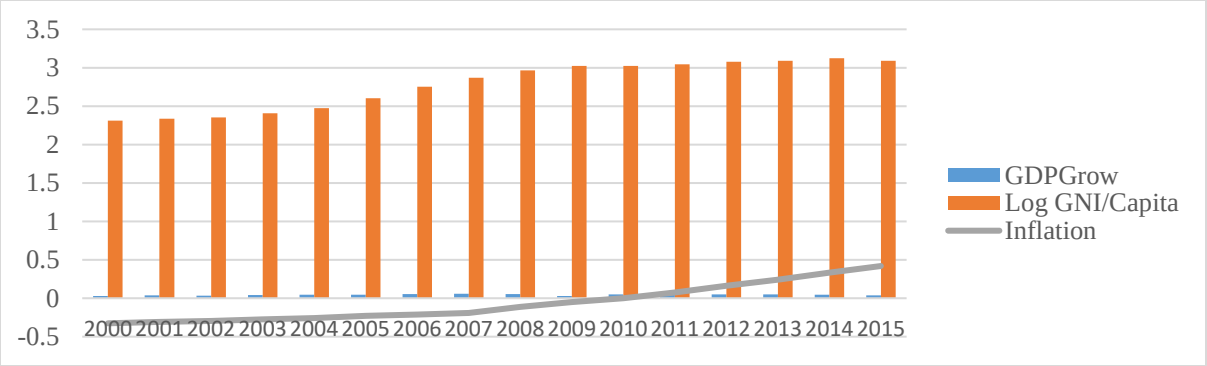


Figure 5.9: Trend analysis of selected macroeconomic fundamental in Africa

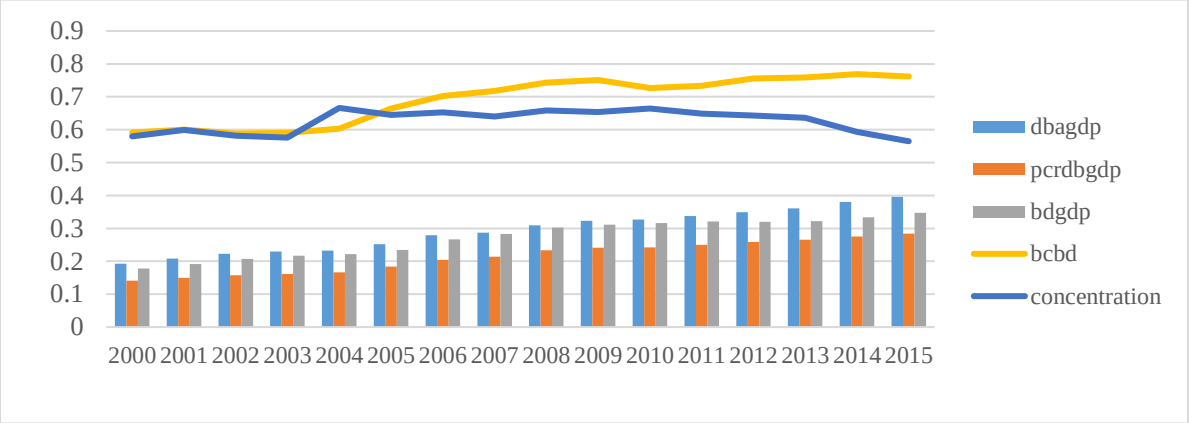


Figure 5.10: Trend analysis of selected financial development indicators in Africa

Note. dbagdp= deposit money bank assets to GDP (%); Pcrdbgdp= private credit by deposit money banks to GDP (%); bdgdp= bank deposits to GDP (%); bcbd= bank credit to bank deposits (%); concentration= bank concentration (%)

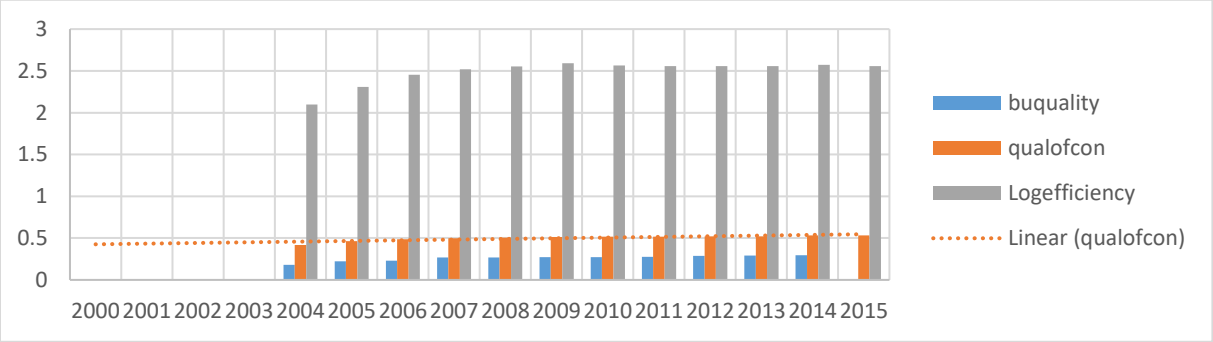


Figure 5.11: Trend analysis for selected institutional quality variables for African countries.

Note. buquality= bureucratic quality (score in resolving insolvency); qualofcon= quality of contract enforcement (score in enforcing contracts); legefficency= legal efficiency (enforcing contracts - Time (days))

The analysis of variance (ANOVA) results reveals that the difference in the mean scores of loan loss allowance, and the standard deviation of return of equity for cross-border banks and domestic banks are significantly different from zero (see Table 5.2, and Table 5.3 below). The p-values of the F-test capture this. Thus, any differences existing in the mean scores between these two bank risk variables, for these two groups of banks are not due to random events. Further diagnostic tests confirm that there is equality in the variance for the two groups in the Loan loss allowance test, at a conventional testing level of 5%. The insignificant p-value (alpha level: 5%) of Bartlett's test captures this. The Standard deviation of return of equity risk measure, however, provides the p-value for Bartlett's test that is significant. The import of these results is that only the standard deviation of return of equity confirms the study's hypothesis that cross-border banking increases bank risk. The results for loan loss allowance instead suggests that cross-border banks, on a significant basis, make lower provision for Loan loss allowances than domestic banks. The One-way ANOVA results for all other risk measures (Z-score, Sharpe ratio, Non-performing loans, the standard deviation of ROE, and Standard Deviation of ROA) have insignificant p-values for the F-test. The study, therefore, does not report these results.

Table 5.2: *One-way Analysis of Variance report for the ratio of loan loss provision to total loans (LLA)*

	Sum of squares	Degree of freedom	Mean square	F-test	P-value
Between groups	0.00587	1	0.00587	43.82	0.0000
Within groups	0.00402	30	0.00013		
Total	0.00990	31	0.00032		
Diagnostic test:					
Bartlett's test	3.1303				
P-value	0.077				
Observation	32				

Note. Bartlett's test for equal variances is a test of homogeneity of variance. The null hypothesis here is that there is equality in the mean value of the ROA ratio for both cross-border (CBB) banks and domestic banks.

Table 5.3: *One-way Analysis of Variance for the standard deviation of ROE*

	Sum of squares	Degree of freedom	Mean square	F-test	P-value
Between groups	0.22287	1	0.22287	8.22	0.0075
Within groups	0.81374	30	0.02712		
Total	1.03662	31	0.03344		
Diagnostic test:					
Bartlett's test	53.9585				
P-value	0.000				
Observation	32				

Note: Bartlett's test for equal variances is a test of homogeneity of variances. The null hypothesis here is that there is equality in the mean value of return on assets (ROA) ratio for both cross-border (CBB) banks and domestic banks.

The Effect of CBB on Bank Risk in the Presence of EDI

To assess the effect of CBB on bank risk in the presence of the regulatory difference- explicit deposit insurance (EDI), two sub-samples are studied. As a preliminary examination of the data used, this study did a pair-wise correlation analysis between selected variables of interest. The results are presented below as Table 5.4 and Table 5.5. Table 5.4 presents the pair-wise correlation coefficient results for selected variables for banks in only EDI countries. Whiles Table 5.5 shows the pairwise correlation coefficient results for IDI countries. From both tables, this study notices that the asset size of a bank positively correlates with cross-border banks EDI countries whiles it correlates negatively with cross-border banks in IDI countries. Therefore, as the dummy variable for measuring cross-border banking moves from 0 to 1, bank asset size experiences an increase within countries with explicit deposit insurance. In countries with implicit deposit insurance, bank asset size instead experiences a decline as the status of the bank changes from 0 to 1. Banking literature is, however, indeterminate on the effect bank asset size has on reduction of bank risk.

Table 5.4: C*orrelation coefficient table for banks in explicit deposit insurance countries*

	Cross-border bank	Total assets	Capital adequacy ratio	Non-performing loans	Sharpe ratio	Income diversification	Z-score	Loan loss allowance
Cross-border bank	1.0000							
Total assets	-0.1155*	1.0000						
Capital adequacy ratio	0.0385	-0.1611*	1.0000					
Non-performing loans	-0.0252	0.0310	-0.0122	1.0000				
Sharpe ratio	-0.0642	0.0138	0.0654*	-0.1611*	1.0000			
Income diversification	0.0740*	-0.0344	0.0302	0.0135	-0.0421	1.0000		
Z-score	-0.1240*	0.0889*	0.2207*	-0.3583*	0.3843*	0.0356	1.0000	
Loan loss allowance	-0.0281	0.0344	0.0710*	0.1689*	-0.0459	-0.0859*	0.0077	1.0000
Standard deviation of ROE	0.0533	-0.0871*	-0.1896*	0.2028*	-0.2209*	-0.0865*	-0.5660*	-0.0061
Standard deviation of ROA	0.1687*	-0.1230*	0.1140*	0.2420*	-0.2535*	-0.0672	-0.7106*	0.0100
ROA	0.0506	0.0367	0.1498*	-0.3692*	0.2228*	0.0647*	0.2887*	0.0150
ROE	0.0627*	0.0753*	-0.0811*	-0.3644*	0.1855*	0.0652*	0.1828*	-0.0502
Management quality	0.1967*	-0.2140*	0.0709*	0.0744	-0.1906*	0.0485	-0.3075*	0.0131
Liquidity	0.1212*	-0.2403*	0.0955*	-0.0063	-0.0018	0.0530	-0.0230	0.0095
GDP growth rate	0.0726*	-0.0973*	-0.0666*	-0.1281*	-0.0308	0.0175	-0.1775*	-0.0259
Inflation	0.0148	0.1241*	0.0843*	0.1086*	0.0357	0.0628	0.1324*	0.0033
Deposit money bank assets to GDP (%)	-0.1261*	0.5149*	-0.0604	0.0412	0.1367*	-0.0664*	0.2616*	-0.0250
Bureaucratic quality	0.0500	-0.0458	0.1941*	-0.1387*	0.0423	-0.2037*	0.1382*	0.0023

Table 5.4 continued: *Correlation coefficient table for banks operating in countries with explicit deposit insurance (EDI)*

	The standard deviation of ROE	The standard deviation of ROA	ROA	ROE	Management quality	Liquidity	GDP growth rate	Inflation
The standard deviation of ROE	1.0000							
The standard deviation of ROA	0.5857*	1.0000						
ROA	-0.2450*	-0.2035*	1.0000					
ROE	-0.3405*	-0.2270*	0.7121*	1.0000				
Management quality	0.2191*	0.3803*	-0.2488*	-0.1971*	1.0000			
Liquidity	0.0643	0.0216	0.0257	0.0497	-0.1030*	1.0000		
GDP growth rate	0.1763*	0.1546*	0.0182	0.0173	0.2580*	-0.0406	1.0000	
Inflation	0.1074*	-0.0720*	0.1063*	0.0032	-0.0317	-0.2647*	-0.1822*	1.0000
Deposit money bank assets to GDP (%)	-0.1934*	-0.2191*	-0.0326	-0.0128	-0.4452*	-0.1414*	-0.2751*	0.0536*
Bureaucratic quality	-0.0576	-0.0206	0.0347	-0.0137	-0.3315*	0.2663*	-0.3035*	-0.0124

* implies significant at 5% or more.

Note. Table 4.4 depicts the pair-wise correlation coefficient relationship between selected variables for a sub-sample constituting only banks operating in countries with explicit deposit insurance. The pairwise correlation coefficient relationship is estimated on a sample of 148 cross-border banks (CBB) operating across 18 countries. CBB is a cross-border banking variable. It is a dummy variable that takes a binary value of 1 if a bank is a cross-border bank and 0 otherwise. Nonperforming loans are total impaired loans/ total loans. Sharpe ratio is the mean ROE/ standard deviation of ROE. Income Diversification is 1-| (net interest income - other operating income)/ operating income) |. Z-Score is (ROA+ ratio of capital to assets)/ standard deviation of ROA. Loan loss allowance is the ratio of loan loss allowance to total loans. ROA is pre-tax profits/total assets. ROE is pre-tax profits/equity capital. Management quality is overheads to total assets. Liquidity is the ratio of liquid assets-to-total assets. GDP growth rate is the Gross Domestic Product (GDP) growth rate (annual %). Inflation is the annual change in consumer prices /annual change in CPI. Bureaucratic quality (score in resolving insolvency).

Table 5.5: *Correlation coefficient table for banks in implicit deposit insurance countries*

	Cross-border bank	Total assets	Capital Adequacy ratio	Nonperforming loans	Sharpe ratio	Income diversification	Z-Score	Loan Loss Allowance
Cross-border bank	1.0000							
Total assets	-0.1571*	1.0000						
Capital Adequacy ratio	-0.0509*	-0.1633*	1.0000					
Nonperforming loans	-0.0623*	-0.0872*	0.1742*	1.0000				
Sharpe ratio	0.0099	0.0561*	0.0032	-0.0976*	1.0000			
Income diversification	0.0640*	0.0592*	0.0053	-0.0637*	0.0296	1.0000		
Z-Score	-0.0584*	0.1361*	0.1263*	-0.0737*	0.2943*	0.0616*	1.0000	
Loan Loss Allowance	-0.0744*	0.0121	0.0607*	0.0571	-0.0159	-0.0026	-0.0066	1.0000
Standard deviation of ROE	0.0395	-0.0098	-0.0182	-0.0059	0.1822*	0.0042	-0.0085	0.0030
Standard deviation of ROA	0.0607*	-0.1194*	-0.0115	0.1249*	-0.1030*	-0.1285*	-0.4684*	0.1579*
ROA	0.0613*	-0.0217	0.2472*	-0.1837*	0.1176*	0.2212*	0.1664*	-0.0602*
ROE	0.0224	0.0218	0.0274	-0.0672*	0.0112	0.0127	0.1005*	-0.0436*
Management quality	0.0782*	-0.1792*	0.1444*	0.0837*	-0.0751*	0.0414*	-0.3088*	0.0450*
Liquidity	0.0738*	-0.1217*	0.0508*	-0.0166	-0.0531*	0.0158	-0.1371*	-0.0387
GDP grow	-0.0176	0.0234	0.0589*	-0.0021	-0.0134	-0.0390	-0.1179*	-0.0351
Inflation	0.0799*	0.1388*	-0.0080	0.0426	0.0422	0.0374	0.1353*	-0.0671*
Deposit money bank assets to GDP (%)	-0.1398*	0.2286*	-0.0186	-0.0629*	0.0137	-0.0483*	0.2270*	-0.0205
Bureaucratic quality (score in resolving insolvency)	0.0285	0.1359*	0.0603*	-0.1370*	-0.0005	-0.1207*	0.0872*	-0.0249

Table 5.5 continued: C*orrelation coefficient table for banks in implicit deposit insurance countries*

	The standard deviation of ROE	The standard deviation of ROA	ROA	ROE	Management quality	Liquidity	GDP growth rate	Inflation
The standard deviation of ROE	1.0000							
The standard deviation of ROA	0.0456*	1.0000						
ROA	-0.0079	-0.3039*	1.0000					
ROE	-0.0811*	-0.0933*	0.1437*	1.0000				
Management quality	0.0024	0.2404*	0.0365	0.0045	1.0000			
Liquidity	-0.0089	0.0311	0.0502*	-0.0022	0.0217	1.0000		
GDP growth rate	-0.0093	0.0741*	0.0835*	0.0016	0.1484*	0.1043*	1.0000	
Inflation	-0.0092	-0.0660*	0.0770*	0.0262	0.0521*	-0.1748*	-0.0720*	1.0000
deposit money bank assets to GDP (%)	-0.0431*	-0.0791*	-0.1724*	-0.0267	-0.4878*	-0.1652*	-0.1821*	0.1076*
Bureaucratic quality (score in resolving insolvency)	-0.0397	-0.1229*	0.0034	0.0172	-0.2336*	-0.1894*	-0.0707*	0.1542*

* implies significant at 5% or more.

Table 4.3 depicts the pair-wise correlation coefficient relationship between selected variables for a sub-sample constituting only banks operating in countries with implicit deposit insurance. The pairwise correlation coefficient relationship is estimated on a sample of 156 cross-border banks (CBB) operating across 20 countries. CBB is a cross-border banking variable. It is a dummy variable that takes a binary value of 1 if a bank is a cross-border bank and 0 otherwise. Non-performing loans are total impaired loans/ total loans. Sharpe ratio is mean ROE/standard deviation ROE. Income Diversification is 1-| (net interest income - other operating income)/ operating income) |. Z-Score is (ROA+ ratio of capital to assets)/standard deviation of ROA. Loan loss allowance to total loans. ROA is pre-tax profits/total assets. ROE is pre-tax profits/equity capital. Management quality is overheads to total assets. Liquidity is the ratio of liquid assets-to-total assets. GDP growth rate is Gross Domestic Product growth rate (annual %). Inflation is the annual change in consumer prices /annual change in CPI.

The capital adequacy ratio, non-performing loans, and loan loss allowance relate negatively with only cross-border banks in IDI countries. The relationship these variables have with cross-border banks in IDI countries is significant. Therefore, as the dummy variable measuring cross-border banking increases from 0 to 1, the capital levels reduces whiles the asset quality levels of cross-border banks in IDI countries improves. Consistent with banking literature, the income diversification variable relates positively to CBB in both EDI countries and IDI countries. The bank stability measure, Z-Score, relates negatively with CBB in both EDI countries and IDI countries. The correlation between Z-Score and CBB seems to support the general conclusion made in earlier sections that cross-border banking decreases bank stability. This correlation appears to support the market risk hypothesis, as explained in international banking literature.

The standard deviation of ROA relates positively to CBB in both EDI countries and IDI countries. This finding is in line with the summary statistics shown in Table 5.1. There, the Table shows that generally, cross-border banks have higher volatility in their profits than their domestic counterparts. Whiles ROA relates positively to only CBB in IDI countries. ROE relates positively to only CBB in EDI countries. The lack of a significant positive correlation between CBB in EDI countries and ROA is contrary to expectation since Table 5.4 indicates that a positive correlation exists between cross-border banks in EDI countries and bank asset size. This study expected this positive correlation to help enhance bank profits. But no evidence exists to this effect. Table 5.4 shows that in line with banking literature, the GDP growth rate variable correlates positively with CBB in EDI countries. The correlation between the GDP growth rate and CBB in IDI countries is not significant. CBB in IDI countries significantly and positively relates to other macroeconomic

indicators such as inflation. CBB in both EDI countries and IDI countries have an inverse correlation with financial development indicators such as deposit money bank assets to GDP. This correlation is contrary to expectation considering that one of the benefits of CBB is to enhance financial development. Thus, as CBB increases, financial development reduces.

Altogether, the pairwise correlation analysis (see Table 5.4 and Table 5.5) and the descriptive summary statistics (see Table 5.1) shows that banks in EDI countries perform relatively well in most of the variables except the liquidity variable. The study further notices that banks in EDI countries have lower success with their income diversification strategies than CBB in IDI countries. Also, the correlation matrix reveals that the CBB variable negatively correlates with bank stability whiles it positively correlates with the standard deviation of ROA. Both variables are, therefore, areas of concern, in addition to the liquidity issues raised earlier. Another point of trouble on the correlation matrix is that cross-border banking in both EDI countries and IDI countries move in the opposite direction to financial development. Altogether, it also appears from the pairwise correlation matrix that cross-border banking variable in EDI areas positively correlates with the standard deviation of ROA, ROE, Management quality, and Liquidity. Except for ROE, these correlations are the same for CBB in IDI areas. In this next section, the study presents results from a two-stage System GMM regression Windmeijer-correct standard errors, small sample adjustment, and orthogonal deviation.

The results presented below as Table 5.6 and Table 5.7 are from a two-stage System GMM regression with Windmeijer-correct standard errors, small sample adjustment, and orthogonal

deviation. The regression results assess the effect of Cross-border banking (CBB) on various bank risk measures. Bank risk measures include Z-Score, Sharpe ratio, loan loss provision, non-performing loans, the standard deviation of ROE, the standard deviation of ROA. All risk measures are lagged and enter the model as regressors. CBB is cross-border banking. It is a dummy variable that takes on the binary value of 1 if a bank is a cross-border bank or 0 otherwise. Other control variables are management quality, capital adequacy ratio, income diversification and total assets. Inflation and bureaucratic quality respectively control for the macroeconomic and institutional quality of a country's environment. Bureaucratic quality is the score of a country in resolving insolvency. Table 5.6 and Table 5.7 also reports the following diagnostic tests: the number of observations included in each regression; the number of groups; the F-test; Hansen test of over-identifying restrictions (it tests the null hypothesis that the instruments used in the regressions are valid); and the Arellano-Bond test for first and second-order serial correlation in the residuals.

Table 5.6 presents Two-stage System GMM regression results from a sample of banks in IDI countries. Whiles Table 5.7 shows Two-stage System GMM regression results from a sample consisting of banks from EDI countries. As stated earlier, the study measures the dependent variable as a vector of six bank risk measures. They are the Z-Score, Sharpe ratio, loan loss allowance, non-performing loans, the standard deviation of ROE, and the standard deviation of ROA. To examine the effect of CBB on bank risk, given the presence of EDI, Table 5.6 and Table 5.7 are analysed together.

Table 5.6: *GMM regression results for banks in implicit deposit insurance countries.*

	Alternate risk measures					
Variable	(1) Z-Score	(2) Sharpe ratio	(3) Loan loss allowance	(4) Non-performing loans	(5) SD ROE	(6) SD of ROA
Z-Score_Lag 1	0.5482***					
	(11.17)					
Cross-border banking	-0.3922	-1.4497	-0.0334	0.0686*	-1.3014	0.0007
	(-1.29)	(-0.31)	(-0.96)	(2.22)	(-0.67)	(0.15)
Management quality	-2.9241***	-42.6161***	0.2397	0.1107	0.3244	
						0.0560***
	(-3.68)	(-3.68)	(1.59)	(0.68)	(0.07)	(5.81)
Income diversification	0.1970*	1.9933	-0.0151	-0.0187	0.7863	-0.0015
	(2.44)	(1.45)	(-0.84)	(-1.07)	(0.79)	(-1.46)
Capital adequacy ratio	0.6481	7.3906	-0.2082	0.0113	0.3530	0.0044
	(1.45)	(0.86)	(-1.03)	(0.11)	(0.15)	(0.62)
Total assets	-0.0084	0.2448	-0.0018	0.0041	-0.0514	-0.0001
	(-0.28)	(0.38)	(-0.26)	(0.79)	(-0.29)	(-0.20)
Inflation	0.1898*	0.8024	0.0154	0.0122	0.1744	-0.0025*
	(2.53)	(0.47)	(1.03)	(1.10)	(0.51)	(-2.47)
Bureaucratic quality	0.1781	0.7826	-0.0291	-0.0293	0.0516	-0.0005
	(0.85)	(0.25)	(-0.79)	(-0.80)	(0.05)	(-0.27)
Sharperatio_Lag1		0.1236*				
		(2.60)				
Loan loss allowance_Lag1			0.0106			
			(1.02)			
Non-performing loans_lag1				0.5888***		
				(6.51)		
Standard deviation_lag1						
					0.1750***	
					(22.38)	
The standard deviation of ROA_lag1						0.5876***
						(11.51)
Constant	0.7663**	4.8045	0.0663	-0.0189	0.4420	0.0011
	(3.09)	(1.04)	(1.03)	(-0.57)	(0.40)	(0.27)
Diagnostic tests						
No. of Observation	1289	1301	1253	742	1325	1328
Number of instruments	32	32	32	32	32	32
Number of groups	171	172	168	129	173	172
F-test	32.25***	5.61***	3.00***	7.92***	105.19***	90.54***
Hansen test	37.51	38.84	29.32	22.29	16.89	26.78
P value	0.029	0.021	0.170	0.503	0.815	0.265
AR (2) test	0.022	-0.85	0.45	1.12	-1.00	0.30
P value	-2.28	0.397	0.651	0.263	0.319	0.764

Note. t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 5.7: *GMM regression results for banks in Explicit deposit insurance countries*

Variable	(1) Z-Score	(2) Sharpe ratio	(3) Loan loss allowance	(4) Non-performing loans	(5) SD. of ROE	(6) SD. of ROA
Z-Score_lag1	0.3386***					
	(3.71)					
Cross-border banking	0.2824	3.3090	0.0259	-0.0260	0.1001	-0.0002
	(1.10)	(0.57)	(0.90)	(-0.82)	(1.11)	(-0.02)
Management quality	-4.7643*	-77.2878*	0.1453	0.2416	0.4023	0.0526
	(-2.10)	(-2.10)	(1.52)	(1.08)	(1.03)	(1.44)
Income diversification	-0.1166	-3.4636	-0.0040	0.0157	-0.0250	0.0008
	(-0.90)	(-1.42)	(-0.57)	(0.60)	(-0.63)	(0.64)
Capital adequacy ratio	1.1713*	1.3051	0.0074	0.0100	-0.1050	0.0067
	(2.24)	(0.18)	(0.26)	(0.10)	(-0.73)	(1.14)
Total assets	0.0260	-0.2120	0.0010	0.0013	0.0036	-0.0000
	(0.88)	(-0.27)	(0.68)	(0.23)	(0.31)	(-0.04)
Inflation	0.0996	0.4919	0.0067	0.0184*	0.0109	-0.0009
	(1.83)	(0.44)	(1.00)	(2.10)	(0.95)	(-0.50)
Bureaucratic quality	-0.0475	2.2454	0.0211	-0.0799	0.2150	0.0023
	(-0.12)	(0.18)	(0.80)	(-0.56)	(1.09)	(0.10)
Sharpe ratio_lag1		0.2964***				
		(3.51)				
LLA_lag1			-0.1244			
			(-0.20)			
Non-performing loans_lag1:				0.3351		
				(1.72)		
Standard deviation of ROE_lag1					0.7385***	
					(21.18)	
Standard deviation of ROA_lag1						0.6236***
						(8.76)
Constant	0.9414**	7.9926	-0.0154	0.0374	-0.1049	-0.0018
	(3.15)	(0.93)	(-0.81)	(0.66)	(-0.91)	(-0.12)
No. of Observation	502	639	607	352	646	623
No. instruments	32	32	32	32	32	32
No. of groups	71	83	82	53	83	82
F-test	8.75***	4.49***	1.30	2.34**	77.49***	34.33***
Hansen test	21.60	22.95	19.97	28.86	20.50	22.82
P value	0.545	0.464	0.643	0.185	0.611	0.471
AR (2) test	-1.12	-1.21	-0.33	-1.71	1.00	0.47
P value	0.261	0.227	0.741	0.086	0.317	0.640

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

The results reveal that cross-border banking positively and significantly causes non-performing loans to increase in IDI countries. These results appear to confirm the market risk hypothesis (see Table 5.6). The regression results, however, fail to establish any significant effect of cross-border banks on bank risk, in EDI countries.

