



A University of Sussex PhD thesis

Available online via Sussex Research Online:

<http://sro.sussex.ac.uk/>

This thesis is protected by copyright which belongs to the author.

This thesis cannot be reproduced or quoted extensively from without first obtaining permission in writing from the Author

The content must not be changed in any way or sold commercially in any format or medium without the formal permission of the Author

When referring to this work, full bibliographic details including the author, title, awarding institution and date of the thesis must be given

Please visit Sussex Research Online for more information and further details

Essays on the interplay between bank competition, corporate
governance, financial stability and misreporting in the context of
the global financial crisis

Lazarus Tapuwa Mabvira

Thesis submitted to the University of Sussex for the degree of
Doctor of Philosophy in Finance



September 2017

Declaration

I HEREBY DECLARE THAT THIS THESIS HAS NOT BEEN AND WILL NOT BE,
SUBMITTED IN WHOLE OR IN PART TO ANOTHER UNIVERSITY FOR THE
AWARD OF ANY OTHER DEGREE.

Signature.....

Abstract

The market conditions in the banking sector, the corporate governance structure of banks, and the financial accounting practices have been highlighted among the key causes of the global financial crisis of 2007-2010. In this thesis, I analyse the ‘dark side’ of competition by casting the spotlight on the relationship between competition, corporate governance, financial stability, and financial misreporting. I also bring corporate governance into the fray by analysing its link to financial misreporting. Probing the interplay between banking sector competition, corporate governance, financial stability and financial misreporting provides a fantastic setting to tap into and provide unique insights across the accounting, banking and finance domains.

In putting together this piece of work, I extracted data from sources including Bankscope, Compustat, SEC enforcement releases and the World Bank Doing Business survey among others. In the 1st chapter, I regress financial stability proxies against various competition/concentration proxies using the GMM estimator with an instrumental variable technique to address potential endogeneity. In the 2nd chapter I use difference-in-difference analysis to analyse how changes in the competitive landscape in the US financial services industry instigated by the financial crisis as an exogenous factor led to an increase in misreporting incidences. The 4th chapter is an evaluation of how five corporate governance dimensions impacted on financial misreporting in US commercial banks subject to SEC enforcement actions from 2000 to 2016.

I uncover strong evidence to support the competition-fragility view, without yet being able to disprove the competition-stability view. My results suggest that greater banking competition yields riskier loan portfolios, but this increased risk is more than offset by banks holding higher capital and liquidity thresholds. I also study the link between competition and incidences of financial misreporting in the US financial services industry and the results suggest a significantly positive association between competition and financial misreporting. Furthermore, there is evidence that an exogenous increase in competition because of the financial crisis also fuelled financial misreporting incidences in the financial services industry. I then investigate the impact of corporate governance on financial misreporting in US commercial banks subject to SEC enforcement actions. My results are mixed across the five corporate governance dimensions utilised for this study. Consistent with the ‘agency cost’ hypothesis, I find a negative association between

board size and financial misreporting, yet CEO power asserts a positive association with financial misreporting in violation of both the ‘stewardship’ and ‘entrenchment’ hypotheses. The equity-based portion of executive compensation is negatively related with misreporting, whereas there is a positive association between the cash-based portion and misreporting.

My research not only contributes to literature on competition, market power, bank risk, financial stability, corporate governance, and financial misreporting; but also provide several practical and theoretical implications for regulators, academics, governments and policymakers on the effective and efficient regulation of the governance and competitive landscapes in financial services. I specifically shine the spotlight on emerging literature on the pervasive effects (dark side) of competition from a purely financial services perspective and within the context of the global financial crisis of 2007-2010.

Acknowledgements

I would like to seize this opportunity to convey my deepest gratitude to my first supervisor, Dr Nikolaos Papanikolaou, for his astute, involved and direct supervision approach to my doctoral process. It is an understatement to say he sometimes went beyond the scope of a supervisor to be a mentor when the situation demanded. I could never thank him enough for helping me develop and expand my academic network, itself an impeccable asset for a future career in academia and beyond. I consider it a privilege to have had him as my supervisor and shall be eternally grateful for his sacrifices and investment in the crafting of this piece of work. In the same vein, I also salute my second supervisor, Professor Dimitrios Gounopoulos, for his continued devotion to my work, even as distance came into play with his move away from the University of Sussex. His thoughtful feedback greatly enriched my work.

I acknowledge my Annual Review panel members – Professors Carol Alexander, John Forker, Iqbal Khadaroo, Ranko Jelic and Drs Mike Osborne and Johannes Rauch for their constructive criticism and recommendations alike. Their ideas challenged me to always explore my research ‘in other terms’ which greatly transformed my insight into the topics. I am also indebted to academic staff in the Business and Management Department at the University of Sussex, participants at the 2016 & 2017 International Finance and Banking Society (IFABS) conferences, the 2015 & 2016 Business & Management PhD conferences at the University of Sussex, the 2017 British Accounting & Finance Association (BAFA) conference, and anonymous reviewers of the Journal of International Financial Markets, Institutions and Money and European Accounting Review for their helpful comments, insights, ideas, and suggestions.

I bring out for specific mention my father Pancrasio, sister Nyasha, brothers Simbarashe & Chikomborero, and my in-laws Lovemore & Cecilia Nyakudya for always being there and providing the moral support to enable the process of putting together this piece of work. Last but certainly not least, I acknowledge my PhD peers in the Business and Management department from 2014 to 2017 with whom I always interacted and conferred, especially during my stint as the Business and Management PhD Students Representative for the 2014-15 and 2015-16 academic years.

Dedication

“To the two women in my life, Pamela and Rebecca Mabvira. Throughout my existence

I have stood on the shoulders of true giants.

For whatever it is worth today, I owe a huge chunk to you both.”

Table of Contents

Title page.....	i
Declaration.....	ii
Abstract.....	iii
Acknowledgements.....	v
Dedication.....	vi
Table of contents.....	vii
List of tables and figures.....	x
List of abbreviations.....	xii
 Chapter 1 – Introduction.....	 1
1.1. Background and motivation.....	1
1.2. Market power, bank risk and financial stability in the G7 countries.....	2
1.3. Competition and misreporting in the US financial services industry.....	4
1.4. Corporate governance and misreporting in US commercial banks.....	5
 Chapter 2 – Market power, bank risk and financial stability in the G7 countries.....	 9
2.1. Introduction.....	9
2.2. Literature review.....	11
2.2.1. The CV hypothesis.....	11
2.2.2. The BDN hypothesis.....	14
2.2.3. The MMR hypothesis.....	18
2.3. Hypothesis development.....	19
2.3.1. Competition and insolvency risk hypothesis.....	19
2.3.2. Competition and credit risk hypothesis.....	20
2.3.3. Competition and capital risk hypothesis.....	20
2.3.4. Competition and liquidity risk hypothesis.....	21
2.4. Empirical analysis.....	21
2.4.1. Sample banks.....	22
2.4.2. Regression analysis.....	22
2.4.3. Competition measures.....	25
2.4.4. Bank risk.....	29

2.4.5.	Regulatory, institutional and control variables.....	31
2.4.6.	Descriptive statistics.....	33
2.5.	Discussion of the empirical results.....	35
2.6.	Robustness / sensitivity analysis.....	40
2.7.	Concluding remarks.....	42
Chapter 3 – Competition and misreporting in the US financial services industry.....		57
3.1.	Introduction.....	57
3.2.	Literature review.....	60
3.2.1.	The competition-restraining hypothesis.....	60
3.2.2.	The competition-misreporting hypothesis.....	64
3.3.	Hypothesis development.....	70
3.3.1.	Crisis and misreporting hypothesis.....	70
3.3.2.	Competition and crisis hypothesis.....	71
3.3.3.	Competition and financial misreporting hypothesis.....	71
3.4.	Data and empirical methodology.....	73
3.4.1.	Data and sample selection.....	73
3.4.2.	Financial misreporting measures.....	74
3.4.3.	Measures of competition.....	76
3.4.4.	Control variables.....	79
3.4.5.	The regression specification.....	80
3.5.	Discussion of the empirical results.....	81
3.6.	Robustness / sensitivity analysis.....	83
3.7.	Concluding remarks.....	85
Chapter 4 – Corporate governance and misreporting in US commercial banks.....		98
4.1.	Introduction.....	98
4.2.	Literature review.....	101
4.2.1.	Board size and financial misreporting.....	101
4.2.2.	Block-ownership and financial misreporting.....	104
4.2.3.	CEO power and financial misreporting.....	106
4.2.4.	Compensation mix and financial misreporting.....	108
4.2.5.	Insider representation and financial misreporting.....	110
4.3.	Hypothesis development.....	112

4.3.1.	Board size and financial misreporting hypothesis.....	112
4.3.2.	Block-ownership and financial misreporting hypothesis.....	113
4.3.3.	CEO power and financial misreporting hypothesis.....	114
4.3.4.	Compensation mix and financial misreporting hypothesis.....	115
4.3.5.	Insider representation and financial misreporting hypothesis...	115
4.4.	Empirical analysis.....	116
4.4.1.	Data and sample selection.....	116
4.4.2.	Corporate governance variables.....	117
4.4.3.	Financial misreporting variables.....	118
4.4.4.	Control variables.....	119
4.4.5.	The regression specification.....	120
4.4.6.	Descriptive statistics.....	121
4.5.	Discussion of the empirical results.....	122
4.6.	Robustness / sensitivity analysis.....	127
4.7.	Concluding remarks.....	127
Chapter 5 – Conclusion.....		140
References.....		144

List of tables & figures

2.1. Variable descriptions, abbreviations and sources.....	44
2.2. Sample selection.....	46
2.3. List of countries, bank-year observations and number of banks.....	46
2.4. Descriptive statistics.....	47
2.5. Descriptive statistics: competition and concentration measures by year.....	48
2.6. Descriptive statistics: competition and concentration measures by period.....	49
2.7. Correlation matrix.....	50
2.8. Regression results: the effect of market power on credit risk.....	51
2.9. Regression results: the effect of market power on insolvency risk.....	52
2.10. Regression results: the effect of market power on capital risk.....	53
2.11. Regression results: the effect of market power on liquidity risk.....	54
2.12. Robustness analysis: The Crisis Years.....	55
2.13. Robustness analysis.....	56
3.1. Variable descriptions, abbreviations and sources.....	87
3.2. Accounting enforcement releases breakdown.....	89
3.3. Distribution of misreporting methods.....	89
3.4. Descriptive statistics.....	90
3.5. Correlation matrix.....	91
3.6. Difference-in-difference estimations: competition and financial misreporting....	92
3.7. Difference-in-difference estimations: crisis and competition.....	93
3.8. Difference-in-difference estimations: crisis and financial misreporting.....	94
3.9. Crisis and financial misreporting.....	95
3.10. Robustness analysis: competition & financial misreporting (DISC_LL)P)	96
3.11. Robustness analysis: crisis & competition (HHISL).....	97
4.1. Variable descriptions, abbreviations and sources.....	130
4.2. Accounting enforcement releases breakdown.....	132
4.3. Descriptive statistics.....	133
4.4. Descriptive statistics: corporate governance variables year by year.....	134
4.5. Correlation matrix.....	135

4.6. Regression results: board size and block-ownership.....	136
4.7. Regression results: CEO power and compensation mix.....	137
4.8. Regression results: insider representation.....	138
4.9. Robustness analysis.....	139

List of abbreviations

2SLS:	Two-stage Least Squares
TBTF	Too-Big-To-Fail
CEO:	Chief Executive Officer
CFO:	Chief Financial Officer
GFC:	Global Financial Crisis
GMM:	Generalised Method of Moments
e.g.:	for example
EM:	Earnings Management
LLP:	Loan Loss Provisions
i.e.:	that is
CG:	Corporate Governance
IV:	Instrumental Variable
OLS:	Ordinary Least Squares
HHI:	Herfindahl-Hirschmann Index
SOX:	Sarbanes-Oxley
ROA:	Return on Assets
ROE:	Return on Equity
SEC:	Securities and Exchange Commission
GDP:	Gross Domestic Product
AAERs	Auditing and Accounting Enforcement Releases
UK:	United Kingdom
US:	United States (of America)
G7:	Group of Seven

Chapter 1 - Introduction

1.1. Background and motivation

The aftermath of the global financial crisis has seen competition and corporate governance take centre stage among the key causes of the crisis. Financial stability's place as a key mandate of the bank regulation and supervision authorities is firmly established. The financial crisis of 2007-10 altered the competitive landscape and market structure within the banking system in a fundamental sense. This has culminated in the competition-financial stability relationship coming under sharp focus as an area of immense research interest. Studies in this area have largely been split between the competition-fragility and competition-stability views. The competition-fragility view advanced by Keely (1990) and supported by the likes of Hellman (2000), Beck et al. (2006) & Craig & Dinger (2013) posit that increased competition negatively impacts the stability of the financial system. The competition-stability view fronted by Boyd & De Nicolo (2005) and supported by Schaeck & Cihak (2012) and Carletti & Leonello (2014) among others, argues for the beneficial impact of competition on financial system stability. A third literature strand postulating non-linearity in the competition-financial stability nexus has since emerged fronted by Martinez-Miera & Repullo (2008) and garnered support from Jimenez et al. (2013) among others.

There generally has been a consensus about the welfare-increasing impact of competition on the wider economy Adam Smith (1776). There is however an emerging literature casting the light on the 'dark side' or pervasive effects of competition. I delve into this terrain and probe the interplay between competition and financial misreporting. I split and analyse literature on this into two broad clusters i.e. competition-restraining and competition-misreporting hypotheses. The competition-restraining hypothesis speaks to and touts the beneficial effect of competition on financial misreporting i.e. increased competition has a disciplining effect on managers and result in better financial disclosures since the opportunity cost of misreporting is greater in an ultra-competitive environment Hart (1983); Darrough & Stoughton (1990); Gentzkow & Shapiro (2008); Besley & Pratt (2006). The competition-misreporting hypothesis runs counter to this and essentially postulates that competition increases the occurrences of financial misreporting incidences Milgrom & Roberts (1992). Shleifer (2004) argues that competition triggers a 'race to the bottom' among firms in a competitive industry as they bid to outdo each other. In this

case the opportunity cost of not ‘following the grain’ is equally great in an opposite sense to the one alluded to under the competition-restraining hypothesis Verrecchia (1990); Mullainathan & Shleifer (2005); Bloom et al. (2010); Bagnoli & Watts (2010). Extant literature on this subject mainly document the impact of competition on accounting-based proxies of earnings management. In my thesis, I adopt Accounting and Auditing Enforcement Releases of the US Securities & Exchange Commission as an objective-based proxy for financial misreporting. Furthermore, I investigate whether the global financial crisis altered the competitive landscape in the US financial services industry.

Corporate governance features prominently among the key causes of the financial crisis. Richard (2008) attribute the crisis to the degree of complexity ushered into banking on the back of innovation resulting from the liberalisation of financial services. According to Demirguc-Kunt & Huizinga (2010), investment banking is widely responsible for the crisis that emanated from the US and spread into a global phenomenon. Johnson (2004) posits effective corporate governance as leading to greater accountability, which in turn implies transparent, honest and informative reporting of financial information. The governance of banking institutions has really come to the fore as an area of intense research interest in the post-crisis period Beltratti & Stulz (2012); Pathan & Faff (2013). Banks are highly leveraged institutions which automatically raises some corporate governance implications Hagendorf (2014). The issue of opacity, allied with the complexity of the banking model, makes it difficult for shareholders to keep track of bank operations DeAndres & Vallelado (2008). Against this background, I investigate whether corporate governance – proxied by five dimensions i.e. board size, block-ownership, CEO power, compensation mix and insider representation – is responsible for financial misreporting in US commercial banks subject to SEC enforcement actions. To this end, I adopt Accounting and Auditing Enforcement Releases of the US Securities & Exchange Commission as an objective-based proxy for financial misreporting.

The next three sections of this chapter provide brief outlines of the motivation, methodology, findings and contributions of the three research areas that constitute this thesis i.e. bank competition and financial stability in the G7 bloc, competition and financial misreporting in the US financial services industry and corporate governance and financial misreporting in US commercial banks subject to SEC enforcement actions.

1.2. Market power, bank risk and financial stability in the G7 countries

The stability of the financial system has always been one of the key objectives of bank regulators and supervisors. The global financial crisis of the late 2000s has fundamentally altered the structure of the banking industry, putting the relationship between competition, bank risk, and financial stability at the centre of academic interest. The competition-fragility view which posits that intensified competition in banking negatively influences the stability of the financial sector has been the dominant view. Keely (1990), through a seminal paper on the topic, demonstrates that competition drives margins down, erodes profits and shrinks the franchise value of banks. All this incentivises banks to be riskier, which in turn induces higher insolvency rates and threaten the stability of the financial system. A burgeoning literature has emerged challenging Keeley (1990)'s doctrine and documents a positive link between market power and bank risk-taking. Indeed, Boyd and De Nicolo (2005) show that banks with market power have the ability to charge higher interest rates to firms and this raises borrowers' credit risk as a result of moral hazard. An interesting third view has since filtered through fronted by Martinez-Miera and Repullo (2010) and report a non-linear (U-shaped) relationship between competition and risk.

In order to investigate the relationship between competition and financial stability in the G7 economies, I seek to address two main research questions. (1) whether the impact is homogeneous across several risk types i.e. credit, insolvency, capital and liquidity risk, and (2) whether the financial crisis as an exogenous factor altered the direction of impact in any significant way. A contentious issue in examining the competition-risk-stability nexus is the adoption of bank concentration measures to proxy for competition and I address this by employing three measures of market concentration (i.e. the lerner index, the Herfindahl-Hirschmann index and the C5 ratio), as well as a pure measure of bank competition (i.e. Boone indicator), in my empirical analysis. I am also alive to endogeneity issues that tend to blight a study of this nature i.e. through reverse causality (risk determines competition) or correlation between the market power determinants. I respond to and address endogeneity concerns by using the commonly used instrumental variable (IV) technique.

My results provide support for the competition-fragility view, without necessarily disproving the competition-stability view. More specifically, I document that while higher competition results in increased credit risk via the loan channel; riskier banks are likely to hold higher capital buffers in mitigation. The implication from this result is that in so far as banks are concerned, less competition contributes to a higher degree of

financial stability. The trade-off is that such concentrated banking systems also provide fertile ground for ‘too-big-to-fail’ (TBTF) institutions to breed subjecting the banking system to greater risk overall. In sum, I argue that the benefits of competition need to be balanced against those of concentration towards the maintenance of the overall soundness of the banking system.

Research on the competition-risk nexus in banking remains contested with no academic consensus emerging yet on whether competition results in higher or lower stability levels. This research contributes to and extends current literature by shedding more light on this contentious relationship. I also account for both the linear and nonlinear aspects of the examined relationship. Moreover, I take a broader view by adopting and incorporating into one model four individual risk types, i.e. credit risk, insolvency risk (z-score), capital risk and liquidity risk and to proxy for financial stability. My findings have some important implications for banks, regulators, governments and multilateral financial institutions on the management of bank risk for overall system soundness.

1.3. Competition and financial misreporting in the US financial services industry

The general consensus in the mainstream economics and finance domains has been that competition is a force for good in so far as the attainment of positive economic outcomes is concerned. An emerging literature however challenges this notion of competition being beneficial to the wider economy. In this paper, I delve into this emerging debate on the pervasive effects (dark side) of competition and focus on the interplay between competition and financial misreporting in the US financial services industry. I advance two broad and diverging mechanisms through which competition can affect financial misreporting i.e. the competition-restraining and the competition-misreporting hypotheses. The Competition-restraining hypothesis posits the notion that firms in more competitive industries are less likely to misreport and follow better disclosure and financial reporting practices Gentzkow & Shapiro (2008); Besley & Pratt (2006). The counter theory to this is the competition-misreporting hypothesis which postulates that firms that operate in more competitive environments will have less forthcoming and informative disclosure policies and are more likely to misreport Bloom et al. (2010); Bagnoli & Watts (2010). These contradictory notions on the relationship between competition and financial misreporting in theoretical studies across the accounting, economics and finance domains provide the basis and theoretical underpinning for my study.

The research questions I seek to answer for a more refined understanding of the link between competition and financial misreporting are based on the interplay between competition, financial misreporting and the financial crisis as follows: (1) Did the financial crisis impact on financial misreporting incidences in the United States financial services industry? (2) Did the financial crisis alter the competitive landscape in the financial services industry, and (3) Does the intensity of competition lead to increased financial misreporting incidences in the financial services industry? I regress my main financial misreporting proxy i.e. SEC AAERs against four competition proxies (market size, ease of entry, product substitutability and HHI sales) and a battery of carefully selected control variables. I make use of Difference-In-Difference analysis to identify exogenous shifts in competition, as well as to evaluate how the financial crisis impacted on the occurrence of incidences of financial misreporting in the financial services industry in the pre-crisis and post-crisis periods.

I find that there exists a positive and significant effect of competition on financial misreporting i.e. competition escalates the possibility of financial misreporting incidences occurring. I also document a positive and significant relationship between the crisis variable and competition. These results firmly suggest that the financial crisis altered the competitive landscape in the financial services industry.

To the best of my knowledge, mine would be the first paper of its kind to exclusively focus on a financial services sample and establish a link with financial misreporting. By way of contribution, my research adds to and extends the burgeoning research probing the so-called the “dark side” of competition within markets that shines a light on the negative and undesirable effects of competition in altering the way firms behave in the market place. Governments, regulators and academics alike ought to critically consider the pervasive effects of competition in policy-making, compliance, welfare and other economic deliberations.

1.4 Corporate governance and financial misreporting in US commercial banks

According to Acharya and Richardson (2009) the financial crisis can be attributed to the degree of complexity ushered into banking on the back of innovation resulting from the liberalisation of financial services. The degree of complexity and opacity synonymous with the banking intermediation model raise serious corporate governance issues, which makes this a compelling setting for empirical based research to be instituted. Increased transparency is one of the key aims of corporate governance reforms worldwide and

effective governance by boards of directors is seen as influencing the quality of financial reporting. The governance of financial institutions has really come to the fore in the crisis aftermath Beltratti and Stulz (2012); Pathan and Faff (2013). In this paper, I innovate and contribute to extant literature by bringing together two hot and current topics in banking literature into one study based on a sample of 17 listed US commercial banks from 2000-16.

My main research question seeks to uncover how five carefully selected corporate governance dimensions affect financial misreporting in US commercial banks subject to SEC enforcement actions. To this end, I regress my main financial misreporting dependent variable (i.e. SEC AAERs) against my corporate governance proxies based on five dimensions (i.e. board size, equity ownership, CEO duality, compensation mix and insider representation) and a battery of control variables (i.e. financial leverage, large international auditor, insolvency risk, bank size, SOX and financial crisis). I further decompose the five corporate governance dimensions into sixteen factors to make for a more comprehensive list of proxies that facilitates for richer analytical insight into the topic e.g. I collapse the board size dimension into four factors i.e. total board size, fraction of which female, fraction of which on the audit committee and fraction of which on the compensation committee. I adopt and utilise the instrumental variable technique (IV) in order to address endogeneity issues emanating from reverse causality and multicollinearity resulting from serial correlation among the corporate governance factors.

I document a negative association between board size and financial misreporting consistent with the ‘agency cost’ hypothesis. However, the relationship reverses when using a quadratic term of the same variable. Moreover, the CEO power asserts a positive effect on misreporting in violation of both the ‘stewardship’ and ‘entrenchment’ hypotheses. Additionally, the equity portion of executive compensation is negatively related with misreporting; whereas the association is positive between the cash portion and misreporting.

My findings have got practical implications and speaks to the wider discussion around executive compensation as a critical aspect of bank regulation. Most specifically, I motivate compliance monitors, regulators and shareholders alike with regards to the ongoing agenda for reforms to executive compensation packages.

Even though I use the same dataset for Chapters 3 & 4, the studies have different thrusts thereby necessitating application of different samples and methods. In Chapter 2,

my study contributes to financial misreporting literature by showing that industry attributes like competition could play an important role in influencing firms' propensity to misreport e.g. manage earnings. This is against the backdrop of extant literature on financial misreporting primarily focusing on identifying firm-specific determinants of misreporting e.g. managerial incentives and corporate governance characteristics. In this respect, my study is in sync with recent research which suggests that higher order factors at the industry or country level play a more prominent role in influencing firm policy and governance than firm level factors (e.g. Doidge et al. 2007). I focus my study on the US financial services industry firms (SIC Codes 6000-6999) subject to SEC enforcement actions from 2000 to 2016. In Chapter 3 I revert to convention and accord prominence to how firm-level factors influence financial misreporting using a sample of listed commercial banks subject to SEC enforcement actions in the United States from 2000 to 2016. The variations in sample, variables and methodology can therefore be justified on this basis.

In probing the competition-financial stability relationship in Chapter 2, I use the Instrumental Variable Technique with a GMM estimator Berger et al. (2009), Schaeck & Cihak (2012); whereas I effect a slight variation and adopt the two-step 'system' GMM estimator (within a dynamic panel framework) Arrelano & Bover (1995); Blundell & Bond (1998) to evaluate the relationship between corporate governance and financial misreporting in Chapter 4 Beltratti & Stulz (2012); Pathan & Faff (2013). It is a common strength of the two models that they can be employed in both contexts to address endogeneity concerns arising from an examination of the phenomena under consideration in my study i.e. competition, corporate governance, financial stability and financial misreporting. In Chapter 4 for example, endogeneity concerns can arise from possible interrelationships among corporate governance characteristics such as board size, block-ownership, CEO power, insider representation, compensation mix and financial misreporting Wintoki et al. (2012). I use the lagged dependent variable as the only instrument in my dynamic panel estimations because of a fairly small sample size in Chapter 4, using many instruments would result in estimation bias. Using the lagged dependent variable among the regressors (Athanasoglou et al., 2008) can also cure the well-known persistence in bank profits (Berger et al., 2000). Against this backdrop, using the two-step 'system' GMM estimator was more suited to the study of the relationship between corporate governance and financial misreporting in Chapter 4 compared with the instrumental variable technique with a GMM estimator that I used in Chapter 2.

The rest of my thesis proceeds as follows. In chapters 2, 3, and 4 I present my studies on the previously outlined research topics via the medium of three papers. To be more precise, Chapter 2 investigates the interplay between market power, bank risk and financial stability in the G7 bloc. Chapter 3 explores the association between competition and financial misreporting the US financial services industry. Chapter 4 examines the impact of corporate governance on financial misreporting in US commercial banks subject to SEC enforcement actions. Finally, Chapter 5 provides the concluding remarks.

Chapter 2 – Market structure, bank risk and financial stability: New evidence from the G7 economies

2.1. Introduction

The stability of the financial system has always been one of the key objectives of bank regulators and supervisors. The global financial crisis of the late 2000s has transformed the market structure of the banking industry to a great extent. A new landscape has been created due to the number of mergers and acquisitions which have taken place from the onset of the crisis in 2007 onwards. In addition, many banking institutions have either gone bankrupt, or received financial assistance in the form of bailouts during the crisis. As a result, a relationship which is once again in the forefront is that between competition, bank risk, and financial stability.

Until recently, it was almost widely accepted that intensified competition in banking negatively influences the stability of the financial sector. This view, which is widely known as the competition-fragility view, is central in the Charter Value (CV) hypothesis that focuses on the liabilities side of banks' balance sheets examining competition in the deposit markets. Keeley (1990), who is recognised as the grounding father of this hypothesis, demonstrates that competition drives down margins erodes profits and shrinks the franchise value of banks; and with less to lose, banks have strong incentives to engage in riskier investment activities which induce higher insolvency rates and threaten the stability of the financial system.

A burgeoning literature that has more recently turned to examine both the liabilities and the assets side of banks' balance sheets challenged Keeley (1990)'s doctrine, documenting a positive link between market power and bank risk-taking. Indeed, Boyd and De Nicolo (2005) show that banks with market power have the ability to charge higher interest rates to firms and this raises borrowers' credit risk as a result of moral hazard. Boyd et al. (2006) and De Nicolo and Loukoianova (2007) provide among others further empirical support to this negative link between market concentration and financial stability.

A third view on the competition-risk-stability nexus is provided by Allen and Gale (2004). Based on a variety of modelling approaches, they investigate the relationship that holds between competition and financial stability and find no clear trade-off between the two variables. In a similar vein, Martinez-Miera and Repullo (2010) report a non-linear

(U-shaped) relationship between competition and risk. Their model - which extends that of Boyd and De Nicolo (2005) - reveals that as the number of banks increases and competition becomes more intense, total bank risk decreases. Nevertheless, the sign of the examined relationship holds up to some certain level of competition. Beyond that level, banks are found to take more risk thus exerting a harmful impact on the stability of the system.

Even though the link between competition and financial stability is a widely researched area, there is yet no academic consensus on whether competition results in higher or lower stability levels. In this paper, I contribute to current literature by shedding more light on this contentious relationship. Towards this, I test all three views that currently hold in the literature by accounting for both the linear and nonlinear aspects of the examined relationship. Moreover, while previous research is largely focused on a single bank risk type as a proxy for stability (see, e.g. Boyd and De Nicolo, 2005; Schaeck and Cihak, 2012), I take a broader view adopting three individual key risk types, i.e. credit risk, capital risk, and liquidity risk together with a measure of overall bank risk captured by the z-score as a proxy for financial stability. Such an approach allows me to provide a richer insight and a more comprehensive response to a crucial research question which asks whether the impact of competition is homogeneous across different risk types. A major issue in examining the competition-risk-stability nexus has been the adoption of bank concentration as a proxy for competition. To address this, I clearly distinguish between competition and concentration by employing three measures of market concentration in our empirical analysis as well as a pure measure of bank competition.

I conduct a cross-country analysis based on the commercial banking sectors of the G7 economies. My focus on these economies is due to several important reasons. First, the G7 banking sectors were seriously hit by the crisis and have therefore undergone considerable changes in their market structure due to large-scale bailouts, mergers, acquisitions and failures. Second, the G7 countries account for more than 50% of the GDP of the global economy. Third, an understanding of the competition-risk dynamics in the leading world economies is vital because the latter set the tone for other economies to follow in so far as best practice in bank regulation and supervision is concerned. Finally, G7 is the most representative set of economies in terms of banking and financial services sophistication, business models, and standards to which all other western-type economies wish to adhere. My data period extends from 2000 to 2015, thus including the period

preceding the global financial crisis which erupted in 2007-10, the crisis years as well as the post-crisis era.

I provide support to the competition-fragility view, without yet being able to reject the competition-stability view. More specifically, my results suggest that while higher competition results in increased credit risk via the loan channel; riskier banks are likely to hold higher capital buffers in mitigation. The implication from this result is that in so far as banks are concerned, less competition contributes to a higher degree of financial stability. The trade-off is that such concentrated banking systems also provide fertile ground for ‘too-big-to-fail’ institutions to breed subjecting the banking system to greater risk overall. In sum, I argue that the benefits of competition need to be balanced against those of concentration towards the maintenance of the overall soundness of the banking system.