In Model (1) and Model (2) of Table 5.6, the regression results reveal that management quality has a significant negative relationship on the Z-score and the Sharpe ratio of banks, respectively. Hence, the conclusion is that increasing overhead expenses of banks causes banks to face lower stability and higher market risk within countries with implicit deposit insurance. In line with this, Model (6), shows that as the overhead expenses of banks increase within IDI countries, the volatility of bank profitability increases. These results are all statistically significant at the level of 1%.

Table 5.7 presents Two-stage System GMM regression results for a sample of banks operating within countries with explicit deposit insurance. Model (1) and Model (2) of the Table show consistent significant results with Table 5.6, on the effect management quality has on the Z-Score and Sharpe ratio. In Model (1) of Table 5.6 and Table 5.7, the regression results reveal a significant positive effect of income diversification on the Z-Score of banks. This finding is generally in line with Sissy et al. (2017). The evidence in Table 5.7 is, however, weak because it is only significant at the 10% level of testing.

This study also finds evidence that capital adequacy ratio weakly increases bank stability in countries with EDI at a significance testing level of 10% (see the model (1) of Table 5.7). It does not find such evidence in the results presented for banks in IDI countries. All other risk measures such as the Sharpe ratio, loan loss allowance, standard deviation of ROA, and standard deviation of ROE do not provide any evidence on the impact capital has on the risk of the sample of banks operating in EDI countries. This last evidence holds as well for banks in IDI countries. This study does not find any significant impact of bank asset size on any of the six risk measures in Table 5.6 and Table 5.7.

In Model (1) of Table 5.6, the regression results reveal a significant positive relationship between inflation in IDI countries and bank stability. The sign for the Inflation variable is contrary to expectation. In line with banking literature, this study expected that deteriorating values for inflation would hurt bank stability as represented by the Z-Score. However, the study finds that inflation causes bank stability to increase in IDI countries. In model (2) the regression results show no significant consequences on the impact of inflation on the Sharpe ratio of banks. Table 5.6 further indicates that inflation in the model (6) leads to a significant reduction in the volatility of the ROA for banks in IDI countries. Table 5.7 presents Two-stage System GMM regression results for the sample of banks operating within states with explicit deposit insurance. In line with banking literature, inflation in regression (6) produces a positive relationship with Non-performing loans. Meaning that, as inflation within these countries increases, it causes total impaired loans also to increase. The level of financial development of a country, the study found, does not affect any of the risk measures used.

The F-test results for all the regression indicate that all the estimated parameters are jointly significant. Except for regression (6), the Hansen test for all other five regressions reveals insignificant p-values, thus confirming the null hypothesis that the instruments are valid. The AR (2) test for second-order serial correlation also confirms the null hypothesis that there is no second-order serial correlation in the residuals.

Time series analysis is also done here for various bank risk measures to support GMM regression findings. The results are presented below as Figures 5.12, 5.13, 5.14, 5.15, 5.16, and 5.17. Figure 5.12 shows that cross-border banks in EDI countries have lower non-performing loans than their counterparts who operate in countries with implicit deposit insurance. The GMM results confirm this. Table 5.6 shows GMM results that cross-border banking positively and significantly cause Non-performing loans of IDI countries to increase. Figure 5.12, however, reveals a general upward trend in the nonperforming loans ratio for all the banks.

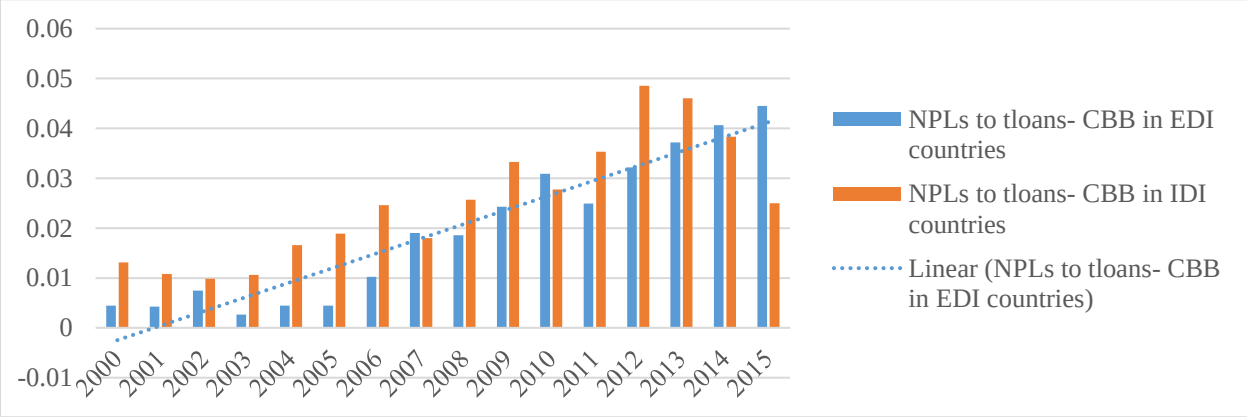


Figure 5.12: Time series analysis of non-performing loans (NPLs to tloans) for CBB

Figure 5.13 reveals a general upward trend in the Loan loss allowance of CBB in EDI countries. This upward trend is, however, above those of CBB operating in countries with IDI.

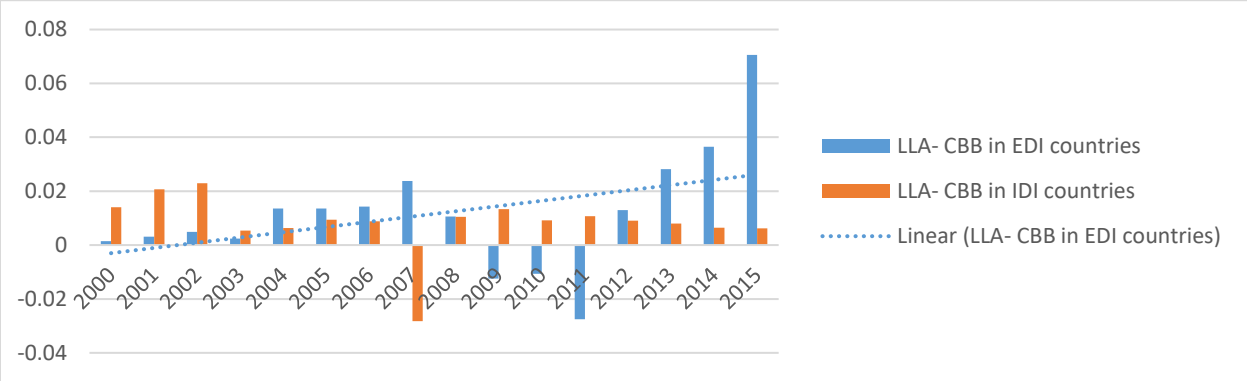


Figure 5.13: Time series analysis of the loan loss allowance (LLA) for CBB

Figure 5.14 shows that banks that operate in countries with explicit deposit insurance have lower volatility in their return on equity earnings than cross-border banks that operate in countries with implicit deposit insurance.

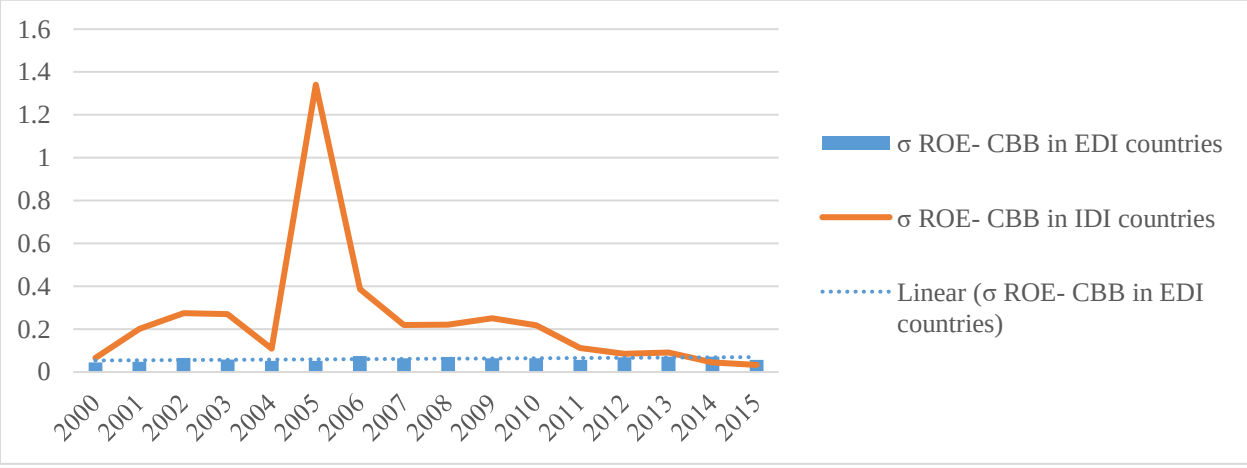


Figure 5.14: Time series analysis of σ ROE (the standard deviation of ROE) for CBB

Figure 5.15 shows that CBBs in countries with EDI has had the volatility in their ROA on an upward trend, whiles their counterparts operating in countries with implicit deposit insurance have been observing a decline (or an improvement) in the values they record for this variable.

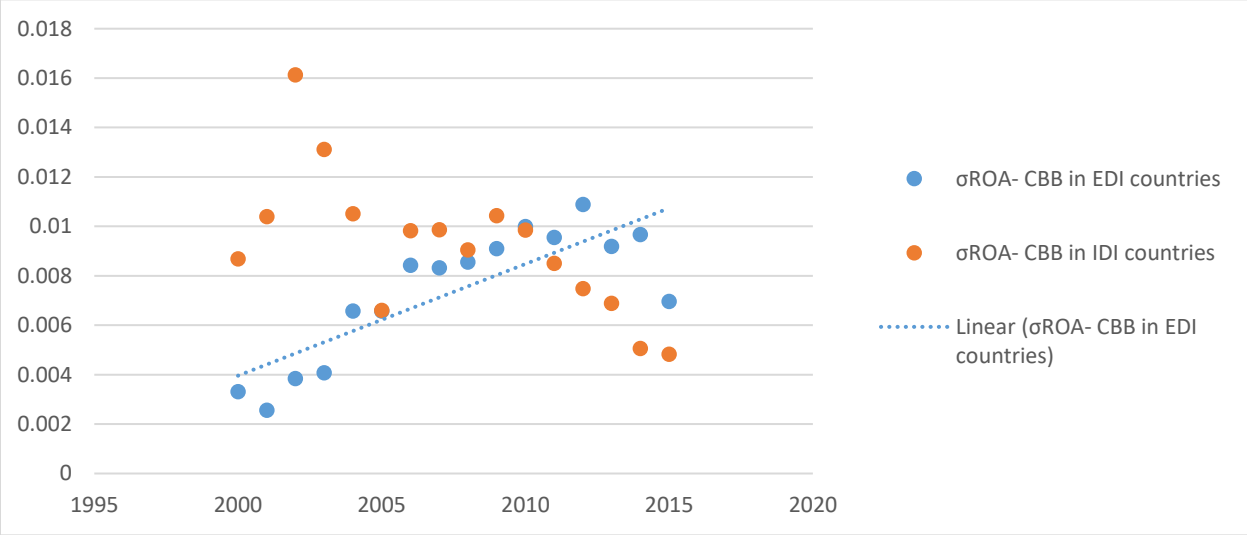


Figure 5.15: Time series analysis of the σ ROA (the standard deviation of ROA) for CBB

The time series analysis in Figure 5.16 shows that the market risk of cross-border banks in EDI countries has been on an upward trend. The Figure also shows a similar trend for CBB in IDI countries. It, however, appears that CBB that operate in EDI countries have lower market risk ((higher Sharpe ratio) than banks that operate in countries with implicit deposit insurance.

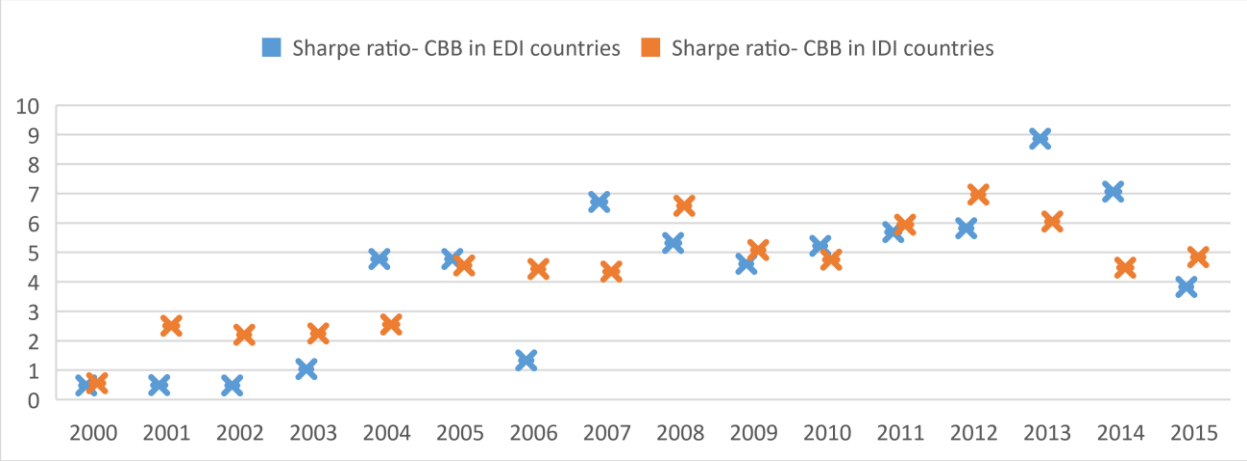


Figure 5.16: Time series analysis of the Sharpe ratio for CBB

Figure 5.17 shows that cross-border banks that operate in EDI countries have lower stability levels than their counterparts in countries with implicit deposit insurance. The charts show that cross-border banks operating in countries with explicit deposit insurance have lower stability levels as given by the Z-score level.

Figure 5.18 shows that cross-border banks in countries with explicit deposit insurance are better capitalized than cross-border banks in countries with implicit deposit insurance. These results are contrary to expectations. In line with the moral hazard hypothesis of deposit insurance, this study expected that banks operating within countries with explicit deposit insurance will want to engage in excessive risk, and shift the negative consequences of that risk to the deposit insurer.

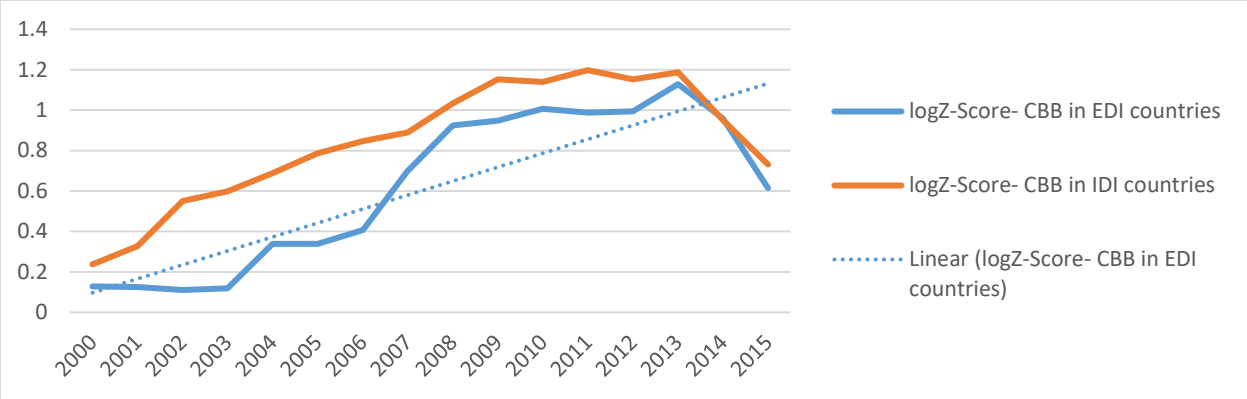


Figure 5.17: Time series analysis of the log of Z-score levels for CBB

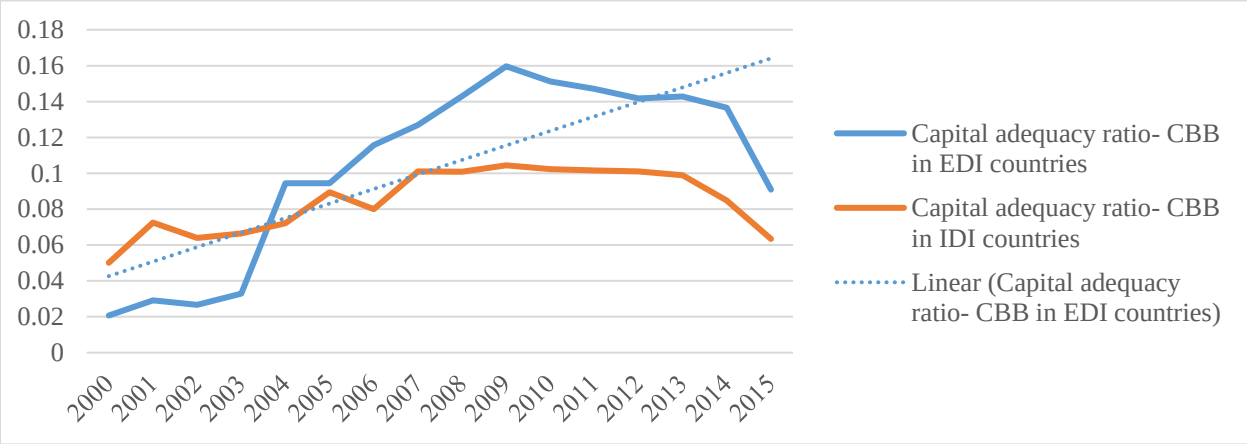


Figure 5.18: Time series analysis of the capital adequacy ratio for CBB

5.3 A Complete Test for DMD and, within the Context of CBB Operating in Africa

The second objective of this study is to examine the ability of depositors to monitor the bank risk in the presence of cross-border banks. As stated in previous chapters, this study defines DMD to exist when depositors actively reward or punish banks for their risk-taking behaviour (see Desli, Schoors & Meir, 2013). The study measures the dependent variable as changes in deposit growth and changes in bank deposit costs. The study's risk measures are CAMEL indicators. The study expects a deteriorating CAMEL measure to be inversely related to changes in deposit growth and

positively to bank deposit cost for DMD to exist. It also expects a positive relationship to exist between an improved CAMEL measure and changes in deposit growth, and an inverse relationship to exist between an improved CAMEL measure and changes in bank deposit cost. The results are presented below. It includes indirect least square (ILS) regression results; Prais-Winsten regression with heteroskedastic panels corrected standard errors (henceforth xtpcse); and Prais-Winsten AR (1) regression with iterated estimates (henceforth Prais). The study runs the last two types of linear regressions as robustness checks for the ILS regressions.

The study uses two variables as measures for the dependent variable, DMD. The results from the two alternative dependent variables, based on equation (15) and equation (16) of the study, are presented simultaneously in each table to enable better conclusions on the complete test of market discipline to be made. The discussion starts with the summary statistics presented in the following section.

Summary Statistics

This section of the research presents and discusses the summary of the statistical description of the data collected for banks in Africa. Based on the mean values in Table 5.8, the study finds that some banks in Africa have seen over a hundred percent increase in their deposits from 2000 to 2015.

Table 5.8: *Summary statistics on depositor market discipline study*

	Source	Mean	SD	Min	Max
DMD measures:					
Bank deposit growth rate	Bankscope	0.3187	2.0242	-0.9967	106.4424
Bank deposit cost	Bankscope	0.0460	0.0460	0.0000	0.7888
CAMEL measures:					
Capital adequacy ratio	Bankscope	0.1253	0.0890	-0.9584	0.9911
Non-performing loans	Bankscope	0.0631	0.0840	0.0000	0.9171
Real estate to total loans	Bankscope	0.1379	0.1780	1.46e-06	0.8807
Consumption loans to total loans	Bankscope	0.2566	0.2241	0.0000	0.9384
Commercial loans to total loans	Bankscope	0.4683	0.2780	0.0007	0.9978
Non-performing loans 2	Bankscope	0.2539	5.2749	-222.6667	7.2083
Loan loss allowance	Bankscope	0.0350	0.2837	-4.4530	5.1289
ROA	Bankscope	0.0210	0.0343	-0.7517	0.4349
ROE	Bankscope	-1.2150	84.2080	-5111.467	9.9609
Management quality	Bankscope	0.0463	0.0329	-0.0000	0.3161
Liquidity1	Bankscope	0.2968	0.1819	0.0001	0.9737
Liquidity2	Bankscope	0.0800	0.2753	0.0003	2.6274
Total assets	Bankscope	2.6824	0.9450	-1.2996	6.1113
Macroeconomic measures:					
GDP growth rate	World Development Indicators	0.0490	0.0614	-0.6208	1.2313
The real GDP growth rate	World Development Indicators	0.0477	0.0601	-0.642	1.065
GNI per capita	World Development Indicators	3.0718	0.4497	2.0791	4.0948
Inflation	International Financial Statistics	-0.0859	0.35557	-0.7888	2.4982

Note. Table 5.8 presents summary statistics on depositor market discipline (DMD) measures, CAMEL measures of bank risk, other bank fundamentals, and some macroeconomic indicators. The bank deposit growth rate is measured as (Bank deposit$_t$ - Bank deposit$_{t-1}$)/ Bank deposit$_{t-1}$. Bank deposit cost is measured as the ratio of interest expense/average total deposits. Capital adequacy ratio (capital/total assets); Non-performing loans are total impaired loans to total loans; LLA is loan loss allowance to total loans; Management quality is overheads to total assets ratio; Liquidity 1 is liquid assets to total assets; Total assets is the logarithm of the US Dollar value of total assets. LGNICapita- logarithm of Gross National Income (GNI) per capita in US$; and Inflation (annual change in CPI). SD means standard deviation. Min is Minimum, and Max means maximum. The total sample used includes 304 banks in 38 African countries.
Source: Author's construction

However, the summary statistics also show that some banks lost some deposits over this same period. The loss in deposits could be an indication of the presence of market discipline. Altogether, the information presented about the deposit growth rate in Table 5.8 reveals the volatile nature of bank deposit mobilization. Alongside this volatility experience in bank deposit growth, Figure 5.19 shows that the bank deposit cost variable has been on an upward trend for banks operating in Africa. In terms of capital, Table 5.8 reveals a favourable positive figure, which is well over the minimum of 10% proposed by the International soft laws called Basel II and Basel III.

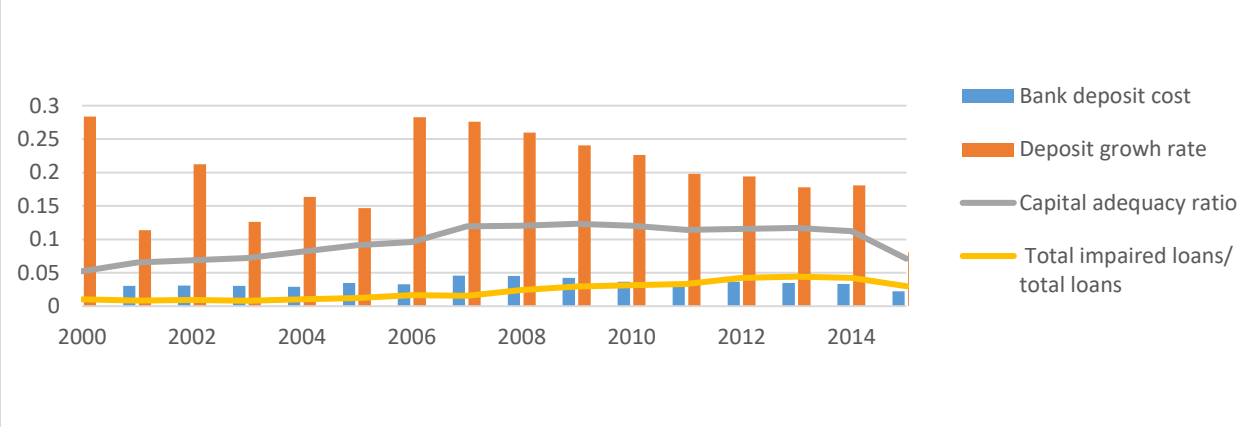


Figure 5.19: Trend Analysis of Selected Bank Fundamentals in Africa

Looking at the study's asset quality measures in Table 5.8, one would see that on average bases, banks in Africa tie up a lot of their funding in commercial loans. Total impaired loans to total loans as another asset measure. It, however, shows a very high record for the maximum value recorded for this ratio. Similarly, the proportion of total impaired loans to equity reveals a similar trend. The loan loss provision to total loans also shows a similar point of concern based on the high maximum figure recorded. In terms of bank earnings or profitability, Table 5.8 reveals a low but positive mean figure for the ROA of banks in Africa.

On the other hand, the Table reveals a negative mean/average figure for all banks' return on equity ratio. This means that on average bases, bank owners are not getting a good return for their investment. It could also reflect the inability of some banks to inject the needed funds for its activities. This is evidenced by the negative recorded minimum figure for the capital adequacy ratio. The standard deviation score for this ROE is, therefore, not surprisingly, very high. Table 5.8 shows high recorded values for the study's management efficiency variable, Mgntquality. The Table also reveals good positive mean values for the study's two liquidity measures. However, Table 5.8 indicates that some of the banks are operating at points of even insolvency. This conclusion is drawn from the minimum negative figure recorded for this variable.

Further analysis of Table 5.8 shows that Africa has generally seen positive Gross Domestic Product Growth with an accompanying positive Gross National Income per capita. The Inflation figure shows that inflation in some African countries has more than doubled over the study period. This is evidenced by the maximum figure recorded for Inflation. Inflation is estimated as the annual change in CPI. These descriptive statistics are generally in line with Figure 5.9 shown above. Figure 5.9 presents a trend analysis of GDP growth rate, GNI per Capita, and inflation in Africa. Figure 5.9 shows an upward trend in Inflation in Africa after the year 2007. This study, therefore, expects sub-samples of this dataset based on periods before the world financial crises of 2007-2009 and after the crises period may provide different revelations. As seen here, the deterioration in the inflation variable after the year 2007 is likely to affect market discipline.

This study's other observations about the research sample are that slightly more than half of the sample is made up of cross-border banks (see Figure 5.21). This implies that cross-border banks may weakly drive the regression output presented in the next section. Figure 5.20, on the other hand, shows that about half of the banks in the sample have adopted the International Financial reporting standards (IFRS). Based on the purpose for which the IFRS exists, one can infer that a fair number of banks in Africa make the required disclosures about their operations in the financial reports they provide for public scrutiny. Altogether, the summary statistics and the aggregated average figures for some of the ratios highlighted, show some evidence of DMD. The correlation matrix is needed to help determine how CBB correlates with bank risk and DMD.

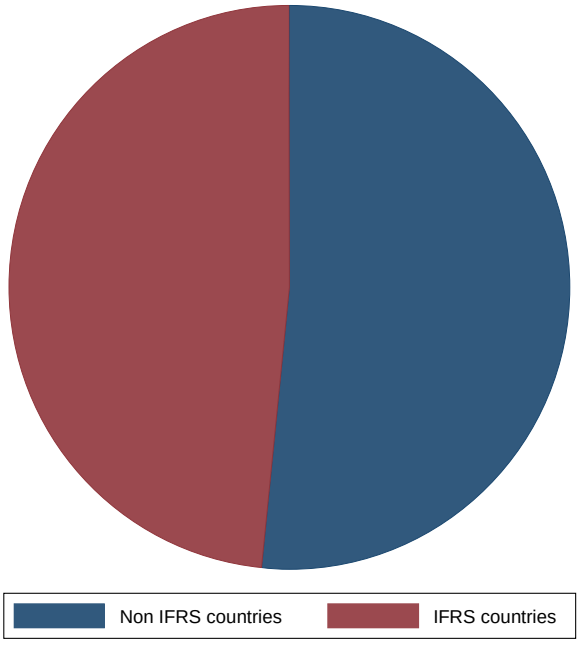


Figure 5.20: Percent of Banks in sample that have adopted IFRS in Africa

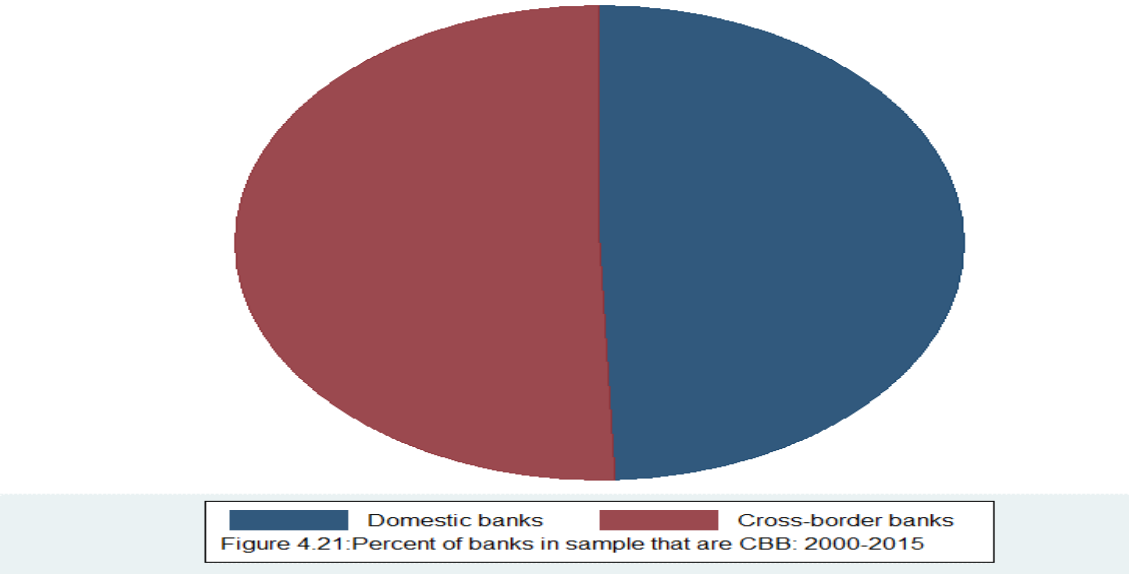


Figure 5.21: Percent of banks in the sample that are CBB

Pairwise correlation Analysis

On the correlation matrix in Table 5.9, it appears that the capital adequacy ratio of banks positively but insignificantly correlates with the bank deposit growth rate. It, however, significantly and positively moves with bank deposit cost. This finding is contrary to the study's expectation. Capital is a kind of a deductible in insurance that ensures that bank owners partake in the losses banks accrue due to excessive risk-taking. Therefore, to protect their capital, banks with high capital play it safe. So, in general, banks with high capital levels are perceived to be safer. So, they can attract lower deposit costs. However, some studies perceive that, when banks are directed by regulators to keep high levels of capital, they see this as reducing their profit-making frontier (see Chapter Two). And so, instead of having a bridling effect on bank owners to reduce their risk levels, it may instead encourage them to take more risk.

Table 5.9: *The correlation coefficient for depositor market discipline study*

	Deposit growth rate	Interest expense on deposit	Cross-border banking	Capital adequacy ratio	Non-performing loans to total loans	Real estate to total loans	Consumption loans to total loans	Corporate and commercial loans to total loans
Deposit growth rate	1.0000							
Interest expense on deposit ratio	0.0552*	1.0000						
Cross-border bank	0.0022	-0.1063*	1.0000					
Capital adequacy ratio	0.0048	0.0891*	-0.0413*	1.0000				
Nonperforming loans to total loans	-0.0291	0.1035*	-0.0439*	0.1243*	1.0000			
Real estate to total loans	0.0302	0.4530*	-0.1494*	0.4222*	0.2525*	1.0000		
Consumption loans to total loans	-0.0038	-0.2075*	0.0260	-0.2251*	0.2298*	0.0645	1.0000	
Corporate and commercial loans to total loans	-0.2001*	0.2617*	-0.1251*	-0.0098	0.0236	-0.4409*	-0.4688*	1.0000
Non-performing loans to equity ratio	0.0009	-0.0195	-0.0211	0.0311	0.0379	0.1102*	0.2749*	-0.0588
Loan Loss Allowance	-0.0077	-0.0284	-0.0809*	0.0713*	0.0730*	-0.1102*	0.0789*	0.0531
ROA	0.0181	-0.0729*	0.0594*	0.2201*	-0.2089*	-0.0331	-0.1111*	0.0974*
ROE	0.0057	-0.0018	0.0175	0.0231	-0.0827*	-0.0759	-0.0531	0.0541
Management quality	-0.0163	0.0365*	0.1098*	0.1127*	0.0769*	0.0511	0.2346*	-0.1032*
Liquid Assets-to-Total Assets	-0.0082	0.0380*	0.0648*	-0.0254	-0.0896*	0.4226*	0.0387	-0.1041*
Subordinated Debts-to-total Assets	-0.0043	0.1036*	0.1293*	0.2551*	0.0054	-0.0492	-0.1389*	0.0795
GDP growth rate	0.0190	0.0036	0.0018	0.0102	-0.0264	0.1241*	-0.1420*	0.0042
Real GDP growth rate	0.0207	-0.0020	0.0148	0.0116	-0.0224	0.0968*	-0.1493*	0.0245
GNI per Capita	-0.0407*	0.0279*	-0.1347*	0.0058	-0.0303	0.0549	-0.2772*	0.0603*
Inflation	-0.0466*	-0.1408*	0.0396*	0.0336*	0.0501*	-0.1791*	-0.2570*	0.0536

Table 5.9 Continued

	Non-performing loans to equity ratio	loan loss allowance to total loans	ROA	ROE	Management quality	Liquid Assets-to-Total Assets	Subordinated Debts-to-Total Assets
Non-performing loans to equity ratio	1.0000						
Loan loss allowance to total loans	0.0058	1.0000					
ROA	-0.0153	-0.0491*	1.0000				
ROE	0.9084*	-0.0243	0.1298*	1.0000			
Management quality	-0.0116	0.0100	-0.0160	0.0034	1.0000		
Liquid Assets-to-Total Assets	-0.0043	-0.0138	0.0410*	0.0021	-0.0148	1.0000	
Subordinated Debts-to-Total Assets	-0.0017	0.0314	-0.1539*	-0.0348	0.3913*	-0.0478	1.0000
GDP growth rate	-0.0116	-0.0211	0.0360*	0.0013	0.0859*	0.0570*	0.1637*
Real GDP growth rate	-0.0108	-0.0219	0.0519*	0.0010	0.1039*	0.0242	0.1651*
GNI per Capita	-0.0153	-0.0379*	-0.0953*	0.0009	-0.4577*	-0.0646*	-0.2339*
Inflation	-0.0262	-0.0137	0.0834*	0.0205	0.0167	-0.1893*	0.0744*

Table 5.9 Continued

	Subordinated Debts-to-total Assets	GDP growth rate	The real GDP growth rate	GNI per Capita	Inflation
Subordinated Debts-to-total Assets	1.0000				
GDP growth rate	0.1637*	1.0000			
Real GDP growth rate	0.1651*	0.9450*	1.0000		
GNI per Capita	-0.2339*	-0.0778*	-0.1171*	1.0000	
Inflation	0.0744*	-0.0382*	-0.0507*	0.3023*	1.0000

Note. * implies significant at 5% or more.
CBB is a cross-border banking variable. It is a dummy variable that takes a binary value of 1 if a bank is a cross-border bank and 0 otherwise. EDI is a notation for explicit deposit insurance. It is also a dummy variable that assumes a binary value of 1 if a country has adopted explicit deposit insurance and 0 otherwise.

In line with banking literature, this study finds that Non-performing loans to total loans moves negatively with deposit growth rate but positively with bank deposit cost. This correlation provides some evidence of depositor market discipline via the quantity mechanism and price mechanism, respectively (a complete test of DMD). The ratio of real estate loans to total loans, however, moves positively with bank deposit growth rate and positively with bank deposit cost. This study expected the ratio of real estate loans to total loans to move negatively with the bank deposit growth rate but positively with bank deposit cost. Only the correlation between real estate loans and bank deposit cost is, however significant. The ratio of consumption loans to total loans as seen on the correlation matrix indicates an insignificant negative relationship with bank deposit growth rate but a significant negative relationship with bank deposit cost. A priori, this study was not sure of the sign of this variable, since, consumption loans can be seen as safe due to their short tenures but risky because they are not backed by collateral. Therefore, this negative relationship between consumption loans and bank deposit cost could be so because depositors perceive this loan product of banks to be safe. The study does not, however, observe this perception being translated into a significant positive correlation with bank deposit growth. The effect of loan loss allowance on both measures of market discipline is not significant.

An observation of the two profitability measures analysed, ROA and ROE, shows that only ROA significantly correlates with the price-based mechanism of DMD. It correlates inversely with bank deposit costs. This result implies that as banks make more profit, they tend to see a reduction in their cost. This is in line with the DMD hypothesis. Furthermore, and in line with the literature, this study finds that bank overhead cost reduces deposit growth whiles increasing bank cost. This finding is, however, insignificant.

The two liquidity measures, Liquid assets to total assets and subordinated debts-to-total assets significantly and positively correlate with bank deposit cost. This result is unexpected. In line with bank literature, safer banks hold higher liquidity, and so they are expected to correlate negatively with bank deposit cost. However, keeping excess liquidity has a price. So, it appears that within the African setting, depositors may punish banks that hold excess liquidity. But correlation does not imply causation.

Among the three macroeconomic variables recorded on the correlation table, the study finds that GNI/capita negatively but significantly correlates with bank deposit growth rate. It however positively but significantly correlates with bank deposit cost. This result is unexpected to the presence of market discipline since an improvement in economic conditions should see deposits levels rise, and bank deposit cost reduce. In line with DMD theory, inflation significantly correlates negatively with bank deposit and positively with bank deposit cost.

A Complete Test for DMD of Bank Risk in Africa

This section of the study analyses various CAMEL measures in order to assess their effect on DMD. The ILS estimator is used to estimate equation (15) and equation (16) specified in Chapter Four of the study. As a check for robustness, xtpcse and prais regressions are also run. Table 4.4 in Chapter Four of this study provides the expected signs for the CAMEL measures.

Based on ILS regression (see Table 5.15), this study provides significant evidence that the capital adequacy ratio that banks keep causes an increase in the deposit growth rate of banks in Africa. This result is in line with DMD via the quantity mechanism. Contrary to the DMD hypothesis, the study finds that the bank capital adequacy ratio increases bank deposit cost. The positive impact capital has on the bank deposit growth rate seen in Table 5.15 is consistent and supported by the xtpcse and prais estimators. The results for bank deposit costs are, however, not robust since the prais regression provides that the capital adequacy ratio of banks increases bank deposit cost. The prais result is consistent with the DMD hypothesis. In sum, Table 5.15 provides significant evidence of DMD via the quantity mechanism when the CAMEL measure is the capital adequacy ratio. Table 5.20, however, provides strong and robust evidence that the capital adequacy ratio of banks impacts positively on bank deposit growth and negatively on bank deposit cost. This evidence is strong because the ILS evidence is robust across the xtpcse and prais regression at the 5% level of significance. This piece of evidence supports the study's hypothesis of finding the existence of DMD via a complete test. All other regressions in which capital appears shows that increasing capital levels also leads to an increase in bank deposit growth. The estimations in Table 5.11, Table 5.13, Table 5.16, Table 5.17, Table 5.19, show that depositors react to bank risk as measured by the capital adequacy ratio via the price-based mechanism and quantity-based mechanism. These results confirm evidence of a complete test for the DMD hypothesis in Africa. Table 5.14 does not provide any proof of DMD. Table 5.12 provides significant effects, but the findings are not consistent with the literature, and they are not robust across other forms of regressions.

Table 5.10: *CBB, capital adequacy ratio and DMD*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.1706**	-0.1572*	-0.1788**	-0.0002	0.0013	0.0000
	(-3.04)	(-2.55)	(-2.78)	(-0.04)	(0.27)	(0.01)
Capital adequacy ratio	-0.1885	0.3570	0.5250	0.0683*	-0.0045	0.0050
	(-0.58)	(1.22)	(1.49)	(2.28)	(-0.14)	(0.18)
Cross-border banking χ capital adequacy ratio	0.6953	0.8280	0.9939*	-0.0908**	-0.0855*	-0.0947**
	(1.72)	(1.92)	(2.13)	(-2.80)	(-2.22)	(-2.65)
Non-performing loans	-0.0746	-0.1993**	-0.1465	0.0192	0.0234	0.0049
	(-0.77)	(-2.73)	(-0.90)	(0.85)	(1.05)	(0.41)
ROA	0.8432	0.0074	0.3289	0.0023	0.1033**	0.1083**
	(1.58)	(0.02)	(0.61)	(0.05)	(2.93)	(3.18)
Management quality	1.0122**	1.1014***	1.4520**	0.0663	0.0432	0.0126
	(2.88)	(3.52)	(3.15)	(1.79)	(1.52)	(0.34)
Liquidity1 (liquid assets-to-total assets)	0.1584*	0.0260	-0.0858	-0.0266**	-0.0245***	-0.0188**
	(2.02)	(0.40)	(-0.98)	(-2.95)	(-4.66)	(-3.24)
Total assets	-0.0355**	-0.0242	-0.0427*	-0.0013	-0.0031*	-0.0035
	(-2.86)	(-1.92)	(-2.45)	(-1.55)	(-2.45)	(-1.69)
Inflation	-0.1577***	-0.2085***	-0.1820**	-0.0017	0.0037	0.0077
	(-3.90)	(-4.93)	(-3.07)	(-0.41)	(1.02)	(1.59)
Bureaucratic quality	0.2413***	0.2146**	0.1439	0.0467***	0.0420***	0.0458***
	(3.39)	(2.86)	(1.13)	(4.23)	(3.56)	(3.64)
Deposit money bank assets to GDP (%)	-0.1059*	-0.0904	-0.0680	0.0012	0.0081	-0.0044
	(-2.35)	(-1.88)	(-0.93)	(0.26)	(1.15)	(-0.54)
Constant	0.2759***	0.2318***	0.2674**	0.0343***	0.0450***	0.0494***
	(5.07)	(4.55)	(3.10)	(5.15)	(6.21)	(5.64)
Diagnostic tests						
No. of Observation	1129	1129	1129	1139	1139	1139
R^2	0.078	0.222	0.087	0.110	0.471	0.182
F-test	6.80***		9.70***	11.16***		22.85***
Wald chi2(11)		116.45***			90.20***	
Fixed effect	Y			Y		
Hausman test	121.84***			79.47***		
BP test: chi2(1)	163.46***			90.03***		
Wooldridge test for the first-order autocorrelation: F-test	1.091			87.451***		

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.11: *CBB, non-performing loans and DMD.*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.0922***	-0.0458	-0.0483	-0.0068*	-0.0050	-0.0092*
	(-3.34)	(-1.65)	(-1.25)	(-2.50)	(-1.92)	(-2.20)
Capital Adequacy ratio	0.1332	0.6417**	1.0092***	0.0246	-0.0461*	-0.0459*
	(0.52)	(2.87)	(3.70)	(0.97)	(-2.26)	(-2.33)
Non-performing loans	-0.1205	-0.1520	-0.0760	0.0515	0.0623	0.0209
	(-0.98)	(-1.93)	(-0.34)	(1.45)	(1.71)	(1.23)
Cross-border banking χ non-performing loans	0.0549	-0.2638	-0.1930	-0.0676	-0.0836*	-0.0303
	(0.30)	(-1.31)	(-0.61)	(-1.80)	(-2.31)	(-1.30)
ROA	0.7880	-0.0640	0.2691	0.0011	0.0935**	0.1030**
	(1.47)	(-0.16)	(0.49)	(0.02)	(2.72)	(3.01)
Management quality	0.9482**	0.9939**	1.3881**	0.0746*	0.0536*	0.0149
	(2.75)	(3.15)	(3.00)	(2.04)	(2.00)	(0.40)
Liquidity1 (liquid assets-to-total assets)	0.1575*	0.0121	-0.1001	-0.0278**	-0.0231***	-0.0176**
	(2.01)	(0.19)	(-1.14)	(-3.06)	(-4.51)	(-3.04)
Total assets	-0.0350**	-0.0223	-0.0415*	-0.0014	-0.0028*	-0.0036
	(-2.82)	(-1.78)	(-2.38)	(-1.61)	(-2.58)	(-1.77)
Inflation	-0.1483***	-0.1932***	-0.1713**	-0.0027	0.0025	0.0072
	(-3.72)	(-4.80)	(-2.89)	(-0.66)	(0.69)	(1.47)
Bureaucratic quality	0.2446***	0.1980*	0.1359	0.0442***	0.0410***	0.0454***
	(3.40)	(2.55)	(1.06)	(4.31)	(4.06)	(3.60)
Deposit money bank assets to GDP (%)	-0.1078*	-0.1006*	-0.0690	0.0019	0.0096	-0.0039
	(-2.42)	(-2.15)	(-0.94)	(0.42)	(1.49)	(-0.47)
Constant	0.2425***	0.2041***	0.2103*	0.0381***	0.0466***	0.0547***
	(5.01)	(4.42)	(2.54)	(6.40)	(7.88)	(6.42)
Diagnostic tests						
No. of Observation	1129	1129	1129	1139	1139	1139
R^2	0.075	0.215	0.084	0.110	0.474	0.178
F-test	8.22***		9.30***	12.68***		22.26***
Wald chi2(11)		110.16***			109.93***	
Fixed effect	Y			Y		
Hausman test	380.08***			67.08***		
BP test: chi2(1)	113.36***			78.30***		
Wooldridge test for first-order autocorrelation: F-test	1.000			85.196***		

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.12: *CBB, Real estate loans to total loans and DMD*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.1008	-0.1238**	-0.1215	-0.0096*	-0.0086*	-0.0116
	(-1.82)	(-2.92)	(-1.69)	(-2.28)	(-2.12)	(-1.58)
Capital adequacy ratio	0.4786	0.6937	1.5916***	0.0879*	-0.0269	-0.0416
	(0.96)	(1.75)	(3.68)	(2.01)	(-0.78)	(-1.58)
Real estate loans to Total Loans	-0.2880	-0.3582**	-0.5515**	0.0441*	0.0955***	0.0527*
	(-1.68)	(-2.98)	(-2.69)	(2.13)	(3.79)	(2.41)
Cross-border banking χ Real estate to Total loans	0.0348	0.0880	0.3043	-0.0241	-0.1140***	-0.0646
	(0.16)	(0.60)	(0.91)	(-1.02)	(-3.92)	(-1.94)
ROA	1.3007	1.6346**	1.4412*	-0.3021***	-0.0184	0.0674
	(1.66)	(3.03)	(2.00)	(-3.56)	(-0.36)	(1.56)
Management quality	0.1279	0.7840	0.7411	-0.1312	0.0390	0.0200
	(0.25)	(1.21)	(1.00)	(-1.69)	(0.88)	(0.30)
Liquidity1 (liquid assets to total assets)	-0.0767	-0.2149	-0.5277**	-0.0490***	-0.0422***	-0.0213*
	(-0.65)	(-1.72)	(-3.23)	(-3.63)	(-4.20)	(-2.03)
Total assets	-0.0292	-0.0372**	-0.0364	-0.0017	0.0011	-0.0020
	(-1.80)	(-2.84)	(-1.30)	(-1.05)	(0.76)	(-0.53)
Inflation	-0.2626**	-0.3038***	-0.4090***	0.0127	-0.0088	-0.0074
	(-2.67)	(-4.22)	(-3.77)	(1.50)	(-1.37)	(-0.86)
Bureaucratic quality	0.2127	0.2630	0.1378	0.0188	0.0177	0.0402*
	(1.29)	(1.35)	(0.67)	(1.34)	(1.62)	(1.97)
Deposit money bank assets to GDP (%)	-0.2732**	-0.2765**	-0.2683*	-0.0318***	-0.0121*	-0.0187
	(-3.02)	(-2.73)	(-2.21)	(-4.52)	(-2.23)	(-1.33)
Constant	0.4039***	0.4249***	0.4528**	0.0756***	0.0579***	0.0632***
	(3.45)	(4.25)	(2.74)	(5.83)	(5.81)	(3.63)
Diagnostic tests						
No. of Observation	229	229	229	230	230	230
R^2	0.174	0.384	0.265	0.413	0.733	0.385
F-test	4.15***		7.11***	13.95***		12.43***
Wald chi2(11)		74.33***			145.74***	
Fixed effect	Y			Y		
Hausman test	77.82***			21.59**		
BP test: chi2(1)	91.50***			93.52***		
Wooldridge test for first-order autocorrelation: F-test	27.366***			28.757***		