The rest of the paper is structured as follows. Section 2 discusses the related literature through the lenses of the three prevalent views. Section 3 develops the hypotheses to be tested. Section 4 presents the data set, the model variables and the underlying empirical methodology. Section 5 reports and discusses the empirical findings and their policy and business implications. Section 6 presents the robustness analysis I conduct, whereas Section 7 offers a set of concluding remarks.

2.2. Literature review

The literature on the competition-risk-stability nexus can essentially be distilled into three broad strands: the Charter Value Hypothesis (henceforth, CV Hypothesis), the Boyd and DeNicolo (2005) Hypothesis (henceforth, BDN Hypothesis), and the Martinez-Miera and Repullo (2010) Hypothesis (henceforth, MMR Hypothesis).

2.2.1. The CV Hypothesis

The CV hypothesis reflects the competition-fragility view and has been the conventional view on the competition-risk-stability nexus, which is backed by a large body of literature. Following the widespread deregulation and the relaxation of state branching restrictions in the U.S. banking sector during the 1980s, Keeley (1990) commissioned a ground-breaking study. Based on a data set that extended from 1971 to 1986, he regressed the capital-to-asset ratios of 85 large U.S. bank holding companies on their market-to-book asset ratios, utilising Tobin’s q as the key measure of market power. He founded that increased competition erodes market power, decreases profit margins,

and, eventually, results in shrinking bank charter values. This mechanism provides banks with incentives to take on more risk to compensate for the squeeze in profitability. Restrained competition, on the other hand, encourages banks to protect their higher franchise values by pursuing safer policies and this has a positive impact on the stability of the system.

Against the background of the negative impact of competition on the stability of the banking system, the reasoning behind the stability-enhancing effect of concentrated systems becomes apparent. Greater market power for a bank is linked to greater charter value. As an intangible asset, the charter value can only have meaning if the bank remains alive. One can clearly glean from this fact that the opportunity cost of going bust is higher for banks with a greater charter value. Therefore, charter value has a restraining effect on bank risk-taking behaviour and can, in fact, render the task of regulators to maintain financial stability less cumbersome. The need to preserve charter value is greater and these banks naturally tend to behave more prudently, e.g., through keeping more equity capital as a buffer against financial turmoil or an economic downturn, by holding less risky portfolios, or by presiding over lean loan portfolios.

The Glass Steagall Act (GSA) of 1933 was specifically crafted to curb competition in banking by limiting the scope of activities banks could venture into and restricting entry through stringent licensing and high capital requirements. Keeley (1990) conducted his study against the background of the gradual dilution of GSA on the back of heavy lobbying from large and systemically-important banks in the U.S. for greater liberalisation, which would allow for mergers and acquisitions essentially culminating in banks transacting insurance business and growing their investment banking portfolios among other activities. An argument can be made that during the period from 1933 when the GSA was introduced to 1999 when it was repealed by the Gramm-Leach-Bliley Act, there had not been many bank failures and panics comparable to the magnitude and scale of bankruptcies during the global financial crisis of 2007-10.

Hellmann et al. (2000) focus on the liabilities side of bank's balance sheet to investigate whether capital requirements are an effective regulatory tool to curb moral hazard in a highly liberalised environment. In line with Keely (1990), they document that increased competition in the deposit market undermines prudent behaviour leading to depressed profitability which, in turn, destroys charter values, thereby escalating the incentives for moral hazard. They cite the Japanese banking crisis and the U.S. Savings and Loans crisis as examples of excessive risk-taking that yielded enormous social costs.

They attribute this to the financial liberalisation process, which pulled down branching restrictions and barriers to entry with the purpose to render the banking system more competitive. This phenomenon is more acute in an environment with comprehensive deposit insurance coverage. In other words, banks have stronger incentives to take on more risks in a market where a government safety net is in existence thus making the system more fragile. Like Smith (1984), who proposes deposit rate ceilings as a more effective and appropriate regulatory measure to rein in deposit market competition, Hellman et al. (2000) argue that deposit rate controls are more efficient than capital requirements as an instrument to curb the market-stealing effect and, at the same time, to incentivise banks to behave more prudently.

Consistent with the afore-mentioned findings, Craig and Dinger (2013) show that deposit market competition leads to an upsurge in the cost of bank liabilities, which results in a squeeze in bank profitability. This alters bank behaviour and leads to a depletion of bank charter values thereby reducing financial stability. Gan (2004) and Beck et al. (2006) also endorse the CV hypothesis. Gan (2004) casts the spotlight on the Texas real estate crisis and employs the logarithmic transformation of the number of thrifts and the number of bank branches in a town as the two measures of competition in his empirical analysis. He finds that competition reduces banks' franchise value, which in turn induce banks to take on more risk. Using an international sample of banks, Beck et al. (2006) reaches the conclusion that the likelihood of a financial crisis is lower in economies with concentrated banking systems.

The findings of two recent studies are also consistent with the CV hypothesis as reflected in the competition-fragility view. Berger et al. (2009) study the impact of competition on financial stability using a sample of 8,325 banks from 23 industrial countries from 1999 to 2005. The results reveal a negative relationship between market power and loan portfolio risk. Also, they find that banks in competitive environments tend to hold higher capital buffers as a risk-mitigating technique that offsets the increased credit risk in their portfolios. Along the same lines, in a sample consisting exclusively of Spanish banks, Jimenez et al. (2013) document a positive relationship between market power in the loan market and portfolio risk. They found that the amount of non-performing loans decreases as the market becomes more concentrated and, as a result, financial stability is promoted.

Other studies examine the competition-risk-stability nexus from a market structure perspective, providing support to the CV hypothesis. For instance, Bordo et al. (1995)

compare the performance of the Canadian and U.S. banking systems in terms of efficiency and stability based on historical data. They observe a period during which the Canadian banking market steadily turned from a system with many competing banks to an oligopoly through a large number of consolidations and report a greater stability in the Canadian system compared to the U.S. system in terms of failure rates during that period. They point to the oligopolistic nature of the Canadian system as the main reason for its relative stability compared to the fragmented and competitive nature of that of the U.S. The broader implication is that a more concentrated banking market can be synonymous with stability, which provides support to the competition-fragility view. A system dominated by a few large banks is more stable because these banks have higher charter values, implying greater opportunity cost of failure thereby making banks more prudent in their risk-taking behaviour.

The relevance of market structure in the competition-risk relationship was brought into question by Matutes and Vives (1996), who argue that competition does not necessarily create instability by itself. They show that bank vulnerability and bank runs can take off in spite of competition; put it otherwise, they can occur under any market structure. However, a recent paper by Mirzaei et al. (2013) rebuts the assertion of market structure irrelevance in so far as bank profitability and stability are concerned. It is found that greater market power leads to higher profitability in advanced economies. Higher profitability, in turn, implies safer banks, and, hence, greater financial stability. Lee and Hsieh (2013) also explore the competition-profitability relationship focusing on Chinese banks and provide support to the findings of Mirzaei et al. (2013). They reach the conclusion that competition strengthens overall financial stability by improving the profitability of banks. Most recently and in direct contradiction with the CVR hypothesis, Fiordelisi & Mare (2014) used the lerner index as the market power / competition proxy to assess the relationship between competition and bank soundness among a large sample of European cooperative banks between 1998 and 2009 and found a positive association between competition and banking system stability.

2.2.2. The BDN Hypothesis

A considerable argument can be mounted against the focus of the studies outlined above on a specific channel, i.e., either on the deposit or the lending channel. However, commercial banks, being in the business of taking deposits and providing credit, compete in either channel simultaneously. Therefore, papers that embrace this fact and develop

models that cater for and accommodate both channels are expected to produce more robust findings. Boyd and De Nicolo (2005) argue that existing research on financial stability assume that competition is allowed in deposit markets while suppressed in credit markets. Hence, they proceeded to introduce models where competition is allowed in both markets. Studies that belong to this strand of literature challenge the mainstream CV hypothesis / competition-fragility view, documenting a positive relationship between market power and bank risk.

Boyd and De Nicolo (2005) establish the competition-stability view showing that enhanced market power in the loan market results in higher bank risk as the higher interest rates charged to loan customers make it harder for them to repay their loans. Further, higher rates exacerbate the moral hazard incentives of borrowers to shift into riskier projects due to adverse selection considerations. They also claim that a highly concentrated banking market may lead to excessive risk-taking if banks are considered to be too-big-to-fail and, as such, are more likely to be explicitly or implicitly protected by the government safety net.

The postulations of Boyd and De Nicolo (2005) on the impact of high rates on borrowers' risk-taking behaviour are strongly supported by an earlier study, that of Stiglitz and Weiss (1981). The latter study posits that higher interest rates increase the riskiness of loan portfolios by exacerbating adverse selection and moral hazard. When rates are high, it is more likely that bank loans will be directed to risky borrowers, who are willing to invest in high-risk investment projects aiming for higher returns. In other words, higher rates tend to deter safe borrowers from the credit market, but they constitute an inducement to venture into riskier projects, thus increasing the probability of default. This eventually results in an increase in non-performing loans, which ultimately undermines financial stability.

In line with Boyd and De Nicolo (2005), the studies of Boyd et al. (2006, 2009) and that of De Nicolo and Loukoianova (2007) provide empirical support to the negative link between market concentration and financial stability. Overall, this strand of literature builds upon the competition-stability view according to which a more concentrated banking system with a smaller number of entities leads to an upsurge in total problem loans and insolvencies thus enhancing the probability of systemic distress. This view is in line with the Too-Big-To-Fail (TBTF) doctrine (Mishkin, 1999), which suggests that managers of large banks with high market power usually follow a gambling policy taking risky financial decisions. This happens because they share the belief that in case the

gamble does not win, authorities will not allow big banks to fail because the whole system might collapse. In this way, a more monopolized banking system leads to greater risk-taking, which is detrimental to bank soundness.

The findings from an earlier study by Boyd and Graham (1991) who approach the examined relationship from an angle where they seek to answer the question whether large banks fail less often than small banks in the U.S., contradict the postulations of Bordo et al. (1995) as presented in Section 2.1. Boyd and Graham (1991) find that the cumulative annual failure rate for large banks is higher than that for small banks. The intuition behind this is that a market punctuated by small banks (implying a higher level of competition) is more stable than a concentrated market punctuated by a few big banks.

The relationship between competition and financial stability has also been explored from the perspective of bank capitalisation. Schaeck and Cihak (2012) use 8,584 bank-year observations from 10 European countries to test whether increased competition causes banks to hold higher capital ratios. Their findings support the BDN Hypothesis: banks hold more capital as a buffer when operating in a more competitive environment and this enhances the stability of the system. In a similar vein, Allen et al. (2011) examine the relationship between credit market competition and capital regulation. They posit that where credit markets are competitive, market discipline from the asset side of the balance sheet induces banks to hold increased levels of capital as a way to commit to monitor and attract safe borrowers. Higher capital enhances the charter value of banks thereby increasing financial stability. An interesting question to pose here is whether holding capital above the regulatory minima is sufficient to maintain financial stability. Several banks went bankrupt during the 2007-10 crisis despite holding higher capital thresholds. This suggests that the ‘welfare-maximising’ capital level for banks may be well above the regulatory minima depending on how stringent they have been pitched in the first place.

In another study that reinforces the stability-enhancing effect of competition on financial stability, Inderst (2013) shows that corporate borrowers care about the financial strength of a bank because this determines to a significant extent their future access to credit. He argues that where banks’ risk positions are transparent to commercial borrowers, prudence can become a key competitive variable as competition restrains the risk appetites of such banks thereby improving overall stability.

Carletti & Leonello (2014) posit the argument that competition is beneficial to financial stability as it induces banks to behave prudently and hold more liquidity. This

ties in with the conclusion reached in Boyd and De Nicolo (2005) and establishes the study firmly in the competition-stability view. It is noteworthy to state that the two studies converge in their key postulations even though the former one is focused on liquidity risk while the latter on credit risk as the source of instability.

Akins et al. (2014) examine the relationship between competition and financial stability in the post-crisis period focusing on the U.S. real estate market and find that banks which face less competition are more likely to engage in risky activities and, hence, to fail. In a similar vein, Beck et al. (2013) find a negative relationship between market power and bank risk-taking. They emphasise that the strength of the relationship between the two variables varies across countries based on the institutional environments. Schaeck et al. (2009) also conclude that greater competition results in a reduction in bank risk-taking. More concretely, they find that the likelihood of experiencing a financial crisis is lower for countries with more competitive banking systems. Boyd et al. (2009) find that when competition is higher, borrower risk is lower, and the loan-to-asset ratio is higher, implying that the bankruptcy risk of banks is lower.

In a recent study on the interplay between competition, efficiency and stability Schaeck and Cihak (2014) empirically examine the mechanism through which competition contributes to banking system stability as widely suggested in most of the recent papers on the competition-risk nexus in banking. They use representative data from the European banking system from 1995-2005 and exploit the unique features of a relatively new competition measure i.e. the Boone Indicator to investigate the mechanism through which competition contribute to financial stability. The results found efficiency to be the conduit through which competition enhances the stability of the banking system. Efficient banks are by extension more stable thereby ultimately enhancing the stability of the system as a whole. However, competition-enhancing policies need to be augmented by efficient regulation to have positive effects on bank efficiency and stability. A plethora of studies have since filtered through in emphatic support of the competition-stability view i.e. BDN hypothesis. Akins et al. (2016) examined the link between competition and financial stability in the context of the financial crisis and vouched for the competition-stability view i.e. banks facing less competition are more likely to engage in risky activities, face regulatory intervention and thus more likely to fail. In another recent paper supporting the BDN hypothesis on the competition-risk nexus in banking, Anginer et al (2014) examined the correlation in the risk-taking behaviour of banks using bank-level measures of competition. They document a negative relationship between competition

and systemic risk i.e. that competition encourages banks to take on more diversified risks, making the banking system more fragile to shocks. Contributing to the same research area and more specifically on competition and bank opacity, Jiang et al. (2016) posed the question whether regulatory reforms that lowered barriers to competition increased or decreased the quality of information banks disclose to the public. They found that an intensification of competition reduced abnormal accruals, loan loss provisions and the frequency of financial statement restatement. They also document that competition reduced opacity yet enhanced the ability of markets to monitor banks. Most recently on the competition-risk nexus, Goetz (2017) investigated whether an increase in competition leads to an increase or decrease in bank stability and found that deregulation lowered entry barriers into urban banking, and this had the positive effect of increasing market competitiveness. This increased market contestability improves bank stability by reducing banks' failure probability, share of non-performing loans and increases profitability.

2.2.3. The MMR Hypothesis

In a break from either the pure competition-fragility or competition-stability views as presented in the preceding sections, Martinez-Miera and Repullo (2010) document a non-linear relationship between competition and financial stability. Their model extends that of Boyd and De Nicolo (2005) revealing that, as the number of financial institutions increases, and competition is boosted, a decrease in bank risk-taking is reported. However, this relationship holds up to a certain point. Beyond that point, competition leads banks to increase their risk and this becomes harmful for systemic stability.

There are essentially two competing forces, which ultimately yield this U-shaped relationship: the risk-shifting and the margin effects. The former positively influences financial stability via the reduction in borrowers' default rates because of lower loan rates. The intuition behind this is that, when banks charge lower rates, the ability of borrowers to repay their loans increases. On the other hand, the margin effect shows that lower loan rates diminish bank revenues from performing loans thereby limiting the capacity of banks to withstand financial shocks and turbulences. In sum, the model hints at an optimum level of competition beyond which the trend reverses.

Assessing the impact of competition on bank risk-taking, Jimenez et al. (2013) also provide evidence of a non-linear relationship between the two variables. They use data from the Spanish banking system in both the deposit and credit markets to endorse the

MMR Hypothesis. Nevertheless, their findings hold true only when pure concentration measures are used to proxy competition; when the Lerner Index is utilised instead, the results support the CV Hypothesis.

A relevant body of emerging literature widely embraces and acknowledges the uniqueness of banking institutions in terms of the environment and the market dynamics within which they operate. Liu and Wilson (2013) focus on the Japanese banking industry to test whether the relationship between competition and risk varies across different types of banks, i.e., city versus regional banks. Their empirical results are interestingly mixed. The impact is not homogeneous but rather varies based on the risk level of the bank in relation to the competitiveness of the environment within which the bank operates. They find competition to have a positive impact on the risk profile of the less risky banks, and a negative impact on their risky counterparts. Drawing from a sample of 17 Latin American countries between 2001 and 2008, Tabak et al. (2013) assessed how bank size and market concentration affect performance and risks. They found systemically-important banks to outperform others in terms of both profit and cost i.e. implying support for the charter-value hypothesis this way. However, an unequal banking market in terms of assets is detrimental to the performance of smaller banks, thus decreasing the stability of the whole system. Regulators therefore ought to work to reduce the size gap between large and small banks as a result.

2.3. Hypotheses development

I can now rely on the literature reviewed in Section 2 to describe the channels through which competition and concentration affects risk and, in turn, financial stability and to proceed to formulate the relevant hypotheses to be tested.

2.3.1. Competition and insolvency risk

Insolvency risk has been widely used in the empirical banking literature as a proxy for financial stability (see, e.g., Schaeck et al., 2009; Laeven and Levine, 2009; Berger et al., 2009; Demirguc-Kunt and Huizinga, 2010; Houston et al., 2010; Lepetit and Strobel, 2013). Most of these studies find that insolvency risk increases in more concentrated banking markets. In other words, the likelihood of bank failure is lower under competitive market conditions, which is in line with the BDN Hypothesis. This array of literature provides the basis and directly leads into the development of my first hypothesis:

H1: *Stronger competition reduces bank insolvency risk and, hence, contributes to a sounder financial system*

2.3.2. Competition and credit risk

The findings in the literature are mixed with regards to the impact of competition on credit risk. Studies that support the CV Hypothesis document a negative relationship between market power and credit risk. In particular, they show that greater market power leads to a decrease in loan portfolio risk, thus promoting financial stability. Along the same lines, they find that competition exerts a detrimental impact on loan portfolio risk. The BDN Hypothesis, on the other hand, illustrates that banks with market power earn monopoly rents by charging higher interest rates on loans making it harder for borrowers to service their loans. Further, that higher interest rates increase adverse selection problems in that safer borrowers are discouraged increasing the likelihood of risky projects being funded, which leads to an increase in non-performing loans, thus ultimately undermining financial stability. All these result in an increase in the level of credit risk in the economy, which constitutes a threat for the stability of the system. This mixed literature on the impact of competition on credit risk set the tone for the formulation of my second hypothesis, which is in line with the BDN Hypothesis:

H2: *Lower competition is synonymous with increased credit risk*

2.3.3. Competition and capital risk

The stability-enhancing effect of competition on bank capital adequacy seems to be indisputable in all three literature strands as presented in Section 2. A higher capital threshold translates into a higher charter value, and this, in turn, increases the opportunity cost of failure. Consequently, banks have incentives to act more prudently and take less risky investment decisions, thereby promoting financial stability. In addition, the assertion of Allen et al. (2011) that banks in competitive environments hold higher capital levels as a means to attract safer borrowers further endorses the positive relationship between competition and the level of capital buffers. It therefore follows that creditworthy borrowers are attracted to banks with higher capital levels as they are most likely to benefit from close monitoring which adds value to their project. According to Schaeck and Cihak (2012), borrower performance improves with increased and close monitoring

from the lending bank as the borrower benefits from the financial expertise of the bank. The above informs and guides the formation of my third hypothesis:

H3: Competition has a restraining effect on financial stability as it compels banks to hold higher capital ratios

2.3.4. Competition and liquidity risk

Liquidity risk, together with capital risk, lies at the centre of Basel III regulations in response to the latest crisis. Whilst the extant literature on the competition-risk-stability nexus widely utilise credit risk as the conduit through which banks import risk into the financial system, liquidity risk can be an equally devastating avenue of instability. Indeed, the maturity mismatch between assets and liabilities can become a crucial source of risk if banks are unable to raise liquidity on demand (Brunnermeier and Pedersen, 2007). When liquidity conditions tighten, borrowing becomes expensive and illiquid assets are disposed at fire sale prices. Ultimately, this leaves banks unable to withstand any liquidity shocks and, as such, exposed to insolvency. Carletti and Leonello (2014) show that competition is beneficial to financial stability as it induces banks to behave prudently and hold more liquidity. In other words, the opportunity cost of holding reserves is greater in more concentrated markets. A similarity can be gleaned from this with my preceding capital risk hypothesis where there is broad support for the stability-enhancing effect of competition on capital thresholds. To this end, I cast the spotlight on liquidity risk and frame my fourth hypothesis:

H4: Competition induces banks to strengthen their liquidity positions as a means of safeguarding their franchise value

2.4. Empirical analysis

There are mainly two approaches in the literature to assess the competition-risk-stability nexus: the cross-country and the single-country set-up. The former approach provides an insight into the average relationship between competition and risk for a set of countries (see, e.g., the studies of Turk Ariss (2010) on developing countries and that of Berger et al. (2009) on a set of industrialised economies). In my empirical analysis, I adopt and apply the cross-country approach to the G7 economies, i.e., Canada, France, German, Italy, Japan, United Kingdom and the United States.

2.4.1. Sample banks

There has been a broader agreement amongst bank regulators on the ‘ring-fencing’ of commercial from investment banking activities as a means of separating the safe from the risky banking arms. This imposes the need to focus on the competition-risk-stability nexus from a purely commercial banking perspective. I therefore exclusively focus on commercial banks by filtering out the cooperative, savings, and investment banks as well as the credit unions/associations. Even though some of these institutions primarily take deposits and grant loans, they often have other business objectives to satisfy. In addition, they do not attract the same regulatory scrutiny and oversight as commercial banks, which makes their analysis a rather arduous and misdirected exercise.

I obtain my sample of commercial banks from the Bureau van Dijk Bankscope database. As shown in Table 2.2, the initial sample consists of 53,616 bank-year observations within the jurisdiction of the G7 group of countries over the period 2000-2015. I apply several filtering rules to eliminate all the non-representative data. Firstly, I exclude the banks with missing observations for more than half of our sample period (that is, 8 years or more), and also those with missing income statement data. Secondly, I leave out those with negative equity values. And, finally, I exclude all banks with equity levels in the top and bottom 1% of the tail distribution as a means of combating the likely dominance of my study by the U.S. banks, which comprise the majority of my sample banks. Applying these filtering rules provides me with a sample of 49,625 bank-year observations, which is composed of 2,899 commercial banks. The bank-year observations and the number of banks for each of the G7 economies are presented in Table 2.3.

2.4.2. Regression analysis

My regression model is based on a panel data set and takes the following specification:

$$risk_{it} = b_0 + b_1 Comp_{itc} + b_2 Comp_{itc}^2 + b_3 RV_{tc} + b_4 IV_{tc} + b_5 MC_{tc} + b_6 IB_{itc} + b_7 AC_{itc} + b_8 BC_{itc} + b_9 CR_{tc} + \varepsilon_{itc} \quad (2.1)$$

In this equation, the subscripts i, t, c refer to bank, time and country respectively. All the bank-level variables are estimated as the average of a particular variable obtained for each bank for each period per country i.e. I initially calculate at the bank-year level and then average by country on a yearly basis between 2000 and 2015. This allows me to

maintain (and not average out) vital phenomena at the bank-level which could otherwise be lost by country-level averaging of bank-specific variables. The country-level variables are averaged for each period per country and included in the regressions Berger et al. (2009); Fiordelisi & Mare (2014). $risk_{it}$ is a vector of bank-specific risk estimates which is proxied by the z-score, non-performing loans to total loans ratio (NPLTL), equity to total assets ratio (ETAR) and cash deposit ratio (CDR) (for insolvency, credit, capital and liquidity risk respectively); $Comp_{itc}$ is a vector of the linear term of the competition and concentration measures i.e. Lerner Index, Boone Indicator, C5 ratio and HHI loans. $Comp_{itc}^2$ is a vector of the quadratic term of the competition measures (i.e. Lerner index, Boone indicator, C5 ratio & HHI loans). This has been built into the model to allow for the non-linear hypothesis advanced by Martinez-Miera & Repullo (2010) which contends that the competition-financial stability relationship is non-linear; RV_{tc} is the country-level regulation variable and measures the overall quality of supervision in a country i.e. capital stringency (CAPSTRI); IV_{tc} is the country-level institutional framework variable and captures the strength of institutions in a country i.e. depth of information sharing (DINFOS); and MC_{tc} is the country-level macroeconomic variable capturing variations in the macroeconomic environments of the sample countries i.e. GDP growth (GDPGR). Country-specific variables i.e. regulatory, institutional and macroeconomic variables change slowly over time. I consider the last updated dataset to be the current one until a new and up to date set comes along Beck et al. (2013); $SIZE_{itc}$ represents a bank-level variable capturing individual characteristics of bank i at time t in country c i.e. bank size (BANSIZ) Berger et al. (2009); IB_{itc} is a bank-level variable capturing individual characteristics of bank i at time t in country c i.e. the interbank ratio (IBANK) Fiordelisi et al. (2014) AC_{itc} is a bank-level variable capturing individual characteristics of bank i at time t in country c i.e. asset composition (ASSCOMP) Berger et al. (2009); CR_{tc} is a crisis dummy to capture the effect of the global financial crisis and is equal to 1 for the crisis years (from 2007 to 2010), otherwise equal to zero for the non-crisis years (pre & post-crisis periods); and ε_{itc} is a vector of the random errors.

I retrieve bank-level financial information from the Bankscope database (ASSCOMP, IBANK, BANSIZ, ZSCORE, NPLTL, ETAR, LERNER, HHIL& CR5); while country-level variables data are obtained from the World Bank Development Indicators (GDPGR) (Business (2011), Fraser Index (LEGRI) (Gwartney et al. (2008), the Heritage Foundation (BANFRE) (Miles et al. (2006), Barth et al. (2013) (ACTRES,

PERGO), Beck et al. (2010) (CAPSTRI), Demirguc-Kunt et al. (2005) (DEPINS), Financial Structure Database (DINFOS, STOMTU)¹. Again, country-specific variables i.e. regulatory, institutional and macroeconomic variables change slowly over time. I consider the last updated dataset to be the current one until a new and up to date set comes along Beck et al. (2013). The Bankscope database reports detailed balance sheet and income statement information for both private and public banks of any given country. The database has been widely used in the banking literature and provides harmonised data that allows for cross-country comparisons as is the case in this study.

I adopt the Instrumental Variable (IV) technique with General Method of Moments (GMM) estimator to address the potential endogeneity issues of the competition and concentration measures in this paper Berger et al. (2009); Schaeck & Cihak (2012). Endogeneity can arise from reverse causality e.g. when a bank's degree of market power is dependent on the riskiness of its loan portfolio. A bank that swells its loan portfolio as a growth strategy assumes greater risk, but the resultant increase in profitability accruing to the bank may be a source of increased power for the bank in the market place.

Heteroscedasticity is a common challenge in using empirical data and has the effect of rendering the usual diagnostic tests for endogeneity invalid when present. In the presence of heteroscedasticity, the Instrumental Variable (IV) coefficient estimates remain consistent but the estimates of their standard errors are inconsistent, and this ultimately prevents valid inference and thus renders the GMM estimator inefficient. Prior to running the GMM regressions, I therefore test for heteroscedasticity using the Breusch-Pagan and Cook-Weisberg tests and they both confirm its presence. This justifies my choice of the GMM estimator introduced by Hansen (1982) as it is widely touted to be the most effective to use when confronted with Heteroscedasticity of an unknown form as is the case here.

I use the first-stage F-statistic to test for the relevance of the instrumental variables; rejecting the null hypothesis implies that the variables are not exogenous. I proceed to utilise Hansen's J-Statistic of over-identification to test for instrument validity; rejecting the null hypothesis implies that the instruments are invalid. The GMM estimator is adopted to address the likely endogeneity of competition and concentration measures but it can only apply in the absence of heteroscedasticity Hansen (1982). In using the

¹ Table 2.1 provides an outline of the descriptions, sources and abbreviations of the dependent, explanatory and instrumental variables used for this study.

instrumental variable technique with a GMM Estimator, I follow Berger et al. (2007) and adopt activity restrictions, banking freedom and percentage of government owned banks as instruments for the competition proxies. Schaeck & Cihak (2007) and Schaeck & Cihak (2012) used the same instruments, but with a 2SLS technique. Activity restrictions determine the scope of banks' business activities and are proxied by an index taking on values between (1) and (4) for categories that capture information on whether banks can engage in securities, insurance, and real estate activities, and if they can hold stakes in non-banks. The activities are classified as unrestricted (1), permitted (2), restricted (3), or prohibited (4) and higher values indicate greater restrictions. I source this variable from Barth et al. (2013). I adopt and use banking freedom as an indicator of banking system openness. The index offers data on whether foreign banks can operate freely, on the difficulties faced when establishing banks, and on government influence over credit allocation. The index ranges from (1) to (5), higher values indicate fewer restrictions and I source this variable from the Heritage Foundation Berger et al. (2009). Finally, I also use the percentage of government-owned banks in a market as an instrument and I source it from Barth et al. (2013). Percent of government owned impacts the competitive situation directly in much the same fashion as banking freedom; the impact being more pronounced as it leaves banks susceptible to political decisions. Table 2.1 presents the key variables used in this paper at a glance.

2.4.3. Competition measures

Nicolo et al. (2006) conclude that the probability of bank failure is higher in concentrated markets. However, upon closer scrutiny, the results are not so emphatic. The correlation coefficient and the regression parameter estimate between concentration and financial stability are negatively significant (i.e., -0.06 & -0.0004 respectively), implying a trade-off between competition and financial stability. However, both are very close to zero, thereby hinting at a possible lack of an economically meaningful relationship between concentration and stability.

There is an important point to note: both Boyd and De Nicolo (2005), Boyd et al. (2006, 2009) and De Nicolo and Loukoianova (2007) draw their conclusions from using pure concentration measures to estimate market structure. It has become widely accepted in the competition-risk nexus in banking that competitive conduct in banking cannot be sufficiently estimated using concentration indicators. In evaluating the degree of

competition in the German banking industry, Moch (2013) reinforces the argument that concentration measures cannot proxy for contestability.