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.13: *CBB, corporate loans to total loans and DMD*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.7503***	-0.4287***	-0.3819***	-0.0090*	-0.0100	0.0005
	(-6.67)	(-4.21)	(-3.44)	(-2.50)	(-1.73)	(0.08)
Capital adequacy ratio	0.7573	0.9472***	1.3723***	-0.0157	-0.0303	-0.0631**
	(1.76)	(3.78)	(3.41)	(-1.04)	(-1.51)	(-3.03)
Corporate loans to total loans	-0.9520***	-0.4616***	-0.3374*	0.0192***	0.0191*	0.0165*
	(-6.18)	(-3.30)	(-2.35)	(3.40)	(2.38)	(2.16)
Cross-border banking χ corporate loans to total loans	1.0800***	0.7099***	0.6315***	-0.0000	-0.0022	-0.0255**
	(6.47)	(4.72)	(3.41)	(-0.01)	(-0.23)	(-2.67)
ROA	2.4538**	1.1580*	1.3806	-0.0559	-0.0223	0.0311
	(2.61)	(2.19)	(1.70)	(-1.23)	(-0.63)	(0.85)
Management quality	1.7374*	1.7846***	3.4052***	0.0418	0.0536	0.0550
	(2.44)	(3.65)	(3.58)	(0.99)	(1.41)	(1.11)
Liquidity1	-0.1755	-0.3767***	-0.5792***	-0.0499***	-0.0289***	-0.0222***
	(-1.32)	(-3.46)	(-4.23)	(-8.38)	(-4.55)	(-3.33)
Total assets	-0.1028***	-0.0988***	-0.1383***	-0.0022*	-0.0018	-0.0011
	(-5.50)	(-4.19)	(-3.85)	(-2.43)	(-1.94)	(-0.50)
Inflation	-0.2752***	-0.2340***	-0.3018**	0.0123*	0.0115*	0.0066
	(-3.73)	(-3.89)	(-2.97)	(2.57)	(2.47)	(1.28)
Bureaucratic quality	-0.5294***	-0.4093**	-0.2847	-0.0381***	-0.0239*	-0.0091
	(-3.42)	(-2.63)	(-1.11)	(-4.27)	(-2.36)	(-0.66)
Deposit money bank assets to GDP (%)	0.1601*	0.1338*	0.2103	0.0172***	0.0185***	0.0136
	(2.22)	(2.10)	(1.44)	(3.80)	(3.66)	(1.65)
Constant	1.1196***	0.7528***	0.6840***	0.0610***	0.0539***	0.0500***
	(6.95)	(3.91)	(3.47)	(9.90)	(6.46)	(4.64)
Diagnostic test						
No. of Observation	531	531	531	525	525	525
R^2	0.303	0.394	0.178	0.280	0.741	0.294
F-test	20.47***		10.22***	18.11***		19.46***
Wald chi2(11)		86.58***			205.18***	
Fixed effect	Y			Y		
Hausman test	34.52***			39.32***		
BP test: chi2(1)	513.97***			50.03***		
Wooldridge test for the first-order autocorrelation: F-test	1.376			61.280***		

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.14: *CBB, consumption loans to total loans, and DMD.*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
CBB: Cross-border banking	-0.0674	-0.0536	-0.0489	-0.0182***	-0.0116*	-0.0127*
	(-1.04)	(-0.73)	(-0.72)	(-4.32)	(-2.11)	(-2.15)
Capital adequacy ratio	0.0525	0.2830	0.2879	-0.0343	-0.0292	-0.0218
	(0.17)	(0.61)	(0.70)	(-1.89)	(-1.64)	(-1.01)
Consumption loans to total loans	0.0309	0.2457	0.0947	-0.0495***	-0.0234*	-0.0132
	(0.15)	(1.00)	(0.62)	(-6.17)	(-2.45)	(-1.39)
Cross-border banking χ Consumption loan	-0.0331	-0.2764	-0.1020	0.0250**	0.0084	0.0024
	(-0.16)	(-1.07)	(-0.54)	(2.66)	(0.76)	(0.21)
ROA	0.1556	0.3002	0.3885	0.0083	0.0036	0.0060
	(0.19)	(0.42)	(0.49)	(0.20)	(0.14)	(0.19)
Management quality	1.5442*	1.8706*	2.0483**	0.0437	0.0219	-0.0179
	(2.24)	(2.29)	(2.60)	(0.84)	(0.47)	(-0.40)
Liquidity1 (liquid assets to total assets)	0.0710	-0.0081	-0.0211	-0.0494***	-0.0299***	-0.0219**
	(0.56)	(-0.06)	(-0.14)	(-6.96)	(-3.91)	(-2.74)
Total assets	-0.0427*	-0.0277	-0.0571*	-0.0014	-0.0015	-0.0017
	(-1.98)	(-1.02)	(-2.46)	(-1.20)	(-1.11)	(-0.68)
Inflation	-0.1359	-0.2592**	-0.1787	0.0035	0.0072	0.0037
	(-1.84)	(-3.13)	(-1.87)	(0.59)	(1.19)	(0.64)
Bureaucratic quality	0.2002	0.1803	0.1665	-0.0275*	-0.0292**	-0.0081
	(1.18)	(0.93)	(0.84)	(-2.28)	(-3.13)	(-0.62)
Deposit money bank assets to GDP (%)	-0.0588	-0.0890	-0.0183	0.0071	0.0171***	0.0086
	(-0.81)	(-1.07)	(-0.18)	(1.30)	(3.29)	(0.93)
Constant	0.2391*	0.2146	0.2260	0.0854***	0.0711***	0.0666***
	(2.54)	(1.63)	(1.56)	(11.41)	(9.27)	(5.76)
Diagnostic test						
No. of Observation	447	447	447	449	449	449
R^2	0.051	0.219	0.066	0.235	0.661	0.269
F-test	2.13**		2.81***	12.17***		14.61***
Wald chi2(11)		37.44***			51.51***	
Fixed effect	Y			Y		
Hausman test	47.75***			270.57***		
BP test: chi2(1)	2.28			64.16***		
Wooldridge test	0.015			49.051***		

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.15: *CBB, loan loss allowance to total loans, and DMD*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.0575*	-0.0164	-0.0225	-0.0096***	-0.0081***	-0.0070
	(-2.29)	(-0.49)	(-0.50)	(-5.03)	(-4.33)	(-1.94)
Capital adequacy ratio	0.7619*	0.9499***	1.1450***	0.0532*	0.0004	-0.0247*
	(2.42)	(4.67)	(3.98)	(2.49)	(0.03)	(-2.13)
Loan loss allowance to total loans	-0.5058	-0.8162	-1.0644	0.0498	-0.0045	-0.0115
	(-0.40)	(-1.19)	(-1.37)	(1.33)	(-0.25)	(-0.58)
Cross-border banking χ Loan loss allowance	0.7824	1.1047	1.4031	-0.0496	0.0051	0.0120
	(0.53)	(1.51)	(1.79)	(-1.32)	(0.29)	(0.60)
ROA	-3.3449	-5.3068***	-6.0768***	-0.0094	0.0516**	0.0695***
	(-0.97)	(-3.71)	(-9.07)	(-0.27)	(2.69)	(3.54)
Management quality	0.4038	0.5852	1.0180	0.0641*	0.0433	-0.0212
	(0.81)	(1.07)	(1.58)	(2.16)	(1.88)	(-0.77)
Liquidity1(liquid assets-to-total assets)	-0.0178	-0.1673	-0.3590**	-0.0430***	-0.0168***	-0.0104**
	(-0.29)	(-1.28)	(-3.07)	(-6.93)	(-4.46)	(-2.60)
Total assets	-0.0412*	-0.0485**	-0.0620**	-0.0016*	-0.0018*	-0.0011
	(-2.53)	(-2.73)	(-2.58)	(-2.14)	(-2.20)	(-0.57)
Inflation	-0.1775***	-0.2506***	-0.2165**	-0.0142**	-0.0026	-0.0018
	(-3.63)	(-3.86)	(-2.79)	(-3.21)	(-0.76)	(-0.51)
Bureaucratic quality	0.1474	0.1181	0.2632	0.0257**	0.0221***	0.0173
	(1.07)	(0.81)	(1.66)	(2.75)	(3.65)	(1.79)
Deposit money bank assets to GDP (%)	-0.0635	-0.0038	-0.0863	0.0145**	0.0188***	0.0066
	(-1.04)	(-0.04)	(-0.88)	(2.76)	(4.03)	(0.85)
Constant	0.3535**	0.4171***	0.4518***	0.0440***	0.0436***	0.0489***
	(2.81)	(4.65)	(4.07)	(9.01)	(12.68)	(6.66)
Diagnostic test	1908	1908	1908	1896	1896	1896
No. of Observation	0.042	0.130	0.077	0.097	0.472	0.116
R^2						
F-test	7.59***		14.37***	18.47***		22.43***
Wald chi2(11)		52.09***			104.60***	
Fixed effect	Y			Y		
Hausman test	163.90***			39.88***		
BP test: chi2(1)	8880.33***			544.10***		
Wooldridge test	4.718**			161.745***		

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.16: *CBB, total impaired loans to equity capital ratio, and DMD.*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
CBB: Cross-border banking	-0.0950***	-0.0569*	-0.0523	-0.0083***	-0.0082***	-0.0104**
	(-3.61)	(-2.22)	(-1.46)	(-3.42)	(-3.71)	(-2.63)
Capital adequacy ratio	0.1438	0.6044**	1.0569***	0.0364	-0.0319	-0.0433*
	(0.57)	(2.82)	(3.93)	(1.27)	(-1.37)	(-2.23)
Total impaired loans to equity capital ratio	-0.0238	-0.0208	0.0027	0.0052	0.0042	0.0012
	(-0.90)	(-1.00)	(0.08)	(1.01)	(1.40)	(0.58)
Cross-border banking χ Total impaired loans to equity capital ratio	0.0260	0.0158	-0.0025	-0.0065	-0.0047	-0.0014
	(0.89)	(0.59)	(-0.07)	(-1.26)	(-1.56)	(-0.59)
ROA	0.8639	0.2330	0.4093	0.0070	0.0921**	0.1049**
	(1.70)	(0.62)	(0.79)	(0.14)	(2.81)	(3.28)
Management quality	0.7970*	0.8956**	1.1929**	0.0628	0.0405	0.0071
	(2.43)	(2.89)	(2.67)	(1.71)	(1.54)	(0.20)
Liquidity1 (liquid assets-to-total assets)	0.1572*	0.0072	-0.1096	-0.0266**	-0.0216***	-0.0164**
	(2.02)	(0.11)	(-1.27)	(-2.96)	(-4.25)	(-2.89)
Total assets	-0.0327**	-0.0206	-0.0399*	-0.0013	-0.0027**	-0.0036
	(-2.66)	(-1.67)	(-2.30)	(-1.57)	(-2.80)	(-1.76)
Inflation	-0.1439***	-0.1878***	-0.1725**	-0.0023	0.0030	0.0076
	(-3.65)	(-4.76)	(-2.94)	(-0.57)	(0.85)	(1.58)
Bureaucratic quality	0.2808***	0.2477**	0.1873	0.0461***	0.0458***	0.0450***
	(3.98)	(3.23)	(1.51)	(4.47)	(4.57)	(3.73)
Deposit money bank assets to GDP (%)	-0.1154**	-0.0984*	-0.0788	0.0007	0.0074	-0.0039
	(-2.63)	(-2.09)	(-1.09)	(0.14)	(1.09)	(-0.48)
Constant	0.2294***	0.1771***	0.1853*	0.0377***	0.0457***	0.0549***
	(4.56)	(3.78)	(2.28)	(6.29)	(8.67)	(6.66)
Diagnostic test						
No. of Observation	1160	1160	1160	1170	1170	1170
R^2	0.071	0.207	0.081	0.107	0.481	0.175
F-test	8.02***		9.23***	12.59***		22.39***
Wald chi2		96.72***			110.77***	
BP test: Prob > chi2	107.83***			86.19***		
Fixed effect	Y			Y		
Hausman test	142.32***			74.02***		
Wooldridge test	1.050			88.041***		

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.17: *CBB, ROA, and DMD*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.0645*	-0.0821**	-0.0578	-0.0114***	-0.0091**	-0.0094*
	(-2.22)	(-2.82)	(-1.42)	(-4.11)	(-2.89)	(-2.27)
Capital adequacy ratio	0.1299	0.7211**	1.0596***	0.0343	-0.0401	-0.0455*
	(0.50)	(3.22)	(3.95)	(1.23)	(-1.82)	(-2.37)
Total impaired loans to equity capital ratio	-0.0060	-0.0043	0.0008	0.0008	0.0003	0.0001
	(-0.42)	(-0.28)	(0.05)	(0.42)	(0.44)	(0.07)
ROA	1.4210	-0.6892	0.2820	-0.0129	0.0997	0.1539**
	(1.59)	(-1.12)	(0.33)	(-0.17)	(1.50)	(2.64)
Cross-border banking χ ROA	-0.8461	1.2164	0.1890	0.0279	-0.0090	-0.0664
	(-0.90)	(1.66)	(0.18)	(0.32)	(-0.12)	(-0.98)
Management quality	0.7471*	0.9128**	1.2026**	0.0661	0.0426	0.0068
	(2.26)	(2.89)	(2.69)	(1.73)	(1.64)	(0.19)
Liquidity1 (liquid assets-to-total assets)	0.1521*	-0.0038	-0.1093	-0.0256**	-0.0217***	-0.0163**
	(1.97)	(-0.06)	(-1.27)	(-2.86)	(-4.24)	(-2.87)
Total assets	-0.0326**	-0.0208	-0.0400*	-0.0013	-0.0027**	-0.0035
	(-2.66)	(-1.71)	(-2.31)	(-1.54)	(-2.82)	(-1.74)
Inflation	-0.1431***	-0.1896***	-0.1726**	-0.0025	0.0034	0.0075
	(-3.63)	(-4.81)	(-2.95)	(-0.60)	(0.96)	(1.56)
Bureaucratic quality	0.2787***	0.2740***	0.1872	0.0467***	0.0434***	0.0452***
	(3.96)	(3.49)	(1.51)	(4.37)	(4.16)	(3.74)
Deposit money bank assets to GDP (%)	-0.1194**	-0.1062*	-0.0779	0.0009	0.0082	-0.0041
	(-2.71)	(-2.21)	(-1.07)	(0.19)	(1.18)	(-0.51)
Constant	0.2167***	0.1799***	0.1881*	0.0393***	0.0483***	0.0544***
	(4.47)	(3.77)	(2.31)	(7.28)	(9.33)	(6.57)
Diagnostic test						
No. of Observation	1160	1160	1160	1170	1170	1170
R^2	0.072	0.210	0.081	0.104	0.466	0.176
F-test	8.07***		9.23***	12.18***		22.43***
Wald chi2(11)		105.83***			100.48***	
Fixed effect	Y			Y		
Hausman test	195.91***			71.46***		
BP test: chi2(1)	116.92***			81.92***		
Wooldridge test for first-order autocorrelation: F-test	1.088			92.512***		

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.18: *CBB, ROE and DMD*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
CBB: Cross-border banking	-0.0145	-0.0328	-0.0285	-0.0134***	-0.0082**	-0.0090*
	(-0.50)	(-1.24)	(-0.73)	(-4.44)	(-2.63)	(-2.19)
Capital adequacy	0.3140	0.6813***	1.1202***	0.0365	-0.0217	-0.0258
	(1.49)	(3.37)	(4.48)	(1.60)	(-1.05)	(-1.40)
Total impaired loans to equity capital ratio	0.0003	-0.0077	0.0092	0.0017	0.0020	0.0017
	(0.02)	(-0.47)	(0.50)	(0.68)	(1.84)	(1.58)
ROE	0.3431*	0.0821	0.1654	-0.0062	0.0124	0.0182**
	(2.54)	(0.96)	(1.67)	(-0.69)	(1.62)	(2.88)
Cross-border banking χ ROE	-0.3365*	-0.0625	-0.1253	0.0126	-0.0043	-0.0096
	(-2.48)	(-0.68)	(-1.16)	(1.15)	(-0.51)	(-1.38)
Management quality	0.8313*	0.9307**	1.2569**	0.0685	0.0407	0.0053
	(2.44)	(2.88)	(2.85)	(1.89)	(1.62)	(0.15)
Liquidity1 (liquid assets-to-total assets)	0.1589*	0.0038	-0.1035	-0.0258**	-0.0220***	-0.0163**
	(2.06)	(0.06)	(-1.20)	(-2.93)	(-4.30)	(-2.89)
Total assets	-0.0333**	-0.0201	-0.0401*	-0.0013	-0.0023*	-0.0035
	(-2.68)	(-1.62)	(-2.33)	(-1.55)	(-2.26)	(-1.74)
Inflation	-0.1438***	-0.1756***	-0.1697**	-0.0020	0.0038	0.0081
	(-3.62)	(-4.43)	(-2.91)	(-0.50)	(1.08)	(1.69)
Bureaucratic quality	0.2669***	0.2470**	0.1878	0.0468***	0.0443***	0.0454***
	(3.76)	(3.23)	(1.53)	(4.47)	(4.24)	(3.76)
Deposit money bank assets to GDP (%)	-0.1130*	-0.0989*	-0.0740	0.0014	0.0069	-0.0044
	(-2.54)	(-2.10)	(-1.03)	(0.30)	(1.00)	(-0.54)
Constant	0.1536**	0.1446**	0.1453	0.0394***	0.0448***	0.0513***
	(2.89)	(2.78)	(1.73)	(6.06)	(8.05)	(6.13)
Diagnostic test						
No. of Observation	1160	1160	1160	1170	1170	1170
R^2	0.081	0.205	0.083	0.106	0.467	0.178
F-test	9.25***		9.44***	12.48***		22.76***
Wald chi2(11)		93.32***			94.97***	
Fixed effect				Y		
Hausman test	-398.20			72.16***		
BP test: chi2(1)	209.24***			111.72***		
Wooldridge test for the first-order autocorrelation: F-test	1.028			103.670***		

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.19: *CBB, management quality, and DMD.*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.0511	-0.0450	-0.1753	-0.0049	-0.0052	-0.0118*
	(-0.73)	(-0.66)	(-1.57)	(-1.00)	(-1.10)	(-2.04)
Capital adequacy ratio	0.7006	0.7761**	1.5400***	-0.0281	-0.0245	-0.0593**
	(1.90)	0.7761**	(3.85)	(-1.85)	(-1.43)	(-2.91)
Commercial loans to total loans	-0.3530***	-0.0380	0.0681	0.0195***	0.0193***	0.0011
	(-4.42)	(-0.60)	(0.69)	(5.57)	(3.82)	(0.23)
ROE	0.1942	0.0472	0.1006	-0.0116	-0.0017	0.0042
	(1.49)	(0.49)	(1.07)	(-1.79)	(-0.38)	(0.95)
Management quality	5.3449**	2.7107	1.8712	0.1094	0.1759	0.0439
	(3.02)	(1.52)	(1.07)	(0.92)	(1.46)	(0.49)
Cross-border banking χ management quality	-4.6024*	-2.2767	2.2817	-0.0985	-0.1503	0.0114
	(-2.50)	(-1.14)	(1.18)	(-0.80)	(-1.20)	(0.12)
Liquidity1 (liquid assets-to-total assets)	0.0256	-0.2471**	-0.5705***	-0.0490***	-0.0322***	-0.0235***
	(0.20)	(-2.66)	(-4.08)	(-7.99)	(-4.73)	(-3.50)
Total assets	-0.0836***	-0.0925***	-0.1462***	-0.0018*	-0.0019*	-0.0013
	(-4.89)	(-4.08)	(-3.71)	(-2.08)	(-2.30)	(-0.60)
Inflation	-0.2465**	-0.2038**	-0.2802**	0.0118*	0.0127*	0.0071
	(-3.06)	(-3.23)	(-2.69)	(2.58)	(2.50)	(1.38)
Bureaucratic quality	-0.4157**	-0.1668	-0.1784	-0.0388***	-0.0267**	-0.0122
	(-2.78)	(-1.09)	(-0.66)	(-4.36)	(-2.94)	(-0.88)
Deposit money bank assets to GDP (%)	0.1033	-0.0183	0.1641	0.0168***	0.0182***	0.0149
	(1.53)	(-0.31)	(1.05)	(3.71)	(3.63)	(1.81)
Constant	0.5813***	0.5176***	0.5302*	0.0600***	0.0501***	0.0587***
	(4.61)	(3.66)	(2.48)	(8.29)	(6.30)	(5.30)
Diagnostic test						
No. of Observation	531	531	531	525	525	525
R^2	0.223	0.326	0.163	0.284	0.731	0.287
F-test	13.51***		9.20***	18.50***		18.75***
Wald chi2(11)		57.98***			240.22***	
Fixed effect	Y			Y		
Hausman test	46.96***			51.55***		
BP test: chi2(1)	452.83***			60.29***		
Wooldridge test for the first-order autocorrelation: F-test	1.332			53.219***		

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.20: *CBB, Liquidity1 (liquid assets-to-total assets), and DMD*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.0428	-0.1129	-0.0479	-0.0149***	-0.0165***	-0.0139**
	(-0.54)	(-1.95)	(-0.48)	(-3.81)	(-4.55)	(-2.71)
Capital adequacy ratio	0.9142*	0.7233**	1.5260***	-0.0283*	-0.0364*	-0.0584**
	(2.40)	(2.76)	(3.83)	(-2.05)	(-2.19)	(-2.86)
Commercial loans to total loans)	-0.3417***	-0.0538	0.0703	0.0183***	0.0164***	0.0008
	(-4.17)	(-0.78)	(0.72)	(5.30)	(3.46)	(0.17)
ROE	0.3261*	0.0767	0.0921	-0.0105	-0.0006	0.0040
	(2.49)	(0.90)	(0.98)	(-1.74)	(-0.14)	(0.91)
Management quality	2.1710**	1.5299**	3.5450***	0.0323	0.0605	0.0510
	(3.02)	(2.67)	(3.60)	(0.75)	(1.63)	(1.04)
Liquidity1 (liquid assets-to-total assets)	0.5330	-0.2738	-0.4642*	-0.0648***	-0.0458***	-0.0305**
	(1.67)	(-1.74)	(-2.10)	(-6.63)	(-5.41)	(-2.83)
Cross-border banking χ Liquidity1	-0.8336*	-0.0495	-0.1395	0.0236*	0.0256*	0.0109
	(-2.45)	(-0.27)	(-0.51)	(2.05)	(2.40)	(0.83)
LogTAssets_lag1: Lag (log of total assets)	-0.1024***	-0.0901***	-0.1406***	-0.0019*	-0.0018	-0.0011
	(-5.47)	(-4.04)	(-3.65)	(-2.13)	(-1.89)	(-0.55)
Inflation	-0.2041**	-0.2122***	-0.2794**	0.0113*	0.0100*	0.0067
	(-2.74)	(-3.50)	(-2.69)	(2.29)	(2.15)	(1.31)
Bureaucratic quality	-0.4409**	-0.1256	-0.1847	-0.0375***	-0.0246*	-0.0117
	(-2.75)	(-0.92)	(-0.69)	(-4.22)	(-2.54)	(-0.85)
Deposit money bank assets to GDP (%)	0.1666*	0.0075	0.1738	0.0154***	0.0196***	0.0145
	(2.21)	(0.13)	(1.13)	(3.39)	(4.15)	(1.77)
Constant	0.5569***	0.5292**	0.4270*	0.0676***	0.0582***	0.0597***
	(3.62)	(3.16)	(2.12)	(10.17)	(7.80)	(5.71)
Diagnostic test						
No. of Observation	531	531	531	525	525	525
R^2	0.221	0.338	0.160	0.286	0.739	0.288
F-test	13.35***		9.01***	18.64***		18.90***
Wald chi2(11)		64.30***			225.12***	
Fixed effect	Y			Y		
Hausman test	40.09***			38.49***		
BP test: chi2(1)	426.29***			55.72***		
Wooldridge test for first-order autocorrelation: F-test	1.226			55.367***		

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

When the study considers an alternative macroeconomic institutional quality and financial development measure, the results provided for bank capital are significant in some of the regressions but not consistent with the sign. (see Table 5.23- Table 5.26). When the CAMEL measure is non-performing loans, the study's findings reveal that only evidence of DMD via the quantity mechanism exists. The study finds this because the xtpcse results indicate that non-performing loans have a negative effect on bank deposit growth rate. This result is significant at the 5% level. It is not robust evidence, however (see Table 5.10).

When real estate loan concentration levels are considered as an asset quality measure, this study finds robust and consistent evidence across several regressions that real estate concentration levels cause a decrease in bank deposit growth whiles leading to an increase in bank deposit cost (see Table 5.12). This evidence supports a complete test for market discipline. This result means that bank concentration levels in real estate loans are perceived by depositors to be risky. This finding is consistent with those found on the pairwise correlation matrix in Table 5.9. This study also finds evidence of a complete test for market discipline when asset quality is measured using loan concentration levels in corporate loans. This result is economically significant and robust in significance level across all three regressions considered for measuring DMD (see Table 5.13).

Table 5.21: *CBB, Liquidity2 (Subordinated debts-to-total assets), and DMD.*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.0315	-0.0749	-0.0389	0.0051	0.0132	0.0056
	(-0.41)	(-1.28)	(-0.40)	(0.99)	(1.81)	(0.54)
Capital adequacy ratio	1.5700	2.1826	2.5779**	-0.0021	-0.0434	-0.0758
	(1.32)	(1.74)	(3.11)	(-0.04)	(-0.69)	(-1.32)
Commercial loans to total loans	0.0134	-0.0187	0.0787	0.0055	0.0117	-0.0150
	(0.17)	(-0.23)	(0.62)	(0.69)	(1.09)	(-1.26)
ROE	-0.0540	0.0465	-0.1383	0.0068	0.0022	0.0056
	(-0.41)	(0.38)	(-0.63)	(0.52)	(0.17)	(0.42)
Management quality	-1.4016	-0.7090	-1.7500	0.1378*	0.0076	0.1669
	(-1.56)	(-0.80)	(-1.35)	(2.01)	(0.06)	(1.38)
Liquidity2 (Subordinated debts-to-total assets)	-0.5614	-1.7557	-1.6685	0.3035	0.5693**	0.4023
	(-0.25)	(-0.74)	(-0.53)	(1.59)	(3.06)	(1.85)
Cross-border banking χ Liquidity2	0.5434	1.6788	1.6427	-0.3088	-0.5643**	-0.4014
	(0.24)	(0.72)	(0.52)	(-1.63)	(-2.99)	(-1.85)
Total assets	-0.0621	-0.0735***	-0.0622	-0.0005	-0.0066*	0.0006
	(-1.98)	(-3.47)	(-1.75)	(-0.26)	(-2.01)	(0.15)
Inflation	-0.2478*	-0.3163**	-0.3032	-0.0089	0.0131	0.0137
	(-2.06)	(-3.04)	(-1.78)	(-0.95)	(1.43)	(0.96)
Bureaucratic quality	0.0228	0.0588	0.0460	-0.0432**	-0.0191	-0.0170
	(0.13)	(0.44)	(0.16)	(-2.75)	(-1.05)	(-0.60)
Deposit money bank assets to GDP (%)	-0.0684	-0.0093	-0.1345	0.0290**	0.0259	0.0301
	(-0.59)	(-0.09)	(-0.91)	(3.27)	(1.72)	(1.85)
Constant	0.3627	0.3090*	0.3163	0.0339**	0.0458*	0.0307
	(1.74)	(2.32)	(1.34)	(2.99)	(2.46)	(1.31)
Diagnostic test						
No. of Observation	140	140	140	140	140	140
R^2	0.171	0.470	0.168	0.131	0.708	0.325
F-test	2.40***		2.35**	1.76		5.59***
Wald chi2(11)		93.01***			39.08***	
Random effect	Y			Y		
Hausman test	14.56			12.72		
BP test: chi2(1)	66.26***			12.29***		
Wooldridge test	30.577***			14.282***		

t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001

ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.22: *CBB, all macroeconomic measures and, DMD*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.2472***	-0.1086*	-0.0999	-0.0076***	-0.0087***	-0.0105*
	(-5.60)	(-2.50)	(-1.34)	(-3.64)	(-3.42)	(-2.55)
Capital adequacy ratio	0.5430	0.7145*	1.4356***	-0.0234	-0.0306	-0.0606**
	(1.52)	(2.51)	(3.59)	(-1.62)	(-1.84)	(-3.06)
Commercial loans to total loans	-0.3592***	-0.0220	0.0409	0.0201***	0.0187***	-0.0013
	(-4.55)	(-0.30)	(0.42)	(6.01)	(4.33)	(-0.27)
ROE	0.2894*	0.0255	0.0910	-0.0135*	-0.0007	0.0033
	(2.26)	(0.26)	(0.95)	(-2.26)	(-0.17)	(0.80)
Management quality	1.8408*	1.5406**	3.0309**	-0.0206	0.0125	0.0247
	(2.37)	(2.61)	(2.88)	(-0.53)	(0.32)	(0.48)
Liquidity1 (liquid assets to total assets)	0.0757	-0.3318**	-0.5636***	-0.0575***	-0.0331***	-0.0210**
	(0.55)	(-2.62)	(-3.90)	(-9.30)	(-4.99)	(-3.17)
Total assets	-0.0622**	-0.0675***	-0.1254**	-0.0022*	-0.0022	-0.0007
	(-3.28)	(-3.66)	(-3.25)	(-2.24)	(-1.93)	(-0.34)
Inflation	-0.1376	-0.2215**	-0.3106*	-0.0011	0.0040	0.0126*
	(-1.63)	(-2.85)	(-2.46)	(-0.21)	(0.89)	(2.08)
GNI per Capita	-0.4490***	-0.0810	-0.1608	0.0094*	0.0049	-0.0063
	(-4.96)	(-1.11)	(-1.24)	(2.20)	(0.70)	(-0.84)
GDP growth rate	-1.8340*	-0.2334	-0.4620	0.0186	-0.0504*	-0.0575**
	(-2.48)	(-0.52)	(-0.97)	(0.50)	(-2.24)	(-2.70)
Bureaucratic quality	-0.0153	0.0453	-0.0606	-0.0437***	-0.0257**	-0.0074
	(-0.09)	(0.36)	(-0.22)	(-4.64)	(-2.62)	(-0.52)
Deposit money bank assets to GDP (%)	0.3776***	0.0343	0.2367	0.0071	0.0104	0.0178
	(3.49)	(0.42)	(1.36)	(1.25)	(1.27)	(1.82)
Constant	1.9257***	0.6614*	0.9468*	0.0429***	0.0472*	0.0773***
	(6.47)	(2.01)	(2.38)	(3.83)	(2.57)	(3.45)
Diagnostic test						
No. of Observation	519	519	519	513	513	513
R^2	0.277	0.307	0.157	0.299	0.736	0.287
F-test	5.46***		7.83***	18.40***		16.78***
Wald chi2(11)		60.85***			227.55***	
Fixed effect						
Hausman test						

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.23: *CBB, Gross Domestic Product Growth rate, and DMD*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.2750***	-0.1401**	-0.1084	-0.0071***	-0.0084***	-0.0096*
	(-5.62)	(-3.09)	(-1.41)	(-3.56)	(-3.47)	(-2.36)
Capital adequacy ratio	0.7883*	0.7681*	1.4094***	-0.0280*	-0.0292	-0.0580**
	(2.03)	(2.50)	(3.48)	(-1.98)	(-1.83)	(-2.93)
Commercial loans to total loans	-0.3902***	-0.0317	0.0497	0.0201***	0.0173***	-0.0008
	(-4.55)	(-0.44)	(0.50)	(5.74)	(3.71)	(-0.16)
ROE	0.3224*	0.0285	0.0845	-0.0139*	-0.0004	0.0037
	(2.29)	(0.29)	(0.88)	(-2.32)	(-0.10)	(0.87)
Management quality	2.4139**	1.4465*	3.3929**	-0.0320	0.0101	0.0264
	(2.92)	(2.06)	(3.20)	(-0.85)	(0.27)	(0.52)
Liquidity1 (liquid assets to total assets)	0.0941	-0.1965	-0.4746***	-0.0566***	-0.0362***	-0.0245***
	(0.70)	(-1.93)	(-3.37)	(-9.67)	(-6.24)	(-3.80)
Total assets	-0.1026***	-0.0886***	-0.1538***	-0.0014	-0.0014	-0.0004
	(-5.35)	(-3.43)	(-3.97)	(-1.67)	(-1.68)	(-0.19)
Gross Domestic Product Growth Rate	-0.8288	-0.2143	-0.3009	0.0062	-0.0516*	-0.0645**
	(-1.23)	(-0.52)	(-0.64)	(0.17)	(-2.18)	(-3.05)
Bureaucratic quality	-0.4030*	-0.0906	-0.1697	-0.0355***	-0.0231*	-0.0109
	(-2.49)	(-0.53)	(-0.62)	(-4.05)	(-2.47)	(-0.81)
Deposit money bank assets to GDP (%)	0.1121	-0.0269	0.1435	0.0136**	0.0170***	0.0135
	(1.43)	(-0.40)	(0.92)	(3.04)	(3.31)	(1.66)
Constant	0.7345***	0.5124*	0.5030*	0.0664***	0.0588***	0.0602***
	(5.08)	(2.55)	(2.48)	(10.55)	(7.91)	(5.90)
Diagnostic test						
No. of Observation	519	519	519	513	513	513
R^2	0.207	0.320	0.144	0.291	0.739	0.283

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.24: *CBB, Real Gross Domestic Product Growth rate, DMD.*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.2627***	-0.1298**	-0.0936	-0.0081***	-0.0106***	-0.0105*
	(-5.42)	(-2.97)	(-1.23)	(-3.67)	(-4.34)	(-2.53)
Capital adequacy ratio	0.7600	0.7847**	1.4498***	-0.0241	-0.0315*	-0.0601**
	(1.96)	(2.67)	(3.61)	(-1.67)	(-1.98)	(-2.98)
Commercial loans to total loans	-0.3829***	-0.0225	0.0655	0.0204***	0.0167***	-0.0001
	(-4.49)	(-0.33)	(0.66)	(5.72)	(3.64)	(-0.02)
ROE	0.2498	0.0170	0.0648	-0.0076	0.0012	0.0043
	(1.91)	(0.20)	(0.69)	(-1.26)	(0.28)	(1.00)
Management quality	1.7327*	1.2246	3.2686**	0.0552	0.0789*	0.0611
	(2.55)	(1.92)	(3.30)	(1.18)	(1.96)	(1.25)
Liquidity 2 (Subordinated debts-to-total assets)	0.0692	-0.2037*	-0.5022***	-0.0539***	-0.0345***	-0.0252***
	(0.53)	(-2.07)	(-3.61)	(-9.20)	(-5.73)	(-3.85)
Total assets	-0.0991***	-0.0869***	-0.1518***	-0.0020*	-0.0018*	-0.0009
	(-5.30)	(-3.44)	(-3.90)	(-2.30)	(-2.06)	(-0.44)
Real Gross Domestic Product Growth Rate	-0.3538	0.0001	-0.0769	-0.0284	-0.0758**	-0.0753***
	(-0.51)	(0.00)	(-0.16)	(-0.74)	(-3.14)	(-3.34)
Bureaucratic quality	-0.3989*	-0.1051	-0.1336	-0.0384***	-0.0252**	-0.0091
	(-2.52)	(-0.63)	(-0.49)	(-4.26)	(-2.74)	(-0.66)
Deposit money bank assets to GDP (%)	0.0979	-0.0185	0.1528	0.0161***	0.0170***	0.0113
	(1.31)	(-0.29)	(0.97)	(3.54)	(3.57)	(1.34)
Constant	0.7480***	0.4989*	0.4593*	0.0644***	0.0602***	0.0628***
	(5.22)	(2.50)	(2.27)	(10.02)	(7.80)	(5.98)
Diagnostic test						
No. of Observation	531	531	531	525	525	525
R^2	0.193	0.327	0.149	0.271	0.744	0.292

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.25: *CBB, GNI per Capita, and DMD*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.2554***	-0.0087***	-0.1089*	-0.0117***	-0.1032	-0.0111**
	(-5.70)	(-3.82)	(-2.24)	(-4.66)	(-1.38)	(-2.68)
Capital adequacy ratio	0.5521	-0.0195	0.7351**	-0.0254	1.4304***	-0.0569**
	(1.50)	(-1.35)	(2.68)	(-1.59)	(3.59)	(-2.80)
Commercial loans to total loans)	-0.3788***	0.0201***	-0.0266	0.0182***	0.0546	0.0008
	(-4.70)	(5.75)	(-0.32)	(3.91)	(0.56)	(0.17)
ROE	0.2035	-0.0069	-0.0270	0.0011	0.0603	0.0046
	(1.64)	(-1.13)	(-0.27)	(0.26)	(0.64)	(1.05)
Management quality	0.9508	0.0643	1.4495*	0.0803	2.9597**	0.0485
	(1.50)	(1.37)	(2.28)	(1.88)	(2.98)	(0.97)
Liquidity1(liquid assets/total assets)	0.1129	-0.0539***	-0.2812*	-0.0330***	-0.5039***	-0.0249***
	(0.87)	(-9.29)	(-2.37)	(-5.45)	(-3.64)	(-3.75)
Total assets	-0.0604**	-0.0027**	-0.0690***	-0.0026*	-0.1375***	-0.0004
	(-3.15)	(-2.65)	(-3.38)	(-2.24)	(-3.52)	(-0.19)
GNI per capita	-0.4177***	0.0075	-0.1121	0.0088	-0.1670	-0.0072
	(-4.83)	(1.74)	(-1.76)	(1.38)	(-1.30)	(-0.96)
Bureaucratic quality	-0.0705	-0.0455***	0.1051	-0.0318**	-0.0330	-0.0080
	(-0.43)	(-4.71)	(0.73)	(-3.21)	(-0.12)	(-0.54)
Deposit money bank assets to GDP (%)	0.3876***	0.0117*	0.0581	0.0101	0.2623	0.0203*
	(3.79)	(2.03)	(0.68)	(1.33)	(1.50)	(2.05)
Constant	1.7896***	0.0444***	0.7033*	0.0344*	0.9077*	0.0769***
	(6.41)	(3.97)	(2.27)	(1.99)	(2.30)	(3.44)
Diagnostic test						
No. of Observation	531	525	531	525	531	525
R^2	0.249	0.275	0.294	0.734	0.150	0.282

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.26: *CBB, all institutional quality measures, and DMD*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.2574***	-0.0086***	-0.1139*	-0.0112***	-0.1051	-0.0118**
	(-5.76)	(-3.73)	(-2.35)	(-4.36)	(-1.40)	(-2.80)
Capital adequacy	0.5457	-0.0194	0.8131**	-0.0247	1.4277***	-0.0577**
	(1.44)	(-1.28)	(2.90)	(-1.49)	(3.59)	(-2.84)
Commercial loans to total loans)	-0.3642***	0.0195***	-0.0271	0.0180***	0.0579	0.0008
	(-4.61)	(5.51)	(-0.33)	(3.77)	(0.59)	(0.17)
ROE	0.2115	-0.0072	-0.0237	0.0008	0.0609	0.0046
	(1.71)	(-1.17)	(-0.23)	(0.18)	(0.64)	(1.08)
Management quality	1.1251	0.0583	1.5684*	0.0755	3.0562**	0.0569
	(1.60)	(1.26)	(2.40)	(1.91)	(3.06)	(1.13)
Liquidity1 (liquid assets to total assets)	0.1141	-0.0539***	-0.2457*	-0.0321***	-0.5003***	-0.0235***
	(0.87)	(-9.29)	(-2.03)	(-5.30)	(-3.60)	(-3.56)
Total assets	-0.0601**	-0.0026**	-0.0707***	-0.0027*	-0.1378***	-0.0010
	(-3.15)	(-2.62)	(-3.45)	(-2.26)	(-3.50)	(-0.43)
GNI per capita	-0.4532***	0.0083*	-0.1543	0.0095	-0.1920	-0.0101
	(-4.88)	(2.00)	(-1.88)	(1.40)	(-1.46)	(-1.30)
Bureaucratic quality	0.0116	-0.0479***	0.0953	-0.0314**	0.0312	-0.0054
	(0.07)	(-4.73)	(0.73)	(-2.75)	(0.11)	(-0.36)
Quality of contract enforcement	-0.0838	0.0032	0.1952	-0.0070	-0.1339	0.0273
	(-0.35)	(0.16)	(0.92)	(-0.37)	(-0.31)	(1.21)
Legal efficiency	0.2613	-0.0090	0.2407	-0.0033	0.2784	0.0350*
	(1.49)	(-0.72)	(1.51)	(-0.28)	(0.97)	(2.42)
Deposit money bank assets to GDP (%)	0.3912***	0.0119*	0.0781	0.0102	0.2589	0.0186
	(3.80)	(2.11)	(0.85)	(1.26)	(1.49)	(1.84)
Constant	1.1779*	0.0660	0.0427	0.0454	0.2601	-0.0254
	(2.14)	(1.55)	(0.10)	(1.19)	(0.28)	(-0.52)
Diagnostic test						
No. of Observation	531	525	531	525	531	525
R^2	0.255	0.277	0.299	0.729	0.153	0.284

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

When asset quality is consumption loans, this study finds that this risk measure significantly but negatively impacts bank deposit cost. In this regard, consumption loans may be safe loans. This study does not find any evidence of DMD when asset quality is measured as loan loss allowance (see Table 5.14). When asset quality is nonperforming loans, the study finds no evidence to support DMD (see Tables: 5.10, 5.11, 5.16, 5.17, 5.18). Table 5.19, Table 5.20, and Table 5.22, Table 5.23, Table 5.25, Table 5.26, Table 5.27 provide further evidence that corporate loan concentration level decreases deposit growth and increases bank cost. Table 5.25, Table 5.26, and Table 5.27 provide significant but inconsistent results. On these tables, the variables that make them different is that they reflect other: macroeconomic variables, institutional quality variable, and financial development variables. For example, in Table 5.27, the regressions give different and inconsistent results on DMD when the CAMEL measure is corporate loan concentration level. The macroeconomic variable is LGNI/capita and not inflation, as seen in previous regressions.

Based on Table 5.10 and Table 5.11, this study finds that ROA leads to a reduction in bank deposit cost. This evidence is robust and significant. It is, however, not consistent with the literature. Banks with higher earnings are perceived to be safer, and so depositors are likely to take this safety feature of a bank and demand less interest rate on their deposits. It, however, appears that in spite of the safety high profits bring to the status of a bank in the literature, here, depositors do not associate high profits with safety. And so, they see no need to reward such banks by accepting low interests on deposits. Table 5.12 and Table 5.13 provide robust evidence-based on ILS and xtpse that ROA leads to increased bank deposit growth. Table 5.12 provides significant evidence that ROA increases bank deposit costs. The evidence is, however, not robust across other estimations.

Table 5.27: *CBB, quality of contract enforcement and DMD.*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.2336***	-0.0099***	-0.1318***	-0.0097***	-0.1101	-0.0109**
	(-5.98)	(-4.71)	(-3.51)	(-4.37)	(-1.58)	(-2.72)
Capital adequacy ratio	0.6255	-0.0268*	0.8224***	-0.0268	1.7309***	-0.0546**
	(1.87)	(-1.97)	(3.33)	(-1.73)	(4.64)	(-3.11)
Commercial loans to total loans	-0.2919***	0.0215***	0.0081	0.0158***	0.0238	0.0000
	(-3.78)	(6.54)	(0.11)	(3.91)	(0.27)	(0.01)
ROE	0.1178	-0.0054	-0.0503	0.0024	-0.0284	0.0028
	(1.01)	(-0.92)	(-0.50)	(0.64)	(-0.31)	(0.75)
Management quality	0.6539	0.0595	1.5622*	0.0615	3.1245**	0.0376
	(1.01)	(1.29)	(2.51)	(1.49)	(3.19)	(0.81)
Liquidity1(liquid assets total assets)	-0.0486	-0.0482***	-0.3920***	-0.0311***	-0.5533***	-0.0247***
	(-0.37)	(-8.88)	(-3.44)	(-5.61)	(-4.16)	(-4.22)
Total assets	-0.0683***	-0.0019*	-0.0898***	-0.0006	-0.1496***	-0.0011
	(-3.83)	(-2.24)	(-5.41)	(-0.62)	(-4.12)	(-0.52)
GNI per capita	-0.3672***	0.0013	-0.0650	-0.0019	-0.1161	-0.0082
	(-4.58)	(0.39)	(-0.87)	(-0.51)	(-1.03)	(-1.24)
Quality of contract enforcement	-0.5467**	0.0088	-0.4623	-0.0092	-0.3945	-0.0072
	(-2.68)	(0.81)	(-1.54)	(-0.84)	(-1.16)	(-0.40)
Deposit money bank assets to GDP (%)	0.6883**	0.0658**	0.3713	0.0454**	0.3575	0.0243
	(2.88)	(3.21)	(1.64)	(3.20)	(0.70)	(0.97)
Private credit by deposit money banks to GDP (%)	0.2804	-0.0439	0.2999	-0.0330	-0.6525	-0.0619
	(0.86)	(-1.87)	(1.03)	(-1.30)	(-0.97)	(-1.84)
Bank deposits to GDP (%)	-0.6876	-0.0382	-0.6147*	-0.0086	0.4453	0.0324
	(-1.92)	(-1.34)	(-2.16)	(-0.44)	(0.69)	(1.05)
Bank credit to bank deposits (%)	-0.1636	0.0169	-0.2301	0.0193	0.2001	0.0582***
	(-1.00)	(1.48)	(-1.81)	(1.72)	(0.61)	(3.63)
Constant	2.1147***	0.0332	1.1157**	0.0417*	0.8253	0.0449
	(6.31)	(1.95)	(2.78)	(2.51)	(1.70)	(1.76)
Diagnostic test						
No. of Observation	635	628	635	628	635	628
R^2	0.230	0.259	0.331	0.755	0.167	0.287

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

When ROE measures bank profitability, the study finds that ROE causes bank deposit to increase, and causes bank deposit costs to increase (see Table 5.18). When the study considers macroeconomic measures other than inflation, the study finds that ROE causes deposits to increase and bank deposit cost to reduce (see Table 5.22 and Table 5.23).

As discussed earlier in Chapter Three, this study also uses management quality as a CAMEL measure. This study finds robust evidence across all three estimators, ILS, xtpcse, and prais, that an increase in banks overhead expenses lead to a rise in deposit growth (see Table 5.10, Table 5.11, Table 5.14, Table 5.16, Table 5.17, Table 5.18, Table 5.20, Table 5.21, Table 5.23, Table 5. 24). The study also finds robust evidence that the bank's overhead expenses cause its bank deposit cost also to increase (see Table 5.11- Table 5.27). In line with theory, an increasing bank overhead expense may be a sign of quality in service provision. If this is so, then it is expected that the overhead expenses ratio will positively affect the deposit growth rate but negatively affect bank deposit cost. These results, however, only provide evidence of DMD via the quantity mechanism.

Across several estimations (see Table 5.10- Table 5.20 and Table 5.22- Table 5.27), this study finds that Liquidity 1, as measured by the ratio of liquid assets to total assets, reduces bank deposits cost. This evidence is robust and economically significant. When banks in Africa increase their liquidity levels, it causes their interest cost on deposits to reduce.

However, this study finds robust evidence that as the liquidity levels of banks increase, it causes their deposit growth rate to reduce. This robust and economically significant finding is, however, not consistent with DMD literature.

When Liquidity 2 is considered as an alternative measure of liquidity, it is seen to have a positive impact on bank deposit cost. Liquidity 2 is subordinated debt to total assets ratio. And so perhaps it has a positive effect on bank deposit cost because of bond safety issues. This evidence is not, however, robust in other estimations (see Table 5.21). Altogether this study finds robust evidence of DMD for bank liquidity as a CAMEL measure, only when DMD is measured as bank deposit cost. To this effect, DMD via a complete test is not found. When another bank fundamental is assessed in addition to the CAMEL measures, this study finds that, on a consistent and significant base, bank asset size leads to a reduction in deposit growth rate. Perhaps this could be evidence of the too–big–to–save policy at work. The effect bank size has on bank costs is found to be negative. This means that as banks increase their asset size, it causes a reduction in their deposit cost. This evidence is consistent from Table 5.10-Table 5.27. It is, however, not consistent in all the regressions.

Consistent with the literature, this study finds that inflation causes a decrease in bank deposit growth rate (see Table 5.13, Table 5.19). Correspondingly, this study finds that inflation causes an increase in bank deposit costs (see Table 5.13, Table 5.19, Table 5.20, and Table 5.22). This finding is robust across two different types of regressions ILS and prais. When the GDP growth rate is used as a macroeconomic variable, this study finds that GDP growth rate causes a significant

negative impact on bank deposit growth rate and bank deposit cost. The finding of a negative effect of GDP growth rate on bank deposit cost is robust across two different regressions. It is also statistically significant. The negative impact of GDP growth rate on the bank deposit cost variable is not robust, and it is significant at the 10% level. Where the macroeconomic variable is the real GDP growth rate, this study finds that it has a significant effect of causing a reduction in bank deposit cost (see Table 5.25). This finding is consistent with the literature. No evidence exists in Table 5.24 on the impact real GDP growth rate has on the bank deposit growth rate. Unexpectedly, this study finds that the GNI per capita negatively affects the bank deposit growth rate. This result is significant at the 1% level and robust across other estimators (see table 5.22 and Table 5.25). This study also finds significant evidence that GNI/Capita increases bank deposit costs. This finding is contrary to expectation. The evidence is, however, not robust (see Table 5.22).

Generally, as the institutional quality increases, it is expected to enhance deposit growth and reduce bank deposit costs. This study, therefore, finds that, when institutional quality is proxied by bureaucratic quality, it causes deposits to grow. Simultaneously, bureaucratic quality causes bank cost also to grow (see Table 5.10, Table 5.11, Table 5.15, Table. 5.16, Table 5.17, and Table 5.18. However, on Tables 5.13, Table 5.14, Table 5.19, Table 5.20, Table 5.23- Table 5.26, bureaucratic quality causes a reduction in both deposits of banks and deposit costs. These differences arise as a result of the usage of alternative CAMEL measures and the use of different macroeconomic indicators. The effect bureaucratic quality has on bank deposit growth, and bank deposit cost indicates that certain conditions need to be met before bureaucratic quality as an institutional quality measure can influence DMD. When a country's institutional quality is measured based on the quality of contract enforcement, this study finds that it reduces the bank

deposit growth rate. This evidence is statistically significant at the 5% level. It is, however, not robust across other estimations.

When the study's financial development measure is deposit money bank assets to GDP (%); the estimations show that, in some regressions, deposit money bank assets to GDP (%) positively affects both bank deposit cost and bank deposit growth rate. In other estimations, deposit money bank assets to GDP (%) has a simultaneous impact of decreasing bank deposit cost and bank deposit growth rate. When financial development is private credit by deposit money banks to GDP (%), the study does not find any evidence to this effect. When financial development is bank deposits to GDP (%), this study finds that it has a negative effect on bank deposit growth. The study does not find any effect of this variable on bank deposit costs. When financial development is bank credit to bank deposits (%), this study finds that it has a positive economic significance on bank deposit cost. This result is not robust, however.

A Complete Test for DMD within the CBB context of Africa

This study assesses the effect of bank risk on DMD within the CBB context by estimating equations (15) and equations (16). The cross-border banking variable across all the regressions, from Table 5.10- Table 5.27, consistently lead to a reduction in bank deposit growth.

Contrary to the DMD hypothesis but consistent with the regulatory hypothesis, the study also finds CBB leads to a decrease in bank deposit cost This result is significant at the 1% level and robust across other estimators. In line with the regulatory hypothesis, when banks are highly leveraged,

they are directed by their regulators to reduce their leverage levels. They tend to offer low interest on deposits, which then negatively impacts their deposit mobilization rate. To ascertain the behaviour of depositors towards risk but in the presence of CBB, the study interacted with CBB with CAMEL measures. The results shown above are in line with the study's expectation, In the presence of CBB, capital adequacy levels have a positive effect on bank deposit growth whiles it reduces bank deposit cost (see Table 5.10). This evidence, although statistically significant, is only robust for DMD via the price-based mechanism. When non-performing loans and real estate loan concentration level are considered sequentially in the model, the study finds that both measures cause bank deposit costs to reduce. This evidence is, however, not robust (see Table 5.11 and Table 5.12).