I utilise the lerner index as the main measure of concentration. It is a proxy for profits that accrue to a bank as a result of its pricing power in the market and has been widely used in literature. The lerner index proxies for current and future profits resulting from pricing power, thus ties in perfectly with the charter value theoretical postulation. The index describes a firm's market power and is defined as:

$$Lerner_{i,t} = \frac{P_{i,t} - MC_{i,t}}{P_{i,t}} \quad (2.2)$$

where: $P_{i,t}$ is the price of total assets i.e. proxied by the ratio of total revenue (interest and other income) to total assets for bank i at time t ; $MC_{i,t}$ is the marginal cost of total assets for bank i at time t . The index ranges from a high of 1 to a low of 0, with high numbers implying greater market power. For a perfectly competitive firm $P_{i,t} = MC_{i,t}$ and therefore meaning no market power. $MC_{i,t}$ is estimated from a translog cost function using the ratios of personnel expenses to total assets, interest expense to total deposits and other operating & administration expenses to total assets as the three input prices for labour, funds and fixed capital respectively. The translog cost function is as follows:

$$\begin{aligned} \ln Cost_{it} = & \beta_0 + \beta_1 \ln Q_{it} + \frac{\beta_2}{2} \ln Q_{it}^2 \\ & + \sum_{c=1}^3 \gamma_{tc} \ln W_{itc} + \sum_{c=1}^3 \phi_c \ln Q_{it} \ln W_{itc} + \sum_{c=1}^3 \sum_{j=1}^3 \ln W_{itc} \ln W_{itj} + \varepsilon_{it} \end{aligned} \quad (2.3)$$

where: Q_{it} represents is a proxy for the bank output (i.e. total assets) for bank i at time t (Berg & Kim, 1994). W_{itc} is a vector of the three input prices of labour, funds and fixed capital and are calculated as the ratios of personnel expenses to total assets², interest expenses to total deposits and other operating & administrative expenses to total assets respectively. β, γ and ϕ in Equation (3) are the coefficients to be estimated. To capture the specificities of each bank, i introduce year fixed effects with standard errors and MC_{it} is then calculated as follows:

² We divide personnel expenses by total assets because the Bankscope database lacks data for the number of bank employees for many banks. A similar approach has been followed by many relevant papers (e.g. Claessens & Laeven (2004)).

$$MC_{it} = \frac{Cost_{it}}{Q_{it}} [\beta_1 + \beta_2 \ln Q_{it} + \sum_{c=1}^3 \phi_c \ln W_{itc}] \quad (2.4)$$

I consider the fact that the lerner index is computable at the bank-level as giving it an edge over the other market structure-based proxies of competition like the HHI and the C5 ratio. By way of advantages, the lerner index better captures the theoretical concept of bank franchise value by measuring a bank's pricing power Beck et al. (2013). By utilising both bank asset and funding information, the lerner index also captures the impact of pricing power on both the asset and liabilities sides of the balance sheet Beck et al. (2006). Additionally, its computation does not require the banking system to be in long run equilibrium, unlike the H-statistic as an example. Finally, it does not rely on the precise definition of geographic product markets. This is vital against the backdrop of banks scaling geographic boundaries and operating in various jurisdictions on a global basis.

I adopt and use the Boone indicator to further improve the credibility and robustness of the lerner Index as my main competition proxy. The Boone indicator is a pure measure of the degree of competition and is calculated as the elasticity of profits to marginal costs. To obtain the elasticity, the log of profits (measured by return on assets) is regressed on the log of marginal costs. It is estimated thus:

$$\ln \pi_{i,t} = \alpha + \beta \ln mc_{i,t,c} \quad (2.5)$$

where; $\pi_{i,t,c}$ denotes average profits; $mc_{i,t,c}$ denotes marginal costs and β is the Boone indicator. The subscripts i, t, c refer to bank, time and country respectively. The estimated coefficient β (computed from the first derivative of a trans-log cost function) is the elasticity. I follow the lead of Delis (2012) and relax the assumption of a constant marginal cost across all banks in the industry and estimate it for each bank-time in the sample. This is a notable departure from most of prior literature on the estimation of both the Boone indicator and lerner index. Koetter and Poghosyan (2009) tout this as highly important in ensuring a minimum level of robustness for market power estimates like the Boone indicator. To this end, I estimate marginal cost ($mc_{i,t}$) using the following linear cost function:

$$\ln tc_{itc} = \alpha_{0,itc} + \alpha_{1,itc} \ln q_{itc} + \alpha_{2,itc} \ln d_{itc} + \alpha_{3,itc} \ln w_{itc} + \varepsilon_{itc} \quad (2.6)$$

where; tc is the total cost of bank i operating in country c at time t , q is bank output, d is the value of bank deposits, w are the prices of inputs, and ε is the stochastic disturbance. I obtain bank- and time-specific coefficients for Equation (6) with the same local regression technique used to estimate Equation (5). The profits of banks with lower marginal costs (higher efficiency) are expected to increase, i.e. β should be negative. A lower market power implies that the value of β will be larger in absolute terms (more negative). The rationale behind the indicator is that higher profits are achieved by more-efficient banks³. Therefore, the more negative the Boone indicator the higher the degree of competition is because the effect of reallocation is stronger. The Boone indicator is touted as having superior attributes to the lerner index as a pure measure of competition. Firstly, the lerner index is heavily devalued because it cannot capture the degree of product substitutability (Vives 2008). Secondly, the theoretical foundations underpinning the lerner index as a measure of competition are not robust i.e. some studies present models where higher competition result in higher price-cost margins (LI). Finally, the lerner index may be thought of as not only measuring bank competition, but also the strength of the profit maximizing incentives of banks Delis (2012).

I also introduce and report the results of the two concentration proxies i.e. the C5 Ratio (CR5) and the Herfindahl-Hirschman Index (HHI Loans) to augment the lerner index and Boone indicator and thereby enrich my insight and analysis of the competition-risk dynamics in the G7 in the period under review. The CR5 ratio is the proportion of total banking assets held by the Big 5 banks in each of my sample countries. It is the norm in banking literature to compute both these measures at the country level and I uphold and conform to this practice in this paper. The HHI is a widely accepted measure of market concentration and is calculated by squaring the market share of each firm competing in a market, and then summing the resulting numbers. It is estimated thus:

³ For more details on the rationale behind the Boone Indicator and its derivation, see Boone et al. (2005) and Boone (2008)

$$HHI_{t,c} = \sum_{i=1}^n (MS_{i,t})^2 \quad (2.7)$$

where: where $MS_{i,t}$ represents the market share of firm i and there are n firms in the market. For a cross-country study of this nature both measures have the benefit of not needing any transformation since they are already computed at the country level. Even though banking markets now generally transcend geographic national boundaries and the fact that competition has a pronounced international feel to it, some products e.g. retail deposits and small business loans are largely competed for on a local basis while wholesale credits and off-balance sheet liabilities are competed for internationally Berger et al. (2009).

I acknowledge the potential impact to my regression model emanating from the fact that these competition proxies are estimated rather than measured. The assumptions made in formulating these proxies also potentially bring some noise into my regressions. Firstly, studies that examine competition and concentration in banking conclude that concentration (i.e. C5 ratio) is a poor proxy for competition Claessens and Laeven (2004). Other measures of competition such as the Panzar and Rosse (1987) H-Statistic require restrictive (and unrealistic) assumptions about the market existing in long-run equilibrium to hold. Another major pitfall of the HHI is that it gives much heavier weight to firms with large market shares than those with smaller ones because of squaring the market shares Berger et al. (2009). The Lerner index's key shortcoming is the fact that it does not capture product substitutability Vives (2008), and it also does not capture risk premia in the prices of a bank's products and services. While the Boone (2008) model neither assumes long-run equilibrium, nor suffer from the problem relating to product substitutability, it has a major flaw in that it assumes constant marginal costs. What matters for the Boone (2008) indicator is how aggressively the more efficient banks exploit their cost advantage to reallocate profits from the least efficient banks in the market. Regardless of all these pitfalls in the formulation and estimation of my competition proxies, they have been widely used in literature on the competition-risk nexus in banking to inspire my confidence as to their robustness in this respect.

2.4.4. Bank risk

In so far as liquidity risk is concerned, Drehmann and Nikolaou (2008) itemise liquidity into three broad clusters i.e. market liquidity, central bank liquidity and funding

liquidity. However, in the Geneva Report on the World Economy, Ferguson et al. (2008) underscore the distinction between the three liquidity types and conclude that all three are vital to the preservation of financial stability. I am quick to point that I adopt and refer to funding liquidity for purposes of this paper. I feel our primary focus on the funding liquidity of banks is justified given the centrality of banks in distributing liquidity in the financial system. Committee (2008) defines funding liquidity as the ability of banks to meet their liabilities, unwind or settle their positions as they come due. In the same vein, the IMF sings a similar tune and marks out funding liquidity as the ability of solvent institutions to make agreed upon payments in a timely fashion. However, references to funding liquidity have also been made from the point of view of traders (Brunnemeier and Pedersen, 2007) or investors (Strahan, 2008), where funding liquidity relates to their ability to raise funding at short notice. The wider debate in the competition-risk nexus has been dominated by the use of credit risk as the financial stability proxy. In practice though, credit risk is not the only source of risk taking by banks as they are also subject to liquidity risk emanating from their role as liquidity providers (e.g. Diamond and Dybvig (1983). The recent financial crisis was essentially a result of the maturity mismatch between assets and liabilities which left banks unable to raise liquidity on demand, ultimately resorting to costly borrowing or auctioning illiquid assets to raise liquidity.

The Z-score can be simply explained as the number of standard deviations by which returns have to fall from the mean to wipe out a bank's equity. In other words, it measures the distance from insolvency. The Z-score combines profitability, leverage and return volatility in a single measure and is used as an inverse proxy for a firm's probability of failure at the bank level. According to Lepetit & Strobel (2013), the Z-Score is a risk measure commonly used in the empirical banking literature to reflect a bank's probability of insolvency. It plays an important role in the assessment of both individual bank risk as well as overall financial stability.

$$Z_{i,t} = \frac{ROA_{i,t} + E/TA_{i,t}}{\sigma ROA_{i,t}} \quad (2.8)$$

where: $ROA_{i,t}$ is the return on assets for bank i at time t . $E/TA_{i,t}$ is the capital asset ratio for bank i at time t and bank insolvency is taken to be a state where $(ROA_{i,t} + E/TA_{i,t}) \leq 0$. $\sigma ROA_{i,t}$ is the standard deviation of return on assets bank i at time t . The

Z-Score is an accounting-based risk measure and risk is taken to be the variability or change in $ROA_{i,t}$. While $ROA_{i,t}$ can be easily computed from the data set available, $\sigma ROA_{i,t}$ cannot be easily computed because of the unavailability of daily, weekly and monthly data. Financials are normally done quarterly; hence this variable has to be estimated. A larger z-score indicates higher bank stability and less overall bank risk. The score increases with higher profitability and capitalisation levels, and it decreases with unstable earnings (reflected by a higher $(\sigma ROA_{i,t})$). The Z-score is a bank-level inverse proxy of the probability of failure of a bank, thus I use one observation per bank, although we use multiple years of data in computing our dependent variables.

The non-performing loans to total loans (NPLTL) ratio is our credit risk proxy, it is measured as the ratio of equity to total assets and a higher NPLTL ratio is indicative of a riskier loan portfolio. The equity to total assets (ETAR) ratio is our capital risk proxy. It is measured as the ratio of equity to total assets and a higher ETAR ratio indicates a stronger capitalisation level, thus lower bank risk. Finally, the Cash deposit ratio (CDR) is our liquidity risk proxy and indicates how much of a bank's core funds are channelled towards the bank's lending activities. It is the proportion of a bank's lending to the deposits it mobilises. All three ratios (i.e. NPLTL, ETAR & CDR) are calculated at the bank level from data collected from the Bankscope database.

2.4.5. Regulatory, institutional and control variables

It is also worth considering the wider regulatory, institutional and macroeconomic environments when evaluating the competition-risk relationship. Regulatory variables used in this paper came from surveys conducted by Barth et al. (2013). The country-level regulatory, institutional and macroeconomic data / variables are adopted as control variables to proxy for the variations in economic development and collateral and bankruptcy laws among the G7 group of countries. Bank-level control variables are also built into the models to control for variations at the bank level. Country-level regulations change slowly over time; thus, previously available survey data can be used until a new survey becomes available. It is vitally important that we have a discussion on how country-specific factors may create cross-country variation in the competition-stability nexus by borrowing extensively from existing theories on the subject.

$RV_{t,c}$ is the regulatory variable in Equation (1) and relates to capital stringency (CAPSTRI). It is a proxy variable for the strength of capital regulation in a country. Allen

et al. (2011) contends that stringent capital requirements (and deposit insurance) can help in controlling bank risk-taking, even against the background of cut-throat competition in the banking sector. I therefore surmise from this that tighter capital regulation may lessen the negative impact that competition tends to have on stability within the financial system. The Capital Stringency index indicates whether there are explicit requirements regarding the amount and source of capital that a bank should have. A higher index indicates greater stringency and the index ranges from 2 to 10 with an average of 5.8.

$IV_{t,c}$ in Equation (1) corresponds to a variable which evaluates the institutional quality in the countries examined. The institutional framework and financial system structures within which banks operate also have a direct influence on the competition-stability relationship. The institutional framework may affect the scope for adverse selection and moral hazard by entrepreneurs. I use depth of information sharing (DINFOS) obtained from the World Bank Development Indicators to reflect the institutional environment. It is an indicator which captures the difference in information content between the credit registries in different countries. Credit registry institutions are public or private entities which collect information on the creditworthiness of borrowers and can help reduce both adverse selection and moral hazard problems that are inherent the lending business. The index ranges between 0 and 6, with a higher value indicating that more information is available. In jurisdictions with developed information sharing systems, borrowers know it will be harder to access finance at other banks if they default on their current loan. Such borrowers have an incentive to repay thereby positively impacting on the stability of the system. Greater market power will therefore not be as detrimental to financial stability because better information sharing systems will lower the entrepreneurs' incentive to take on more risk.

The variable $MC_{t,c}$ in Equation (1) relates to the variable representing the macroeconomic environment and monetary conditions in country c at time t and within a specific country. I extract GDP Growth (GDPGR) from the World Bank Development Indicators (WDI) and slot it into all the regressions to control for variations in economic development among the G7 countries.

I also control for the interbank ratio (IBANK), and loans to assets ratio (ASSCOMP) to proxy for bank size, bank capitalisation and asset composition respectively. According Berger et al (2009), bank size, bank capitalisation and asset composition directly impacts the risk-taking appetite of a banking institution. The charter values of larger and well-capitalised banks tend to have a restraining effect and thus make

such banks conservative in terms of risk-taking. Ultimately this makes banks safer and leans heavily on the competition-fragility hypothesis in the competition-risk nexus. These variables are all derived from the Bankscope database and are computed at the bank level to reflect individual bank characteristics.

2.4.6. Descriptive statistics

Tables 2.4, 2.5 and 2.6 present the Descriptive Statistics while Table 2.7 is a presentation of the Correlation Matrix for the key variables employed in our baseline regressions. I have four dependent variables i.e. the ratio of non-performing loans to total loans (credit risk), the z-score (insolvency risk), the equity to total assets ratio (capital risk) and the cash deposit ratio (liquidity risk). The main explanatory variable is the lerner index which is our competition measure, but we also include the Boone indicator and two traditional concentration measures i.e. C5 ratio and HHI loans in the baseline regressions as alternative measures to our main competition proxy. In the model, I control for both asset composition and bank size and include bank capitalisation and the ratio of total loans in total assets as bank controls. I also collect country-level data relating to the respective countries from the World Bank Development Indicators (GDPGR), Fraser Institute (LEGRI) and the Heritage Foundation (BANFRE) to proxy for the business environments, collateral and bankruptcy laws and variations in economic development of the countries respectively.

In Table 2.4 the mean sample of the z-index is 51.73 and is similar to the 56.76 in Berger et al. (2009). Moreover, my sample mean for the non-performing loans to total loans and equity to total assets ratios are 1.16% and 9.46%, which is comparable to 1% and 12% respectively in Berger et al. (2009). At 21.96, the mean sample of the lerner index can also be compared to the 22 in Berger et al. (2009). The sample mean lerner index in Fiordelisi & Mare (2014) however bucks this trend at a high 52.28. This could be attributed to the fact that the sample is exclusively constituted with cooperative banks (even though the study is a cross-country analysis as well). My sample mean for the Herfindahl-Hirschmann Index (HHI Loans) at 4.36% compares favourably with Berger et al. (2009) at 4%, although there are variations based on a country-by-country analysis of the competition / concentration measures in Table 2.5; or based on the periodical analysis in Table 2.6. The sample mean for our pure competition measure i.e. the Boone indicator at -0.0321 compares favourably with Delis (2012).

In Table 2.5 the mean lerner index for Canada in 2000 is 17.1% and rises to 39.7% in 2015. A higher lerner index symbolises greater banking sector concentration. I augment my analysis by using the C5 ratio which was at 67.6% in 2000 and rose to 86.9% in 2015, further confirming the shift towards even greater concentration in the Canadian banking sector. When I break down the analysis based on whether pre-crisis, crisis-years or post-crisis periods; the mean lerner index for Canada is 17.02%, 15.9% and 34.2% respectively. The mean C5 ratio is 85.5%, 93.2% and 86.5% respectively for the pre-crisis, crisis-years & post-crisis periods respectively.

In so far as the US is concerned, the average C5 ratio in Table 2.5 is 28.1% in 2000 and rises to 47.2% in 2015. The lerner index also rises from 19.6 in 2000 to 32.5% in 2015; whereas the boone indicator weakens from -0.078 in 2000 to -0.041 in 2015; all this exhibiting a shift to greater concentration i.e. competition-fragility. When broken down to a periodical analysis i.e. whether pre-crisis or post-crisis period in Table 2.6, the mean lerner index at 22.7% pre-crisis and 29.1% post-crisis further confirms this trend towards greater concentration. This pattern holds when we bring the Boone and HHI Loans into play for our analysis. The competition-fragility view holds that concentrated systems are more stable overall than competitive ones. The case of Canadian banks makes for particularly interesting reading in supporting this notion as they seem to have been the most resilient through the crisis period in our sample. Canada has the highest average concentration ratios based on the CR5 ratio with an average score of 0.894 in the pre-crisis, crisis-years and post-crisis periods. Despite apparent homogeneity in the competitive situation in the G7 countries, notable peculiarities in terms of the competition dynamics exist among the countries.

The trends as they relate to the US and Canada in terms of gravitating towards greater concentration (i.e. less competition) largely holds in the other five countries in our sample i.e. France, Germany, Italy, Japan and the United Kingdom. The pattern is towards greater concentration in the later years of our study than the earlier years as per Table 2.5. This situation is consistent even when we base our analysis on Table 2.6 which breaks down our numbers per period i.e. whether pre-crisis, crisis-years or post-crisis. Average competition scores as captured by the Lerner Index for the European members of the G7 group i.e. France, Germany, Italy are much lower than the United States. The UK system also became progressively concentrated (based on the C5 ratio) from the pre-crisis to the post-crisis periods (0.586 to 0.769), largely confirming the large taxpayer bailouts of

some of the big commercial banks. This essentially had the effect of maintaining (if not increasing) the big banks' shares of the market.

The first cluster of variables that influence the competition-risk relationship relate to the institutional framework i.e. depth of information sharing (DINFOS) and stock market turnover (STOMTU). Better information sharing among banks lowers moral hazard and adverse selection in bank lending as it is harder for borrowers to access funding with other banks once they default with one. This lowers risk overall and makes for a more stable system overall. Stock market turnover is an indicator of financial market development and existence of alternative funding sources for entrepreneurs. Both DINFOS and STOMTU are positively and significantly correlated with each other, implying therefore that countries with developed markets and greater information sharing are likely to be more stable, notwithstanding the competitive situation obtaining. As far as regulation and supervision is concerned, the main thrust is to protect bank charter values. Deposit protection insurance (DEPINS) helps to control risk-taking and bank runs, despite the state of competition in the respective jurisdiction Allen et al. (2011). More stringent capital regulation may limit the negative impact competition has on financial stability. A generous deposit insurance scheme negatively impacts financial stability i.e. incentivises risk-taking. The correlation table shows a positive and significant correlation between deposit insurance and both institutional variables i.e. depth of information sharing and stock market turnover. Activity restrictions are negatively and significantly correlated with systemic stability (Z-Score) i.e. countries with riskier banking systems also tend to experience higher activity restrictions (ACTRES). When analysing the correlation between the lerner index (LERNER) and the other variables, I find that the relationship between competition and financial system soundness is stronger in jurisdictions with developed systems of information sharing, developed stock markets, generous deposit insurance schemes and higher activity restrictions.

2.5. Discussion of the empirical results

In this section I present the results of our regression analysis. I estimate GMM regressions with robust standard errors clustered at the country level to correct for within-country correlation. In tables 2.8, 2.9, 2.10 and 2.11 I present and report the results of the Breusch-Pagan and Cook-Weisberg statistics conducted to test for the presence of heteroscedasticity in the dataset. As alluded to earlier on, I adopt four dependent variables to proxy for financial stability. In Table 2.8 I measure credit risk using the non-performing

loans to total loans ratio; in Table 2.9 I measure insolvency risk using the z-score; in Table 2.10 I measure capital risk using the equity to total assets ratio; and in Table 2.11 I measure liquidity risk using the cash deposit ratio. The tables also include the results of the diagnostic tests run to verify the relevance (first stage F-test) and validity (Hansen's J-test) of the instruments of measures of competition i.e. the lerner index, boone indicator, C5 ratio, and HHI loans. The results support the presence of heteroscedasticity, and thus justify my use of the GMM estimator. I include either the lerner index, boone indicator, C5 ratio and HHI loans in all our regressions as measures of banking industry competition and I instrument these measures with indicators of activity restrictions, banking freedom credit market regulations. As mentioned earlier, I include a quadratic term in the equations to allow for a nonlinear relationship between measures of financial stability and competition within banking.

Table 2.8 shows my regression results using the ratio of nonperforming loans to total loans as the credit risk (loan portfolio risk) proxy. The Lerner index linear term coefficient is positive and statistically insignificant, whereas the quadratic term coefficient is positive and significant in the first column of Table 2.8. The same pattern of results holds true for my pure competition measure (the Boone indicator) in the second column i.e. that the Boone indicator linear term is positive and statistically insignificant, while the quadratic term coefficient is positive and significant⁴. This need not be an issue in so far as interpretation of the results is concerned. According to Berger et al. (2009) it is not essential that either term be significant. In other words, the significance of the curvilinear (quadratic term) term stands by itself regardless of the significance of the linear term in the regression Fungacova et al. (2017). To evaluate the type of relationship between the variables of interest, the inflection point of each quadratic function is calculated and compared with the distribution of the data. In differential calculus an inflection point is a point on a curve at which curvature or concavity changes sign from plus to minus or vice versa. Using column 1 coefficients in Table 2.8 for illustrative purposes, the inflection point is -0.208. This is approximately the 4th percentile of the Lerner index distribution; which by implication means that more than 96% of the data lies above the inflection point. When I ally this phenomenon with the fact that the Lerner quadratic term coefficient is positive, the relationship between the degree of market power

⁴ It is not essential that either term be significant for interpretation purposes i.e. the significance of the curvilinear (quadratic) term stands by itself regardless of the significance of the linear term in the regression.

(as well as the Boone indicator) and the credit risk proxy (i.e. nonperforming loans to total loans ratio) is significantly positive. In so far as the market structure proxies are concerned i.e. the C5 ratio and HHI Loans in the 3rd and 4th columns of Table 2.8 respectively, the results obtained for the C5 ratio and HHI loans market power measures indicate that linear term coefficients for both are positive and significant, while the quadratic term coefficients for both measures are negative and significant. I introduce the quadratic term to uphold non-linearity in the competition-risk nexus in line with the postulation of Martinez-Miera & Repullo (2008). Because the quadratic term coefficients are negative for both market power measures used in this study, the relationship between both market power measures and the credit risk proxy is concave. This implies that the relationship is positive up to a certain point beyond which it reverses to negative, or vice versa. The inflection points are 0.253 and 0.186 for the C5 and HHIL respectively. A significant and positive link can therefore be established between both market power measures and the credit risk proxy (NPL/TL ratio) based on the results of both the linear and quadratic terms i.e. that greater market power leads to an increase in the credit risk profile of banks through riskier loan portfolios. This is well in sync with the findings of Boyd & De Nicolo (2005), hence firmly grounding this study in the competition-stability sector of the argument when credit risk is the financial stability proxy. When banks have more market power, it also follows that they command higher rates on their loan portfolios thus increasing risk on those portfolios. The results are consistent across the three different proxies of market power i.e. more market power is associated with riskier loan portfolios.

Table 2.9 show the regression results of the z-score as a proxy for insolvency risk. A higher z-score derives from higher earnings or more capital and is indicative of more financial stability. The inflection points for the lerner index, boone indicator, CR5 and HHI loans ratios (0.328, 0.306, 0.194 and 0.216 respectively) all occur above the 99th percentile of the Lerner index data, implying a positive relationship between all proxies of market power and the Z-index as a proxy for insolvency risk. The quadratic term coefficients have a downward-oriented parabola shape i.e. are negative and significant across all four competition/market power proxies. The negative quadratic term coefficients across all four competition/market power measures used in this study indicate a concave relationship between market power measures and the insolvency risk proxy. This implies non-linearity (u-shaped) in the competition-financial stability relationship Martinez-Miera & Repullo (2008) i.e. that the relationship is positive up to a certain point

beyond which it reverses to negative, or vice versa. The linear term coefficients are positive and statistically significant for all four proxies, also implying a positive relationship between the z-score and all the measures of competition/market power used in this study. Greater market power is associated with lower overall bank risk in this instance. This supports the competition-fragility views fronted by the like of Wagner (2010) among others and seem to be at variance with the findings from the earlier findings using NPLTLs as the credit risk proxy. Under the competition-fragility view, concentration is considered as healthy as it safeguards bank charter values while competition increases risk and erodes charter values. At this point, having considered the NPLTL and the z-score as risk proxies, the results imply that greater market power is associated with increased credit risk through the loan channel, but it also results in lower insolvency risk. The big puzzle is how greater market power banks enjoy lower insolvency risk against the backdrop of the earlier findings indicating increasing credit risk for the same banks. Does this necessarily need to be interpreted as a contradiction or there could be other forces at play? It is logical that higher franchise value banks enjoy greater market power and are therefore likely to command higher loan rates, hence ultimately increasing the riskiness of their loan portfolios. However, the fact that banks with more market power also enjoy greater overall financial stability (based on the z-score) seems to suggest that they insulate their charter values from the higher credit risk through other means. The answer could possibly lie in economies of both scale and scope, as well as in robust and sound risk management methods. Or it could simply be that greater market power banks cushion themselves against increased credit risk in their portfolios through holding higher capital thresholds. I further probe and analyse the competition-risk nexus in banking by bringing into play the results of the impact of market power on capital risk using the equity to assets ratio and liquidity risk using the cash deposit ratio.

Table 2.10 presents the results of the relationship between competition and risk, with capital risk as the financial stability proxy. The inflection point for the Lerner index occurs around the 50th percentile of the data, thus no significant positive or negative relationship exists between the lerner index and capital risk. The same intuition holds for the results of the boone indicator and the capital risk proxy i.e. the equity to assets ratio. With regards to the market power / concentration measures, the inflection point for the C5 ratio is -0.028. The quadratic term coefficient is 2.138 and upward oriented such that a positive and significant relationship is established between the C5 ratio and capital risk.

The positive sign when regressing HHI loans as the explanatory variable means that this pattern holds using the HHI loans as well i.e. that is there is a positive and significant relationship between HHI loans and the capital risk proxy. These findings indicate that capital thresholds are higher for banks with greater market power when we utilise either HHI loans or the C5 ratio to proxy for financial stability, while the results for the Lerner index supposedly imply that half the banks with greater market power hold deeper equity capital in reserve.

In so far as Table 2.11 is concerned, the aim is to establish whether banks operating in highly competitive market landscapes do indeed strengthen their liquidity as a cushion to safeguard their franchise values considering the increased insolvency threat. From the three competition proxies already analysed, I have established that market power is synonymous with increased credit risk via the loan market, but also results in banks holding higher capital thresholds for a reduction in overall bank risk as proxied by the z-score. I must analyse the results from my liquidity risk proxy against the background of and in conjunction with our key findings from these three proxies. The results under our main competition proxy i.e. the lerner index indicate that the inflection point of 0.217 occurs around the 71st percentile of the data, thus I can establish a significant and positive relationship between the lerner index (and the boone indicator inflection point of 0.255) and the cash deposit ratio. This result is maintained when I bring the results of both the C5 ratio and HHI loans into the mix with inflection points of -0.0206 and 0.286 respectively. Against this backdrop, a significant and positive relationship emerges between the competition proxy and liquidity risk i.e. the findings indicate that liquidity thresholds are higher for banks in low competition environments. When I link these results to the results from the other proxies discussed in the preceding paragraphs, a more vivid picture emerges regarding the competition-risk nexus in banking. Greater market power leads to an increase in credit risk via the loan market, but this increase is counteracted and compensated by banks holding more equity capital and increased liquidity thresholds for a reduction in overall bank risk as proxied by the z-score.

To conclude, greater market power for commercial banks in the G7 group of advanced economies result in increased credit risk, but insolvency risk is perhaps tampered, in part, by holding higher capital and liquidity thresholds. Banks with greater market power have higher capital and liquidity thresholds and this goes a long way in explaining the lower insolvency (overall) bank risk. It could also be that insolvency risk for banks with greater market power is lower primarily because of their higher franchise

values. Banks with greater market power seem less exposed to overall bank risk, even though credit risk increases through the loan market. Market power also seems synonymous with higher capitalisation levels; thus, an overall conclusion can be reached from this about the merits of the competition-fragility view on the competition-risk relationship in banking. Market power results in higher bank franchise values. The C5 ratios seem to confirm that banking systems in the G7 Advanced economies are fairly concentrated. Prudential regulation of banks can actually be considered as tailored to protect and entrench the franchise values of existing banks by making it harder and onerous for new players to penetrate the banking sector. No wonder ‘too-big-to-fail’ remains a topical challenge well after the financial meltdown of 2008. The big puzzle is how to achieve a balance between having a competitive banking sector without necessarily compromising the stability which concentrated systems seem to engender based on empirical results from this paper.

2.6. Robustness analysis

For robustness purposes, I run various checks on our main models⁵ and the main results are presented in Table 2.12 below. Firstly, I run regressions on a sample of banks that fall foul to the filtering rules and drop out of my sample during the entire period of our study. This I implement in order to probe survivorship bias which we believe could significantly impact the conclusions we arrive at on the competition-risk nexus in banking. My results are robust to this phenomenon. Secondly, I exclude the quadratic term from our baseline regressions and impose a strictly linear relationship between competition and financial stability. This quadratic term arises from the key postulation of Martinze-Miera & Repullo (2008) who posited that the relationship between competition and financial stability is in fact non-linear. My main results still hold when we exclude the quadratic term from the model. Thirdly, I adopt and use a winsorised z-score as the main financial stability proxy i.e. I winsorise the z-score at the 1st and 99th percentile and the findings still fall in line with our reported results. Fourthly, I strip out the United States from the sample and run the regressions based on the other six G7 member states. This I do to deal with the outlier aspect pertaining to the domination of my sample by US banks. Again, my results hold. I also decide to strengthen my analysis by adopting the Boone

⁵ I experiment with additional measures of liquidity risk (liquid assets to total assets ratio) and credit risk (loan loss provisions to total loans ratio) and did not find any significant changes in the results my main variables.

indicator⁶ as the main competition proxy in place of the lerner index and the results are robust to this change as well. The boone indicator is a more modern competition proxy than the lerner index and the trend in recent literature on the competition-risk nexus in banking has gravitated towards the boone indicator as a more robust measure of competition. Additionally, even though I clustered robust standard errors at the country-level in my baseline regressions, I follow the lead of Beck et al. (2013) and cluster robust standard errors at the bank level as a further robustness check. A possibility exists that observations of a given bank are not independent over time i.e. they correlate. Again, my main results hold despite this change. Finally, I utilise alternative control variables to run the main regressions. These include GDP per capita and unemployment Schaeck & Cihak (2014); Berger et al. (2009), Inflation Liu & Wilson (2014) and loan loss provisions to total assets Schaeck & Cihak (2014). A substantial drop in GDP growth is a strong indicator that banking problems might emerge Hutchison & McDill (1999), while increasing inflation is accompanied by bank failures Mannasoo & Mayes (2009). It is quite comforting to report that my main results hold despite effecting these changes in the variables mix. The robustness tests are consistent and confirm the main findings regarding the four financial stability proxies i.e. greater concentration in banking markets is synonymous with increased credit risk via the loan channel. However, greater market power ultimately results in lower overall levels of risk i.e. insolvency risk. The main reason could be because banks with greater market power hold higher capital thresholds and also strengthen their liquidity positions, another of my key hypotheses confirmed by the robustness tests.

Because my study period encompasses the crisis years i.e. 2007-10, to strengthen the crisis dimension and context of my study, I extend my analysis by examining if the global financial crisis influenced the relationship between bank competition and financial stability. The crisis could well have affected both competition and financial stability. Firstly, the large-scale reorganisations, mergers and acquisitions in the crisis aftermath could have altered the competition dynamics in the G7 banking markets by reducing the number of competitors. Secondly, the financial crisis could also have impacted financial stability and increased overall risk in the system through the proliferation in loan losses,

⁶ I follow the lead taken by Delis (2012) and derive estimates of market power using the Boone Indicator for robustness purposes. Using the Boone Indicator (**BI**), bank profitability intuitively increases with lower marginal costs (i.e. efficiency). A lower market power (higher competition) implies that the value of **BI** is larger in absolute terms.

as well as the lowering of incentives for banks to invest in soft information which amplified system-wide information asymmetry. To evaluate the impact of the global financial crisis, I redo my estimations by adding a dummy variable which equals one for the crisis years (i.e. 2007-2010) and an interaction term between the dummy variable and the competition measure(s). I denote several striking results in Table 2.12. In the first instance, the interaction term between the crisis variable and my competition proxies is always significant; suggesting that the crisis period indeed impacted the relationship between bank competition and financial stability. Second, the interaction term in all specifications has an opposite sign from the competition measure; supporting the view that crisis periods dilute the impact of bank competition on financial stability. This conclusion is important in that it suggests that the impact of bank competition on financial stability changes during crisis periods, suggesting that policy prescriptions need to adjust and factor this into account. While my results largely hold, careful consideration need to be given during crisis periods because conventional policies may not necessarily apply.

2.7. Concluding remarks

Literature on the competition-risk-stability nexus remains mixed and inconclusive despite the depth, variation and amount of debate that has been invested on this area so far. The conventional CV Hypothesis i.e. competition-fragility view contends that banking sector competition leads to diminution of the market power of existing banks, leading to falling profitability, and ultimately results in reduced bank franchise values. This chain of events has a tendency of incentivising banks to venture into riskier activities to make up for the squeeze in profits. On the other hand, the BDN Hypothesis i.e. competition-stability view is the alternative view and uses the loan market channel to postulate that more market power in the loan market actually results in higher bank risk as the higher interest rates charged to loan customers make it harder for them to repay the borrowed loans. There has been widespread support for both arguments, making the competition-financial stability nexus one of the most contested spaces in banking literature. My model allows for simultaneity in terms of the operation of financial stability proxies i.e. credit risk, capital risk, liquidity risk and insolvency risk. Greater market concentration results in increased credit risk via the loan market but insolvency risk does not necessarily increase in tandem. I model insolvency risk to be a product of the trade-off between credit risk, capital risk and liquidity risk to argue that the stability from concentrated banking systems is primarily due to the fact that banks naturally increase

their capitalisation and liquidity thresholds in light of competition. This increase in capitalisation and liquidity risk is sufficient to make up for the increased credit risk to yield a lower insolvency risk overall. Banks in concentrated systems could yet be safer overall even though they have increased credit risk through riskier loan portfolios. Greater market power yields higher franchise values; thus high franchise value banks have a greater incentive to protect such values through alternative techniques e.g. reduced capital risk in this instance. An interesting proposition for future study would be to probe the alternative techniques utilised by greater market power banks to mitigate increased credit risk to yield a reduction in insolvency risk. I regressed three financial stability proxies i.e. credit risk, capital risk, liquidity risk and insolvency risk on three measures of competition (market power) i.e. lerner index, HHI loans and C5 ratio using bank-level data for the G7 group of advanced economies. I use the instrumental variable technique with a GMM estimator and adopt adopting activity restrictions, banking freedom, and the percent of government-owned banks as instruments to account for the endogeneity of market power. My results are broadly in the conventional “competition-fragility” sector of the argument without necessarily disproving the “competition-stability” view. Even though greater market power leads to increased credit risk – thereby lending support to the competition-stability view – it also results in falling insolvency risk overall (competition-fragility view). The answer to this puzzle could well be explained by the increasing capitalisation for such banks. It could well be that banks with greater market power offset increased credit risk through the loan market by holding higher capital and liquidity thresholds. Even after factoring the supposed upheavals of the crisis years (i.e. 2007-10) and the mergers and acquisitions and public bailouts that followed, it would appear the market structure architecture has virtually remained the same. The bailouts only plugged holes and were essentially a de-facto recapitalisation of stressed and dying banks such that the market shares of the banks were unaltered, ultimately meaning the competition dynamics in the system have remained the same as before the crisis struck.

Table 2.1 Variable descriptions, sources and abbreviations. This table presents all variables that I use in the econometric analysis. The abbreviation of each variable and the sources I use to collect the data are also reported.

Variable	Abbreviation	Description	Data source
Dependent variables:			
Z-score	<i>ZSCORE</i>	Computed at the bank level. Larger z-score indicates higher bank stability	Bankscope
Equity to total assets	<i>ETAR</i>	The bank level ratio of equity to total assets. A higher capitalisation ratio indicates lower risk	Bankscope
Non-performing loans to total loans	<i>NPLTL</i>	The ratio of non-performing loans to total loans. A higher value indicates a risky loan portfolio	Bankscope
Cash deposits ratio	<i>CDR</i>	Cash in hand & balances held at central bank to total deposits. Depositors' trust in bank is enhanced when the bank maintains a higher cash deposit ratio	Bankscope
Independent variables:			
Lerner index	<i>LERNER</i>	Bank level measure of the mark-up of price over marginal costs. Higher values indicate lower banking sector competition	Bankscope
Boone indicator	<i>BOONE</i>	A pure measure of the degree of competition and is calculated as the elasticity of profits to marginal costs.	Bankscope
C5 ratio	<i>CR5</i>	The total market shares of the five biggest banks in a country. A higher ratio indicates higher concentration, thus less competition	Bankscope
HHI loans	<i>HHIL</i>	A country-level indicator of bank concentration. Higher values indicate greater market concentration	Bankscope
Capital stringency	<i>CAPSTRI</i>	Indicates whether there are explicit requirements relating to the amount and source of capital a bank should have. Ranges from 2 to 10 and a higher index indicates greater stringency	Beck et al. (2010)
Deposit insurance coverage	<i>DEPINS</i>	Reduces the risk of bank runs, thus increases financial stability. Proxied by deposit insurance coverage relative to GDP per capita	Demirguc-Kunt et al. (2005)
Bank size	<i>BANSIZ</i>	The natural logarithm of total assets	Bankscope

Asset composition	<i>ASSCOMP</i>	The loans to assets ratio	Bankscope
Bank capitalisation	<i>ETAR</i>	The total equity to total assets ratio	Bankscope
GDP growth	<i>GDPGR</i>	The rate of growth of the real gross domestic product (GDP) of a country. Accounts for variations in economic development among countries.	World Bank Development Indicators
Depth of information sharing	<i>DINFOS</i>	The strength of information content of the credit bureaus in a country	Financial Structure Database
Stock market turnover	<i>STOMTU</i>	Ratio of the total shares traded to average real market capitalisation	Financial Structure Database
Legal rights index	<i>LEGRI</i>	An index measuring the degree to which collateral and bankruptcy laws facilitate bank lending. Higher score means laws tuned to expand credit	Fraser Index
Instrumental Variables:			
Activity restrictions	<i>ACTRES</i>	An index and takes on values between (1) and (4), with higher values indicating greater restrictions on bank activities and nonfinancial ownership and control.	Barth et al. (2007)
Percent of government owned	<i>PERGO</i>	Percentage of banks owned by government within a certain jurisdiction	Barth et al. (2007)
Banking freedom	<i>BANFRE</i>	Index informs whether foreign banks are allowed to operate freely, difficulties when setting up domestic banks and government interference in credit allocation. Higher score, fewer restrictions	Heritage Foundation

Table 2.2 Sample selection. This table presents a breakdown of how we arrived at our final sample based on bank-year observations and after applying several filtering rules as detailed

Details	Observations
Initial sample	53,616
Filters applied:	
Banks with missing observations for more than half of the sample period	3,129
Observations with missing income statement data	63
Observations with negative equity values	15
Observations with equity values in the top 1% of the tail distribution	397
Observations with equity values in the bottom 1% of the tail distribution	387
Final sample	49,625

Table 2.3 List of countries, bank-year observations and number of banks. This table presents the bank-year observations and the number of banks per country in our sample.

Country	Bank-year observations	Number of banks
Canada	328	57
France	2,137	168
Germany	280	54
Italy	477	99
Japan	168	30
United Kingdom	3,331	304
U.S.	42,904	2,187
Total	49,625	2,899

Table 2.4 Descriptive statistics. This table presents the summary statistics for the key dependent risk variables (i.e. non-performing loans to total loans ratio, z-score, equity to total assets ratio and cash deposits ratio) employed in our baseline empirical analysis. We model the dependent risk variables as a function of competition, regulatory and institutional variables and a set of control variables (i.e. to cater for the regulatory, institutional and macroeconomic environments in the respective countries). Activity restrictions, banking freedom and percentage of government owned are utilized in the regressions as instrumental variables for the competition (and concentration) proxies. We report the number of observations, mean, standard deviation, minimum and maximum for all the variables. The outlines, descriptions and the relevant data sources for all the variables are available in Table 2.1.

Variables	Obs.	Mean	Std. Dev	Minimum	Maximum
Non-performing to total loans	45 982	0.0116	0.0091	0.0000	0.1568
Z-score	45 017	51.7326	44.3786	4.0562	227.7648
Equity to total assets	49 625	0.0946	0.0720	-0.0842	0.7547
Cash to deposits	49 625	0.0723	0.0696	-0.0745	0.8213
Lerner index	49 625	0.2196	0.1503	-0.2096	0.6283
Boone indicator	49 625	-0.0321	0.00881	-0.0408	-0.0200
C5 ratio	49 625	0.0497	0.0612	0.0428	0.8538
HH index (loans)	49 625	0.0436	0.0493	0.0296	0.8667
Depth of information sharing	49 625	7.0572	0.5301	6.0016	7.9885
Bank size	49 625	13.0529	1.2166	7.3036	19.5557
Asset composition	49 625	0.0400	0.0176	0.0000	0.2800
Bank capitalisation	49 625	0.5973	0.1814	0.0000	0.9762
GDP growth	49 625	0.0031	0.1930	-0.0054	0.0220
Banking freedom	49 625	2.4237	0.6142	0.9934	3.1784
Activity restrictions	49 625	7.1359	1.1634	3.9010	9.7732
Legal rights index	45 973	5.6336	0.8320	8.9284	7.4762

Table 2.5 Descriptive statistics. This table presents the coefficients for our proxies of bank market power, market structure and competition (Lerner Index, Boone Indicator, CR5 ratio and HHI (loans) per year and per country over the sample period i.e. 2000 -2015. Our sample is based on the G7 group of advanced economies which include Canada (CAN), France (FRA), Germany (GER), Italy (ITA), Japan (JAP), United Kingdom (UKI) and the United States (USA).

YEAR	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
COUNTRY																
CAN: Lerner	0.171	0.159	0.187	0.170	0.170	0.170	0.164	0.152	0.165	0.222	0.239	0.377	0.403	0.399	0.409	0.397
Boone	-0.111	-0.104	-0.113	-0.188	-0.151	-0.127	-0.105	-0.085	-0.055	-0.018	-0.026	-0.073	-0.080	-0.077	-0.078	-0.078
C5	0.676	0.785	0.822	0.903	0.917	0.959	0.924	0.919	0.945	0.958	0.849	0.843	0.833	0.836	0.865	0.869
HHI	0.050	0.071	0.028	0.026	0.025	0.031	0.038	0.047	0.055	0.031	0.066	0.051	0.049	0.055	0.052	0.052
FRA: Lerner	0.143	0.143	0.141	0.159	0.197	0.205	0.193	0.176	0.145	0.201	0.222	0.142	0.180	0.188	0.207	0.179
Boone	-0.023	-0.023	-0.031	-0.026	-0.025	-0.025	-0.034	-0.031	-0.014	0.000	-0.039	0.002	-0.008	-0.004	-0.010	-0.007
C5	0.699	0.699	0.673	0.687	0.716	0.739	0.748	0.763	0.750	0.787	0.799	0.762	0.767	0.754	0.796	0.775
HHI	0.018	0.016	0.015	0.015	0.016	0.016	0.014	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
GER: Lerner	0.131	0.121	0.145	0.162	0.172	0.166	0.199	0.147	0.137	0.176	0.218	0.077	0.131	0.108	0.134	0.116
Boone	-0.079	-0.009	-0.030	-0.028	-0.032	-0.038	-0.039	-0.040	0.040	-0.026	-0.028	-0.030	-0.036	-0.031	-0.019	-0.029
C5	0.879	0.883	0.893	0.880	0.858	0.882	0.864	0.869	0.870	0.872	0.880	0.863	0.873	0.854	0.994	0.893
HHI	0.003	0.004	0.011	0.010	0.010	0.010	0.009	0.008	0.006	0.007	0.008	0.007	0.007	0.007	0.007	0.007
ITA: Lerner	0.198	0.170	0.166	0.178	0.172	0.213	0.241	0.234	0.197	0.204	0.203	0.041	0.078	0.055	0.080	0.063
Boone	-0.042	-0.033	-0.048	-0.032	-0.136	-0.010	-0.009	-0.018	0.021	0.009	0.014	0.034	0.030	0.037	0.023	0.030
C5	0.888	0.847	0.764	0.818	0.934	0.481	0.497	0.571	0.634	0.654	0.691	0.706	0.701	0.726	0.774	0.734
HHI	0.007	0.011	0.009	0.008	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
JAP: Lerner	0.260	0.253	0.224	0.250	0.250	0.268	0.284	0.277	0.232	0.196	0.228	0.411	0.389	0.389	0.389	0.396
Boone	0.008	0.003	0.019	0.009	0.001	-0.005	-0.008	-0.066	-0.005	-0.005	-0.013	0.016	0.007	-0.003	-0.006	0.000
C5	0.426	0.464	0.501	0.517	0.524	0.519	0.514	0.502	0.586	0.588	0.582	0.571	0.568	0.576	0.605	0.583
HHI	0.008	0.009	0.008	0.007	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006
UKI: Lerner	0.117	0.099	0.112	0.132	0.136	0.144	0.159	0.153	0.143	0.160	0.161	0.222	0.117	0.242	0.265	0.212
Boone	-0.067	-0.078	-0.065	-0.065	-0.052	-0.038	-0.037	-0.081	-0.074	-0.073	-0.031	-0.016	-0.002	-0.034	-0.021	-0.021
C5	0.465	0.502	0.504	0.482	0.813	0.658	0.675	0.742	0.779	0.757	0.759	0.762	0.751	0.741	0.798	0.813
HHI	0.012	0.011	0.010	0.010	0.013	0.013	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
USA: Lerner	0.196	0.196	0.239	0.252	0.257	0.243	0.210	0.184	0.180	0.192	0.223	0.313	0.315	0.337	0.335	0.325
Boone	-0.078	-0.068	-0.062	-0.056	-0.055	-0.064	-0.077	-0.083	-0.059	-0.038	-0.039	-0.039	-0.041	-0.041	-0.041	-0.041
C5	0.281	0.294	0.308	0.311	0.367	0.392	0.415	0.438	0.448	0.452	0.483	0.471	0.468	0.471	0.479	0.472
HHI	0.018	0.025	0.011	0.016	0.013	0.016	0.020	0.019	0.016	0.018	0.018	0.017	0.018	0.018	0.017	0.017

Table 2.6 Descriptive statistics. Table presents the descriptive statistics for our competition and concentration measures over the pre-crisis, crisis-years and post-crisis periods in the countries that constitute the G7 group of advanced economies.

Period	Country						
Pre-crisis: 2000-06	Canada	France	Germany	Italy	Japan	UK	US
Lerner	0.17023	0.16978	0.15653	0.20850	0.25540	0.14636	0.22755
Boone	-0.12833	-0.02708	-0.03658	-0.0445	0.00376	-0.05731	-0.06577
CR5	0.85509	0.70641	0.87692	0.74702	0.49494	0.58568	0.33829
HHIL	0.03866	0.01591	0.00808	0.00777	0.00725	0.01193	0.01703
Crisis-years:2007-10							
Lerner	0.15881	0.16052	0.14175	0.21560	0.25426	0.14811	0.18188
Boone	-0.07011	-0.02264	-0.03981	0.00184	-0.00589	-0.07775	-0.07088
CR5	0.93199	0.75668	0.86921	0.60280	0.54400	0.76043	0.44257
HHIL	0.05111	0.01532	0.00724	0.00667	0.00605	0.01360	0.01771
Post-crisis: 2011-16							
Lerner	0.34161	0.18831	0.11630	0.10732	0.39585	0.19712	0.29140
Boone	-0.05866	-0.00954	-0.02834	0.02514	-0.00052	-0.02821	-0.03994
CR5	0.86416	0.77712	0.88995	0.71219	0.58180	0.76870	0.47071
HHIL	0.05060	0.01514	0.00723	0.00671	0.00599	0.01418	0.01756

Table 2.7 Correlation matrix. This table provides information on the correlation between the various proxies of bank market power, market structure and competition, as well as the country-specific variables used throughout this paper. The correlation coefficients reported in this table are averages at the country level. All competition or market structure measures are constructed such that an increase indicates more market power or concentration. The table contains pairwise correlation coefficients as well as p-values (in parenthesis) that indicate the significance of the correlation. *, **, & *** correspond to 10%, 5%, and 1% level of significance respectively.

Variables	LERNER	CR5	HHIL	DINFOS	CAPSTRI	ACTRES	GDPGR	LEGRI	BANSIZ	ETAR
Lerner index	1.000									
C5 ratio	0.0821** (0.0122)	1.000								
Herfindahl H index (loans)	0.025* (0.364)	0.854** (0.000)	1.000							
Depth of information sharing	0.274* (0.164)	0.152* (0.224)	0.136*** (0.046)	1.000						
Capital stringency	-0.131* (0.118)	0.132* (0.077)	0.052* (0.363)	-0.147* (0.231)	1.000					
Activity restrictions	0.052* (0.197)	-0.142* (0.294)	0.128* (0.357)	0.047* (0.691)	0.038** (0.754)	1.000				
GDP growth	0.287* (0.418)	0.104* (0.432)	0.057* (0.332)	0.107* (0.373)	0.045* (0.738)	-0.141*** (0.207)	1.000			
Legal rights index	0.189* (0.626)	0.069* (0.261)	0.076* (0.384)	0.254* (0.038)	0.098* (0.396)	-0.067* (0.608)	0.047* (0.594)	1.000		
Interbank ratio	0.228* (0.091)	0.328* (0.126)	-0.125* (0.273)	0.265* (0.023)	0.152* (0.222)	0.067* (0.534)	0.048*** (0.671)	0.153** (0.224)	1.000	
Bank capitalisation	0.107* (0.198)	-0.033* (0.204)	0.063* (0.356)	0.149* (0.227)	-0.087* (0.412)	0.161* (0.148)	0.511** (0.582)	0.429* (0.000)	-0.198* (0.076)	1.000

Table 2.8 The effect of market power on credit risk. This table shows bank-level GMM regressions with robust standard errors clustered at the country level to correct for within-country serial correlation⁷. The dependent variable to proxy a bank's credit risk is the ratio of non-performing loans to total loans. The explanatory variables utilised in this study are outlined and defined in Table 2.1. The indicators of competition i.e. lerner index, boone indicator, C5 ratio and HHI loans are instrumented using activity restrictions, banking freedom, and percent of government owned banks. Bank size, legal rights index and GDP growth are also included in all regressions to control for variations in the business environment, the legal framework and economic development of the respective countries. The first stage F-statistic tests the relevance of the instrumental variables; rejecting the null hypothesis implies that the variables are not exogenous. The Hansen's J-statistic tests the validity of the instruments used; rejection implies that the instruments are not valid. The χ^2 test of heteroscedasticity includes the Breusch–Pagan and the Cook–Weisberg tests. We use and report the results of the Chow test to ascertain whether there was a structural break in the data for the global financial crisis years i.e. 2007-2010; accepting the null hypothesis implies no structural breaks exist in the data⁸. Robust standard errors appear in parentheses below estimated coefficients.

Dependent variable: CREDIT RISK	Competition / Market Power Measure			
	Lerner index	Boone indicator	C5 ratio	HHI loans
Degree of competition (linear term)	28.146 (20.528)	108.129 (33.368)	158.609 (41.315)*	267.174 (117.555)*
Degree of competition(quadratic term)	52.532 (22.219)**	48.427 (56.147)**	-484.360 (133.411)**	-752.448 (218.362)*
Inflection point	-0.208	-0.213	0.253	0.186
Sign of the relationship	+	+	+	+
Bank size	-1.263 (0.422)*	-1.784 (0.397)*	-0.588 (0.061)*	-0.254 (0.124)**
Banking freedom	3.384 (1.172)**	1.723 (1.063)**	0.604 (0.852)	-1.640 (1.475)
Legal rights index	1.636 (0.538)*	1.558 (0.509)*	-0.851 (1.303)	0.452 (1.043)
GDP growth	-18.578 (3.375)*	-23.394 (2.977)*	-3.505 (7.551)	2.756 (15.084)
Number of banks	2 663	2 680	2 689	2 689
First stage F-test	21.845	33.678	21.329	38.358
Prob > F	0.000	0.000	0.000	0.000
Hansen's J χ^2	3.177	2.632	4.518	3.461
P-value	0.208	0.208	0.108	0.166
χ^2 test of heteroskedasticity	318.593	734.441	7 857.112	7 136.532
P-value	0.0000	0.0000	0.0000	0.0000
Chow test F-statistic	247.5612	221.128	216.0356	286.1952
R-squared	0.0563***	0.0678***	0.1641***	0.1861***

***, ** & * correspond to 10%, 5%, and 1% level of significance respectively. Robust standard errors appear in parenthesis below the estimated coefficients.

⁷ I prefer to air on the side caution and cluster robust standard errors at the country level because observations of a given bank are highly likely to be independent over time across the period with the financial crisis Berger et. al (2009); Turk-Ariss (2010). Clustering at the higher level (i.e. country level) is more conservative (and likely better) as it allows for the possibility of correlations between the errors in the observations within a given country, since the residuals from all the observations within a country will get multiplied by the residuals of all the other observations in that country. I however cluster robust standard errors at the bank level as a robustness check (Table 2.13).

⁸ I use Chow tests to compare the coefficients we obtain for the sample of commercial banks in the pre-crisis years of our sample (i.e. 2000-2006) with the coefficients in the full sample to verify whether there is significant variation between the two sample sets. The null hypothesis in the Chow test is that the coefficients as a group are not significantly different from each other.

Table 2.9 The effect of market power on insolvency risk. This table shows bank-level GMM regressions with robust standard errors clustered at the country level to correct for within-country serial correlation. The dependent variable to proxy a bank's insolvency risk is the z-score. The explanatory variables utilised in this study are outlined and defined in Appendix A. The indicators of competition i.e. Lerner index, Boone indicator, C5 ratio and HHI loans are instrumented using activity restrictions, banking freedom, and percent of government owned banks. Bank size, legal rights index and GDP growth are also included in all regressions to control for variations in the business environment, the legal framework and economic development of the respective countries. The First Stage F statistic tests the relevance of the instrumental variables; rejecting the null hypothesis implies that the variables are not exogenous. The Hansen's J statistic tests the validity of the instruments used; rejection implies that the instruments are not valid. The χ^2 test of heteroscedasticity includes the Breusch–Pagan and the Cook–Weisberg tests. We use and report the results of the Chow test to ascertain whether there was a structural break in the data for the global financial crisis years i.e. 2007-2010; accepting the null hypothesis implies no structural breaks exist in the data. Robust standard errors appear in parentheses below estimated coefficients.

Dependent variable: INSOLVENCY RISK	Competition / Market Power Measure			
	Lerner index	Boone indicator	C5 ratio	HHI (loans)
Degree of competition (linear term)	6.737 (2.647)**	9.231 (3.714)**	12.534 (4.512)*	7.174 (3.225)**
Degree of competition (quadratic term)	-15.612 (3.121)*	-32.455 (7.462)*	-48.343 (17.334)*	-19.634 (8.543)**
Inflection point	0.328	0.306	0.194	0.216
Sign of the relationship	+	+	+	+
Bank size	-0.026 (0.067)	0.038 (0.023)	0.116 (0.016)*	0.118 (0.004)*
Banking freedom	-0.206 (0.136)	-0.218 (0.174)	-0.516 (0.078)*	-0.586 (0.084)*
Legal rights index	-0.018 (0.021)	-0.027 (0.052)	0.008 (0.039)	-0.052 (0.028)
GDP growth	0.632 (0.294)**	0.814 (0.319)**	1.475 (0.368)*	1.754 (0.396)*
Number of banks	2 826	2 844	2 853	2 853
First stage F-test	27.685	18.432	25.796	11.974
Prob > F	0.000	0.000	0.000	0.001
Hansen's J χ^2	0.752	0.683	1.168	2.503
P-value	0.347	0.319	0.294	0.136
χ^2 test of heteroskedasticity	5 832.253	3 765.442	1 645.413	2 145.532
P-value	0.0000	0.0000	0.0000	0.0000
Chow test F-statistic	144.2167	181.7324	113.8111	266.4202
R-squared	0.0516***	0.0664***	0.1743***	0.1524***

***, ** & * correspond to 10%, 5%, and 1% level of significance respectively. Robust standard errors appear in parenthesis below the estimated coefficients.

2.10 The effect of market power on capital risk. This table shows bank-level GMM regressions with robust standard errors clustered at the country level to correct for within-country serial correlation. The dependent variable to proxy a bank's capital risk is the equity to assets ratio. The explanatory variables utilised in this study are outlined and defined in Appendix A. The indicators of competition i.e. lerner index, boone indicator, C5 ratio and HHI loans are instrumented using activity restrictions, banking freedom, and percent of government owned banks. Bank size, legal rights index and GDP growth are also included in all regressions to control for variations in the business environment, the legal framework and economic development of the respective countries. The first stage F-statistic tests the relevance of the instrumental variables; rejecting the null hypothesis implies that the variables are not exogenous. The Hansen's J-statistic tests the validity of the instruments used; rejection implies that the instruments are not valid. The χ^2 test of heteroscedasticity includes the Breusch–Pagan and the Cook–Weisberg tests. We use and report the results of the Chow test to ascertain whether there was a structural break in the data for the global financial crisis years i.e. 2007-2010; accepting the null hypothesis implies no structural breaks exist in the data. Robust standard errors appear in parentheses below estimated coefficients.

Dependent variable: CAPITAL RISK	Competition / Market Power Measure			
	Lerner index	Boone indicator	C5 ratio	HHI loans
Degree of competition (linear term)	-0.4312 (0.6841)	-0.7542 (0.3364)	0.1933 (0.3624)	0.7430 (0.2387)*
Degree of competition (quadratic term)	1.1613 (0.9782)	1.2481 (0.8243)	2.1382 (1.1731)***	-1.0674 (0.5812)***
Inflection point	0.2091	0.1843	-0.0283	0.332
Sign of the relationship	+ / -	+	+	+
Bank size	-0.0063 (0.1067)	-0.0071 (0.2248)	-0.0128 (0.0021)*	-0.0128 (0.0034)*
Banking freedom	0.0264 (0.0261)	0.0398 (0.0118)	0.0327 (0.0162)**	0.0336 (0.0168)**
Legal rights index	0.0062 (0.0053)	0.0038 (0.0066)	-0.0236 (0.0074)*	-0.0058 (0.0037)**
GDP growth	0.0634 (0.0321)***	0.1468 (0.0228)***	0.1784 (0.0381)*	0.1214 (0.0328)*
Number of banks	2 826	2 844	2 853	2 853
First stage F-test	21.5842	18.4126	21.2850	13.4631
Prob > F	0.0000	0.0000	0.0000	0.0010
Hansen's J χ^2	2.8641	2.0368	0.4276	0.4443
P-value	0.1135	0.1076	0.5096	0.5231
χ^2 test of heteroskedasticity	1 605.5836	3 421.3268	7 155.1316	8 248.8506
P-value	0.0000	0.0000	0.0000	0.0000
Chow test F-statistic	121.1103	154.1471	182.6344	176.5632
R-squared	0.0724***	0.0836***	0.1741***	0.1307***

***, ** & * correspond to 10%, 5%, and 1% level of significance respectively. Robust standard errors appear in parenthesis below the estimated coefficients.