Table 5.13 shows robust evidence that within the CBB context, as corporate loan concentration increase, it leads to an increase in bank deposit growth. Depositors may be viewing corporate loans as safe loans in the presence of CBB growth. The negative effect corporate loans have on bank deposit costs confirms this. Altogether this study finds evidence of a complete test for DMD. The study thus concludes that depositors see corporate loan concentration levels as safe loans. So depositors react by increasing their deposits and demanding less in deposit interest payments. When a consumption loan concentration level interacts with CBB, this study does not find any evidence that it affects the deposit growth rate. However, the study finds that it leads to a reduction in bank deposit costs. This evidence is significant at the 1% level and robust in not just ILS but also xtpcse. This negative relationship implies that depositors may be holding the opinion that consumer loan concentration levels are safe loans with limited credit risk due to their short tenure. Such loans, however, have no security attached to them. This study does not find any evidence on

the effect bank risk has on DMD in the presence of CBB; when CBB interacts with loan loss allowance, non-performing loans to equity ratio and ROA (see Table 5.15, Table 5.16, Table 5.17 respectively).

When CBB interacts with management quality, this study finds that bank overhead expenses reduce deposit growth. This finding is consistent with the literature. Unlike the general case, whereby management quality leads to an increase in bank deposit growth, for CBB, an increase in management quality is perceived as a sign of inefficiency, leading to a reduction in deposit growth. To complete this thought, the impact of the management quality variable should have been positive and significant for the deposit cost variable. The study does not, however, find any evidence to support this (see Table 5.23).

Contrary to the DMD theory, when the study's CAMEL liquidity measures, liquid assets to total assets and subordinated debt to total assets, interact with CBB, the results show that both measures positively affect bank deposit cost. The evidence from liquid assets to total assets ratio is robust. When the study considers the effect of the two liquidity measures on bank deposit growth, the results show the following. The interaction of the ratio of liquid assets to total assets and CBB leads to a reduction in bank deposit growth. This result is unexpected. It is also not robust. The study does not find evidence on the effect of subordinated debt to total assets ratio, and CBB has on bank deposit growth.

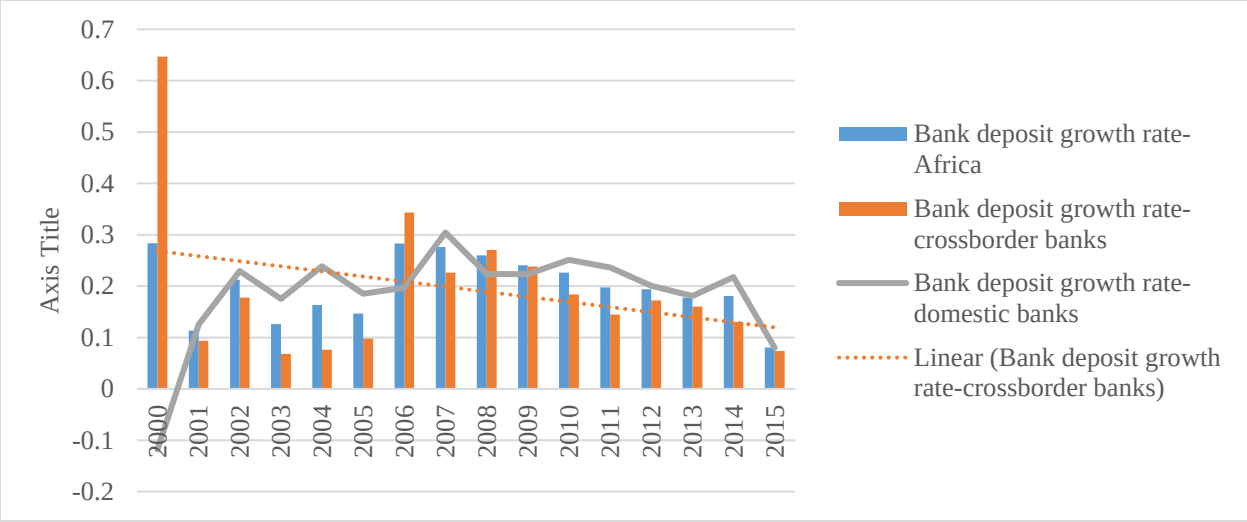


Figure 5.22: Trend analysis of bank deposit cost ratio of banks in Africa.

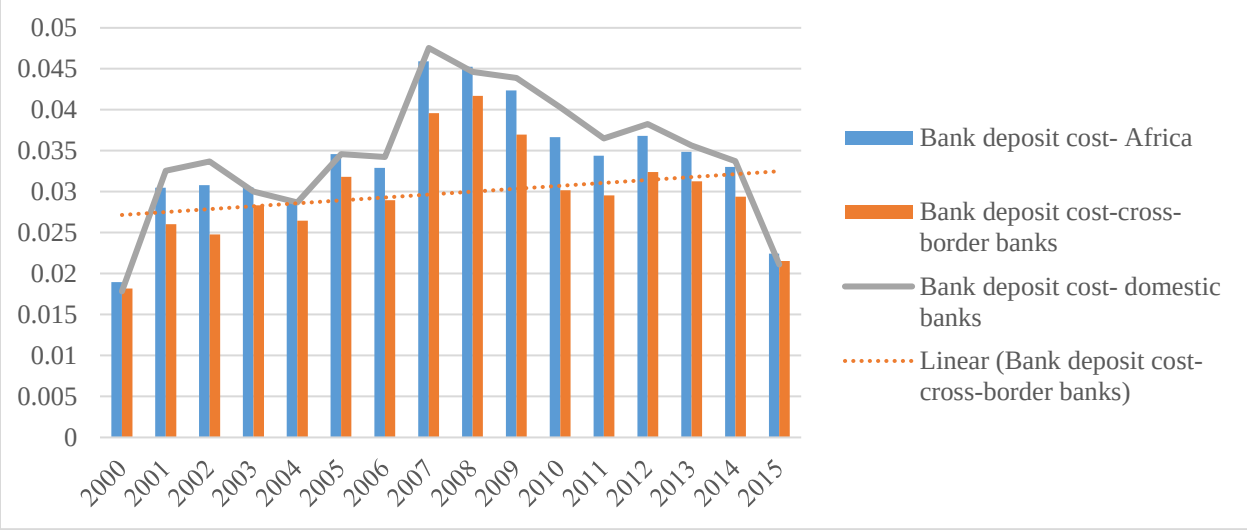


Figure 5.23: Trend analysis of bank deposit cost ratio of banks in Africa.

5.4 The Incentives for DMD Especially within the Cross-border Banking Context

This study identified from banking literature on DMD that EDI, bank asset size, and bank capital serve as incentives for depositors to monitor banks' risk. This section of the study presents

regression results on the ability of depositors to discipline bank risk in the presence of CBB and these incentives. This study discusses the results next.

EDI as an Incentive for Depositors to Monitor and Discipline Risky Banks Especially within the Cross-border Banking Context

The study estimates the ability of depositors to monitor bank risk in the presence of CBB and explicit deposit insurance (EDI). This study expects that when both CBB and EDI exists, depositors will not be able to monitor bank risk. Figure 5.24 shows that about a third of the banks used in the study operated within EDI countries.

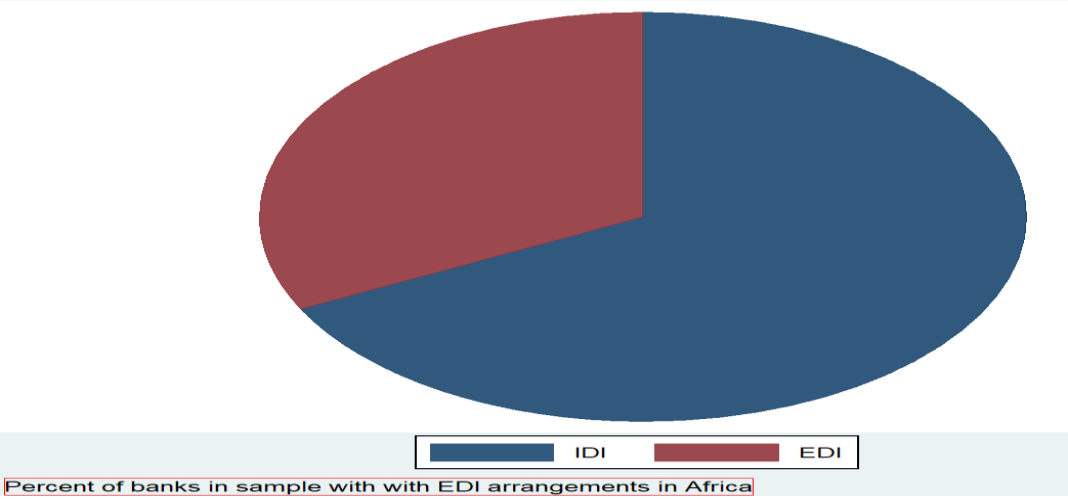


Figure 5.24: Percent of banks in the study sample with explicit deposit insurance (EDI) arrangements in Africa

In this section, the study focuses on the risk measures depositors reacted to, in the presence of CBB, in earlier sections. These risk measures are the capital adequacy ratio and the ratio of corporate loans to total loans ratio. This study finds from Table 5.28 that in the presence of CBB and EDI, the capital adequacy ratio does not affect depositor monitoring via a price-based mechanism. However, the study finds evidence that this relationship leads to an increase in bank

Table 5.28: *CBB, EDI, Capital-to-assets ratio and DMD.*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.3281***	-0.1375*	-0.1830*	-0.0108***	-0.0144***	-0.0114*
	(-5.53)	(-2.37)	(-2.24)	(-3.99)	(-4.29)	(-2.57)
Explicit deposit insurance	-0.2901***	-0.1746**	-0.2222**	-0.0101***	-0.0099**	-0.0070
	(-4.86)	(-2.81)	(-2.75)	(-3.47)	(-3.04)	(-1.68)
Capital adequacy ratio	0.6770	1.0193**	1.2013**	-0.0249	-0.0375*	-0.0533*
	(1.74)	(2.93)	(2.89)	(-1.66)	(-2.06)	(-2.47)
Cross-border banking χ Non-performing loans χ EDI	1.0451*	-0.2464	1.8404*	0.0115	0.0269	-0.0198
	(2.49)	(-0.55)	(2.56)	(0.62)	(1.13)	(-0.53)
Corporate/commercial loans	-0.2717***	-0.0008	0.0732	0.0231***	0.0197***	0.0013
	(-3.65)	(-0.01)	(0.76)	(6.50)	(3.99)	(0.28)
ROE	0.2139	0.0230	0.0820	-0.0129*	0.0021	0.0036
	(1.78)	(0.29)	(0.87)	(-2.24)	(0.45)	(0.84)
Management quality	1.1655	0.7553	3.1646**	0.0007	0.0496	0.0382
	(1.79)	(1.34)	(3.22)	(0.02)	(1.27)	(0.78)
Liquidity1(liquid assets-to-total assets)	-0.1011	-0.2793**	-0.5715***	-0.0532***	-0.0309***	-0.0247***
	(-0.81)	(-2.86)	(-4.13)	(-8.66)	(-4.86)	(-3.70)
Total assets	-0.1124***	-0.0851***	-0.1506***	-0.0026**	-0.0030**	-0.0017
	(-6.17)	(-3.54)	(-3.97)	(-2.89)	(-2.82)	(-0.80)
Inflation	-0.3180***	-0.2586***	-0.2984**	0.0091	0.0098	0.0064
	(-3.98)	(-3.72)	(-2.90)	(1.91)	(1.89)	(1.25)
Bureaucratic quality	-0.3248*	0.0235	-0.2551	-0.0320***	-0.0217*	-0.0104
	(-2.05)	(0.14)	(-0.95)	(-3.35)	(-2.19)	(-0.76)
Deposit money bank assets to GDP (%)	-0.0617	-0.2115**	0.1441	0.0083	0.0121*	0.0107
	(-0.79)	(-2.78)	(0.93)	(1.56)	(2.26)	(1.29)
Constant	1.0087***	0.6539**	0.6773**	0.0725***	0.0649***	0.0643***
	(6.38)	(2.99)	(3.23)	(10.65)	(7.47)	(5.83)
Diagnostic test						
No. of Observation	531	531	531	525	525	525
R^2	0.251	0.363	0.173	0.304	0.740	0.297
F-test	5.46***		9.04***	18.82***		18.04***
Wald chi2(11)		66.56***			225.19***	
Fixed effect	Y			Y		
Hausman test	48.77			39.45		

t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.29: *CBB, EDI, real estate loans, and DMD*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.1303***	-0.1591***	-0.1333*	-0.0170***	-0.0240***	-0.0176*
	(-3.45)	(-4.89)	(-2.37)	(-4.35)	(-5.85)	(-2.57)
Explicit deposit insurance	-0.1525***	-0.1615***	-0.1878**	-0.0122*	-0.0146**	-0.0083
	(-3.65)	(-4.14)	(-2.63)	(-2.11)	(-2.87)	(-0.85)
Capital adequacy ratio	0.9251*	0.9935**	1.7443***	0.0709	0.0265	-0.0345
	(2.57)	(2.93)	(4.38)	(1.69)	(0.83)	(-1.32)
Real estate loans	-0.2646*	-0.3586***	-0.4289**	0.0390**	0.0595**	0.0246
	(-2.54)	(-4.32)	(-2.77)	(2.66)	(2.85)	(1.41)
Cross-border banking χ Real estate loans χ Explicit deposit insurance	1.9525	2.5751**	3.0314**	0.0582	0.0401	-0.0652
	(1.80)	(2.76)	(2.75)	(0.77)	(0.74)	(-0.52)
ROE	0.0790*	0.1487***	0.1225**	-0.0179*	-0.0029	0.0036
	(2.50)	(5.25)	(2.83)	(-2.58)	(-0.66)	(1.36)
Management quality	-0.2806	0.7234	0.2541	-0.1256	0.0344	-0.0120
	(-0.59)	(1.27)	(0.36)	(-1.53)	(0.74)	(-0.17)
Liquidity1(liquid assets-to-total assets)	-0.0789	-0.2743*	-0.5054**	-0.0506***	-0.0408***	-0.0236*
	(-0.73)	(-2.41)	(-3.19)	(-3.67)	(-4.04)	(-2.25)
Total assets	-0.0275	-0.0383**	-0.0382	-0.0030	-0.0011	-0.0030
	(-1.75)	(-3.02)	(-1.42)	(-1.81)	(-0.68)	(-0.78)
Inflation	-0.3131**	-0.3231***	-0.4481***	0.0066	-0.0037	-0.0063
	(-2.94)	(-4.41)	(-4.28)	(0.84)	(-0.52)	(-0.73)
Bureaucratic quality	0.1264	0.1566	0.0346	0.0168	0.0190	0.0433*
	(0.93)	(0.90)	(0.18)	(1.20)	(1.39)	(2.09)
Deposit money bank assets to GDP (%)	-0.2887***	-0.2523**	-0.2775*	-0.0325***	-0.0258***	-0.0277
	(-3.81)	(-2.64)	(-2.45)	(-4.41)	(-4.11)	(-1.93)
Constant	0.4698***	0.4947***	0.5536**	0.0863***	0.0756***	0.0774***
	(4.17)	(5.08)	(3.30)	(6.50)	(7.18)	(4.10)
Diagnostic test						
No. of Observation	229	229	229	230	230	230
R^2	0.225	0.460	0.303	0.404	0.700	0.374
F-test	3.58***		7.82***	7.07***		10.80***
Wald chi2(11)		117.49***			129.35***	
Fixed effect						
Hausman test						

t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001

ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

deposit growth. This evidence is robust but significant, at 10%. The study records a similar reaction by depositors when CBB only interacts with capital adequacy as a CAMEL measure under the third hypothesis of the study. The study does not find any evidence on the impact risk has on depositor monitoring in the presence of EDI and CBB.

In Table 4.29, the study finds that, when the ratio of real estate loans to total loans (Realloans) as CBB risk measure interacts with EDI, it leads to an increase in bank deposit growth rate. This evidence is statistically significant and robust. When the ratio of real estate loans to total loans interacts with only CBB, no evidence is found of DMD via bank deposit growth rate. With CBB, real estate loans, and EDI interacting, depositors perceive this relationship to be safe and so, deposit growth is positively affected.

No evidence of the effect of DMD via bank deposit cost is found of DMD when the ratio of real estate loans to total loans of CBB interacts with EDI. In earlier estimation, the interaction of CBB and commercial loan lead to a reduction in bank deposit cost. However, Table 5.30 shows that in the presence of EDI and CBB, bank risk leads to an increase in bank deposit costs. This result is statistically significant but not robust across other techniques.

Table 5.30: *CBB, EDI, and consumption loan to total loans ratio, and DMD.*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.0925	-0.1704**	-0.0914	-0.0152***	-0.0158***	-0.0145**
	(-1.86)	(-2.70)	(-1.82)	(-4.40)	(-4.47)	(-2.83)
Explicit deposit insurance	-0.0763	-0.1516*	-0.0640	-0.0137**	-0.0153***	-0.0104*
	(-1.30)	(-2.55)	(-1.03)	(-3.26)	(-4.25)	(-2.31)
Capital adequacy ratio	0.1862	0.6613	0.4176	-0.0234	-0.0334*	-0.0212
	(0.63)	(1.52)	(1.10)	(-1.31)	(-2.01)	(-1.01)
Consumption loans	-0.0313	-0.0024	-0.0018	-0.0425***	-0.0305***	-0.0142*
	(-0.26)	(-0.02)	(-0.02)	(-6.57)	(-5.20)	(-2.31)
Cross-border banking χ Consumption loans χ Explicit deposit insurance	0.1191	0.4077	0.1028	0.0239	0.0267**	0.0085
	(0.38)	(1.61)	(0.45)	(1.79)	(2.62)	(0.82)
ROE	-0.0645	-0.0329	-0.0273	-0.0006	0.0016	0.0010
	(-0.86)	(-0.53)	(-0.51)	(-0.21)	(0.89)	(0.49)
Management quality	0.7490	1.0251	1.4526	-0.0437	0.0014	-0.0342
	(0.99)	(1.33)	(1.73)	(-0.75)	(0.03)	(-0.77)
Liquidity1 (liquid assets to total assets)	0.0758	-0.0302	-0.0145	-0.0526***	-0.0331***	-0.0222**
	(0.59)	(-0.21)	(-0.10)	(-7.23)	(-4.70)	(-2.79)
Total assets	-0.0445*	-0.0328	-0.0589*	-0.0020	-0.0030*	-0.0022
	(-2.07)	(-1.27)	(-2.55)	(-1.66)	(-2.23)	(-0.93)
Inflation	-0.1247	-0.2534**	-0.1662	0.0023	0.0063	0.0037
	(-1.62)	(-3.23)	(-1.76)	(0.40)	(1.16)	(0.65)
Bureaucratic quality	0.1667	0.2018	0.1483	-0.0317*	-0.0237**	-0.0099
	(0.93)	(1.08)	(0.75)	(-2.50)	(-2.69)	(-0.76)
Deposit money bank assets to GDP (%)	-0.1211	-0.1999*	-0.0694	-0.0025	0.0052	0.0049
	(-1.64)	(-2.33)	(-0.65)	(-0.39)	(1.03)	(0.54)
Constant	0.3698**	0.4172*	0.3402*	0.1016***	0.0919***	0.0764***
	(2.84)	(2.53)	(2.06)	(9.94)	(10.13)	(6.37)
Diagnostic test						
No. of Observation	447	447	447	449	449	449
R^2	0.059	0.226	0.067	0.253	0.709	0.281
F-test	1.88**		2.62***	8.07***		14.17***
Wald chi2(11)		42.70***			88.50***	
Fixed effect	Y			Y		
Hausman test	57.50***			88.10***		

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.31 shows that in the presence of CBB, bank risk as measured by corporate/commercial loan concentration level leads to an increase in deposit growth. This evidence is significant at the 1 % level. It is also robust. Similar evidence is gathered when EDI is not considered. This means that EDI may not play a part in the way depositors react to CBB risk. In Table 5.33, this study finds that the ROE reduces deposit growth and increases bank deposit cost in the presence of EDI and CBB. This evidence is also the same reaction from depositors via quantity mechanism when EDI is absent.

Table 5.33 shows that the management quality in the presence of CBB and EDI cause a positive impact on deposit growth and a simultaneous positive effect on bank deposit cost. Table 5.34 shows that bank liquidity in the presence of CBB and EDI leads to a positive impact on the bank deposit growth rate. This evidence is significant at 10%, but it is not robust across other estimations. No evidence is found when bank deposit cost as a measure of DMD is considered. In Table 5.34, when EDI is not considered, and CBB interacts with only Liquidity, no evidence of DMD via quantity mechanism is found, but rather only DMD via bank deposit cost is found. In other estimations of equations (17) and equation (18), where the interactions are not the main focus, the ratio of corporate loans to total loans (Corploan) continues to reduce deposits whiles increasing bank deposit cost. This evidence remains economically significant (see Table 5.28 and Table 5.34).

Table 5.31: *CBB, EDI, the ratio of corporate loans to total loans and DMD.*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) Xtpcse	(6) Prais
Cross-border banking	-0.3729***	-0.2178***	-0.1185	-0.0106***	-0.0146***	-0.0117**
	(-5.88)	(-3.51)	(-1.49)	(-3.91)	(-3.90)	(-2.70)
Explicit deposit insurance	-0.3344***	-0.2594***	-0.1236	-0.0097***	-0.0097**	-0.0077*
	(-5.55)	(-4.14)	(-1.67)	(-3.56)	(-3.25)	(-2.06)
Capital adequacy ratio	1.0877**	1.0310***	1.5530***	-0.0218	-0.0324	-0.0579**
	(2.87)	(3.53)	(3.92)	(-1.58)	(-1.91)	(-2.85)
Corporate loans	-0.3508***	-0.0562	0.0363	0.0227***	0.0186***	0.0022
	(-4.17)	(-0.72)	(0.35)	(6.07)	(3.52)	(0.43)
Cross-border banking χ corporate loans χ explicit deposit insurance	0.5142***	0.2354*	0.1296	0.0018	0.0067	-0.0035
	(4.41)	(2.11)	(0.74)	(0.31)	(0.94)	(-0.40)
ROE	(4.41)	0.0429	0.0825	-0.0130*	0.0026	0.0038
	(1.73)	(0.52)	(0.87)	(-2.26)	(0.57)	(0.87)
Management quality	1.1929	0.7514	3.2242**	0.0005	0.0561	0.0355
	(1.89)	(1.43)	(3.28)	(0.01)	(1.47)	(0.72)
Liquidity1(liquid assets-to-total assets)	-0.0193	-0.2825**	-0.5595***	-0.0527***	-0.0308***	-0.0247***
	(-0.15)	(-3.05)	(-4.03)	(-8.75)	(-4.84)	(-3.71)
Total assets	-0.1054***	-0.0960***	-0.1437***	-0.0025**	-0.0028**	-0.0017
	(-5.88)	(-4.21)	(-3.82)	(-2.79)	(-2.73)	(-0.83)
Inflation	-0.3106***	-0.2562***	-0.2944**	0.0093*	0.0098	0.0064
	(-4.01)	(-3.65)	(-2.86)	(1.97)	(1.93)	(1.25)
Bureaucratic quality	-0.2730	-0.0891	-0.1673	-0.0310***	-0.0206*	-0.0112
	(-1.82)	(-0.55)	(-0.63)	(-3.32)	(-2.11)	(-0.82)
Deposit money bank assets to GDP (%)	-0.0378	-0.1338	0.1183	0.0081	0.0127*	0.0106
	(-0.47)	(-1.86)	(0.77)	(1.53)	(2.31)	(1.27)
Constant	0.9500***	0.7646***	0.5658**	0.0716***	0.0634***	0.0653***
	(6.66)	(4.13)	(2.77)	(11.11)	(7.68)	(6.09)
Diagnostic test						
No. of Observation	531	531	531	525	525	525
R^2	0.269	0.384	0.163	0.304	0.737	0.297
F-test	5.83***		8.41***	17.89***		18.04***
Wald chi2(11)		65.83***			396.09***	
Fixed effect	Y			Y		
Hausman test	57.42***			88.02***		
BP test: chi2(1)						
Wooldridge test for the first-order autocorrelation: F-test						

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.32: *CBB, EDI, ROE and DMD*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.3051***	-0.1836***	-0.0969	-0.0120***	-0.0126***	-0.0119**
	(-5.69)	(-3.68)	(-1.28)	(-4.65)	(-4.29)	(-2.88)
Explicit deposit insurance	-0.2546***	-0.2243***	-0.0982	-0.0114***	-0.0082**	-0.0077*
	(-4.93)	(-4.20)	(-1.42)	(-4.41)	(-3.27)	(-2.21)
Capital adequacy ratio	0.9094*	0.9207***	1.5402***	-0.0214	-0.0380*	-0.0581**
	(2.41)	(3.48)	(3.88)	(-1.57)	(-2.47)	(-2.86)
ROE	0.1078	0.0017	0.0752	-0.0194**	-0.0044	0.0056
	(0.70)	(0.01)	(0.64)	(-2.99)	(-0.72)	(1.01)
Cross-border banking χ ROE χ Explicit deposit insurance	0.3341	0.1319	0.0249	0.0202*	0.0097	-0.0045
	(1.90)	(0.92)	(0.14)	(2.32)	(1.24)	(-0.56)
Corporate loan	-0.2824***	-0.0002	0.0639	0.0229***	0.0225***	0.0016
	(-3.72)	(-0.00)	(0.66)	(6.44)	(4.85)	(0.33)
Management quality	1.0710	0.9288	3.2328**	0.0019	0.0393	0.0369
	(1.62)	(1.65)	(3.27)	(0.04)	(1.00)	(0.75)
Liquidity1 (liquid assets-to-total assets)	-0.0611	-0.3170***	-0.5626***	-0.0524***	-0.0327***	-0.0247***
	(-0.49)	(-3.57)	(-4.04)	(-8.61)	(-5.12)	(-3.70)
Total assets	-0.1062***	-0.0965***	-0.1436***	-0.0025**	-0.0025**	-0.0018
	(-6.02)	(-4.46)	(-3.79)	(-2.73)	(-2.70)	(-0.86)
Inflation	-0.2793***	-0.2560***	-0.2926**	0.0103*	0.0093*	0.0061
	(-3.67)	(-3.93)	(-2.82)	(2.14)	(1.98)	(1.19)
Bureaucratic quality	-0.2508	-0.0460	-0.1590	-0.0326***	-0.0203*	-0.0113
	(-1.67)	(-0.29)	(-0.60)	(-3.53)	(-2.05)	(-0.82)
Deposit money bank assets to GDP (%)	-0.0934	-0.1787*	0.1093	0.0086	0.0120*	0.0110
	(-1.19)	(-2.42)	(0.71)	(1.64)	(2.30)	(1.33)
Constant	0.9552***	0.7513***	0.5449**	0.0736***	0.0623***	0.0652***
	(6.48)	(4.26)	(2.65)	(11.30)	(7.50)	(6.08)
Diagnostic test						
No. of Observation	531	531	531	525	525	525
R^2	0.247	0.375	0.163	0.309	0.731	0.297
F-test	5.44***		8.38***		17.95***	18.02***
Wald chi2(11)		63.34***			364.41***	
Fixed effect	Y				Y	
Hausman test	50.11***				42.19***	
BP test: chi2(1)						
Wooldridge test for the first-order autocorrelation: F-test						