Table 2.11 The effect of market power on liquidity risk. This table shows bank-level GMM regressions with robust standard errors clustered at the country level to correct for within-country serial correlation. The dependent variable to proxy a bank's liquidity risk is the cash deposits ratio. The explanatory variables utilised in this study are outlined and defined in Appendix A. The indicators of competition i.e. lerner index, boone indicator, C5 ratio and HHI loans are instrumented using activity restrictions, banking freedom, and percent of government owned banks. Bank size, legal rights index and GDP growth are also included in all regressions to control for variations in the business environment, the legal framework and economic development of the respective countries. The first-stage F-statistic tests the relevance of the instrumental variables; rejecting the null hypothesis implies that the variables are not exogenous. The Hansen's J-statistic tests the validity of the instruments used; rejection implies that the instruments are not valid. The χ^2 test of heteroscedasticity includes the Breusch–Pagan and the Cook–Weisberg tests. We use and report the results of the Chow test to ascertain whether there was a structural break in the data for the global financial crisis years i.e. 2007-2010; accepting the null hypothesis imply no structural breaks exist in the data. Robust standard errors appear in parentheses below estimated coefficients.

Dependent variable: LIQUIDITY RISK	Competition / Market Power Measure			
	Lerner Index	Boone Indicator	C5 Ratio	HHI Loans
Degree of competition (linear term)	-0.7126 (0.5908)	-0.4378 (0.2674)	0.1744 (0.3266)	0.7304 (0.2473)*
Degree of competition (quadratic term)	1.0931 (0.8878)	0.8942 (0.7421)	1.9182 (1.2131)***	-1.0598 (0.5372)***
Inflection point	0.2177	0.2548	-0.0206	0.286
Sign of the relationship	+ / -	+	+	+
Bank size	-0.0057 (0.1106)	-0.0042 (0.1009)	-0.0119 (0.0026)*	-0.0117 (0.0029)*
Banking freedom	0.0283 (0.0242)	0.0239 (0.0367)	0.0364 (0.0156)**	0.0294 (0.0159)**
Legal rights index	0.0071 (0.0057)	0.0058 (0.0041)	-0.0244 (0.0062)*	-0.0062 (0.0044)**
GDP growth	0.0674 (0.0321)***	0.0723 (0.0424)***	0.1686 (0.0322)*	0.1482 (0.0286)*
Number of banks	2 899	2 894	2 831	2 831
First stage F-test	19.3328	23.1814	27.7742	13.3293
Prob > F	0.0000	0.0000	0.0000	0.0009
Hansen's J χ^2	2.7814	1.9916	0.3843	0.4213
P-value	0.1088	0.3263	0.5362	0.5613
χ^2 test of heteroskedasticity	1 352.9175	4 742.8127	6 979.1443	7 103.3363
P-value	0.0000	0.0000	0.0000	0.0000
Chow test F-statistic	124.4553	118.6041	166.8444	172.6128
R-squared	0.0693***	0.0831***	0.1927***	0.1294***

***, ** & * correspond to 10%, 5%, and 1% level of significance respectively. Robust standard errors appear in parenthesis below the estimated coefficients.

2.12 Robustness Analysis. The Pre-Crisis, Crisis & Post-Crisis Periods. This table shows bank-level GMM regressions with robust standard errors clustered at the country level to correct for within-country serial correlation for the pre-crisis (2000-2006), crisis (2007-2010) and post-crisis (2011-2015) periods. The dependent variable to proxy financial stability is the Z-score. The explanatory variables utilised in this study are outlined and defined in Appendix A. The indicators of competition i.e. boone indicator and C5 ratio are instrumented using activity restrictions, banking freedom, and percent of government owned banks. Loan loss provisions to total assets ratio, bank size, unemployment, inflation and GDP per capita are also included in all regressions to control for variations in the business environment, the legal framework and economic development of the respective countries. The first-stage F-statistic tests the relevance of the instrumental variables; rejecting the null hypothesis implies that the variables are not exogenous. The Hansen's J-statistic tests the validity of the instruments used; rejection implies that the instruments are not valid. The χ^2 test of heteroscedasticity includes the Breusch-Pagan and the Cook-Weisberg tests. Robust standard errors appear in parentheses below estimated coefficients.

PERIOD	PRE-CRISIS		CRISIS		POST-CRISIS	
Dependent variable: Z-Score	Boone Indicator	C5 Ratio	Boone Indicator	C5 Ratio	Boone Indicator	C5 Ratio
Competition	-2.5083 (0.6127)***	0.7571 (0.5433)***	-0.04075 (0.5673)***	0.701097 (0.5031)***	-0.0419 (0.5843)***	0.7221 (0.5182)***
Competition x Crisis (Interaction Term)	9.8594 (0.9165)***	-11.9606 (2.5070)***	9.1291 (0.9412)***	-11.0746 (2.3213)***	9.4030 (0.9694)***	-11.4068 (0.3909)***
Loan loss provisions to total assets	-14.4756 (21.5851)***	-15.0463 (-21.879)***	-13.4033 (19.9862)***	-13.9318 (-20.259)***	-13.8054 (-20.585)***	-14.3498 (-20.867)***
Total assets (natural log)	-0.0244 (0.0564)*	-0.0252 (0.0815)*	-0.0226 (0.0522)	-0.0233 (0.0755)*	-0.0233 (0.0538)*	0.0246 (0.0777)**
Unemployment	5.9908 (0.2948)***	-3.6830 (0.0257)*	-0.0271 (0.0253)	-0.0238 (0.0207)*	5.7136 (0.2812)***	-3.5125 (0.0245)***
Inflation	0.0034 (0.0000)***	0.0032 (0.0000)***	0.0031 (0.0000)***	0.0030 (0.0000)***	0.0032 (0.0000)***	0.0031 (0.0000)***
GDP per capita	15.3e-06 (0.0000)***	12.62e-06 (0.0000)***	14.2e-06 (0.0000)***	11.75e-06 (0.0000)***	14.63e-06 (0.0000)***	12.12e-06 (0.0000)***
Banking freedom	-0.2240 (0.1665)	-1.2929 (0.1916)	-0.2074 (0.1542)	-1.1971 (0.1774)	0.2136 (0.1588)	-1.2330 (0.1827)
Number of banks	2 899	2 856	2 899	2 858	2 872	2 876
First stage F-test	24.5562	27.2707	22.7372	27.1025	23.4193	27.9156
Prob > F	(0.0000)	(0.0000)	(0.0000)	(0.0000)	0.0000	(0.0000)
Hansen's J χ^2	0.9836	0.9478	0.9794	0.9637	0.9088	0.9926
P-value	0.3359	0.2960	0.3110	0.2741	0.3203	0.2823
χ^2 heteroskedasticity	6 412.2952	7 668.7830	5 937.3102	7 100.7253	6 115.4311	7 313.7548
P-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Chow test F-statistic	137.2744	177.8486	127.1059	164.6746	130.9132	169.6156
R-squared	0.0899***	0.1686***	0.0832***	0.1561***	0.0857***	0.1608***

***, ** & * correspond to 10%, 5%, and 1% level of significance respectively. Robust standard errors appear in parenthesis below the estimated coefficients.

2.13 Robustness Analysis. This table shows bank-level GMM regressions results with robust standard errors clustered at the bank level to correct for within-bank serial correlation. The ratio of non-performing loans to total loans, the equity to total assets ratio, cash deposits ratio and the z-score are the dependent variables and proxy for credit risk, capital risk, liquidity risk and insolvency risk respectively. The explanatory variables utilised in this study are outlined and defined in Table 2.1 and here we only report the results relating to our main competition proxy i.e. Boone indicator. The Boone indicator is instrumented using activity restrictions (ACTRES), banking freedom (BANFRE), and the percentage of banks that are government owned (PERGO). Loan loss provisions to total assets ratio, bank size, unemployment, inflation and GDP per capita are also built into all regressions to control for variations in the business environment, legal and bankruptcy laws and economic development of the respective countries. The first stage F-statistic tests the relevance, while Hansen's J-statistic tests the validity of the instruments used. I use the Breusch–Pagan and Cook–Weisberg tests to check for the presence of heteroscedasticity. I use and report the results of the chow test to ascertain whether there was a structural break in the data for the global financial crisis years i.e. 2007-2008; accepting the null hypothesis imply no structural breaks exist in the data. Robust standard errors appear in parentheses below estimated coefficients. A constant term is included but not reported. Refer to Table 2.1 for detailed descriptions of the variables used in this study.

Dependent variable: Z-Score	Winsorised Dep. variable Z-score	Survivorship bias Z-score	US out Z-score	Stripped linear Z-score
Boone indicator	4.3758 (3.6193)*	-2.6520 (3.3114)*	-0.2077 (2.4376)**	-4.4200 (3.4413)**
C5 ratio	8.2013 (0.2922)***	6.0647 (0.3321)***	14.7120 (3.3312)	3.1766 (0.3012)***
Herfindahl-Hirschman index (loans)	2.5445 (0.0279)***	3.6932 (0.0499)***	5.3428 (3.1581)***	3.0464 (0.0534)***
Loan loss provisions to total assets	-13.4033 (19.9862)***	-13.9318 (-20.2598)***	-10.2933 (-20.6054)***	-6.1212 (-18.1146)***
Total assets (natural logarithm)	-0.0226 (0.0522)	-0.0233 (0.0755)*	-0.0184 (0.0583)	0.0246 (0.0681)**
Unemployment	-0.0271 (0.0253)	-0.0238 (0.0207)*	-0.0231 (0.0232)	-0.0254 (0.0274)**
Inflation	-2.2251 (0.0000)***	-2.4262 (0.0000)***	-2.5058 (0.0000)***	-2.4122 (0.0000)***
GDP per capita	-0.3772 (-3.5401)***	-0.3794 (-4.5326)***	-0.1283 (-1.2751)***	0.3092 (4.3503)***
Banking freedom	-0.2074 (0.1542)	-1.1971 (0.1774)	-0.2194 (0.1474)	-1.2181 (0.1463)
Number of banks	2 889	2 858	2 838	2 838
First stage F-test	22.7372	27.1025	22.7721	24.0208
Prob > F	(0.0000)	(0.0000)	0.0000	(0.0010)
Hansen's J x ²	0.9794	0.9637	0.7283	0.9488
P-value	0.3110	0.2741	0.3862	0.1678
x ² test of heteroskedasticity	5 937.3102	7 100.7253	5 148.1197	6 025.6636
P-value	0.0000	0.0000	0.0000	0.0000
Chow test F-statistic	127.1059	164.6746	137.1843	232.7066
R-squared	0.0832***	0.1561***	0.0482***	0.1431***

***, ** & * correspond to 10%, 5%, and 1% level of significance respectively. Robust standard errors appear in parenthesis below the estimated coefficients.

Chapter 3 - Competition and financial misreporting in the light of the Global Financial Crisis

3.1. Introduction

The general consensus in the mainstream economics and finance domains has been that competition is a force for good in so far as the attainment of positive economic outcomes is concerned. The welfare-increasing effect of competition is largely through improved choice, product quality and competitive pricing. However, there is an emerging literature debunking and challenging this notion of competition as indisputably beneficial to the wider economy by probing the so-called ‘dark side’ of competition.

In this paper, I delve into this emerging debate on the pervasive effects of competition and focus on the interplay between competition and financial misreporting in the US financial services industry by using the Accounting and Auditing Enforcement Releases (AAERs) of the Securities and Exchange Commission (SEC). For some context right from the onset, I define financial misreporting as the wilful misrepresentation of the true underlying economic performance of a firm. I advance two broad and diverging mechanisms through which competition can affect financial misreporting; these rely upon the competition-restraining and the competition-misreporting hypotheses.

The competition-restraining hypothesis posits the notion that firms in more competitive industries are less likely to misreport and follow better disclosure and financial reporting practices since not providing information and misreporting could be interpreted by potential entrants to the product market as good news. This line of argument establishes the idea of competition as a restraining mechanism in so far as financial misreporting is concerned. The counter theory to the competition-restraining hypothesis is what I refer to in this study as the competition-misreporting hypothesis. It postulates that firms that operate in more competitive environments will have less forthcoming and informative disclosure policies and are more likely to misreport. Specifically, the implications of the models advanced in these studies suggest that in more oligopolistic industries in which incumbents have more interdependent investment strategies it is optimal for firms to have less informative disclosure policies since information disclosed by one firm could be subsequently used against it by its rivals.

These contradictory notions on the relationship between competition and financial misreporting in theoretical studies across the accounting, economics and finance domains

provide the basis and theoretical underpinning for my study. The competition-misreporting nexus is an emerging and hotly contested area of accounting and finance research and there is a burgeoning literature base coming through; yet the question can still be posed and probed from various alternative angles. Also, the existing empirical evidence building on the above analytical predictions is limited and unclear. Several studies suggest that the disciplining role of product market competition is an important mechanism through which competition can relate to misreporting. Beginning with Hart (1983), it has long been argued that product market competition can be effective in curtailing managers' misbehaviour. Numerous theoretical papers formalize this idea by examining the potential channels through which product market competition can impact financial misreporting. However, the recent literature documents that the probability of a firm to provide proprietary information is positively related to industry concentration consistent with the notion that product market competition and disclosure are negatively related.

Given the varied nature of the conclusions arrived at, and the shortcomings of research designs in extant literature, the question whether competition impacts financial accounting misreporting – as well as the direction of the impact - is very much an open one and remains fertile ground for further research. I update, extend and add to the competition-misreporting nexus by posing and investigating the hypothesis that the state of competition in an industry determines the extent of financial misreporting in that particular industry. I then proceed and probe - by way of a difference-in-difference analysis of the pre-crisis and post crisis situations - whether the financial crisis impacted on the competitive environment in the financial services industry. Finally, I establish a link between the global crisis of 2007-10 as an exogenous factor and financial misreporting. I follow the lead taken by Dechow et al. (2011) and utilise the US SEC's Accounting and Auditing Enforcement Releases (AAERs) from 2000 to 2016 as the financial misreporting proxy, with discretionary loan loss provisions coming in as an alternative for robustness purposes.

By way of contribution, firstly my paper adds to and extends the burgeoning research base probing the so-called the “dark side” of competition within markets that shines a light on the negative and undesirable effects of competition in altering the way firms behave in the market place Bennett et al. (2013). To the best of my knowledge, mine would be the first paper of its kind to exclusively focus on a financial services sample and establish a link between competition and financial misreporting. I further seek

to expound on the fact that at sufficiently higher levels, competition potentially yields undesirable consequences which ultimately may result in a reversal and undermining of its supposed benefits on the wider economy. Secondly, prior research on the interplay between competition and financial misreporting has tended to treat competition as being unidimensional and therefore utilised concentration measures to proxy for competition. This practice has since been comprehensively discredited in Industrial Organisation studies and I take heed of this fact in my study by adopting market size, ease of entry and product substitutability as my main competition measures, with the Herfindahl-Hirschman index (HHI sales) also included merely as an alternative measure to strengthen my analysis. Utilising the three product market competition proxies allows me to circumvent and address the shortcomings of traditional concentration measures as proxies for competition. Berger et al. (2009) posit that the main difference between competition and concentration is that while competition measures market conduct; concentration essentially measures market structure. Finally, exclusive focus on the financial sector enables me to shed further light on whether the much-vaunted assertion that the disciplining role of competition is greater in industries where financial statements are highly comparable. This contention emanates directly from an analytical study by Besley and Prat (2006) highlighting that in an industry composed of various information suppliers, there is greater likelihood of there being at least one independent supplier who supplies accurate information. This way enhanced comparability becomes a deterrent and makes it difficult for the other peers in that particular industry to massage the information they disclose.

I regress my main financial misreporting proxy i.e. SEC AAERs against four competition measures (market size, ease of entry, product substitutability and HHI sales) and a battery of carefully selected control variables and find there exists a positive and significant effect of competition on financial misreporting. While it is undeniable that competition largely results in improved welfare for the population, there are potential problems associated with intense competition e.g. it escalates the possibility of financial misreporting incidences occurring. Governments, regulators and academics alike ought to critically consider the pervasive effects of competition in policy-making, compliance, welfare and other economic deliberations.

The rest of the paper is structured as follows. Section 2 discusses the related literature. Section 3 develops the hypotheses to be tested. Section 4 presents the data set, the model variables and the underlying empirical methodology as well as the relevant

descriptive statistics. Section 5 reports and discusses the empirical findings. Section 6 presents the robustness analysis I conduct, whereas Section 7 offers a set of concluding remarks and discusses some policy implications.

3.2. Literature review

A lot has been written already about competition being a vital cog in determining the economic well-being and development of a nation state; and this belief has in turn informed the formulation of key economic policies of a great number of countries e.g. Shleifer and Vishny (1997) claim that “market competition is probably the most powerful force towards economic efficiency in the world.” There is a deeply held belief that competition promotes efficiency as well as fosters innovation as firms struggle to differentiate their products / reduce costs in a bid to maintain a competitive edge under intense competitive market conditions. However, there is an emerging literature on the “dark side” of competition and the relationship between competition and financial misreporting is prime territory for a study of this nature to be sustained. The literature on the competition-financial misreporting nexus can be distilled to two broad strands i.e. what I refer to in this paper as the competition-restraining and competition-misreporting hypotheses.

3.2.1. The competition-restraining hypothesis

Darrough and Stoughton (1990) predict that firms in more competitive industries will follow better disclosure policies. Their analytical model predicts that in industries with greater ease of entry / lower entry barriers, potential entrants could interpret withholding information as possible future good news about the industry due to expected positive shocks to product demand. Accordingly, firms in more competitive industries will follow better disclosure policies and are less likely to misreport financial information. In other words, firms in more competitive industries are less likely to misreport and follow better disclosure and financial reporting practices since not providing information and misreporting could be interpreted by potential entrants to the product market as good news. This line of argument firmly advances the notion of competition as a restraining mechanism in so far as financial misreporting is concerned. However, Gertner et al. (1988) counter this argument and contend that firms in more competitive industries face higher costs associated with disclosures and might find it optimal to misreport in order to provide less useful information to its current and future competitors.

Regardless of this fact, recent theoretical papers from the economics literature provide another mechanism through which market competition constrains managers' behaviour and ultimately disciplines reporting. Specifically, a firm releasing information that is competing with another firm that also releases information runs the risk that, if it distorts its public signal, the competitor's report will expose the inaccuracy and thus reduce investors' assessments of the distorting firm's quality. The work of Gentzkow and Shapiro (2006) makes for some compelling reading here. By modelling the news market, they found that competition in the news market can result in a lowering of bias in news reporting i.e. a distorting firm that is in competition with another firm (news outlet) runs the risk that the competitor's report will expose the inaccuracies; ultimately leading to reputational damage which could be terminal in an intensely competitive market. Reporting quality is construed by firms competing within a particular space to be a great source of competitive advantage such that any lowering of standards in this regard can be costly in terms of ceding market share to competitors. Competition therefore is taken to compel firms in competitive industries to maintain and constantly improve their financial reporting processes and standards, which ultimately leads greater quality in terms of the disclosures released by reporting firms.

Building on and corroborating Gentzkow and Shapiro (2006) on the competition-financial misreporting relationship is the work by Besley and Prat (2006). This is theoretical formulation which postulates that there is a higher likelihood of having at least one independent and objective supplier of accurate information in an environment punctuated by several competing suppliers. This provision of accurate information by the independent supplier serves as a reference point for greater comparability among rivals in that particular industry, thereby curbing their appetite to massage their financial reports. Also backing this conjecture and empirically examining the aspect of bias in earnings forecasts, Hong and Kacperczyk (2010) find that bias in earnings forecasts is reduced when analyst coverage is greater and they actually attribute this reduction in bias to the disciplining effect of competition among analysts. Running with the earnings bias theme, recent economics research is available which provides a convincing argument on how competition can reduce bias in the information provided. This literature contends that competition from suppliers of information makes it more difficult for a single supplier to suppress information. From this we can therefore surmise that, in the setting of a product market, the higher the number of firms, the costlier it will be for a single firm to present an exceedingly optimistic picture of its financial position and performance.

Indeed, Gentzkow and Shapiro (2006) posits that greater competition results in a greater variety and diversity of preferences among suppliers of information and thus ultimately increasing the possibility of having at least one independent information supplier whose preference is not to withhold news, but rather to avail financial reports of the highest quality. It is what is referred to as the “supplier’s independence” and provides another interesting avenue through which competition can have a restraining / disciplining effect on other suppliers of financial information. Put differently, higher competition levels can be construed to be indicative of the fact that there are more firms in an industry to serve as a yardstick against which performance can be measured, hence making the detection of fraud and other forms of misreporting much easier. All in all, this literature emphatically advances and supports the restraining effect competition has on financial accounting misreporting i.e. that incidences of misreporting should be fewer under highly competitive market conditions, thereby firmly endorsing the competition-restraining hypothesis as outlined in earlier paragraphs of this paper.

There is another emerging and interesting channel emerging from recent economics literature which chimes with the disciplining effect of competition on financial misreporting. The theory contends that a firm releasing information that is competing with another firm that also releases information runs the risk that the competitor’s report will expose the inaccuracy (misreporting), and thus ultimately reducing investors’ assessments of the distorting firm’s quality. However, it is also sensible to adopt the opposing view and discern from this postulation that there could be an incentive for firms in more competitive environments to misreport their performance as a means of fooling their competitors by making it difficult for the competitors to learn about the firms’ “true” performance. Further support for this argument is contained in the theoretical voluntary disclosure literature. The theory predicts that firms in more competitive industries may either misreport or withhold disclosure of performance in order to misinform their competitors Gertner et al. (1988). This view goes against the beneficial effects of competition on financial misreporting and supports the opposing theory instead i.e. the theory that holds that competition actually negatively impacts financial misreporting.

From an empirical perspective, recent studies seem to be advancing and supporting the idea that higher market competition provides incentives for managers to be more closely aligned with shareholders’ interests e.g. Giroud and Mueller (2010). Working with a sample of 10,960 firm-year observations from 1976 to 1995, Giroud and Mueller (2010) found no obvious evidence of ‘empire building’ by managers in competitive

industries in light of the enactment of business combination (BC) laws which essentially had the effect of increasing hostile takeovers. They found no change in capital expenditure in competitive industries in the aftermath of the passage of BC laws, strongly suggesting that competition was instrumental in reducing managerial slack as well as in better aligning managers' interests with their shareholders. These findings contradict established thinking on the 'myopia argument' which contend that competitive pressure results in firms reducing capital expenditure and research & development (R&D) investment, accumulating cash reserves and equity; all this while decreasing debt Fresard and Valta (2012). Christie et al. (2003) also contradict Giroud & Mueller (2010)'s contention on competition aligning managers' and investors' interests by arguing that managers in competitive industries have a greater likelihood to focus on short-term actions aimed at enhancing their firms' survival prospects and/or sustain competitive advantage. Financial misreporting is a handy tool for myopic managers who tend to be driven by short-term reported performance and this myopic orientation of managers could therefore ultimately result in an escalation of financial misreporting in competitive industries. To further support the myopia argument advanced above, von Thadden (1995) considers misreporting of accounting information as a classic example of an agency problem where firms' managers forgo long-term shareholder value for short-term private gains.

Hart (1983) postulates that while the notion that competition disciplines managers' incentives with regards to financial reporting practices is appealing, it is harder to establish the precise mechanism by which this occurs. What is certain though is the fact that this agency theory provides another avenue via which market competition can be an efficient disciplinary and monitoring mechanism to curb agency problems. Using data from publicly traded shares in 19 countries, Guadalupe & Perez-Gonzalez investigated the impact of product market competition on private benefits of control and the results came out in support of the competition-restraining hypothesis i.e. that product market competition brings closer the rights of managers with those of their shareholders. This postulation also wades directly into the broader issues around the agency theory that is so topical in finance and corporate governance literature. Markarian & Santalo (2014) is another of the recent papers that provide rather tame support for the competition-restraining hypothesis in the competition-misreporting nexus. This was an empirical study using a large panel data set with earnings management as the financial misreporting proxy and found that competition ought to reduce, rather than increase, earnings

manipulation in intensely competitive markets. However, in the main the study broadly fell in the competition-misreporting sector of the argument. In another interesting paper extolling the virtues of competition as having a disciplining effect on financial misreporting, Verrecchia and Weber (2006) found a firm's probability to provide proprietary information to be positively related to industry concentration, therefore implying a negative relationship between product market competition and disclosure as a result. In their paper, Berger and Hann (2007) however dampen the significance of this postulation by finding proprietary costs linked to product market competition to be an insignificant consideration in a firm's decision to provide segment disclosures.

Finally, in another interesting take on the relationship between competition and financial misreporting, DeFranco, Kothari and Verdi (2011) classified industries based the comparability of financial statements and found that disciplining role of competition on financial misreporting is greatest in industries with higher levels of financial statement comparability. The scope as well as propensity to misreport is greatly reduced in environments with greater comparability because the report of one firm essentially informs and build expectations about the reports of the other firms in that industry. Any significant departures from established patterns and trends are likely to be easily seized upon and reacted to by the market. This postulation goes a long way in justifying our decision to restrict our study to just the financial services industry as it enhances and maximises our study's potential to benefit from greater financial statement comparability.

3.2.2. The competition-misreporting hypothesis

This is the opposing theory to the competition-restraining effect alluded to in the foregoing paragraph. Competition is an essential tenet of a capitalist system and has long been touted as welfare-increasing and synonymous with good economic outcomes all round is widely accepted. One could trace the evolution of the literature espousing the virtues of competition right from the early contributions of Adam Smith himself Smith (1776). Fairly modern contributions on economic thought have also backed this established notion of competition as a welfare-enhancing instrument e.g. Caves (1980). The central argument for the beneficial impact of competition on positive economic outcomes is the fact that it is believed to promote efficiency and foster innovation as firms differentiate products / reduce costs in quest to acquire a sustainable competitive edge. While the bulk of the contributions on this has advanced the positive impact competition and how it boosts efficiency within an economy, there is an emerging literature

documenting the so-called “dark side” of competition which associates intense competition with incidences of undesirable business practises. Among such malpractices is the escalation in incidences of financial misreporting in intensely competitive systems. I refer to this as the “competition-misreporting hypothesis” for purposes of our study. I establish the competition-misreporting hypothesis as a counter theory to the competition-restraining hypothesis and it establishes the line of thought that competition increases the occurrence of incidences of financial misreporting. Milgrom and Roberts (1992) noted that the excessive risk taking and fraudulent behaviour that caused the Savings and Loan (S&L) crisis of the early 1980s was amplified by intense competition in the industry, and more recently Shleifer (2004) comes out in support of view by arguing that intense competition promotes unethical (and even criminal) behaviour among firms within an industry through triggering a typical ‘race to the bottom’. This “race to the bottom” results in otherwise conservative and ethical firms feeling compelled to imitate the questionable practices of their less ethical counterparts. The idea being that not doing so will force them out of business. This therefore implies that firms operating in competitive industries may engage in financial misreporting merely because its peers in this industry engage in this practice. Other examples of unethical practices that firms in competitive industries may be forced to mimic in a bid for survival include tax avoidance and bribery. Bringing a disclosure dimension to the debate, Gal-Or (1985) and Gertner (1988) among others posit that firms in more competitive industries will have less forthcoming and informative disclosure policies and are more likely to misreport. Specifically, the implications of the models advanced in these studies suggest that in more oligopolistic industries in which incumbents have more interdependent investment strategies it is optimal for firms to have less informative disclosure policies since information disclosed by one firm could be subsequently used against it by its rivals. In a similar vein, Verrecchia (1990) argues that greater product market competition inhibits better disclosures in markets comprised of mature competitors. Further, Wagenhofer (1990) shows that although there is always a full disclosure equilibrium, there might exist partial-disclosure equilibria suggesting that the relation between product market competition and a firm’s disclosure policies is unclear ex-ante. Prior research argues that market competition can be an efficient disciplinary and monitoring mechanism to curb agency problems e.g. Hart (1983). Also backing up this contention, Shleifer and Vishny (1997) claim that “product market competition is probably the most powerful force towards economic efficiency in the world.” The idea that market competition provides incentives for managers to be more

closely aligned with shareholders' interests seem to be gaining quite some traction in recent empirical studies e.g. Giroud and Mueller (2010) and Christie et al. (2003) argue that managers in highly competitive industries are accorded greater discretion to engage in complex actions in the quest to attain and sustain a competitive advantage over peers in such an industry. Such a background makes it difficult for firms to maintain oversight, observe and comprehend such actions, hence allowing financial misreporting to fester and be common-place in intensely competitive environments. Allied to this argument is the contention that the greater uncertainty and volatility of performance in competitive industries provides a breeding ground of greater scope for financial misreporting which is primarily coined to mask such volatility. Against this backdrop, the expectation for an enhance scope for financial accounting misreporting is more pronounced in highly competitive industries. Still on earnings management specifically, Bloom et al. (2010) posits that greater competition increases the scope of earnings management by increasing its complexity, and therefore lowers the observability of managerial actions. We can infer from this that misreporting in an industry increases with the intensity of competition. Shleifer (2004) contributes on the 'dark side' of competition and argues that intense competition within an industry promotes unethical and even criminal behaviour among firms. The mechanism through this happens is via the fact that greater competition triggers a 'race to the bottom'. This race to the bottom takes root when supposedly ethical firms are literally compelled to mimic the questionable practices of their less ethical counterparts and the cost of not doing is most likely to be bankruptcy. Shleifer proceeds and provides examples to further highlight his postulation. In the first example, he notes that intensely competitive industries are more likely to employ child labour because competition forces all firms to exploit the lower wages from child labour. A firm in such an industry that opts not to walk this path has a cost disadvantage in relation with its competitor peers and this will most likely result in its demise in such a highly competitive industry. The ethical firms are essentially left with no option, especially if such practices yield undue advantages and benefits to the unethical firms. Also on the dark side of competition, Shleifer (2004) argues that competitive pressures could act as an incentive for firms to adopt aggressive accounting methods as a means to inflate their stock price. Bagnoli and Watts (2010) developed a model scenario where a firm is motivated to misreport (manage earnings) if it believes that its peers are doing the same and this scenario is obviously amplified under intensely competitive market conditions, leading to widespread misreporting by all firms in the industry. Consistent with Shleifer's

postulation, Linck et al. (2013) suggest that a firm can ease financial constraints and gain access to external funds through financial misreporting i.e. managing earnings, thus reducing its cost of capital as well as increasing firm value. They also find that accounting fraud actually tends to fool the market in the short term. Shleifer (2004) further treads this 'short-termism' path and posits that higher earnings emanating from massaged figures could translate into higher managerial compensation and also higher stock prices which in turn could ultimately confer various advantages to the firm e.g. reduced cost of capital and increased ability to retain or attract employees. All these bring to the fore the undesirable effects of competition on financial accounting misreporting.