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.33: *CBB, EDI, management quality and DMD*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.3385***	-0.1775**	-0.1325	-0.0105***	-0.0161***	-0.0141**
	(-5.69)	(-3.15)	(-1.66)	(-4.23)	(-4.93)	(-3.27)
Explicit deposit insurance	-0.3168***	-0.2134***	-0.1664	-0.0097**	-0.0124***	-0.0123**
	(-4.92)	(-3.33)	(-1.91)	(-3.28)	(-3.96)	(-2.76)
Capital adequacy ratio	1.0276**	0.8569***	1.5424***	-0.0220	-0.0358*	-0.0582**
	(2.70)	(3.31)	(3.90)	(-1.58)	(-2.37)	(-2.88)
Corporate loan	-0.2794***	-0.0128	0.0661	0.0230***	0.0198***	0.0020
	(-3.73)	(-0.20)	(0.69)	(6.45)	(4.20)	(0.41)
ROE	0.2426*	0.0509	0.0909	-0.0128*	0.0047	0.0043
	(1.99)	(0.60)	(0.96)	(-2.19)	(1.03)	(0.97)
Management quality	0.7087	0.6319	2.8697**	-0.0016	0.0405	0.0135
	(1.17)	(1.04)	(2.80)	(-0.04)	(1.05)	(0.26)
Cross-border banking χ	3.3668**	0.4256	2.0534	0.0122	0.0996*	0.1072
Management quality χ	(3.23)	(0.48)	(1.19)	(0.26)	(2.32)	(1.28)
Explicit deposit insurance						
Liquidity1 (liquid assets-to-total assets)	-0.0471	-0.3071***	-0.5561***	-0.0527***	-0.0294***	-0.0244***
	(-0.37)	(-3.68)	(-4.00)	(-8.79)	(-4.62)	(-3.66)
Total assets	-0.1087***	-0.0913***	-0.1467***	-0.0025**	-0.0032**	-0.0020
	(-6.03)	(-4.24)	(-3.89)	(-2.82)	(-3.11)	(-0.96)
Inflation	-0.3312***	-0.2645***	-0.3021**	0.0093	0.0093	0.0061
	(-4.06)	(-3.81)	(-2.93)	(1.91)	(1.82)	(1.21)
Bureaucratic quality	-0.2952	0.0020	-0.1808	-0.0311***	-0.0222*	-0.0122
	(-1.93)	(0.01)	(-0.68)	(-3.33)	(-2.26)	(-0.89)
Deposit money bank assets to GDP (%)	-0.0689	-0.2052**	0.1063	0.0079	0.0124*	0.0104
	(-0.88)	(-2.81)	(0.69)	(1.51)	(2.28)	(1.26)
Constant	0.9637***	0.7378***	0.6026**	0.0716***	0.0663***	0.0694***
	(6.60)	(3.99)	(2.90)	(11.02)	(7.90)	(6.30)
Diagnostic test						
No. of Observation	531	531	531	525	525	525
R^2	0.256	0.365	0.165	0.304	0.740	0.299
F-test	5.65***		8.50***	17.97***		18.16***
Wald chi2(11)		62.28***			386.90***	
Fixed effect	Y			Y		
Hausman test	48.41***			40.02***		
BP test: chi2(1)						
Wooldridge test for the first-order autocorrelation: F-test						

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

Table 5.34: *CBB, EDI, Liquidity ratio, and DMD*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.3114***	-0.1630**	-0.1221	-0.0110***	-0.0141***	-0.0139**
	(-5.50)	(-2.97)	(-1.55)	(-3.97)	(-3.95)	(-3.25)
Explicit deposit insurance	-0.2707***	-0.1965**	-0.1374	-0.0104***	-0.0093**	-0.0111**
	(-4.68)	(-3.24)	(-1.77)	(-3.50)	(-3.00)	(-2.84)
Capital adequacy ratio	0.8599*	0.9612***	1.5243***	-0.0232	-0.0330	-0.0581**
	(2.31)	(3.39)	(3.85)	(-1.67)	(-1.81)	(-2.87)
Corporate loan	-0.2736***	-0.0021	0.0653	0.0231***	0.0194***	0.0013
	(-3.65)	(-0.03)	(0.68)	(6.48)	(3.93)	(0.28)
ROE	0.2065	0.0386	0.0880	-0.0130*	0.0015	0.0038
	(1.72)	(0.48)	(0.93)	(-2.25)	(0.33)	(0.88)
Management quality	1.1534	0.7437	3.2553**	0.0016	0.0526	0.0384
	(1.75)	(1.28)	(3.31)	(0.04)	(1.34)	(0.78)
Liquidity1 (liquid assets-to-total assets)	-0.1287	-0.2887**	-0.6017***	-0.0540***	-0.0323***	-0.0273***
	(-0.97)	(-2.66)	(-4.16)	(-8.36)	(-4.79)	(-3.91)
Cross-border banking χ Liquidity1 χ Explicit deposit insurance	0.3760*	-0.0606	0.2960	0.0078	0.0109	0.0192
	(2.11)	(-0.32)	(0.96)	(0.78)	(0.94)	(1.25)
Total assets	-0.1113***	-0.0925***	-0.1466***	-0.0026**	-0.0029**	-0.0019
	(-6.16)	(-3.85)	(-3.87)	(-2.88)	(-2.76)	(-0.92)
Inflation	-0.3059***	-0.2572***	-0.2973**	0.0091	0.0102*	0.0061
	(-3.90)	(-3.80)	(-2.88)	(1.93)	(2.00)	(1.20)
Bureaucratic quality	-0.2511	-0.0207	-0.1697	-0.0314***	-0.0194*	-0.0115
	(-1.68)	(-0.13)	(-0.64)	(-3.36)	(-1.99)	(-0.84)
Deposit money bank assets to GDP (%)	-0.0847	-0.1961**	0.1199	0.0082	0.0119*	0.0115
	(-1.09)	(-2.59)	(0.77)	(1.56)	(2.21)	(1.38)
Constant	0.9681***	0.7111***	0.5764**	0.0725***	0.0634***	0.0679***
	(6.39)	(3.64)	(2.80)	(10.86)	(7.48)	(6.29)
Diagnostic test						
No. of Observation	531	531	531	525	525	525
R^2	0.247	0.369	0.164	0.305	0.738	0.298
F-test	5.55***		8.46***	18.86***		18.12***
Wald chi2(11)		65.79***			221.36***	
Fixed effect	Y			Y		
Hausman test	49.66***			37.52***		

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression

The ROE leads to an increase in deposits (see Table 5.28) but leads to a reduction in Bank deposit cost (see Table 5.28, Table 5.29, Table 5.31- Table 5.34). Management quality leads to an increase in deposit growth. The study does not find any evidence of the effect of management quality on bank deposit cost. The ratio of liquid assets to total assets, as measured by Liquidity 1, leads mostly to a reduction in deposit growth and deposit cost. This evidence is robust (see table 5.28- 5.29). Table 5.30 has no proof, however. The log of total assets continues to lead to a fall in deposit growth and bank cost (see table 5.28-Table 5.34). Table 5.29, however, produces no evidence. Inflation is found here to lead to a reduction in deposit growth and an increase in deposit cost. Bureaucratic quality weakly leads to an increase in deposit growth (see Table 5.29), but bureaucratic quality generally leads to a decrease in bank deposit cost. This evidence is robust (see Table 5.28, Table 5.30, Table 5.34). Table 5.30, however, shows that bureaucratic quality leads to an increase in bank deposit costs. The study produces these results when it interacts CBB, EDI and the ratio of real estate loans to total loans as a CAMEL measure in the presence of EDI.

When financial development is measured as deposit money bank assets to GDP (%), the study finds that generally, financial development leads to a reduction in deposit growth. It also leads to a reduction in deposit costs, see Table 5.29). In other estimations, this study finds that deposit money bank assets to GDP (%) lead to an increase in bank deposit cost (see Table 5.28, Table 5.29, Table 5.32, Table 5.33, and Table 5.34). Across all the Tables (see Table 5.28- Table 5.34), this study observes that CBB leads to a decrease in both the deposit growth rate and bank deposit cost. This study also finds that EDI negatively affects both deposit growth and bank deposit cost. This evidence is robust and significant at the 1 % level (see Table 5.28-Table 5.34). Altogether, the results discussed above do not support the study's fifth hypothesis of a complete test for DMD

existing for CBB risk in the presence of EDI. The evidence presented instead supports the regulatory hypothesis

5.4.1 Bank Size as an Incentive for Depositors to Monitor and Discipline Risky Banks Especially within the Cross-border Banking Context

Regarding the study's hypothesis of bank asset size as an incentive for depositors to monitor CBB risk, this study finds no evidence to this regard across all different estimations- ILS, xtpcse, and prais (see Table 5.35). Contrary to the expectation of the study to observe too big to save (TBTS) effect as suggested in the conceptual framework of the study, the study finds no significant results at all.

5.4.2 Bank Capital as an Incentive for Depositors to Monitor and Discipline Risky Banks Especially within the Cross-border Banking Context

Considering that the capital adequacy ratio is a measure of risk, and at the same time it is an incentive for depositor monitoring, this study found that estimating equation (17) and equation (18) would be similar to estimating equation (15) and equation (16). Therefore, the results had when CBB interacts with the capital adequacy ratio, is also relevant. The discussions earlier had on the effect CBB risk has on DMD, indicates that capital does indeed serve as an incentive for depositor monitoring.

Table 5.35: *CBB, EDI, Liquidity1 (liquid assets to total assets), and DMD.*

	DMD Measure: Deposit Growth Rate			DMD Measure: Bank Deposit Cost		
Variable	(1) ILS	(2) xtpcse	(3) Prais	(4) ILS	(5) xtpcse	(6) Prais
Cross-border banking	-0.2494**	-0.1936**	-0.1084	-0.0151***	-0.0165***	-0.0142**
	(-3.31)	(-2.81)	(-1.17)	(-3.90)	(-3.98)	(-2.93)
Explicit deposit insurance	-0.2203***	-0.2135***	-0.0941	-0.0092***	-0.0076***	-0.0084**
	(-5.15)	(-4.71)	(-1.47)	(-3.94)	(-3.43)	(-2.59)
Capital adequacy ratio	0.9121*	0.9026***	1.5362***	-0.0258	-0.0495**	-0.0576**
	(2.42)	(3.50)	(3.87)	(-1.90)	(-3.08)	(-2.84)
Corporate loan	-0.2775***	-0.0084	0.0623	0.0221***	0.0193***	0.0012
	(-3.60)	(-0.13)	(0.64)	(6.19)	(4.01)	(0.24)
ROE	0.2099	0.0594	0.0848	-0.0133*	-0.0010	0.0036
	(1.72)	(0.74)	(0.90)	(-2.31)	(-0.22)	(0.83)
Management quality	1.0824	0.8425	3.2429**	0.0004	0.0442	0.0362
	(1.68)	(1.55)	(3.29)	(0.01)	(1.18)	(0.74)
Liquidity1 (liquid assets to total assets)	-0.0086	-0.3761*	-0.5989**	-0.0639***	-0.0417***	-0.0299**
	(-0.04)	(-2.44)	(-3.00)	(-7.05)	(-4.67)	(-3.07)
Total assets	-0.1022***	-0.1021***	-0.1467***	-0.0035**	-0.0032*	-0.0021
	(-4.46)	(-4.13)	(-3.71)	(-2.95)	(-2.28)	(-1.00)
Cross-border banking χ total assets χ Liquidity1	-0.0396	0.0340	0.0210	0.0073	0.0065	0.0029
	(-0.44)	(0.54)	(0.25)	(1.79)	(1.75)	(0.72)
Inflation	-0.2918***	-0.2734***	-0.2960**	0.0089	0.0080	0.0061
	(-3.80)	(-4.12)	(-2.86)	(1.87)	(1.66)	(1.21)
Bureaucratic quality	-0.2097	-0.0507	-0.1618	-0.0319***	-0.0154	-0.0118
	(-1.42)	(-0.34)	(-0.61)	(-3.37)	(-1.57)	(-0.86)
Deposit money bank assets to GDP (%)	-0.1093	-0.1880*	0.1127	0.0085	0.0095	0.0112
	(-1.39)	(-2.56)	(0.73)	(1.61)	(1.79)	(1.36)
Constant	0.8828***	0.7791***	0.5589*	0.0777***	0.0684***	0.0683***
	(5.03)	(3.99)	(2.58)	(9.78)	(6.74)	(6.10)
Diagnostic test						
No. of Observation	531	531	531	525	525	525
R^2	0.243	0.380	0.163	0.308	0.735	0.298
F-test	17.84***					18.14***
Wald chi2(11)		64.48***			330.10***	

Note. t statistics in parentheses * p<0.05, ** p<0.01, *** p<0.001
ILS = Indirect Least Squares, xtpcse = Prais-Winsten heteroskedastic panels regression, and Prais = Prais-Winsten AR (1) regression.

The results indicated that, as the capital levels of a bank increases, depositors react with a show of pleasure by increasing their deposit rate. At the same time, their pleasure in observing that their banks are keeping high capital levels translates into a reduction in bank deposit costs (see Table 5.10). As indicated earlier, this evidence is statistically significant. It is, however, only robust for DMD via the price-based mechanism. This study concludes that bank capital serves as an incentive for depositor monitoring of risk in the presence of CBB.

5.5 Depositor Response to Bank Risk-taking and its Influence on Banks to Reduce their risk-taking levels: The Influencing Aspect of Market Discipline

This section of the study estimates equation (19) specified in Chapter Four. The estimated parameters are to help the study capture a banks' dynamic response to the depositor discipline. The analysis proceeds by assessing the output of the Two-stage generalized method of moments (GMM) estimator developed for dynamic models of panel data. Suppose an exogenous rise in interest rate affects the number of uninsured deposits by causing it to fall. In that case, it indirectly means that managers who had been disciplined via the price mechanism are still engaged in risky activities. Hence, their inability to attract deposits with offers of high-interest rates on deposits. Table 5.36 and Table 5.37 is the study's two-stage SYS GMM results for estimating depositor response to bank risk-taking and its influence on bank managers to reduce their risk-taking levels. The results are presented for three categories of banks: All Banks in Africa, Good Banks in Africa, and Bad Banks in Africa. Good Banks are banks that keep higher capital adequacy ratios than banks

Table 5.36: *DMD influence on bank managers*

Dependent variable: the first difference of deposit growth rate	All Banks		Good Banks		Bad Banks	
	(1) deposit growth lag2 included as instrument	(2) deposit growth lag2 & lag3 included as instruments	(1) deposit growth lag2 included as instrument	(2) deposit growth lag2 & lag3 included as instruments	(1) deposit growth lag2 included as instrument	(2) deposit growth lag2 & lag3 included as instruments
bank deposit growth rate in first difference with one lag	-0.0670**	-0.0870**	-0.0867	0.1098	-0.0843	-0.0900
	(-3.24)	(-2.83)	(-0.65)	(0.73)	(-1.95)	(-1.45)
Bank deposit growth rate in first difference with two lags	-0.0255	-0.0683**	-0.0281	0.0056	-0.0363	-0.0468
	(-1.48)	(-2.74)	(-0.37)	(0.04)	(-1.09)	(-0.63)
Bank deposit cost in first difference with one lag	-0.7897	-1.1312	-0.0901	3.7423**	-1.9828	-2.0914
	(-0.75)	(-0.83)	(-0.05)	(2.93)	(-0.53)	(-0.36)
Capital adequacy ratio in first difference with two lags	0.6668*	0.3930	0.3795	2.6264	-0.1937	-0.4453
	(1.99)	(0.92)	(0.34)	(1.93)	(-0.19)	(-0.31)
Non-performing loans in first difference with two lags	-0.3168	-0.3247	0.2745	0.0361	-0.5764	-1.0211
	(-1.19)	(-0.93)	(1.12)	(0.14)	(-0.71)	(-0.81)
Management quality in first difference with two lags	1.3496	1.8514	2.3771	1.1601	1.8995	1.3632
	(1.70)	(1.55)	2.3771	(0.49)	(0.75)	(0.36)
ROE in first difference with two lags	0.0709*	0.0942***	0.1375	-0.0183	0.0918	-0.0056
	(2.21)	(3.46)	(0.80)	(-0.09)	(1.43)	(-0.05)
Liquid assets to total assets in first difference with two lags	-0.2426*	-0.2527*	-0.1501	-0.3421	-0.2349	-0.3070
	(-2.39)	(-2.41)	(-0.60)	(-1.55)	(-1.18)	(-1.34)
Total assets in first difference with two lags	0.7992***	0.6849***	0.5530	1.0572*	0.6719**	0.5199*
	(3.70)	(4.22)	(1.37)	(2.07)	(3.28)	(2.12)
Inflation rate in first difference with lag 1	0.5843**	0.5842*	0.6103*	0.5465*	0.4739	0.1940
	(3.31)	(2.41)	(2.31)	(2.68)	(0.98)	(0.30)
Deposit money bank assets to GDP (%) in first difference with one lag	0.7601	0.7164	0.3356	0.5051	1.4391	1.9414
	(1.75)	(1.02)	(0.36)	(0.52)	(0.80)	(0.75)
Bureaucratic quality in first difference with one lag	0.2237	0.3166	0.1152	0.2942	0.1590	0.1156
	(1.03)	(1.27)	(0.13)	(0.25)	(0.50)	(0.31)
Bank deposit growth rate in first difference with three lags		-0.0158		-0.0285		-0.0060
		(-1.49)		(-0.37)		(-0.11)
Constant	0.1314	0.2208***	0.0334	-0.0048	0.1823	0.3803*
	(1.82)	(3.75)	(0.21)	(-0.05)	(1.86)	(2.35)
No. of Observation	785	703	144	120	411	365
Number of instruments	36	36	36	36	97	36
Number of groups	174	168	40	34	36	86
F-test	4.86***	5.06***	3.46 ***	18.71***	4.61***	4.48***
Hansen test	7.49	9.99	10.56	11.80	12.16	11.72
P value	0.379	0.125	0.159	0.067	0.095	0.069
AR (2) test	-0.50	-0.20	-0.49	0.68	0.11	-0.69
P value	0.614	0.838	0.623	0.497	0.909	0.490

Note. t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table 5.37: *DMD influence on bank managers, with different asset quality measures.*

	All Banks		Good Banks		Bad Banks	
Dependent variable: the first difference of bank deposit growth rate	(1) Real estate loans	(2) Loan loss allowance	(1) Real estate loans	(2) Loan loss allowance	(1) Real estate loans	(2) Loan loss allowance
Bank deposit growth rate in first difference with one lag	-0.0412***	0.1427	0.1373	0.0076	0.0212	-0.0192
	(-4.48)	(1.92)	(0.20)	(0.13)	(0.19)	(-0.49)
Bank deposit cost in first difference with one lag	-2.5236*	-1.4320	0.0000	-0.3220	-0.1566	-3.3552
	(-2.30)	(-1.33)	(.)	(-0.37)	(-0.08)	(-1.39)
Capital adequacy ratio in first difference with two lags	1.3063	0.0476	3.0567	-0.5479	0.9767	-0.8331*
	(1.13)	(0.12)	(0.48)	(-0.61)	(1.26)	(-2.03)
Real estate loans to total loans in first difference with two lags	-0.4133		0.0000		-0.3817	
	(-1.38)		(.)		(-1.45)	
Bank management quality in first difference with two lags	1.0929	2.1639**	-5.9321	1.4396	-2.0402	0.4126
	(0.67)	(3.00)	(-0.54)	(0.78)	(-0.78)	(0.25)
ROE in first difference with two lags	0.1094***	-0.0019***	-0.4693	0.0179	0.1369*	0.0913
	(4.32)	(-14.27)	(-0.56)	(0.08)	(2.18)	(1.85)
Liquid assets to total assets in first difference with two lags	-0.3719	-0.2599	1.2734	-0.1948	-0.2068	0.0527
	(-2.00)	(-1.96)	(0.48)	(-0.78)	(-0.98)	(0.26)
Total assets in first difference with two lags	0.9671***	0.8625***	2.3724	0.7905*	0.5149	0.5380
	(4.94)	(4.38)	(0.57)	(2.05)	(2.03)	(1.69)
Inflation rate in first difference with one lag	0.4125	0.4744*	0.8130	0.3689*	0.5950	0.5241
	(1.28)	(2.35)	(0.71)	(2.33)	(1.30)	(1.66)
Deposit money bank assets to GDP (%) in first difference with one lag	-1.0954	0.1379	-1.4725	1.1338	0.3549	0.2949
	(-1.82)	(0.30)	(-0.48)	(1.46)	(0.90)	(0.31)
Bureaucratic quality in first difference with one lag	0.3989	0.0587	4.2168	0.2684	-0.4096	-0.1044
	(1.22)	(0.26)	(0.64)	(0.67)	(-0.88)	(-0.38)
Loan loss allowance first difference with one lag		0.0341		0.0228		-0.0116
		(1.05)		(1.43)		(-0.03)
Constant	0.0719*	0.1113***	0.0445	0.1026*	0.0645*	0.1054**
	(2.11)	(4.93)	(0.19)	(2.45)	(2.29)	(3.23)
Diagnostic test						
No. of Observation	162	1445	23	300	89	781
Number of instruments	35	35	27	35	35	36
Number of groups	54	239	10	69	32	140
F-test	48.79***	392261.66***	2.84	2.42	6.76***	1.06
Hansen test	24.09	27.72	0.00	20.87	23.67	45.79
P value	0.399	0.226	1.000	0.589	0.423	0.005
AR (2) test	-0.68	1.75		-0.21	0.93	0.20
P value	0.498	0.080		0.834	0.354	0.844

Note. t statistics in parentheses* p<0.05, ** p<0.01, *** p<0.001

in the mean capital adequacy ratio for all banks in Africa. Bad Banks are banks that hold capital adequacy ratios below the mean capital adequacy ratio for all banks in Africa. The model is

estimated based on the quantity mechanism approach of DMD. Therefore, the dependent variable is: changes in deposit growth. Following Maechler and McDill (2006), up to three lag lengths of the dependent variable enter the model as regressors. All the variables under consideration are in the first difference.

When the results for All Banks are analysed, it is realized that when the first difference of deposit growth rate enters the regression with lag 1 and lag 2, it is found to have a negative effect on the first difference of deposit growth rate. This means that the previous depositor discipline effect via the quantity approach has not had any influence on bank managers to reduce their risk-taking. Hence, the observed further reduction in current deposits. In order to make this finding complete, the bank deposit cost variable in the first difference needs to be analysed alongside. A look at this variable, however, shows an expected negative sign. It is, however, insignificant. Model (1) of All Banks shows that other variables that significantly explain changes in deposit growth include the capital adequacy ratio (positive sign); ROE (positive sign); liquid assets to total assets (Liquidity 1- positive sign); log of total assets (positive sign); and inflation (positive sign). Amongst these findings, only the ratio of liquid assets to total assets ratio and inflation provides unexpected results. Model (2) results for All banks are the same for the model (1) except for the capital adequacy ratio. There, the capital adequacy ratio is positive but significant.

When the Good Banks category is analysed, the study realises that the previous lags of the dependent variable, changes in bank deposit growth, do not significantly explain current deposit levels. Evidence of market discipline is, therefore, not gleaned in this respect. Model (2), however,

shows that an increase in previous bank deposit cost increases current bank deposits. This finding indicates that bank managers have been influenced by depositor monitoring via the price-based mechanism of DMD. This finding is significant at the 5% level. Model (2) further shows that the log of total assets positively impacts current deposits. Contrary to expectation, the study finds that previous years' inflation leads to an increase in the current bank deposit. Model (1) also provides the same results for the inflation variable.

The dynamic panel regression results for Bad Banks shows that there is no evidence of depositor monitoring and influence. The dependent variable's lags and the bank deposit cost variable remain insignificant across model (1) and model (2). Only Asset size positively and significantly affects deposit growth in Bad Banks. In all the estimations, non-performing loans, management quality, Deposit money bank assets to GDP (%), and Bureaucratic quality do not significantly explain the deposit growth rate. The asset quality measure used in Table 5.35 is non-performing loans to total loans. When other asset quality measures such as real estate loans and loan loss allowances are considered in Table 5.36, the study unearths the following about deposit growth rate within All banks in Africa, Good Banks in Africa, and Bad Banks in Africa.