The catering view is another theory expounding on the negative impact of intensely competitive markets on financial accounting misreporting. The catering view suggests that competition can increase bias if the end users of financial information (investors) have an expectation to receive financial reports that conform to their priors Mullainathan and Shleifer (2005). According to Narayanan (1985), competition can also increase financial misreporting through the inducement of opportunistic behaviour. As an example, he observes that top managers may take actions that boost measures of short-term performance at the expense of creating long-run shareholder value if they are concerned with their personal position in the labour market of top executives. This phenomenon can only be but exacerbated under competitive market conditions due to the fact that profitability and the ability to achieve superior performance decline with increased competition.

To further buttress the competition-misreporting hypothesis, DeFond and Park (1999) found CEO turnover to be higher in more competitive industries compared to concentrated ones. We establish a link and analyse this study with the conclusion arrived at by Burns and Kedia (2006) in their study when they examined the relationship between the occurrence of financial misreporting incidences and stock-based compensation for managers. They found that managers with stock-based compensation may misreport to boost stock prices and therefore obtain private gains. This phenomenon is more pronounced in competitive industries and the key takeaways from both studies suggest that financial reporting quality is expected to be lower in more competitive industries. In other words, the likelihood of financial accounting misreporting is amplified in competitive market conditions.

Verrecchia (1999) considers financial accounting misreporting as an outcome of a firm's overall disclosure decision to withhold the true underlying information about the

firm's economic performance given the costs and benefits of doing so. On one hand - based on this view - firms in more competitive industries face higher costs associated with disclosures and might find it optimal to misreport in order to provide less useful information to its current and future competitors Gertner et al. (1988). On the other hand, as expounded at length in an earlier paragraph, firms in more competitive industries are less likely to misreport and follow better disclosure and financial reporting practices since not providing information and misreporting could be interpreted by potential entrants to the product market as good news Gertner et al. (1988). While the pressure that comes with operating in intensely competitive environments can motivate the attainment of various positive economic outcomes e.g. improved productivity and innovation, it can also inadvertently exert pressure on managers in undesirable behaviours e.g. financial misreporting. This is especially so if the misreporting aids the respective firms in maintaining their competitive advantage over its peers in the same industry.

Financial misreporting (in the form of earnings management) could help boost the current stock price (Stein 1988), and this inflated stock price can then be used to the firm's advantage in the M&A, capital, and labour markets; ultimately leading to a lowering of the firms' overall cost of doing business and therefore aid in maintaining its competitive edge. This also is the crux of Shleifer's thesis as expounded on in an earlier paragraph in this prose. A study by Graham (2003) makes for interesting in the context of what is under discussion in this paragraph. Graham (2003) surveyed and interviewed more than 400 executives to determine the factors that drive reported earnings and disclosure decisions and found that 78% admitted to sacrificing long term earnings by smoothing earnings. The underlying aim being to boost prices, especially against the backdrop where executive compensation was via stock options. They further found that earnings, and not cash flows, were the key metric considered by outsiders in assessing the performance and prospects of a company. A competitive environment escalates these issues as managers adopt a short-term orientation towards decision as their tenure is becomes highly volatile with greater competition; therefore, providing greater incentives for firms to misreport i.e. through income smoothing.

In another recent paper on the competition-misreporting nexus, Datta et al (2013) examined the link between product market power and the degree of earnings management. They found that firms with inferior product market pricing power engage in greater use of discretionary accruals. Competition leads to greater financial misreporting for such firms because their ability to pass on costs to customers is blunted.

Firms with greater market have got better leeway to cushion themselves against the squeeze in profits ushered in by intense competition, thus are less likely to engage in financial misreporting (i.e. via earnings manipulation). Tying in with this paper, Irvine and Pontiff (2008) examined US time series of idiosyncratic volatility to probe why idiosyncratic return volatility had outpaced total market volatility. They found that the upward trend was attributable to an increasingly competitive environment in which firms have less market power which ultimately provide fertile ground for firms to misreport financial accounting information. Competition increases cash flow volatility and this creates incentives for managers engage in the smoothing of earnings. The greater uncertainty and volatility of performance in competitive industries provides greater scope for earnings management that masks this volatility to take place. According to Graham (2005) income smoothing is one of the most common forms of financial misreporting by firms. Wang and Winton (2012) also provide support to the competition-misreporting hypothesis when they studied the effect of product market competition on firms' incentives to fraudulently report financial information and found fraud propensity to be greater on average in competitive industries.

Veenman et al (2011) examined whether managers' decisions to exercise their stock options had any signalling effect in terms of providing incremental information regarding a firm's future earnings performance and current earnings quality. They specifically hypothesised whether executive options liquidation exercises are associated with upward earnings management and found options causing managerial wealth to be more sensitive to price changes thereby inducing more risk-taking in terms of opportunistic financial reporting. Another interesting recent study by Markarian & Santalo (2014) posits that it is difficult for investors to observe real firm output and sales in a crowded and competitive market place which provides fertile ground for financial misreporting to take place. They further contend that the boost in market value resulting from misreporting is much more pronounced in competitive industries than in concentrated ones.

Finally, managers in competitive industries are accorded greater discretion to engage in complex actions to attain/sustain a competitive advantage in the industry (Christie et al. 2003, Bloom et al. 2010). This makes it difficult for firms to observe and comprehend such actions, thus allowing financial misreporting to be rampant in competitive environments. For these reasons, I expect that there is greater scope for financial misreporting by firms operating in more competitive industries.

3.3. Hypotheses development

In this section, I rely on the relevant literature to review the channels through which product market competition impacts our financial misreporting proxy i.e. SEC Auditing and Accounting Enforcement Releases (SEC AAERs). This literature background provides the setting for the formulation of the four testable hypotheses that form the basis of our study.

3.3.1. Crisis and misreporting hypothesis

The first two hypothesis builds up to and provide the premises and support for my formulation of the key hypothesis that is the basis of my study i.e. whether product market competition leads to an increase or decrease in financial misreporting in the financial services industry within the context of the global financial crisis of 2007-08. My first hypothesis seeks to establish a direct link between the financial crisis as an exogenous shock with incidences of financial misreporting in the financial services industry. I specifically assess how my financial misreporting proxy i.e. SEC AAERs responds to variations in the financial services industry ushered in by the global financial crisis. I uphold and follow Balakrishnan & Cohen (2013) and utilise Difference-in-Difference analysis to evaluate how the financial crisis impacted on the occurrence of incidences of financial misreporting in the financial services industry (and the direction of the impact). To achieve this, I compare the pre-crisis and post-crisis dispensations in this regard. This is in line with Bertrand et al (2014)'s postulation that the Difference-In-Difference approach is now increasingly popular in recent literature as the design of choice for identifying causal effects. According to De Franco et al (2011) the extent to which product market competition is a disciplining force in so far as financial misreporting is concerned is thought to be greater in industries where financial statements are comparable. I believe exclusive focus on a single industry i.e. financial services allow us to fully maximise on this comparability aspect as the financial statements are broadly similar in scope, content and form. Did the financial crisis impact on financial misreporting incidences in the United States? This background therefore forms the basis of my first supporting hypothesis thus:

H1. The financial crisis as an exogenous factor led to an increase in financial misreporting incidences in the US financial services industry

3.3.2. Competition and crisis hypothesis

The second of my supporting hypotheses relates the crisis with the competitive environment in the US financial services industry. Under this hypothesis, I seek to assess how the financial crisis impacted the competitive environment in the financial services sector. The global financial crisis has its genesis deeply rooted in the financial services industry and it is also fair to surmise that the full force of its impact was largely felt and concentrated in this industry as well. I therefore follow the lead taken by Karuna (2007) and seek further confirmatory evidence of the nature of the relationship between product market competition and financial misreporting as articulated in my main hypothesis. This I achieve by probing whether the Global Financial Crisis of 2007-08 instigated an exogenous increase in competition in the financial services sector, which by extension ultimately resulted in a modification of the financial reporting and disclosure behaviours of financial services firms. Karuna (2007) used the deregulation in the telecommunications industry and tariff reductions emanating from the North American Free Trade Agreement (NAFTA) to ascertain whether an exogenous shock (i.e. deregulation) culminated in an altering of the competition dynamics in the telecommunications industry. Balakrishnan and Cohen (2013) also took a similar path but instead used shifts in import tariffs to identify the exogenous intensification of competition emanating from the occurrence of a major event. As in the preceding supporting hypothesis, I make use of Difference-In-Difference analysis to identify exogenous shifts in competition in the pre-crisis and post-crisis periods. In other words, I seek to establish how the financial crisis altered the competitive landscape in the financial services industry and, by extension, whether this ultimately modified the reporting behaviours of executives in the industry. This informs the formulation of my second supporting hypothesis thus:

H2. The financial crisis increased (or decreased) the intensity of competition in the US financial services industry

3.3.3. Competition and financial misreporting hypothesis

Having sought to establish how the financial crisis impacted on reporting behaviour and the competitive landscape in the US financial services industry in my two preceding supporting hypotheses, the stage is now set for me to pose my basic main hypothesis that intensely competitive industries tend to exacerbate firms' propensity to partake in financial misreporting in all its guises e.g. around revenue recognition, outright

fraud or earnings management among other vices. I premise my hypothesis on both demand-side and supply-side factors. On the demand-side, I make the contention that competition abets managers' willingness to misreport, while on supply-side factors I contend that competition increases the scope for managers to misreport. I expound on both contentions a little bit more. Cut-throat competition exerts pressure on managers to grow and maintain a competitive advantage over peers in the industry in which they operate. Once realised, sustenance of this competitive edge is paramount and an inability to do so ultimately results in a firm going out of business. While competitive pressure is touted to yield positive outcomes such as improved productivity and innovation, it is also true that it can impose pressure on managers to "cut corners" and engage in financial accounting misreporting if such practices are expected to help the firms attain their competitive edge.

I start by documenting various channels advanced in literature via which competition has a positive and beneficial impact on financial misreporting. (Darrough & Stoughton (1990); Hart (1983)) argue that firms in competitive environments follow better disclosure while Giroud & Muller (2010) posited that product market competition incentivises managers to align with shareholders' interests. Hong and Kacperczyk (2010) contend that competition makes it hard for a single firm to misreport i.e. eliminates bias and De Franco et al (2011) found the disciplining effect to be greater in industries with higher levels of financial statements comparability De Franco et al (2011). Against the backdrop of this literature base I formulate the first of my two-part main hypothesis, thus:

H3a. The level of competition enhances the quality of disclosures thereby curbing the occurrence of financial misreporting incidences in the financial services industry

I then proceed to document the literature contributing on the negative impact of competition on financial misreporting e.g. Gal-Or (1985) find firms in competitive industries less forthcoming in their disclosures. Verrecchia (1990) contends that competition inhibits better disclosure in mature markets while Mullainathan & Shleifer (2005) found competition to have the effect of increasing bias if end users expect to receive financials that conform to priors' i.e. the Catering View. Burns & Kedia (2006) argue that managers with stock-based compensation misreport to boost stock prices. Markarian & Santalo (2014) also contribute by arguing that gains from financial misreporting are greater in competitive industries. Irvine and Pontiff (2009) argued that competition increases cash flow volatility and Valta and Fresard (2012) find that

competitive pressure results in firms reducing capital and R&D investment. This literature discussion informs the framing and positioning of the second bit of my two-part main hypothesis, thus:

H3b. The intensity of competition in the financial services industry / banking increases the likelihood of firms operating in the industry misreporting

3.4. Empirical analysis

3.4.1. Data and sample selection

I describe the data I use for purposes of my study in this section. I obtain and use data from various sources for the purposes of my analyses. For my financial misreporting proxy, i.e. AAER_ENF, I collect accounting enforcement data from the United States Securities & Exchange Commission's (SEC) Accounting and Auditing Enforcement Releases (AAERs). My main focus is on the financial services industry which is four-digit SIC Codes from 6000 – 6999. I started with a population of 2 604 industry-year observations and then applied some filtering rules to arrive at my final sample. I excluded auditing enforcement releases and accounting enforcement releases relating to individual CPAs, LLCs and LLPs. This ultimately left me with a final sample of 681 industry-year observations as per the breakdown in Table 3.2 and I winsorise all my variables at the 1st and 99th percentiles to dilute the likely impact of outliers. All my competition variables i.e. market size (MKTSZ), ease of entry (ENTRY), product substitutability (SUBST) and the Herfindahl-Hirschman Index (HHISL) are extracted from the Segments and Annual Industrial databases in Compustat. From the same Compustat database, I also derive two of my control variables i.e. cash flow volatility (CFVOL) and the leverage ratio (LEVRA). I obtained data for the control variable equity incentives (EQINS) from Execucomp and for the corporate governance index (GOVINS) from Risk Metrics⁹. I explain and justify my choice of variables for this study based on the most recent relevant literature in a later section in this study.

My primary sample encompasses the period from fiscal 2000 to 2016 and I have no specific data constraints with SEC AAERs in this regard. The period 2000 to 2016 is particularly interesting for the financial services industry because of the occurrence

⁹ Descriptions, abbreviations, computations and sources of all the variables used in this study are presented by way of Table 3.1.

of the global financial crisis of 2007-2010 which emanated from this industry. This makes it possible for me to examine and make periodical comparisons about the competition-misreporting relationship based on conditions as they were before, in the build-up to and after the crisis period. I require five years of prior cash flow data to estimate one of my key variables i.e. cash flow volatility (CFVOL)) for a given year, thus commencing my study in the year 2000 makes sense since the Compustat Segments Data starts in 1992. My main thrust in this study to evaluate the effect intense market competition has on financial misreporting from a financial services industry perspective. Against this background, I therefore conduct my empirical analysis at the primary four-digit standard industrial classification (SIC) industry level as opposed to doing it at the firm level.

3.4.2. Financial misreporting measure(s)

SEC AAERs: my analysis is strengthened by my use of an objective-based proxy of financial misreporting i.e. SEC AAERs. Unlike the accrual-based proxies used for earnings management which tend to be subject to measurement error during the estimation process Kothari et al. (2005), SEC enforcement releases are more robust to estimation errors since they are publicly reported incidences of financial misreporting. The US SEC's Accounting and Auditing Enforcement Releases (AAERs) primarily serve as evidence that a firm committed an accounting violation to warrant being charged for that violation by the SEC. Because AAER releases are disclosed to the public via the medium of the SEC website well after the actual accounting violation has been committed, I have to read the AAER releases case by case to determine the period when the actual violation first occurred. Dechow et al. (2010) tout SEC AAERs as a robust financial misreporting proxy by remarking that "the AAER fraud sample represents the most egregious accounting manipulations that are identified by the SEC thereby providing me with a measure that unambiguously captures financial misreporting." Table 2 above detail the violation types and the frequency with which they are committed by firms. Close to 84% of the violations relate to presenting misleading financial information, with revenue recognition and internal control violations also featuring heavily at 66% and 48% respectively. In the majority of cases, a single AAER normally contains a combination of various of these infractions e.g. a company that violates revenue recognition conventions also automatically gets charged with presenting misleading financial information as well with issues

pertaining to the existence of a weak internal control environment. My study is based on industry-year observations; thus, I determine the proportion of firms in each four-digit SIC code that are subject to a SEC enforcement action in a particular year. SEC AAERs constitute my main financial misreporting proxy for purposes of this study.

Discretionary Loan Loss Provisions: I estimate the absolute value of discretionary loan loss provisions (DISC_LL) as an alternative financial misreporting proxy to SEC AAERs (AAER_ENF) for robustness purposes. I feel backing up my objective-based misreporting proxy (i.e. SEC AAERs) with a subjective-based one (loan loss provisions) strengthens and enriches the sensitivity of my analysis. In so far as banks are concerned, an opportunity exists for managers to misreport earnings through discretionary actions related to the recording of loan loss provisions. Loan loss provisions consists of two components i.e. a non-discretionary component and a discretionary portion which is supposed to be closely monitored and regulated. A challenge therefore exists as to how to quantify a measure of discretionary loan loss provisions (DISC_LL), or more specifically, a proxy for financial misreporting (in the form of earnings management). I adopt the Beatty et al. (2002) model to estimate discretionary loan loss provisions and run fixed-effects OLS regressions based on the regression specification (1) below. I also follow the lead taken by Beatty et al. (2002) and Cornett et al. (2009) and use Cook's (1977) distance criterion to remove influential observations from the sample. Most specifically, I use the following regression model to estimate loan loss provisions as:

$$LNLLP_{i,t} = \alpha_0 + \beta_1 LASS_{i,t} + \beta_2 NPL_{i,t} + \beta_3 LLA_{i,t} + \beta_4 OTLOAN_{i,t} + \varepsilon_{i,t} \quad (3.1)$$

where: i = bank; t = year (2000 to 2016); $LNLLP_{i,t}$ = loan loss provisions as a percentage of total loans; $LASS_{i,t}$ = the natural log of total assets; $NPL_{i,t}$ = nonperforming loans (includes loans past due 90 days or more and still accruing interest and loans in nonaccrual status) as a percentage of total loans; $LLA_{i,t}$ = loan loss allowance as a percentage of total loans; $OTLOAN_{i,t}$ = all other loans (i.e. incorporating real estate loans, commercial and industrial loans, loans to depository institutions, agriculture loans, consumer loans and loans to foreign governments) as a percentage of total loans; $\varepsilon_{i,t}$ = error term.

In line with Beatty et al. (2002) and Cornett et al. (2008), I then proceed and designate the error term from this regression as the discretionary component of loan loss provisions. However, because my measure of earnings management (defined below) is standardized by total assets, I transform the error term and define my measure of discretionary loan loss provisions (DISC_LL*P*) as:

$$DISC_LLP_{i,t} = (\varepsilon_{i,t} * TOTLNS_{i,t}) / TOTASS_{i,t} \quad (3.2)$$

where: $DISC_LLP_{i,t}$ = discretionary loan loss provisions; $TOTLNS_{i,t}$ = total loans; $TOTASS_{i,t}$ = total assets.

3.4.3. Measures of competition

In this study, I follow the path established by Karuna (2007) and estimate market competition along three dimensions i.e. product substitutability (SUBST), market size (MKTSZ) and entry costs (ENTRY). I believe these three determinants of price competition capture the nature of competition in an industry better than the concentration measures which were widely used as competition proxies in much of prior literature on competition (e.g. Aggarwal and Samwick (1999). Industrial organizations literature e.g. Raith (2003) have effectively banished concentration measures as proxies for competition. For one, Ahn (2002) & Karuna (2007) lament that industry concentration fails to capture the threat from potential competition in the industry. I however include a concentration measure in our regressions i.e. the Herfindahl-Hirschman index (HHISL) to control for the level of concentration in an industry, as well as a robustness check for the competition proxies. (Vives, 2008) propounds that it is important to control for concentration as a means of capturing the multi-dimensional aspects of competition and avoid the correlated omitted variables bias that studies that treat competition as one-dimensional suffer from. HHISL is a commonly used measure of industry concentration and is calculated by taking the sum of squared market shares of firms in an industry and multiplying them by minus one. Industrial Organisation (IO) based competition proxies would still be superior for my study when pitted against purely banking competition type proxies. This is primarily because my sample (i.e. SIC Codes 6000-6999) includes some firms which can best be described as “quasi-banking” at best, and this makes it harder for me to estimate

the bulk of the variables required for banking competition proxies to be applicable. Also, I seek to make a comparison of the competitive landscapes between the financial services industry and the other industries and I run into all sorts of estimation challenges when trying to impose purely banking competition proxies to other industry types. For these reasons among others, I believe IO based competition proxies reflect market fundamentals that more directly capture the nature of competition in all industry types than both concentration and banking competition proxies.

Product substitutability (SUBST): basically, denotes the extent to which there are close (or perfect) substitutes for a product in a particular industry; the greater the availability of close substitutes, the greater the intensity of price competition. I tag along with prior studies in the Industrial Organizations literature and adopt use the price-cost margin as proxy for product substitutability Nevo (2001). Higher substitutability breeds greater competition and ultimately results in a lower price cost margin. In line with prior studies (e.g. Karuna (2007), Nevo (2001)), I compute SUBST as equal to the average operating industrial segment profit divided industrial segment revenue multiplied by minus one (at the four-digit SIC code level). The intuition behind this is that intense competition is associated with lower profitability, and ultimately with greater values of SUBST. Greater values of SUBST therefore denote the existence of higher product substitutability in an industry.

Market size (MKTSZ): is considered to be reflective of the density of consumers in an industry. Raith (2003) argue that when market demand for a product increases, the sales of that particular product also increase in tandem. The prospects of greater profitability attract new firms to enter the market (industry) leading to an increase in price competition. I mimic Karuna (2007) and measure an industry's market size by primary industry revenue at the four-digit SIC code level; larger industry revenue denotes larger market size. It is equal to the natural log of industrial segment revenue (at the four-digit SIC code level) averaged over the past three years and the current year. In other words, larger values of MKTSZ indicate greater market size and thus greater competition.

Entry costs (ENTRY): refer to the ease with which new firms can penetrate an industry i.e. the barriers to entry in an industry Bresnahan (1992). The higher these barriers to entry, the lower the intensity of price competition. I consider entry costs to be the minimum level of investment that must be incurred by an entrant firm into an industry before production commences. In this study, consistent with Karuna (2007),

the minimum level of investment is computed as the the natural log of the weighted average gross value of total assets weighted by each firm's market share in industry multiplied by minus one (at the four-digit SIC code level). This variable is averaged over the past three years and the current year. Market share is derived by dividing the segment revenue figure for the primary industrial segment of a firm by the sum of the segment revenue of all firms that have this particular industry as their primary industry at the four-digit SIC code level. To combat the skewness, I log-transform our entry costs measure and larger values of ENTRY reflect a lower level of entry costs and thus more intense competition.

Herfindahl-Hirschman index (HHISL): this is widely used in literature as a proxy for industry concentration and is calculated by taking the sum of squared market shares of firms in an industry multiplied by minus one. I adopt and build HHISL into our study to control for the level of concentration in the financial services industry. It is an established convention in prior research to examine these dimensions of competition while controlling for concentration in the same instance e.g. Raith (2003); Vives (2008). This is important for two reasons: 1) to capture the incremental and more exogenous effects of each measure relative to the other competition measures as there could be associations among these variables, and 2) to carefully capture the multi-dimensional aspects of competition and avoid the correlated omitted variables bias that studies that treat competition as one-dimensional suffer from. Recently, in support of this contention, Subramanian (2013) illustrate that it is important to distinguish the different dimensions of competition in both theoretical and empirical analyses of the effects of competition. By showing that industry concentration is endogenous, Sutton (1991) asserts that there is a historically determined lower bound to the level of concentration which must be controlled for in examining the effects of the three determinants of competition we examine.

Summing up, given the level of concentration, I examine how the three competition proxies (SUBST, MKTSZ and ENTRY) impact financial misreporting; all this at the primary four-digit SIC code level. I average each of the three competition proxies and the concentration measure HHISL) over the year of measurement and the prior three years. I do this as a means of ensuring my regressions capture any lagged effects of competition on financial misreporting.

3.4.4. Control variables

I build into the regressions a plethora of other control variables that bear some correlation with my measures of both competition and financial misreporting. Hribar and Craig Nichols (2007) suggest that unsigned financial misreporting measures are correlated with the volatility of cash flows and for this reason I control for cash flow volatility (CFVOL) in the regressions. I derive this as the standard deviation of cash flows from operations scaled by beginning assets for the four-digit SIC industry-year group (6000 – 6999). Consistent with the reasoning of Ivashina et al. (2009) who suggested that creditors may serve as corporate control in monitoring companies, I include the leverage ratio (LEVRA) to control for capital structure. This is computed as the sum of long-term debt and debt in current liabilities divided by total assets for the four-digit SIC industry-year group. I account for the likelihood that executive pay and compensation may influence financial misreporting by including CEO equity compensation incentives (EQINC). Prior studies e.g. Cheng and Warfield (2005) suggest that equity incentives of CEOs may drive financial misreporting. However, there is a lot of research arguing that the impact may actually be opposite i.e. that CEO equity incentives could actually lead to a reduction in incidences of financial misreporting Armstrong et al. (2010). I compute this as equal to the sum of restricted stock grants and Black-Scholes value of options granted divided by the total CEO compensation package. I follow Gompers et al. (2003) and include a corporate governance measure (GOVIN) to control for the feasible assertion that stronger governance frameworks discipline managers from engaging in financial misreporting. In line with Gompers et al. (2003), I denote this as the composite index of charter provisions and by-laws based on IRRC data for the four-digit SIC industry-year group (6000 – 6999). I proceed and acknowledge the role of quality auditors in restraining financial misreporting by including the percentage of big auditors (BIG4AUD) in an industry-year group. It is the percentage of the banks audited by large auditing firms in the four-digit SIC industry-year group. I identify large auditing firms to be the large international auditing firms i.e. Arthur Andersen (before 2002), Ernst & Young, Deloitte & Touche, KPMG and Price Waterhouse Coopers (PWC). Finally, I control for firm size (LNTAS) because large firms may have more robust control systems that act as a deterrence for financial misreporting. This is equal to the natural log of a firm's total assets over the sample period.

3.4.5. The regression specification

For purposes of this study, the dependent variable for my set of regressions is the financial misreporting proxy i.e. *AAER_ENF*, with *DISC_LL*P coming in as a robustness check. The three competition variables i.e. *MKTSZ*, *SUBST*, *ENTRY*, and *HHISL* (the industry concentration measure for robustness), are the main explanatory variables and these are common to each of our regressions. When slotting these continuous explanatory variables into the regressions, I standardize them at the mean value of zero so that the effects of these variables are comparable. I estimate the regressions at the firm level for each year, and because of this it follows that I also average each of the control variables at the firm level. To control for unobserved time effects, I include year fixed effects. I test my hypotheses using a regression specification which takes the following form:

$$\begin{aligned} AAER_ENF_{i,t} = & b_0 + b_1 MKTSZ_{i,t} + b_2 ENTRY_{i,t} + b_3 SUBST_{i,t} + b_4 HHISL_{i,t} + \\ & b_5 CFVOL_{i,t} + b_6 LEVRA_{i,t} + b_7 EQINC_{i,t} + b_8 GOVIN_{i,t} + b_9 B4AUD_{i,t} + \\ & b_{10} CRISIS_{07-10} + \sum_i Year\ Indicator + \varepsilon \end{aligned} \quad (3.3)$$

Table 3.4 reports the descriptive statistics of the key variables I utilize in my research study. The descriptive statistics are comparable to earlier studies conducted at the firm level even though I construct my variables at the industry level. As an example, the mean value of *AAER_ENF* at 0.63% and 10.84% for *DISC_LL*P indicates that incidences of reported financial fraud are rare occurrences within the financial services industry. This position isn't at all out of line with the overall unconditional fraud ratio of 0.37% from Dechow et al. (2011). The difference could be attributable to the fact that Dechow et al. 2011's *AAER* data spanned from 1971 to 2003, whereas my sample period covers a period which witnessed significantly more *AAER* fraud cases in comparison. In addition, my variable is weighted at the industry level whilst the one in Dechow et al. (2011) is constructed at the firm level. Finally, the coefficients of the competition and concentration measures i.e. *MKTSZ*, *ENTRY* and *HHISL* are also very much in sync with Karuna (2007).

Table 3.5 presents the Pearson correlations for the various explanatory variables adopted for application in the baseline regressions. Whilst there are no particularly large correlations among the variables, the correlation between *MKTSZ* and *ENTRY* at 0.751 merits some further elucidation. By implication, this is consistent with

Karuna (2007) in suggesting that firms operating in larger industries / or markets also invest in heavy capital stock such as plant and equipment i.e. that higher values of ENTRY are indicative of lower values of plant and equipment. I also find B4AUD and LNSLS (Firm Size) highly correlated at 0.5702 and this position is well in line with earlier studies e.g. Becker et al. (1998).

3.5. Discussion of the empirical results

Table 3.6 is a presentation of the results from the regressions on the product market competition-financial misreporting, most specifically looking at the relationship between market competition and financial misreporting in terms of the frequency with which the misreporting incidences occur. I utilise AAER_ENF as the dependent variable (i.e. SEC Auditing and Accounting Enforcement Releases) in this case. At the 5% significance level or better, the coefficients / values on the three main competition measures (i.e. market size, product substitutability, and ease of entry) are all positive and statistically significant at conventional levels. It is fair to say that these coefficients are also economically significant e.g. a one standard deviation increase in SUBST, MKTSZ and ENTRY is associated with a relative increase of 3.4%, 19.2% and 11.7%, respectively, of the relative frequency of financial misreporting when AAER_ENF is the dependent variable. On the whole, the results from using the frequency of financial misreporting, and those based on the three main concentration measures (SUBST, MKTSZ & ENTRY) come out in support of the hypothesis that there is a greater likelihood of firms operating in competitive environments / industries to misreport compared to their peers in less competitive industries. However, there is a departure from this trend and I obtain conflicting evidence when I use the industry level concentration measure i.e. the Herfindahl-Hirschmann index (HHISL) as the competition proxy. At conventional levels, the HHISL coefficient is negative and statistically significant. I glean from these results the fact that greater industry concentration is not associated with / not related to AAER_ENF. The mixed nature of these serves to stress and reinforce the ambiguity emanating from using industry concentration measures to capture competition in line with the wider Industrial Organizations (IO) literature (e.g. Sutton (1991)). The concentration measures e.g. HHISL have now been effectively cast as weak proxies for competition because they imply market structure while competition infers market conduct.

In Table 3.7 I report the impact of the global financial crisis on the competitive environment in the financial services / banking industry. In this regard, I restrict the focus of my analysis to the two years prior to the financial crisis (2004-2006) and the two years after the crisis peak (2009-2010). In the first instance, I analyse whether the financial crisis results in an increase in competition in the banking industry by regressing each of the main competition proxies (SUBST, MKTSZ, and ENTRY) on the interaction term between the indicator variables for the global financial crisis (CRISIS) and the financial services industry (FSERV). The financial crisis (CRISIS) variable equals zero during the two years preceding the onset of the financial crisis and equals one in the two years after the financial crisis. The financial services industry (FSERV) variable equals one if the firm operates in the financial services industry and equals zero if it operates in another sector. I also control for competition variables not included as the dependent variable in the regression and other variables. By way of interpretation, the intuition is that I should observe a positive and significant coefficient on the interaction term CRISIS×FSERV. Did the onset of the financial crisis result in a relative increase in competition in the financial services sector? Using each of the competition and concentration measures as the dependent variable, the results show that the coefficient on this interaction term (CRISIS×FSERV) is indeed significantly positive across all the competition measures (MKTSZ, ENTRY & SUBST). This evidence bears testimony to the fact that the global financial crisis resulted in increased competition in the financial services sector and this further validates my setting to examine how an exogenous increase in competition affects financial misreporting.

In Table 3.8 I report the results of the frequency of change of financial misreporting AAER_ENF around the CRISIS event. I consider whether the financial misreporting i.e. the SEC investigation starts in the prior or post-crisis period as a way of ensuring that the occurrence of the misreporting is due to the crisis event. The results are interesting in that while the financial services industry had fewer cases of financial misreporting before the onset of the global financial crisis in comparison to other industries, it experienced a higher proportion of misreporting firms compared to other industries after the crisis event. In other words, the change in financial misreporting incidences around the crisis is much more significant and pronounced in the financial services industry than it is in non-financial services industries (5.37% against - 1.5336% respectively; p-value = 0.0318). The economic importance of this change in

the frequency of financial misreporting stems from the fact that the increase in the financial services industry around the crisis event is four times in excess of the change in the non-financial services industries.

Table 3.9 reports the change in accruals management resulting from the CRISIS event. We average the absolute value of discretionary loan loss provisions over the prior (or post) financial crisis period to allow sufficient time for the crisis to have an effect on loan losses management (i.e. financial misreporting). A comparison of the two rows in Table 3.9 illustrate that the financial services industry experienced a marked upsurge in the absolute value of discretionary loan losses after the financial crisis (i.e. 0.2261 against 0.1247; with the p-value of difference in means equal to 0.000). This can be contrasted with the values for ‘Other’ industries (i.e. non-financial services) where the DISC_LLTP values also increased but the magnitude of increase was lower in comparison to financial services (i.e. 0.1706 against 0.1293; with the p-value of difference in means equal to 0.000). The difference of the change in DISC_LLTP between the financial services and the non-financial services industries is 0.0601 and this is significant at the 1% level. I conclude from these results that the CRISIS event is positively associated with the magnitude of accruals-management (financial misreporting) in the financial services industry.

Overall, Tables 3.8 & 3.9 provide insightful and robust evidence on the causal nature of the relation between competition and financial misreporting in that the results suggest that crisis in the financial services industry - which yielded an exogenous increase in the intensity of competition in that industry-led to greater financial misreporting via the medium of higher likelihood of SEC enforcement actions.

3.6. Robustness / sensitivity analysis

To ensure the robustness of my results, I conduct a battery of other analyses across a range of our variables. Firstly, I adopt and use discretionary loan loss provisions (DISC_LLTP) as the main dependent variable in place of AAER_ENF and present results of the regressions in Table 3.10. The positive coefficients we report on SUBST, MKTSZ and ENTRY are suggestive of the fact that firms in industries that are subject to fierce product market competition are blighted by poorer discretionary loan losses quality. This ultimately lends support to one of my hypothesis where I contend that firms operating in more competitive industries engage in greater financial misreporting (i.e. earnings management) than their peers in less competitive

environments. The coefficients for the three competition proxies (i.e. SUBST, MKTSZ and ENTRY) are statistically significant. I draw from the results for the variable DISC_LLTP in Table 3.10 to illustrate this point. The coefficient estimate on the standardized variable SUBST is 0.0136, and this is statistically significant at the 1% level. At 0.0317, the coefficient estimate for the competition proxy MKTSZ is also statistically significant at the 1% level. This also holds true with regards to the coefficient estimate on ENTRY is 0.0116 and is statistically significant at the 10% level. My results corroborate and are consistent with the findings from when I use AAER_ENF in the baseline regressions.

Secondly, I substitute and utilize HHIL as the main competition/concentration proxy in place of MKTSZ, ENTRY & SUBST and my results hold. In Table 3.11 the coefficient on the interaction term (CRISIS×FSERV) and the concentration measure HHISL is positive and significant, implying that concentration decreases in the financial services industry after the financial crisis i.e. the sector became competitive. A key policy response in the aftermath of the financial crisis was to reduce the systemic impact of too-big-to-fail financial institutions on the system as a whole. This result attests to that policy thrust as moves have certainly been made to inject some competition into the financial services sector as one among a plethora of other initiatives to make the banking system more competitive. The results support my finding that the global financial crisis resulted in increased competition in the financial services sector.

Finally, I am highly cognizant of the fact that the entry and exit of firms in both the pre and post crisis periods could potentially wreak havoc with my analysis. To this end, I actually find that 347 firms continue to operate in both the pre- and post-crisis periods, and 164 firms leave or join the industry after the crisis. As a robustness check, I therefore redo my analysis based only on firms that consistently remain in my sample before and after the crisis event to allay, eliminate or mitigate this concern. Based on this tweaked sample, I find that the frequency of financial misreporting increases by 2.46% (from 0% to 2.46%), which is significantly larger than the change for the non-financial services industries (0.6%). My results for this constant-firm sample are robust (if not stronger) to this change.

3.7. Concluding remarks

I empirically examined the relationship between product market competition and financial misreporting. I document a positive relationship between the intensity of competition and financial misreporting incidences by using product substitutability, market size, entry costs and HHI Sales to capture competition; and SEC AAERs (Accounting and Auditing Enforcement Releases to proxy for financial misreporting. I draw causal inferences regarding the impact of competition on financial misreporting by conducting an independent natural experiment. I examine whether an exogenous increase in competition via the financial crisis in the financial services industry culminated in an increase in financial misreporting incidences for firms within that particular industry. The results provide some intriguing insight into the competition-misreporting nexus by attesting to the robust nature of the positive effect competition has on financial misreporting. While the notion that competition ultimately improves welfare and provides a myriad of economic benefits is established and uncontested in established economic thought, it is vital that a competing narrative around the potential problems synonymous with competition be developed in academic literature. If not diligently addressed, these pitfalls of competition have the potential to reverse and undermine the economic benefits associated with healthy levels of competition. According to Durnev and Mangen (2009), financial misreporting is harmful to firms and ultimately to the economy at large. My findings are thus suggestive of the fact that governments, regulators and academia ought to critically consider the pervasive effects of competition in policy-making, compliance, welfare and other economic deliberations.

Table 3.1 *Variable definitions, abbreviations and sources.* This table presents all the variables that we utilize in our econometric analysis in this study. The abbreviations, descriptions and sources of each variable we use are also presented.

Variable	Abbreviation	Description and computation	Data source
<i>Dependent variables:</i>			
Accounting & auditing enforcement releases	<i>AAER_ENF</i>	The percentage of firms that commit accounting fraud by manipulating earnings in a four-digit SIC industry-year group. Firms that commit fraud in a given year are identified from the SEC investigations in AAERs	SEC AAER Website
Discretionary loan loss provisions	<i>DISC_LL</i>	The provision for loan losses deflated by beginning loans.	Compustat Annual Data
<i>Competition variables:</i>			
Market size	<i>MKTSZ</i>	Market size of the four-digit SIC industry-year group. It is equal to the natural log of industrial segment revenue (at the four-digit SIC code level) averaged over the past three years and the current year	Compustat Segments Data
Ease of entry	<i>ENTRY</i>	Ease of entry into four-digit SIC industry-year group. It is equal to the natural log of the weighted average gross value of total assets weighted by each firm's market share in industry multiplied by minus one (at the four-digit SIC code level). This variable is averaged over the past three years and the current year	Compustat Annual and Segments Data
Product substitutability	<i>SUBST</i>	Product substitutability i.e. the extent to which there are close substitutes in a four-digit SIC industry-year group. It is equal to average operating industrial segment profit divided industrial segment revenue multiplied by minus one (at the four-digit SIC code level). The variable is averaged over the past three years and the current year	Compustat Segments Data
Herfindahl-Hirschman index (sales)	<i>HHISL</i>	Concentration in the four-digit SIC industry-year group, denoted by Herfindahl-Hirschman index multiplied by minus one	Compustat Segments Data
<i>Other independent variables:</i>			

Cash-flow volatility	<i>CFVOL</i>	The standard deviation of cash flows from operations scaled by beginning assets	Compustat Segments Data
Leverage ratio	<i>LEVRA</i>	is equal to the sum of long-term debt and debt in current liabilities divided by total assets	Compustat Segments Data
Equity incentives	<i>EQINC</i>	is equal to the sum of restricted stock grants and Black-Scholes value of options granted divided by total compensation	Execucomp
Governance index	<i>GOVIN</i>	denoted as the composite index of charter provisions and bylaws based on IRRC data	Gompers et al. (2003)
Big 4 auditor	<i>B4AUD</i>	The percentage of firms audited by the big auditors in an industry-year group i.e. PWC, Deloitte, KPMG and Ernst & Young	
Firm size	<i>LNTAS</i>	The natural log of firm assets	
Financial services	<i>FSERV</i>	An indicator variable that captures whether firms belong to the financial services industry	
Global financial crisis	<i>CRISIS</i>	An indicator variable that captures whether firms are in the post-crisis period	

Table 3.2 *Auditing and accounting enforcement releases breakdown.* This table presents the breakdown of the AAERs showing how we arrived at the industry-year observations used in our study at a glance.

Description	Observations
Total SEC AAERs from 2000-2016	2 604
Auditing enforcement actions & individual CPAs, LLCs & LLPs	1 923
Corporate accounting enforcement actions	681

Table 3.3 *Distribution of misreporting methods.* Table presents violation types via which firms misreport, the number of firms per violation and the violation types as percentage of the total infractions in our sample.

Violation type	Number of firms	Percentage of total
Misleading presentation	577	84
Revenue recognition	453	66
Insufficient internal controls	330	48
Understatement of expenses	82	33
Backdating stock options	96	14
Improper payments / bribery	282	41
Inventory valuation misconduct	55	8

Note: The bulk of the AAERs detail multiple infractions, hence table cannot aggregate to 100%

Table 3.4 *Descriptive statistics.* This table reports the summary statistics for our industry-year sample from 2000 – 2016. We collect financial data from Compustat and data to construct the variable AAER_ENF from the Securities & Exchange Commission’s (SEC) Accounting and Auditing Enforcement Releases (AAERs). The data specifically includes Accounting Enforcement Releases of Corporates in all the 4-digit SIC Code industry classifications. We exclude Auditing Enforcement Releases and enforcement releases for accounting and auditing practices. All variables are defined, outlined, described and provided by way of Table 3.1.

Variables	Obs.	Mean	Std. Dev	Minimum	Maximum
Accounting enforcement releases (AAER_ENF)	681	0.0063	0.0253	0.0021	0.2371
Discretionary loan loss provisions (DISC_LL)	608	0.1084	0.1362	-0.0136	0.1964
Market size (MKTSZ)	681	8.1107	2.2734	0.0000	0.0423
Ease of entry (ENTRY)	681	-6.1964	2.2726	4.4978	9.6637
Product substitutability (SUBST)	681	-0.0698	2.2093	0.0084	0.8362
HHI index (sales) (HHISL)	681	-0.4137	0.2764	0.0073	0.8174
Cashflow volatility (CFVOL)	681	0.5987	3.2458	0.3268	2.7732
Leverage ratio (LEVRA)	681	0.5106	1.4826	0.0689	0.5147
Equity incentives (EQINC)	681	0.2964	0.1904	0.0000	0.7387
Governance index (GOVIN)	681	8.8213	1.8936	5.9758	13.0086
Big 4 auditor (B4AUD)	681	0.7707	0.1852	1.1964	4.0000
Firm size (LNTAS)	681	4.6693	1.6088	4.3821	9.5843

Table 3.5 *Correlation matrix.* This table provides information on the Pearson correlations among the independent variables used in our regressions i.e. the competition proxies, as well as the various control variables used throughout this paper. The p-values that indicate the significance of the correlation are reported in parentheses and all the variables and their computational details are defined and provided by way of Table 3.1.

Variables	MKTSZ	ENTRY	SUBST	HHISL	CFVOL	LEVRA	EQINC	GOVIN	B4AUD	LNTAS
Market size	1.0000									
Ease of entry	-0.7512 (0.0000)	1.0000								
Substitutability	-0.3718 (0.0000)	0.2241 (0.0000)	1.0000							
HHI index (sales)	-0.2067 (0.0000)	-0.2471 (0.0000)	-0.2326 (0.0000)	1.0000						
Cash-flow volatility	0.0894 (0.0000)	0.0822 (0.0000)	0.0894 (0.0000)	-0.0432 (0.0018)	1.0000					
Leverage ratio	0.0632 (0.0000)	0.0592 (0.0000)	0.0674 (0.0000)	0.0109 (0.4222)	0.1187 (0.0000)	1.0000				
Equity incentives	0.0214 (0.1050)	-0.0337 (0.0158)	-0.0218 (0.1216)	0.0134 (0.3871)	0.0249 (0.0891)	0.0244 (0.0852)	1.0000			
Governance index	0.0542 (0.0000)	-0.0517 (0.0000)	0.0542 (0.0000)	-0.0417 (0.0046)	-0.0536 (0.0009)	-0.0258 (0.0976)	-0.0271 (0.0794)	1.0000		
Big 4 auditor	-0.1247 (0.0000)	-0.2574 (0.0000)	-0.1094 (0.0000)	0.1437 (0.0000)	-0.1761 (0.0000)	-0.1468 (0.0000)	0.0762 (0.0000)	0.0082 (0.5621)	1.0000	
Firm size	-0.0811 (0.0000)	-0.4933 (0.0000)	-0.0723 (0.0000)	-0.0227 (0.1072)	0.0103 (0.0000)	0.0327 (0.0274)	-0.0438 (0.0047)	0.0723 (0.0000)	-0.0241 (0.5702)	1.0000

Table 3.6 *Competition & financial misreporting* (SEC AAERs). This table reports the OLS regressions conducted on the basis of Equation 1 in our empirical model. The dependent variable is AAER_ENF and the sample period span from 2000 to 2016. The regression we run is as follows: $AAER_ENF = b_0 + b_1 MKTSZ + b_2 ENTRY + b_3 SUBST + b_4 HHISL + b_5 CFVOL + b_6 LEVRA + b_7 EQINC + b_8 GOVIN + b_9 CRISIS_{07-08} + b_{12} B4AUD + \sum Year Indicator + \varepsilon$. The variable definitions, sources and computational details are provided by way of Appendix A. We estimate standard errors by clustering by year and industry and ***, ** & * correspond to 10%, 5% and 1% significance level respectively.

Variables	AAER_ENF
Market size	0.0054 (0.0068)***
Ease of entry	0.0028 (0.0394)**
Product substitutability	0.0009 (0.0757)*
Herfindahl-Hirschman index (sales)	-0.0002 (0.8332)
Cash-flow volatility	0.0012 (0.1472)
Leverage ratio	0.0009 (0.3989)
Equity incentives	0.0004 (0.5631)
Governance index	0.0006 (0.2874)
Big 4 auditor	-0.0015 (0.0523)*
Bank size	0.0011 (0.3964)
Year indicator	Included
Observations	681
Adjusted R ²	0.0278

Table 3.7 *Crisis and competition.* This table presents the results of the Difference-In-Difference Analysis of the effect of the 2007 – 2010 global financial crisis on financial misreporting in the financial services / banking industry. CRISIS = 1 for the seven-year period (2011-2016) after the crisis event of 2007-10, otherwise equals 0 for the seven-year period (2000-2006) before the crisis event. FSERV = 1 if a firm belongs to the financial services industry (4-digit SIC Codes 6000 to 6999), otherwise equals zero if not so. The standard errors are estimated by clustering by firm. *, ** and *** correspond to 10%, 5% and 1% significance levels respectively. P-values are reported in parentheses.

Variables	Market size	Ease of entry	Substitutability
CRISIS	0.3296 (0.0000)***	0.1284 (0.0019)***	0.0024 (0.0781)*
FSERV	-0.4174 (0.0000)***	-1.5876 (0.0000)***	-0.0526 0.0000***
CRISIS * FSERV	0.2712 (0.0048)***	0.4284 (0.0000)***	0.0637 (0.0000)***
Control variables	Included	Included	Included
Observations	681	681	681
Adjusted R ²	0.3681	0.6343	0.5664

Table 3.8 *Crisis and financial misreporting (AAER_ENF)*. This table presents results of the Difference-In-Difference analysis of the impact of the 2007-2010 global financial crisis on the SEC's Auditing & accounting enforcement releases (AAERs) in the financial services industry. The proportion of accounting fraud in the industry is estimated as the number of accounting fraud cases divided by the number of firms in the industry during the investigation window. The estimation is presented in parentheses. ***, ** and * correspond to 10%, 5% and 1% significance levels respectively.

Period	Financial services	Other	FServ (-) Other
Pre-crisis period (2000-2006)	3.1915% (= 12 / 376)	3.3769% (= 354 / 10 483)	-0.1854% (p-value = 0.1492)
Post-crisis period (2009-2015)	8.5575% (= 35 / 409)	1.8433% (= 208 / 11 284)	6.7142%* (p-value = 0.0661)
Difference (Post – Pre)	5.3660% (p-value = 0.0000)	-1.5336 (p-value = 0.0058)	6.8996% (p-value = 0.0318)

Table 3.9 *Crisis and financial misreporting* (DISC_LLTP). This table presents results of the Difference-In-Difference analysis of the change in the absolute value of Discretionary loan loss provisions (DISC_LLTP) caused by the 2007-2010 Global Financial Crisis on in the financial services industry compared to other industries. The estimation is presented in parentheses. ***, ** and * correspond to 10%, 5% and 1% significance levels respectively.

Period	Financial Services	Other	FServ (-) Other
Pre-Crisis Period (2000-2006)	0.1247 (n = 228)	0.1293 (n = 7 109)	-0.0046 (p-value = 0.793)
Post-Crisis Period (2009-2015)	0.2261 (n = 262)	0.1706 (n = 8 139)	0.0555*** (p-value = 0.0023)
Difference (Post – Pre)	0.1014*** (p-value = 0.0000)	0.0413*** (p-value = 0.0000)	0.0601*** (p-value = 0.0019)

Table 3.10 *Competition & financial misreporting* (DISC_LLTP). This table reports the OLS regressions conducted on the basis of Equation 1 in our empirical model. The dependent variable is DISC_LLTP and the sample period span from 2000 to 2016. The regression we run is as follows: $DISC_ACC = b_0 + b_1MKT SZ + b_2ENTRY + b_3SUBST + b_4HHISL + b_5CFVOL + b_6LEVRA + b_7EQINC + b_8GOVIN + b_9CRISIS_{07-08} + b_{12}B4AUD + \sum Year Indicator + \varepsilon$. The variable definitions, sources and computational details are provided by way of Table 3.1. We estimate standard errors by clustering by year and industry and ***, ** & * correspond to 1%, 5% and 10% significance level respectively.

Variables	DISC_LLTP
Market size	0.0317*** (0.0000)
Ease of entry	0.0116* (0.0762)
Product substitutability	0.0136*** (0.0000)
Herfindahl-Hirschman index (sales)	0.0076** (0.0394)
Cash-flow volatility	0.0018 (0.5842)
Leverage ratio	0.0053 (0.1843)
Equity incentives	0.0071*** (0.0009)
Governance index	-0.0082** (0.0232)
Big 4 auditor	-0.0043 (0.3242)
Bank size	-0.0496 (0.0000)
Year indicator	Included
Observations	681
Adjusted R ²	0.1584

Table 3.11 *Crisis and competition (HHISL)*. This table presents the results of the Difference-In-Difference analysis of the effect of the 2007 – 2010 global financial crisis on financial misreporting in the financial services / banking industry. CRISIS = 1 for the seven-year period (2011-2016) after the crisis event of 2007-10, otherwise equals 0 for the seven-year period (2000-2006) before the crisis event. FSERV = 1 if a firm belongs to the financial services industry (4-digit SIC Codes 6000 to 6999), otherwise equals zero if not so. The standard errors are estimated by clustering by firm. *, ** and *** correspond to 10%, 5% and 1% significance levels respectively. P-values are reported in parentheses.

Variables	HHI sales
CRISIS	-0.0257 (0.0000)***
FSERV	0.0663 (0.0000)***
CRISIS * FSERV	0.0186 (0.0009)***
Control variables	Included
Observations	681
Adjusted R ²	0.3911

Chapter 4 - Corporate governance & misreporting in US banks subject to SEC Enforcement Actions

4.1. Introduction

The twin forces of globalisation and widespread liberalisation of the financial sector ushered in unprecedented levels of innovation in banking that significantly altered the conventional wisdom around which banking architecture and operations were premised. One such area of great disruption in banking through innovation was the consolidation of commercial and investment banking activities into a composite structure. Investment banking is widely believed to have been responsible for the 2008 credit crunch that emanated from the US before then becoming a global phenomenon Demirgüç-Kunt and Huizinga (2010). According to Acharya and Richardson (2009) the financial crisis can actually be attributed to the degree of complexity ushered into banking on the back of innovation resulting from liberalisation of financial services. The degree of complexity of banking activities is closely aligned with the corporate governance of banks, thus all these issues relating to complexity and structure raise serious corporate governance issues and make this a compelling setting for empirical based research to be instituted. Allied to the opacity and complexity synonymous with the banking intermediation model, it also is indisputable that corporate governance failures were at the heart of the advent of the crisis that paralysed the global markets at the top end of the last decade. Johnston (2004) tout effective corporate governance as leading to greater accountability, which in turn implies transparent, honest and informative reporting of financial information. In other words, increased transparency is one of the key aims of corporate governance reforms worldwide. The SOX guidelines Sarbanes (2002) also aim to improve corporate governance through measures that will strengthen internal checks and balances and ultimately strengthen corporate accountability. Effective governance by boards of directors is seen as influencing the quality of financial reporting.

In this paper, I focus and shine a light on the effect of corporate governance on financial misreporting in US commercial banks subject to enforcement actions from 2000 to 2016. The governance of financial institutions has really come to the fore in the crisis aftermath Beltratti and Stulz (2012); Pathan and Faff (2013). Indeed, attempting to define corporate governance is no mean feat and the corporate governance of banks is particularly cumbersome because of the uniqueness of these institutions in comparison to

others. For some perspective on the definition of corporate governance however, I borrow from Gillan and Starks (2000) who described corporate governance as an internal mechanism that is linked closely to the system of acts, laws and dynamics that control the operations of a firm. Because of the unique and distinctive nature of banks as institutions, corporate governance plays a particularly central role. I outline and proffer three main characteristics that motivate a separate evaluation of corporate governance in banks. Firstly, banks are opaquer in comparison to other institutions due to the nature of financial intermediation as a model Levine. In other words, the complexity of the bank business model is highly reflective of the “special nature” of banks Furfine (2001). This issue of opacity - married to the complexity of the bank business model - imposes a certain level of difficulty for shareholders to keep track of bank operations, thus creating information asymmetries this way De Andres and Vallelado (2008). Secondly, according to Hagendorff (2014) banks are highly leveraged firms and this in turn has some corporate governance implications. Even though equity is relatively low in banks compared to other firms, shareholders in banks tend to control the main corporate governance mechanisms e.g. executive compensation and the board. Thirdly, because of the importance of banks to the wider economy and also the opacity of bank activities, the need for regulation is critical for banking institutions Hagendorff (2014). This special monitoring of regulations can be considered to be supplementary to governance. To go with this, governments can also own banks and act in their own interests which may not necessarily comply with the basic tenets of good corporate governance. Government-owned banks have been shown to underperform in previous studies Hagendorff (2014).

Against the backdrop of my postulations in the foregoing paragraphs, I hypothesise that corporate governance is responsible (in part) for financial misreporting in firms Abbott et al. (2004); Agrawal and Chadha (2005). According to Cremers and Nair (2005), corporate governance systems have internal and external components. Internal governance includes mechanisms and procedures related to oversight of firm management by the board while external governance addresses statutory and charter provisions that determine the costs to shareholders of challenging both the management and the board. In this study I focus on how five carefully selected corporate governance factors (i.e. board size, block ownership, CEO duality, compensation mix and insider representation) affect financial misreporting. The relationship between corporate governance and financial misreporting is of continuing importance due to the fact that literature on this is largely mixed e.g. Zhao and Chen (2008); Armstrong et al. (2012) find

that staggered boards (weak corporate governance) are associated with lower likelihoods of committing fraud and a smaller magnitude of absolute unexpected accruals. In contrast to this, Bowen et al. (2008) indicate that firms with a higher G-Index (strong corporate governance) are more likely to smooth earnings, report small positive earnings surprises and exercise greater accounting discretion.

This study is an innovation that contributes to extant literature by bringing together two hot and current topics in banking literature (i.e. corporate governance and financial misreporting) into one paper based on a sample of 90 listed US commercial banks from 2000-16. This paper contributes to existing literature in various ways. Firstly, I am the first to examine the interplay between corporate governance and financial misreporting on a sample of banks that are subject to SEC enforcement actions in the pre-crisis and post-crisis periods. Secondly, I deploy a comprehensive set of corporate governance measures to proxy board size, equity ownership, CEO duality, compensation mix and insider representation. Thirdly, I use simple-to-understand objective (i.e. SEC AAERs) and subjective (i.e. discretionary loan loss provisions) accounting-based indicators to proxy for financial accounting misreporting.

I regress my main financial misreporting dependent variable (i.e. SEC AAERs) against the corporate governance proxies (i.e. board size, equity ownership, CEO duality, compensation mix and insider representation) and a battery of control variables (i.e. financial leverage, large international auditor, insolvency risk, bank size, SOX and financial crisis). Consistent with the ‘agency cost’ hypothesis, the results show a negative association between board size and financial misreporting. However, the relationship reverses when using a quadratic term of the same variable. Moreover, the CEO power asserts a positive effect on misreporting in violation of both the ‘stewardship’ and ‘entrenchment’ hypotheses. Additionally, the equity portion of executive compensation is negatively related with misreporting; whereas the association is positive between the cash portion and misreporting. My results have some important policy implications for policymakers, practitioners and regulators alike. Firstly, my research amplifies how important it is to simultaneously probe multiple corporate governance dimensions in one study. Investigating a single dimension in isolation e.g. compensation mix could reveal a significant association with misreporting; yet when studied as an element of a set of corporate governance dimensions, the result could yet be just about marginally significant Baysinger & Butler (1985). Secondly, I believe the applicability and explanatory power of the conventional agency theory is limited in so far as the banking industry is concerned.

There is therefore a need to carefully consider peculiarities in terms of the organizational settings and regulatory environment which may markedly interfere with and compromise the monitoring power of different corporate governance mechanisms e.g. while agency theory touts the virtues of stronger independent representation on the board, the role some of the insider-related mechanisms e.g. CEO duality and insider representation play in curtailing financial misreporting – as contended by stewardship theory – warrants further examination according to alternative theoretical paradigms. In so far as practical implications go, my study speaks to the wider discussion around executive compensation as a critical aspect of bank regulation. I contribute to and motivate compliance monitors, regulators and shareholders alike with regards to the ongoing agenda for reforms to executive compensation packages. The direction of travel should be towards the adoption of compensation packages with a long-term orientation e.g. via options or restricted stock.

The rest of the paper is structured as follows. Section 2 discusses the related literature. Section 3 develops the hypotheses to be tested. Section 4 presents the data set, the model variables and the underlying empirical methodology as well as the relevant descriptive statistics. Section 5 reports and discusses the empirical findings. Section 6 presents the robustness analysis I conduct, whereas Section 7 offers a set of concluding remarks and discusses some policy implications.

4.2. Literature review

In this section, I review the key papers relating to the relationship between corporate governance and our explanatory variable i.e. financial misreporting. My main thrust in this paper is to document how five carefully selected corporate governance variables (i.e. board size, equity ownership, CEO duality, compensation mix and insider representation) impact financial accounting misreporting in banking. I however also extensively refer to literature on the interplay between corporate governance and bank performance because I believe a failure to attain expected performance targets is what breeds or incentivises the urge to misreport in the first instance.

4.2.1. Board size and financial misreporting

Literature on how board size affects financial misreporting in firms is broadly split into two clusters that have a solid underpinning in agency theory. One side of the argument generally allude to the beneficial impact a larger board of directors has on firm operations. In support of this postulation, Dalton et al. (1999) contend that a larger board

is beneficial to firm operations as it increases the collection of expertise and resources accessible to a firm. Building on this and in a study observing the impact of board size on the performance of 35 bank holding companies for the period between 1965–1999, Adams and Mehran (2012) found board size to be positively related to bank performance using Tobin's Q and the ROA ratio as bank performance proxies. Yermack (1996) also tout the virtues of big boards in terms of them pooling together experts from a diversity of fields and backgrounds, but however also finds excessively large boards to be a drag on efficiency of the board as well as an impediment on the effectiveness of corporate governance mechanisms. An earlier study by Pfeffer (1972) found a positive link between board size and the performance of large firms in particular. This was largely attributed to the need for large firms to have more board members who can legitimate the company to its external environment. I draw from this literature on the beneficial impact of a large board on firm performance and extend it further in the direction of financial misreporting. To this end I posit that if a large board positively impacts bank performance, it also follows that the improved performance outcomes ought to result in lower financial misreporting incidences i.e. that there is a statistically significant negative association between board size and financial misreporting Xie et al. (2003); Abed et al. (2012). In a study examining whether financial misreporting is systematically related with the internal corporate governance structures of a firm, Davidson et al. (2005) used a cross-sectional sample of 434 listed Australian firms for the year 2000 and found having a majority of non-executives on the board significantly associated with a lower likelihood of financial misreporting (i.e. discretionary accruals). I read the results from this study in conjunction with the intuition behind Dalton et al. (1999) and contend that the majority of non-executives alluded to here would be on a large board for the firm to fully exploit the benefits of an expanded talent pool synonymous with large boards. Consistent with this assertion, Peasnell et al. (2005) examined whether financial misreporting in US firms depended on board monitoring and found the likelihood of managers making income-increasing abnormal accruals to be negatively related to having a large presence of outsiders on the board. Ghosh et al. (2010) used discretionary accruals as a financial misreporting proxy to examine whether board characteristics (i.e. size, composition and structure) are associated with financial misreporting before and after the enactment of the Sarbanes-Oxley Act. They also found board size to be negatively associated with the spate of discretionary accruals. Finally, Dechow et al. (1996) investigated firms subject to SEC enforcement actions for GAAP violations and found that firms with weak internal

corporate governance engaged in financial misreporting on a greater magnitude than those that have strong governance structures. Weak governance was considered to include management-dominated board, CEO duality, founder CEO, no Audit committee and no independent outsiders among other factors. The benefits of large boards dominated by independent non-executives can never be underestimated for banking institutions given the opacity and complexity that underlie the intermediation model that guide and inform banking operations.