In the All Banks column of Table 5.36, model (1) shows that when asset quality is real estate loans, the previous period deposits negatively affects the deposit growth rate. Previous periods bank deposit cost also negatively influences the dependent variable. This evidence supports depositor monitoring and influence in All Banks. Table 5.35 provides similar evidence but for Good Banks. Other variables that explain deposit growth for All banks are ROE (positive sign) and log of total

assets (positive sign). These signs are all expected because their presence enhances bank safety, hence deposit growth. In model (2), when the asset quality measure is still Real estate loan concentration level, no evidence of depositor monitoring and influence is found. However, for the first time, the management quality variable is significant with a positive sign. This evidence means that as management quality increases, the deposit growth rate variable also increases in value. Other significant variables are the log of total assets (positive sign) and inflation (positive sign). When the study examines Good Banks, model (1) with real estate loans as an asset quality measure provides no significant finding. However, when the asset quality measure is loan loss allowance, the log of total assets and inflation is used to explain the deposit growth rate. These results are significant at the 10% level. Bad banks results show that in the model (1) where the asset quality measure is real estate loans, only ROE has a significant positive impact on deposit growth. In model (2) where the asset quality measure is loan loss allowance, the study finds that the capital adequacy ratio significantly reduces deposit growth at the significance level of 10%.

Altogether, this section of the study finds evidence to support depositor influence within All Banks in Africa, and also within Good Banks in Africa. Just as in Maechler and McDill (2006), this study finds that higher funding costs for deposits effectively reduce a bank's desire to take higher risks.

CHAPTER SIX

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

6.1 Introduction

This study assesses the effect of CBB on bank risk and market discipline in the presence of explicit deposit insurance and depositor market discipline incentives. To this effect, this research assesses the relationship between cross-border banks and bank risk, given explicit deposit insurance. The study also tests for evidence of depositor monitoring of bank risk, in the presence of cross-border banks, in Africa. The study further examines the factors that serve as an incentive for depositors to monitor bank risk. Lastly, this study investigates the effect of depositor monitoring and discipline on banks. This chapter of the thesis, therefore, provides a summary of the findings. It also presents the conclusions drawn from the results. Lastly, the study also makes future policy recommendations.

6.2 Summary of Findings

This study started by first examining the effect of cross-border banks on bank risk, in the presence of the regulatory difference- explicit deposit insurance (EDI), in Africa. This objective first analyses the relationship between CBB and risk. This study finds the following about cross-border banks in Africa over domestic banks in Africa. The time series analysis and summary statistics reveal that CBB has better asset quality, higher earnings, higher-income diversification scores, and higher liquidity than their domestic counterparts. The higher trend observed for CBB over domestic banks provides evidence to support the diversification hypothesis. However, cross-

border banks have higher volatility in profits, higher overhead expenses, higher market risk, lower stability scores, and lower levels of capital than their domestic counterparts. Based on this, the study finds some evidence to support the hypothesis that CBB increases bank risk. The F-test from the One-way ANOVA output shows that the higher volatility of earnings cross-border banks have is significant. This evidence supports the market risk hypothesis. Based on F-test results from One-way ANOVA, the study finds that cross-border banks significantly make lower provision for loan loss allowances than domestic banks. Based on this risk measure, the study fails to reject the study's null hypothesis that cross-border banking does not increase risk. Altogether the results show support for both the market risk hypothesis and diversification hypothesis.

The summary statistics for the second hypothesis of the study shows that when compared to banks in IDI countries, banks in EDI countries record higher profits (ROA and ROE), and better asset quality. Based on this, the study concludes from the summary statistics that banks that operate in EDI countries have a lower risk than those who do not. Banks in EDI countries also have higher overhead expenses than their counterparts. Yet, they experience lower volatility in their profits than their counterparts in IDI countries. Banks could, therefore, partly manage their risk by operating in countries with explicit deposit insurance arrangements. The thesis also further finds that banks in EDI countries record lower levels of liquidity. Lower records of liquidity are worrying since lower liquidity levels are usually associated with higher risk. The summary statistics also reveal that banks in EDI countries are not able to diversify their income sources as much as their counterparts.

The study's two-stage System GMM regression shows that contrary to expectation, cross-border banks significantly increase the impaired loans of CBB in IDI countries. These results appear to confirm the market risk hypothesis. The results are also in line with the first hypothesis of the study. Regarding the second hypothesis of the study, however, no evidence is found to the effect that CBB increases bank risk, in the presence of EDI. The study further finds that the overhead expenses to total assets ratio of banks operating in both EDI countries and IDI countries impact on bank risk by reducing their stability (Z-score), and increasing their market risk (Sharpe ratio). The thesis finds that when banks in IDI countries increase their indirect expenses, the volatility in their earnings also increases. These results indicate that banks in Africa, irrespective of whether they are operating in EDI countries or IDI countries have to be mindful of their overhead expenses. Additional findings from the study indicate that income diversification enhances bank stability within banks operating in both EDI countries and IDI countries. Also, the results show that capital increases bank stability within banks in EDI countries. So, this should be encouraged too. Contrary to expectation, the study finds that inflation increases the strength of banks in IDI countries whiles reducing the volatility in the standard deviation of ROA. In line with banking literature, the study finds that inflation increases the ratio of total impaired loans to total loans of banks within EDI countries.

The study's GMM regression output does not support the study's second hypothesis. Instead, it provides evidence to support the first hypothesis of the study. Other results show that cross-border banks in EDI countries have: lower asset quality; higher deviation in earnings; higher market risk; and lower stability. This evidence supports a benign form of the presence of the regulatory arbitrage hypothesis within CBB in Africa.

The second objective of the study is to test for evidence of depositor monitoring of bank risk, especially cross-border bank risk via the price-based mechanism and the quantity-based mechanism in Africa. The study makes the following key findings. The study finds statistically significant evidence that DMD via the priced based mechanism and the quantity-based mechanism exist in Africa. The study, therefore, finds evidence to support a complete test for DMD. Across several estimations, the study finds that capital has a positive impact on the deposit growth rate and a negative impact on bank deposit cost. This evidence is robust across other linear regression estimators such as the Prais-Winsten heteroskedastic panels corrected standard errors regression and Prais-Winsten AR (1) regression with iterated estimates. Some of the study's asset quality measures like non-performing loans do not show any evidence of DMD. Among the study's alternative asset quality measures, only the ratio of corporate loans to total loans provides robust, economically significant evidence to support the complete test for DMD. Based on Indirect Least Squares regression, the study's finds that depositors perceive corporate loan concentration levels as being risky. Therefore, this ratio leads to a negative impact on a bank's deposit growth and a positive effect on bank deposit cost. This evidence is robust across the Prais-Winsten heteroskedastic panels corrected regression and Prais-Winsten AR (1) regression

The ratio of real estate loans to total loans as an asset quality measure also provides evidence of complete DMD. It is, however, only robust across two regressions. The results do not show any evidence of a complete test for DMD among the profitability measures. The study's bank efficiency measure does not provide proof of a complete test for DMD. The study finds evidence of a complete test for DMD for bank liquidity. The evidence is, however, not robust across other regressions.

The study notes that the effect bank liquidity levels have on bank deposit growth rate and bank deposit cost depend on the macroeconomic indicator controlled for in the model. The sign for the effect of deposit growth rate and bank deposit cost remains the same when the study considers other macroeconomic indicators such as the real GDP growth and Gross National Incomes. Based on this, the study concludes that banks need to be mindful of the negative impact these macroeconomic variables can have on the bank deposit growth rate. Inflation as a macroeconomic variable provides evidence to support DMD. It shows that as inflation increases, holding all other independent variables constant, an increase in inflation leads to a negative impact on bank deposit growth rate and a positive effect on bank deposit cost. On the whole, the study's institutional quality and financial development measures do not support a complete test for DMD.

The study further finds that in the presence of cross-border banking, capital adequacy ratio causes banks to increase their deposit growth rate holding all other independent variables constant. Alongside this finding, the capital adequacy ratio also causes bank deposit costs to reduce. The study finds evidence on only deposit growth. The evidence on bank deposit cost is, however robust in all results provided by the three estimators adopted for the study. The study also finds consistent evidence that corporate loan concentration levels lead to a reduction in deposit growth rate. The study further finds that corporate loan concentration levels impact on bank deposit cost by causing it to decrease.

Contrary to expectation, the study finds that in the presence of CBB, bank liquidity leads to a reduction in the deposit growth rate of banks. Furthermore, given CBB, bank liquidity leads to a decrease in deposit cost. Consistently, the study notices in all the regressions result that cross-border banking leads to a reduction in both deposit growth and deposit cost. This evidence is robust across all three estimators adopted for the study. Therefore, based on corporate loan concentration levels and the capital adequacy ratio as risk measures, this study finds evidence that depositors react to bank risk, in the presence of cross-border banks. This finding, therefore, provides evidence to support the hypothesis that a complete test of DMD exists within the CBB context.

The study also examines the relationship between cross-border banks, explicit deposit insurance, bank risk, and depositor market discipline via the price-based mechanism and the quantity-based mechanism in Africa. The results for this interaction do not, however, provide evidence to support DMD via a complete test as specified in the study's hypothesis. The presence of EDI does not have any influence on the complete test for DMD. Similar to this, the study does not find any evidence that bank asset size serves as an incentive for depositors to monitor the risk of CBB. The study's seventh hypothesis is that bank capital interacts with bank risk and CBB to influence depositor market discipline (DMD). The results indicate that depositors react to the risk of cross-border banks via both the price-based mechanism and quantity-based mechanism. In this regard, the study finds enough evidence to support its hypothesis. Bank capital serves as an incentive for depositors to monitor and discipline the risk of cross-border banks.

The last objective of the study is to investigate the response of banks, to depositor monitoring and discipline. The findings indicate that depositor response to bank risk-taking is strong enough to influence banks to reduce their risk-taking levels. The study presents results for three categories of banks: All Banks in Africa, Good Banks in Africa, Bad Banks in Africa. The study finds that for All Banks, previous periods deposits leads to a reduction in current bank deposit growth rate. It is also influenced negatively by previous periods bank deposit cost. This evidence supports depositor monitoring and influence in All Banks. The study provides similar evidence for Good Banks. Altogether, this section of the study finds evidence to support depositor influence within All Banks in Africa, and also within Good Banks in Africa. Just as in Maechler and McDill (2006), this study finds that higher funding costs effectively reduce a bank's desire to take higher risks.

6.3 Contributions to the Study

In connection with Objective One, the study contributes to knowledge in cross-border banking studies by providing empirical evidence based on new empirical evidence on the relationship between cross-border banks and bank risk. The thesis creates new knowledge on the cross-border banking/bank risk relationship by analysing unexamined new samples. They are banks in EDI countries and banks in IDI countries.

This study has contributed to knowledge by unearthing the significant role depositors can play in the monitoring of banks. This evidence is lacking in Africa at the moment. Therefore, the study contributes to knowledge by unearthing the existence of a complete test for market discipline. The

study also contributes to knowledge by showing that depositor monitoring exists within the context of CBB. The right amount of information in circulation, the lack of adequate supervision problems identified in the cross-border banking literature can be eliminated with depositors policing the risk of cross-border banks. The study also indicates the factors that serve as incentives for depositors to monitor the risk of CBB. Until now, such knowledge remained unknown in the literature. Lastly, the study contributes to market discipline literature by providing evidence of DMD based on a true test. Very few studies exist to this effect. Lastly, this study contributes to DMD literature by unearthing sufficient information to show that depositors can be relied on to play an important role in policing the risk of cross-border banks.

6.4 Conclusion

This study makes the following conclusions about the effect of cross-border banking on bank risk and market discipline in the presence of explicit deposit insurance, based on the study's findings. This study concludes that the phenomenon of cross-border banking is good because such banks bring about benefits such as better diversification of income sources. Based on this, the study concludes on having found evidence to support the diversification hypotheses. This study, however, further concludes that when banks transcend their country's borders into host nations, they simultaneously increase their risk, especially when they operate in IDI countries. This finding supports the market risk hypothesis. For all banks, the study concludes that most African countries should accept the adoption of an explicit deposit insurance arrangement because such banks, for instance, enjoy higher profits. However, the study concludes with concern that banks operating in countries with explicit deposit insurance have lower liquidity and diversification scores.

For cross-border banks operating in explicit deposit insurance countries, the study concludes that it is good for cross-border banks to operate in countries that have explicit deposit insurance in place. Within such environments, cross-border banks perform in the volatility levels in their earnings. They, however, do not perform well in managing their asset quality. Based on this performance, this study concludes on having observed a benign form of the regulatory arbitrage hypothesis in Africa. The study further concludes that depositors monitor by paying attention to the capital levels of banks and also the loan concentration levels of banks in Africa.

The study also concludes that depositors discipline banks through both the price-based mechanism and the quantity-based mechanism. Lastly, the study concludes that when depositors discipline banks, for risk-taking, it influences the behaviour of bank managers operating in Good Banks. Based on the evidence of depositor monitoring and influence of DMD among banks in Africa, this study concludes that true tests of DMD exist in Africa. Regarding the macroeconomic indicators used in the study, this study concludes that inflation increases the ratio of total impaired loans to total loans of banks within EDI countries.

Based on the above-drawn conclusions from the study, this study makes the following policy recommendations.

6.5 Policy Recommendations

Cross-border banking should be encouraged because it supports the income diversification hypothesis. This study, therefore, recommends that African leaders via the African Union platform should push for further economic and financial integration on the continent. However, when banks cross-borders, their market risk, insolvency risk, and standard deviation in their return on equity ratio increases. So, the study recommends that in as much as diversification is good, it does not inure to market risk reduction. Considering that the study finds evidence of depositor monitoring of bank risk in the presence of cross-border banking, the study recommends that central banks should make public, bank information on these risk measures. The study does not significantly find any evidence that cross-border banking increase bank risk in explicit deposit insurance countries. So, the study recommends that more developing countries should adopt explicit deposit insurance. However, the study also observes some liquidity concerns with banks operating in countries with explicit deposit insurance. Therefore, the study recommends that the deposit insurer of countries with explicit deposit insurance arrangement should work together with the bank regulators in their countries to ensure that banks keep an optimum level of liquidity. To ensure this, bank regulators can publish regular information about bank performance on this score. Regular provision of information and not a sporadic one will help countries avoid bank runs and self-fulfilling prophecies. Banks that find themselves in default of meeting the liquidity standard are likely to make amends quickly. Furthermore, considering that inflation increases the level of impaired loans within countries with explicit deposit insurance, countries that adopt explicit deposit insurance should be mindful that their inflation position does not deteriorate.

The study also finds evidence of depositor monitoring and influence in Africa. As such, the study 0has found a market-based solution to the monitoring problem associated with cross-border banks. The market should, therefore, be harnessed by regulators to serve as a complement to the supervision of cross-border banks. The banking industry is the market for depositor market discipline. So, to make this market thrive, the market needs to be stimulated with a large number of players through an increase in bank penetration.

Lastly, the study provides evidence from a complete test that depositors in Africa react to the capital adequacy ratio level and corporate loan concentration levels, in the presence of cross-border banks. The study recommends that the Basel Committee on Banking Supervision (BCBS) and central banks should continue to pay attention to the capital levels of banks, especially cross-border banks. The loan concentration levels of banks, especially internationally active banks, should also be monitored. Further to this, policymakers can lower the cost of depositor monitoring of bank risk by formulating a public policy that will enhance bank disclosure requirements on a timely basis.

6.6 Limitations and Suggestions for Further Research

This study's findings on market discipline are limited because it provides evidence of market discipline from only depositors as market disciplining forces. The study, therefore, does not consider market discipline by other market participants such as subordinated debt holders, outside equity holders, credit rating agencies, auditing firms, regulatory discipline, and even the self-

discipline abilities of a bank. This study is also further limited by the fact that it did not consider depositor market discipline via mechanisms such as maturity-based mechanism and "flight to quality" mechanism due to data limitations.

For market discipline to be effective, the depositor must be an investor (Garten, 1986). Based on this premise, the author defines two types of investors: the involuntary depositor and the investor depositor (see also Min, 2015). The author notes that investor depositors such as wholesale deposit market investors exert better discipline than bank's involuntary depositors because they are concerned with the risk and return on their funds. This study was not, however, able to get access to data that will enable such distinction. Lastly, incentives of depositor discipline such as banking crises, the design scheme of explicit deposit insurance, and prompt corrective action, were not covered in the study due to data limitations. Future studies can, therefore, unearth further evidence on the incentive of depositor monitoring from this direction. Whiles presenting the results, the study noticed that an upward trend in inflation for African countries after the year 2007. This study, therefore, expects sub-samples of this dataset based on periods before the world financial crises of 2007-2009 and after the crises period may provide different revelations. As seen here, the deterioration in the inflation variable after the year 2007 is likely to affect market discipline. Future analysis can therefore unearth new knowledge from this direction.

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APPENDIX ONE

THE EFFECT OF CBB ON BANK RISK, GIVEN EDI

Table 1: *Shapiro-Wilk Normality test for selected bank fundamentals*

Variable	Obs.	W	V	z	P-value
Capital adequacy ratio	32	0.9569	1.436	0.752	0.2261
Non-performing loans	32	0.9432	1.894	1.326	0.0925
Sharpe ratio	32	0.9453	1.825	1.249	0.1058
Income diversification	32	0.9259	2.472	1.879	0.0302
Z-Score	32	0.9114	2.957	2.251	0.0122
Loan loss allowance	32	0.9140	2.868	2.187	0.0144
The standard deviation of ROE	32	0.4988	16.719	5.847	0.0000
The standard deviation of ROA	32	0.9357	2.144	1.584	0.0567
ROA	32	0.9548	1.508	0.853	0.1968
ROE	32	0.1801	27.351	6.869	0.0000
Management quality	32	0.9011	3.298	2.477	0.0066
Liquidity	32	0.9502	1.660	1.052	0.1464

Note. Table 1 presents results from a test of a normal distribution for selected bank fundamentals on banks in explicit deposit insurance countries and implicit deposit insurance countries.
Source: Author's construction

Table 2: *Two-sample t-test with unequal variances for the variable capital adequacy ratio*

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
EDI Bank	16	0.0992	0.0121	0.0485	0.0733	0.1250
IDI Bank	16	0.0891	0.0038	0.0153	0.0810	0.0973
Diagnostic tests						
t -test	0.7873					
P-value	0.4412					

Note. Table 2 captures the mean difference in the capital adequacy ratio for banks in EDI countries and banks in IDI countries. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction

Table 3: *Two-sample t-test with unequal variances for the variable non-performing loans*

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
EDI Bank	16	0.0171	0.0028	0.011	0.0111	0.0231
IDI Bank	16	0.0245	0.0034	0.0135	0.0173	0.0317
Diagnostic tests						
t -test	-1.6842					
P-value	0.1022					

Note. Table 3 captures the mean difference in the non-performing loans for banks in EDI countries and banks in IDI countries. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction

Table 4: *Two-sample t-test with unequal variances for the variable Sharpe ratio*

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
EDI Bank	16	4.7340	0.7374	2.9499	3.1621	6.3060
IDI Bank	16	4.2079	0.4329	1.7318	3.2851	5.1307
Diagnostic tests						
t -test	0.6152					
P-value	0.5439					

Note. Table 4 captures the mean difference in the Sharpe ratio for banks in EDI countries and banks in IDI countries. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction

Table 5: *Two-sample t-test with unequal variances for the variable Income diversification*

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
EDI Bank	16	0.4116	0.0531	0.2123	0.2985	0.5247
IDI Bank	16	0.4813	0.0301	0.1206	0.4170	0.5455
Diagnostic tests						
t -test	-1.1422					
P-value	0.2642					

Note. Table 5 captures the mean difference in the income diversification for banks in EDI countries and banks in IDI countries. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table 6.
Two-sample t-test with unequal variances for the variable Z-score

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
EDI Bank	16	0.7487	0.1099	0.4396	0.5145	0.9830
IDI Bank	16	0.8659	0.0696	0.2784	0.7175	1.0142
Diagnostic tests						
t -test	-0.9003					
P-value	0.3760					

Note. Table 6 captures the mean difference in the Z-score for banks in EDI countries and banks in IDI countries. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table7: *Two-sample t-test with unequal variances for the variable loan loss allowance*

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
EDI Bank	16	0.0140	0.0033	0.0130	0.0070	0.0209
IDI Bank	16	0.0167	0.0025	0.0100	0.0114	0.0220
Diagnostic tests						
t -test	-0.6624					
P-value	0.5128					

Note. Table 7 captures the mean difference in the loan loss allowance for banks in EDI countries and banks in IDI countries. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table 8: *Two-sample t-test with unequal variances for the variable standard deviation of ROE*

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
EDI Bank	16	0.0562	0.0040	0.0163	0.0475	0.0650
IDI Bank	16	0.1660	0.0443	0.1771	0.0717	0.2604
Diagnostic tests						
t -test	-2.4698					
P-value	0.0257					

Note. Table 8 captures the mean difference in the standard deviation of ROE for banks in EDI countries and banks in IDI countries. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table 9: *Two-sample t-test with unequal variances for the variable standard deviation ROA*

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
EDI Bank	16	0.0057	0.0006	0.0023	0.0045	0.0070
IDI Bank	16	0.0081	0.0004	0.0019	0.0072	0.0091
Diagnostic tests						
t -test	-3.2274					
P-value	0.0030					

Note. Table 9 captures the mean difference in the standard deviation of ROA for banks in EDI countries and banks in IDI countries. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table 10: *Two-sample t-test with unequal variances for the variable ROA*

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
EDI Bank	16	0.0154	0.00192	0.0075	0.0114	0.0194
IDI Bank	16	0.0153	0.0008	0.0034	0.0140	0.0171
Diagnostic tests						
t -test	0.0538					
P-value	0.9576					

Note. Table 10 captures the mean difference in the ROA for banks in EDI countries and banks in IDI countries. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table 11: *Two-sample t-test with unequal variances for the variable ROE*

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
EDI Bank	16	0.1180	0.0112	0.0449	0.0940	0.1419
IDI Bank	16	-1.3453	1.4716	5.8864	-4.4820	1.7913
Diagnostic tests						
t -test	0.9943					
P-value	0.3358					

Note. Table 11 captures the mean difference in the ROE for banks in EDI countries and banks in IDI countries. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table 12: Two-sample t-test with unequal variances for the variable management quality

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
EDI Bank	16	0.0315	0.0029	0.0117	0.0253	0.0378
IDI Bank	16	0.0349	0.0020	0.0083	0.0304	0.0392
Diagnostic tests						
t -test	-0.9220					
P-value	0.3642					

Note. Table 12 captures the mean difference in the management quality for banks in EDI countries and banks in IDI countries. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table 13: *Two-sample t-test with unequal variances for the variable liquidity to total assets*

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
EDI Bank	16	0.2051	0.0159	0.0637	0.1712	0.2391
IDI Bank	16	0.2180	0.0140	0.0555	0.1885	0.2476
Diagnostic tests						
t -test	-0.6087					
P-value	0.5471					

Note. Table 13 captures the mean difference in the management quality for banks in EDI countries and banks in IDI countries. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table 14: *Kruskal-Wallis equality-of-populations rank test for the variable capital adequacy ratio*

Bank name	Obs.	Rank Sum
EDI Bank	16	282.00
IDI Bank	16	246.00
Chi-squared	0.460	
P-value	0.4975	

Note. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table 15: Kruskal-Wallis equality-of-populations rank test for the variable non-performing loans

Bank name	Obs.	Rank Sum
EDI Bank	16	219.00
IDI Bank	16	309.00
Chi-squared	2.876	
P-value	0.0899	

Note. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table 16: Kruskal-Wallis equality-of-populations rank test for the variable Sharpe ratio

Bank name	Obs.	Rank Sum
EDI Bank	16	281.00
IDI Bank	16	247.00
Chi-squared	0.411	
P-value	0.5217	

Note. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table 17: *Kruskal-Wallis equality-of-populations rank test for the variable income diversification*

Bank name	Obs.	Rank Sum
EDI Bank	16	245.00
IDI Bank	16	283.00
Chi-squared	0.513	
P-value	0.4739	

Note. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table 18: *Kruskal-Wallis equality-of-populations rank test for the variable Z-score*

Bank name	Obs.	Rank Sum
EDI Bank	16	256.00
IDI Bank	16	272.00
Chi-squared	0.091	
P-value	0.7630	

Note. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table 19: *Kruskal-Wallis equality-of-populations rank test for the variable loan loss allowance*

Bank name	Obs.	Rank Sum
EDI Bank	16	235.00
IDI Bank	16	293.00
Chi-squared	1.195	
P-value	0.2744	

Note. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table 20: *Kruskal-Wallis equality-of-populations rank test for the variable standard deviation of ROE*

Bank name	Obs.	Rank Sum
EDI Bank	16	175.00
IDI Bank	16	353.00
Chi-squared	11.251	
P-value	0.0008	

Note. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table 21: *Kruskal-Wallis equality-of-populations rank test for the variable standard deviation of ROA*

Bank name	Obs.	Rank Sum
EDI Bank	16	188.00
IDI Bank	16	340.00
Chi-squared	8.205	
P-value	0.0042	

Note. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table 22: *Kruskal-Wallis equality-of-populations rank test for the variable ROA*

Bank name	Obs.	Rank Sum
EDI Bank	16	281.00
IDI Bank	16	247.00
Chi-squared	0.411	
P-value	0.5217	

Note. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table 23: *Kruskal-Wallis equality-of-populations rank test for the variable ROE*

Bank name	Obs.	Rank Sum
EDI Bank	16	261.00
IDI Bank	16	267.00
Chi-squared	0.013	
P-value	0.9100	

Note. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table 24: *Kruskal-Wallis equality-of-populations rank test for the variable management quality*

Bank name	Obs.	Rank Sum
EDI Bank	16	243.00
IDI Bank	16	285.00
Chi-squared	0.626	
P-value	0.4287	

Note. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.

Table 25: *Kruskal-Wallis equality-of-populations rank test for the variable Liquid assets to total assets*

Bank name	Obs.	Rank Sum
EDI Bank	16	254.00
IDI Bank	16	274.00
Chi-squared	0.142	
P-value	0.7063	

Note. EDI Bank means banks in countries with explicit deposit insurance. IDI bank means banks in countries with implicit deposit insurance
Source: Author's construction.