To the contrary, there is also an established literature base touting the demerits of large boards on firm performance. In fact, Hermalin and Weisbach (2003) emphatically argue of there being a “consensus” in the economic literature on larger boards negatively impacting firm performance; ultimately implying an upsurge in incidences of financial misreporting. In an earlier study, Jensen (1993) found an increase in board size to seriously impair a board’s ability to monitor and provide effective oversight over management; all this largely due to a greater ability to shirk and an increase in decision-making time. Agency theory actually attributes this inefficiency on the part of a large board to a rise in “agency conflicts” arising from inefficient communication and cooperation costs Lipton and Lorsch (1992). In a recent study on the detrimental effects of large board size on firm performance and using a sample of US bank holding companies from 1997-2011, Pathan and Faff (2013) used Tobin’s Q, return on assets (ROA), return on equity (ROE) and pre-tax operating income (POI) ratios as bank performance ratios and observed a negative relationship between the board size and performance. In a departure from the above two positions, a study of 69 commercial banks from six European countries for the period from 1995–2005 by De Andres and Vallelado (2008) show that there exists an inverted U-shaped association between board size and bank performance. This is indicative of the fact that an increase in the number of board members only enhances the performance of banks to certain point; beyond which point the impact of board size on performance reverses to negative due to high information asymmetries among the board members. Adams and Mehran (2005) find that banks have larger boards due to their unique operating environment, complex organizational structure and the presence of more committees i.e. the lending and credit risk committees. I contend that depressed firm performance owing to large boards should imply greater incidences of financial misreporting. Vafeas (2000) probed whether the informativeness of earnings changes with the proportion of external directors being a part of board and concluded that a small board size might be an effective technique in attaining higher quality controlling.

In a study examining the use of discretionary accruals by firms making seasoned equity offerings (SEOs), Ching et al. (2006) found firms borrow future income to manage earnings in pre-issue years and consequently earnings decrease in post-issue years. They specifically found SEO firms that have a large board size to also have a higher degree of financial misreporting around SEOs. Related to this, Haniffa et al. (2006) used a sample of 97 firms listed on the Malaysian Stock Exchange to investigate the extent of the effectiveness of the board, Audit Committee and concentrated ownership in reducing financial misreporting. They concluded that larger boards were positively associated with financial misreporting i.e. that larger boards were ineffective in their oversight duties relative to smaller boards. I expect that financial performance increases with board size, and for the increased financial performance to suppress the incentives for firms to misreport. However, the relationship becomes negative when the board becomes too large which might impair bank performance due to a lack of efficient monitoring by the board and increased agency conflicts De Andres and Vallelado (2008).

4.2.2. Block-ownership and financial misreporting

Literature advances mixed predictions and results on the relationship between financial misreporting and large shareholders. In an earlier study Jensen and Meckling (1976) found the distinction between the ownership and the managerial control of a firm to result in a misalignment of the interests of shareholders and those of the boards they nominate to represent their interests. Grove et al., (2011) characterises “blockholders” as typically holding at least five percent of a firm’s outstanding shares and can also serve as directors and officers of the firm. Ultimately, this means they wield so much influence over the firm’s decision-making, thus from this we could therefore surmise that the higher the ownership stake, the greater the blockholder’s incentive to acquire information and monitor managers. In recent times in the post-financial crisis period, there has been a steady flow of literature examining the corporate governance of banking entities in terms of managers’ incentives in the context of the crisis period e.g. Fahlenbrach and Stulz (2011) found no statistical evidence indicating a misalignment of CEO incentives with shareholders’ interests during the crisis period.

The first argument vouches for a negative relationship between large shareholders and financial misreporting i.e. that having large shareholders (block ownership) is associated with a reduction in incidences of financial misreporting. Shleifer and Vishny (1997) show that large shareholders often play an active monitoring role of corporate

managers, and this role is particularly essential in banking given the opaque and complex nature of banking business. They perform this role through avenues such as leading securities fraud class actions, selecting board members and voting initiatives. This “active monitoring role” of large shareholders and the influence they wield over managers’ real actions lead to better alignment of managers’ and shareholders’ interests. This alignment allows managers to focus more on activities that create long-term value and worry less about misreporting current performance to achieve short-term performance benchmarks Stein (1988); Giroud and Mueller (2010). In addition, more closely monitored managers are less likely to engage in the extraction of private benefits and therefore they have less to conceal from shareholders by managing earnings. Murphy (1999) leans on the agency framework and contend that managers’ interests are in line with those of shareholders when the former have partial ownership of the company. Under this framework, higher block ownership facilitates more active monitoring and mitigates agency costs. Prowse (1995) supports the importance of the monitoring role of block-holders in the banking industry given the rarity of disciplinary takeovers, the acquisition of and holding of low equity stakes, and the fact that bank directors are less aggressive than other directors in removing poorly performing managers. Against this background, block ownership can be taken as a vehicle through which managers’ and shareholders’ interests are aligned through increased monitoring and oversight. Dechow et al. (1996) and Farber (2005) used firms subject to SEC accounting enforcement actions as a financial misreporting proxy and found that manipulating firms are less likely to have a large shareholder in comparison to control firms.

The alternative view posits the existence of a positive relationship between block-holders and financial misreporting i.e. that having large shareholders leads to greater (and not less) financial misreporting Vafeas (2000). According to Shleifer and Vishny (1997), large shareholders have incentives to extract gains from creditors and other shareholders. In other words, block-holders may benefit from financial misreporting via the reduction in the firm’s cost of external financing and debt covenant violations emanating directly from having a massaged view of a firm’s performance Jiang (2008). They also could benefit from disposing higher-priced stocks to second generation shareholders Lopez and Rees (2002). In light of this, block-holders may motivate greater managerial discretion in terms of financial reporting, ultimately culminating in greater financial misreporting. In a recent study and for a sample of US banks over the 2007-08 crisis period, Beltratti and Stulz (2012) found banks with a higher proportion of board ownership to have operated

worse than their peers with less board ownership. I reason that the need for financial misreporting arises from a failure to hit performance targets, thus greater block-ownership in the case of US banks alluded to above imply greater risk of financial misreporting for these banks.

The third view on the relationship between large shareholders and financial misreporting is what I refer to as the “neutral view” for purposes of this study. This contends that most investors do not actively engage with management, thus have no influence on a firm’s financial misreporting Dou et al. (2016). In fact, according to McCahery et al. (2016) shareholders tend to ‘vote with their feet’ and exit the firm rather than to ‘use their voice’ in dealing with a firm’s management; implying no significant relationship between block-holders and financial misreporting. There is solid support for this neutral view e.g. Agrawal and Chadha (2005) and Larcker et al. (2007) do not find a significant relationship between large shareholdings and SEC enforcement actions, earnings restatements and abnormal accruals respectively.

4.2.3. CEO duality and financial misreporting

Views on the relationship between CEO power and financial misreporting essentially fall into two broad clusters based on the agency framework i.e. those arguing for more CEO power having a beneficial impact on financial misreporting and those pinning for the alternative view in favour of less power. Agency theory contends that the roles Chief Executive Officer (CEO) and Board chairman should be separated to mitigate agency costs. As leader of a firm’s board, the chairman is essentially charged with having oversight on the CEO’s decision-making and also assume responsibility over the process of hiring, firing, evaluating and compensating the CEO. Combining the two roles thus dilutes the chairman’s effectiveness in playing the monitoring and oversight role without the additional burden of executive decision making.

The dominant view on the CEO duality – financial misreporting nexus is the one arguing for less CEO power. Combining the two roles is thought to promote CEO ‘entrenchment’ and intensify agency conflicts. Finkelstein and D’aveni (1994) opine that ‘entrenchment risk’ occurs when managers obtain so much power and are able to use it to maximize their own utility rather than the value of shareholders. Contributing on power dynamics in top management teams, Finkelstein (1992) concluded that more powerful CEOs can exert their will and influence corporate decisions to a greater extent than less powerful CEOs, including those related to Chief Financial Officers (CFOs). CFOs are the

custodians of the financial reporting function in most firms. Building on this analysis, Feng et al. (2011) conducted a study examining why Chief Financial Officers (CFOs) become involved in material accounting manipulations. They found that CFOs engage in financial misreporting mainly because they succumb to pressure from CEOs, rather than because they seek to immediate financial gain from their equity incentives. A closer look at SEC AAERs content reinforces this conclusion as CEOs are more likely to be described by the SEC as having orchestrated accounting manipulations as well as having benefitted from such manipulations. In fact, further support to the ‘entrenchment’ hypothesis was provided by Beasley et al. (1999) who found CEO duality to have been involved in 72 per cent of the frauds examined by the SEC. According to Adams et al. (2005), the effectiveness of governance in reducing the extent of upward real financial misreporting (e.g. earnings management) is stronger for firms with less powerful CEOs than for other forms. In support of this contention, Cheng et al. (2015) examined whether internal governance affects the extent of financial misreporting in US corporations and found internal governance to be stronger for firms where CEOs are less powerful. This is mainly attributable to the fact that other key executives’ contributions to governance are stronger when CEO is less powerful. I therefore expect subordinate executives to have lower ability to influence CEOs’ decisions when CEOs hold substantial power and authority within the firm. Conversely, I expect internal governance to be more effective in constraining the extent of financial misreporting when CEOs are less powerful. A recent study by Lisic et al. (2015) found CEO duality to reduce or completely eliminate the effectiveness of an audit committee, despite regulations adopted to improve audit committee effectiveness. In other words, the monitoring effectiveness of board committees is contingent on CEO power. Effective audit committees should serve as vehicles to enhance the reporting quality of firms, thus reducing the potential for financial misreporting within the respective firms.

Running counter to the ‘entrenchment’ hypothesis discussed above is the ‘stewardship’ theory fronted by the likes of Barney (1991) & Donaldson and Davis (1991). The stewardship theory suggests that a strong CEO acts as a good agent for a company’s assets and the company should take advantage of the unity of direction and strong command and control that the powerful CEO offers. A recent study conducted by Pathan (2009) on a sample of US bank holding companies from 1997-2004 found CEO duality to have effect of reducing risk-taking; which in turn could ultimately lead to improved bank performance. Firms engage in financial misreporting mainly to make up

for depressed performance, thus if CEO duality is associated with improved firm performance, it also follows that greater CEO power should have a restraining effect on financial misreporting. In support of this argument, Armstrong et al., 2010) found that accounting irregularities occur less frequently at firms where CEOs have relatively higher levels of equity incentives, thus greater CEO power results in lower financial misreporting this way. For banking firms, I surmise that the opacity and lack of market for control can further weaken CEO discipline, making it even more essential to have a separation of the two roles of CEO and Board chairman. I consider duality as a key driver of agency conflicts due to reduced monitoring and allowing the CEO to act in his or her own interests.

4.2.4. Compensation mix and financial misreporting

Compensation mix refers to various types of incentive pay in an executive compensation package, including an annual performance bonus and stock-based compensation Grove et al. (2011). Executive compensation as an item has really been a headline item in the news on a global scale, more so in the aftermath of the debilitating global financial crisis of 2007-2008 e.g. Crawford et al. (1995); Bebchuk et al. (2009). Executive compensation is typically structured to incorporate two aspects i.e. the cash that includes base salary and bonus, and the equity-based compensation that includes stock options and restricted stock grants which constitute a form of long-term compensation Grove et al. (2011). Literature broadly advances two conflicting notions based on the agency framework on how executive compensation impacts financial misreporting in firms.

The conventional view which is firmly rooted in agency theory posits that increases in CEO stock options, along with effective monitoring, produce better alignment between the interests of management and shareholders. In other words, both CEOs and shareholders benefit from rising long-run stock prices, thereby reducing the likelihood of moral hazard Jensen and Murphy (1990). From this postulation I therefore reason that CEOs with stock options will most likely strive to ensure that their financial disclosures and accounting practices are legitimate, credible and robust. I lend support to this postulation by drawing and making inferences from literature on how executive compensation affects firm performance. The long-term orientation behind stock-based compensation is thought to positively impact firm value as long-term pay tends to reward managers when they meet firms' performance goals Baysinger and Hoskisson (1990);

Hall and Liebman (1998). Recent studies based by Fahlenbrach and Stulz (2011) and Vallascas and Hagendorff (2013) probing the impact of executive compensation on bank performance also reported a positive association between equity compensation and performance. I extend to this literature and argue that the incentives to misreport financial accounting information primarily stems from a failure to attain set performance benchmarks. I therefore expect the incentives to misreport to diminish when banks perform in line with market expectations. Ali and Zhang (2015) examined changes in the CEOs' incentive to misreport during their tenure. They found the propensity to misreport to be greater early on in a CEO's tenure as the market is uncertain about the CEO's ability to steer the ship in these early years. A new CEO is thus most likely to engage in financial misreporting in the early years of their reign simply as a means of convincing the market they are a safe pair of hands. They also found CEOs' incentives to misreport greater in later years when they are coming to the end of their tenure because they would like to cash in their equity options at a higher price. It follows therefore that oversight over the accounting function and disclosures should be naturally more robust and vigilant at these phases of a CEO's tenure to counter the increased threat of financial misreporting.

The alternative view contradicts this established view and argues in favour of the notion that considers stock-based compensation as undermining corporate governance. I contrast the conventional view that CEO stock options aid corporate governance by reducing moral hazard with the proposition that CEO stock options may subvert sound corporate governance instead O'Connor et al. (2006). The results from O'Connor et al. (2006) were rather mixed, finding support for both the conventional and alternative views on how executive compensation impacts financial misreporting. Large CEO stock option grants were sometimes associated with a lower incidence of fraudulent reporting and sometimes with a greater incidence, and this depended upon whether CEO duality was present and whether directors also held equity options in the firm. In a much more emphatic fashion, Bergstresser and Philippon (2006) came out in support of the alternative view that equity options resulted in greater financial misreporting. They used data from Compustat and Execucomp and found that the use of discretionary accruals to manipulate reported earnings is more pronounced at firms where the CEO's potential total compensation is more closely tied to the value of stock and option holdings. Leaning on how equity/stock options impact firm performance to further support the alternative view, Mehran (1992) finds a positive relationship between the firm's leverage ratio and the percentage of executives' total compensation in incentive plans; while Peng and Röell

(2008) argue that stock options cause executives to focus on short-term stock price. Chen et al. (2006) assume and exclusively banking focus and find that stock option-based executive compensation is more prevalent at banks versus firms in other industries. They found equity option-based compensation to ultimately promote risk-taking in the banking industry. I seize upon these studies to make the argument the nature of banking business in terms of both opacity and complexity amplifies the pitfalls associated with widespread use of equity options as an executive compensation mechanism. To the extent that equity options align shareholders' and managers' interests in the long term, I hypothesize that they should be an effective vehicle to combat and minimise financial misreporting if used in conjunction with other corporate governance measures e.g. independent/unaffiliated directors, CEO duality, board size and block-ownership, among other metrics.

4.2.5. Insider representation and financial misreporting

The presence of a majority of non-independent or affiliated directors is likely to impair board independence, given the fact that these directors are less likely to be independent from the CEO or other top executives. The accumulation of large holdings of stocks by executives is a form of insider representation. According to Lasfer (2006), as managerial ownership increases, managers tend to use their ownership power to select a board that is unlikely to monitor. The opaque and complex nature of banking business catalyses information asymmetry at banking firms, which in turn makes it easier for the outside investors to be exploited by the insiders Grove et al. (2011). From this I surmise that higher insider representation would worsen agency problems in banking firms, which in turn depresses firm performance and ultimately this decreased performance is the central reason behind managers' misreporting financial accounting information.

The dominant view here vouches for the beneficial impact of boards dominated by independent outsiders over those dominated by insiders / affiliates. Jensen and Meckling (1976) contend that boards with a more independent orientation are positively associated with firm performance Jensen and Meckling (1976); Dalton et al. (1998); Busta (2007). Using a sample of seventeen banking institutions in the UK from 2001 to 2006, Tanna et al. (2011) also examined the impact of board independence on performance. They utilised various efficiency measures as performance proxies and concluded that there exists a positive and significant relationship between board independence and bank efficiency. I extrapolate this positive impact on performance to imply a lessening of the incentives to misreport for firms i.e. firms that meet or exceed their performance targets have no / less

real incentives to misreport accounting information. Klein (2002) used a sample of 692 firm-years from 1992-1993 to examine whether the audit committee and board characteristics are related to financial misreporting and found abnormal accruals to increase with a reduction in board independence i.e. boards structured to be more independent of the CEO are more effective in monitoring the firm's corporate accounting process. Some studies however paint a mixed picture of the impact of majority independent director representation on the board. In response to widespread and massive accounting scandals in the late 1990s and early 2000s e.g. Enron and WorldCom, the NASD and the NYSE proposed new corporate governance rules which were approved by the SEC in 2003. These rules specifically required firms to have a majority of independent directors on their boards. Chen et al. (2015) examined whether these regulatory reforms requiring majority board independence lead to a reduction in financial misreporting and found that noncompliant firms do not experience a significant reduction in earnings management from the pre to post-regulation periods in comparison to compliant ones. They however found non-compliant firms with low information acquisition cost experience a significant decrease in earnings management compared to those with high information acquisition cost. These findings suggest that board independence in itself does not reduce earnings management, but a richer information environment can facilitate independent directors' monitoring; ultimately resulting in a reduction in earnings management. In support of this, (Davidson et al. 2005); (Peasnell et al. 2005) found having a majority of non-executives on the board significantly associated with a lower likelihood of financial misreporting in the form of discretionary accruals; and Baysinger and Butler, 1985) also came out in support of having a majority of independent directors on the board when finding companies to perform worse if boards have more affiliated / insider representations.

The alternative view on the relationship between independent directors and financial misreporting advances the contrary narrative based on the 'stewardship' theory. Again, this construct borrows heavily from how the existence of a majority independent / unaffiliated directors impact on firm performance. Wiseman and Gomez-Mejia (1998) posit that a rise in the proportion of non-independent directors on the board could actually positively contribute to firm performance as insiders have more experience and better firm-specific knowledge; while Westphal (1999) argue that a higher level of independence could result in infertile political activity by non-independent members that could lessen the productivity of the outsiders and decrease the cooperation among the

board members. Recent studies by Erkens et al. (2012) and Pathan and Faff (2013) also came out in support of this argument by reporting a negative association between independent directors and performance. Erkens et al. (2012) specifically used a sample of 296 banks across 30 countries over the 2007-08 crisis period for their study. I extend the intuition behind these studies and posit that a failure to hit set performance targets is the chief reason why firms misreport financial accounting information. If having a majority of independent and unaffiliated directors on the board depresses performance in ways argued above, it follows that the incentives for a firm's managers to misrepresent financial disclosures increases in tandem.

On the balance of our literature discussion on the relationship between independent directors and financial misreporting, I consider a board dominated by inside directors to be symptomatic of a weak corporate governance environment and thus to be most likely positively associated with financial misreporting. The opacity and complexity that typify bank structures and operations makes the need for more independent directors on bank boards paramount. Firms exhibit high managerial ownership are less likely to have a majority of independents on the board, are less likely to separate the roles of the CEO and chairman and are less also likely to appoint a non-executive director as board chairman. This setting provides fertile ground for insiders to promote their own interests at the expense of shareholder interests, ultimately translating to greater financial misreporting among other vices.

4.3. Hypothesis development

4.3.1. Board size and financial misreporting hypothesis

Literature on how board size affects financial misreporting in firms is broadly split into two clusters that have a solid underpinning in agency theory. One side of the argument generally allude to the beneficial impact a larger board of directors has on firm operations as it increases the collection of expertise and resources accessible to a firm Yermack (1996); Dalton et al. (1999); Adams and Mehran (2012). I draw from this literature on the positive association between board size and firm performance and extend it further in the direction of financial misreporting. To this end, I posit that if a large board positively impacts bank performance, it also follows that the improved performance outcomes ought to result in lower financial misreporting incidences. In other words, there is a negative association between board size and financial misreporting Xie et al. (2003); Davidson et al. (2005); Abed et al. (2012); Peasnell et al. (2005); Ghosh et al. (2010). The

opposite view touts the demerits of large boards on firm performance Lipton and Lorsch (1992); Jensen (1993); Hermalin and Weisbach (2003); Pathan and Faff (2013). I contend that depressed firm performance owing to large boards imply greater incidences of financial misreporting. Researching on how board size affects financial misreporting Vafeas (2000); Ching et al. (2006); Haniffa et al. (2006) concluded that larger boards were positively associated with financial misreporting. Consistent with Adams and Mehran (2005) I expect banks to have larger boards due to their unique operating environment, complex organizational structure and the presence of more board committees. I expect improved financial performance resulting from having a large board to suppress the incentives for firms to misreport. I draw from this literature base and formulate our first hypothesis, thus:

- H1. There is a negative association between large boards and financial misreporting in commercial banks owing to better monitoring and access to a wider talent pool

4.3.2. Block-ownership and financial misreporting hypothesis

Literature advances mixed predictions and results on the relationship between financial misreporting and large shareholders. The first argument vouches for a negative relationship between large shareholders and financial misreporting because large shareholders often play an active monitoring role of corporate managers Shleifer and Vishny (1997). This “active monitoring role” of large shareholders leads to better alignment of managers’ and shareholders’ interests Stein (1988); Giroud and Mueller (2010). Closely monitored managers are less likely to engage in the extraction of private benefits and therefore they have less to conceal from shareholders by managing earnings. Prowse (1995) specifically underline the importance of the monitoring role of block-holders in the banking industry. Dechow et al. (1996) and Farber (2005) used firms subject to SEC accounting enforcement actions and found manipulating firms less likely to have a large shareholder compared to control firms. The alternative view posits the existence of a positive relationship between block-holders and financial misreporting Vafeas (2000). According to Shleifer and Vishny (1997) large shareholders have incentives to extract gains from creditors and other shareholders via the reduction in the firm’s cost of external financing emanating directly from financial misreporting Jiang (2008); Lopez and Rees (2002). A recent study by Beltratti and Stulz (2012) found banks with a higher proportion of board ownership to have operated worse than their peers with less board ownership. I reason that the need for financial misreporting arises from a failure

to hit performance targets, automatically implying greater risk of financial misreporting for these banks. The third view is what we refer to here as the “neutral view”. It contends that most investors have no influence on a firm’s financial misreporting Larcker et al. (2007); Dou et al., 2016; (McCahery et al. (2016). I consider the better information acquisition and more efficient monitoring of block-holders to be more crucial to banking firms given the opaque and complex nature of banking business. This background informs the framing of our second hypothesis, thus:

- H2. There exists a negative association between increased equity ownership and financial misreporting in commercial banks

4.3.3. CEO duality and financial misreporting hypothesis

The dominant view on the CEO duality – financial misreporting nexus is the one arguing for less CEO power as combining the two roles promotes CEO ‘entrenchment’ and intensify agency conflicts Finkelstein (1992); Finkelstein and D’aveni (1994); Feng et al. (2011). Further support to the ‘entrenchment’ hypothesis was provided by Beasley et al. (1999) who found CEO duality to have been involved in 72 per cent of the frauds examined by the SEC for a sample of US corporations Cheng et al. (2015) also found internal governance to be stronger for firms where CEOs are less powerful. A recent study by Lisic et al. (2015) found CEO duality to reduce or eliminate the effectiveness of an audit committee, despite regulations adopted to improve audit committee effectiveness. I expect effective audit committees to enhance the reporting quality, thus reduce the potential for financial misreporting within firms. The alternative view to the entrenchment hypothesis is the ‘stewardship’ theory fronted by the likes of Barney (1991) & Donaldson and Davis (1991). It contends that a strong CEO is good as he / she provides the unity of direction and strong command over the company. A recent study conducted by Pathan (2009) on a sample of US bank holding companies from 1997-2004 associates CEO duality with improved bank performance. I expect improved performance to have a restraining effect on financial misreporting. In support of this argument, Armstrong et al. (2010) found that accounting irregularities occur less frequently at firms where CEOs have relatively higher levels of equity incentives. For banking firms, I surmise that the opacity and lack of market for control can further weaken CEO discipline, making it even more essential to have a separation of the two roles of CEO and Board chairman. I consider duality as a key driver of agency conflicts due to reduced monitoring and this literature background in forms the framing of our third hypothesis, thus:

- H3. There is a positive relationship between greater CEO power (i.e. CEO duality) and financial misreporting in commercial banks

4.3.4. Compensation mix and financial misreporting hypothesis

Literature advances two conflicting notions on how executive compensation impacts financial misreporting. The conventional view posits that increases in CEO stock options reduce moral hazard and produce better alignment between the interests of management and shareholders Jensen and Murphy (1990). Executives with stock options will strive to ensure that their financial disclosures are legitimate because both CEOs and shareholders stand to benefit from rising long-run stock prices. The long-term orientation behind stock-based compensation is thought to positively impact firm value as long-term pay tends to reward managers when they meet firms' performance goals Baysinger and Hoskisson (1990); (Hall and Liebman (1998); Fahlenbrach and Stulz (2011); Vallascas and Hagendorff (2013). I expect the incentives to misreport to diminish when banks perform in line with market expectations. Ali and Zhang (2015) found the propensity to misreport to be greater early on in a CEO's tenure as he strives to convince a sceptical and uncertain market about his ability to successfully steer the ship. The alternative view argues in favour of the notion that considers stock-based compensation as undermining corporate governance O'Connor et al., 2006; Bergstresser and Philippon (2006) i.e. result in greater financial misreporting. Chen et al. (2006) concluded that equity incentives ultimately promote risk-taking in the banking industry. I seize upon these studies to make the argument that the nature of banking business in terms of both opacity and complexity amplifies the pitfalls associated with widespread use of equity options as an executive compensation mechanism. To the extent that equity options align shareholders' and managers' interests, we hypothesize that they can be an effective vehicle to combat financial misreporting if used in conjunction with other corporate governance measures. Against this background, I expect equity incentives to ultimately reduce the incentives to misreport in financial disclosures. We pose our fourth hypothesis, thus:

- H4. Higher levels of equity-based executive compensation have got a negative association with financial misreporting in commercial banks

4.3.5. Insider representation and financial misreporting hypothesis

The dominant view here vouches for the beneficial impact of boards dominated by independent outsiders over those dominated by insiders Jensen and Meckling (1976);

Dalton et al. (1998); Busta (2007). Tanna et al. (2011) also concluded that there exists a positive and significant relationship between board independence and bank efficiency. I extrapolate this positive impact on performance to imply a lessening of the incentives to misreport for banks Klein (2002). In support of this, Davidson et al. (2005); Peasnell et al. (2005) and Baysinger and Butler (1985) all found having a majority of independent, non-executives on the board significantly associated with a lower likelihood of financial misreporting in the form of discretionary accruals. The alternative is based on 'stewardship' theory and posit that a rise in the proportion of non-independent directors contributes to firm performance as insiders have more experience and better firm-specific knowledge Wiseman and Gomez-Mejia (1998); Westphal (1999). Recent studies by Erkens et al. (2012) and Pathan and Faff (2013) also came out in support of this argument by reporting a negative association between independent directors and performance. I extend the intuition behind these studies and posit that a failure to hit set performance targets is the chief reason why firms misreport financial accounting information. If a majority of independent directors on the board depresses performance in ways argued above, it follows that the incentives misrepresent financial disclosures increase in tandem. Based on our literature discussion, I consider a board dominated by inside directors to be symptomatic of a weak corporate governance environment and thus to be most likely positively associated with financial misreporting. The opacity and complexity that typify bank structures and operations makes the need for more independent directors on bank boards paramount. I borrow from this discussion and formulate my fifth hypothesis, thus:

H5. Greater insider representation on the board of directors is positively related with financial misreporting in commercial banks.

4.4. Empirical Analysis

4.4.1. Data & sample selection

My sample (as outlined in Table 4.2) consists of 17 major listed commercial banks which were the subject of SEC enforcement actions (SEC AAERs), are headquartered in the US and are within the Standard Industry Classification (SIC Code) range from 6020 to 6029. I include only the listed commercial banks as information on corporate governance data are standardised through the SEC Edgar platform. My unbalanced panel dataset includes 279 observations over the period 2000 – 2016. I collected data relating to the main explanatory variable i.e. SEC AAERs from the SEC website and I extract data for the alternative dependent variable i.e. discretionary loan loss provisions from

Compustat. The corporate governance data are hand collected from DEF 14A proxy statements of annual meetings found in the SECs EDGAR filings. I follow the lead of Adams and Mehran (2012); Pathan and Faff (2013) and measure governance data from the date of the proxy statement. Financial information on commercial banks come from Thomson Financial Banker and Bankscope. I obtained compensation variables from ExecuComp, which provides executive compensation data for firms in the S&P 500, S&P MidCap 400, and S&P SmallCap 600 indices.

4.4.2. Corporate governance variables

Consistent with the literature review and hypothesis development sections, my corporate governance factors are premised on five general dimensions i.e. board size, block (equity) ownership, CEO power, compensation mix and insider representation. This allows me to account for a wide variety of board characteristics framed around these five pillars.

Board size is the number of members that constitutes a bank's board of directors. I crystallize this variable into three factors to better capture the board characteristics in so far as board size is concerned. Total board size (BRDSZE) is the total number of directors on a bank's board. Number serving on Audit Committee (BRDADT) is the proportion of the total board members who constitute the board's Audit Committee. Number serving on Compensation Committee (BRDCMP) is the proportion of the total board members serving on the Compensation Committee. Gender diversity (BRDFML) is the fraction of females on the bank's main board Campbell and Mínguez-Vera (2008).

I go along with Baber et al. (2015) and designate a block-holder to be a shareholder who holds more than five percent of the outstanding shares of a bank. Shleifer and Vishny (1997) and Cremers and Nair (2005) tout the monitoring and disciplining effect of institutional investors (large outside block-holders) on management. I build on this construction and therefore anticipate the relationship between financial misreporting and the number of outside block-holders / institutional ownership to be a negative one. For purposes of this study, I develop three variables under this block-ownership cluster Grove et al. 2011. I include the fraction of outstanding shares owned by block-holders (BHEQT%), the number of block-holders (BHEQT#) and the shareholding of the largest block-holder (EQT%OS).

I employ three measures to proxy for CEO power i.e. CEO duality, CEO tenure and CEO age. Dechow et al. (1996) and Agrawal and Chadha (2005) report that the

likelihood of an accounting failure increases when a founder is the CEO or board chairperson. Abbott et al. (2004) find that the probability of accounting failure increases with board size; while Dechow et al. (1996) and Farber (2005) find that AAER firms are more likely to have a CEO who also serves as the board chair. CEO duality (CEODUA) is a dummy that takes the value of 1 if the CEO also chairs the board, and 0 otherwise Donaldson and Davis (1991); (Dalton et al. (1998); Ballinger and Marcel (2010). CEO tenure (CEOTNR) is estimated as the number of years that the CEO has served in the position Mishra and Nielsen (2000); Pathan and Faff (2013). CEO age (CEOAGE) is a variable that denotes the age of the CEO Mishra and Nielsen (2000); Cornett et al. (2008).

In order to examine how the compensation mix impacts financial misreporting in banks, I account for the portion of total executive compensation that's in cash (EXCCSH) which I compute as the ratio of bonus over total cash compensation of the executives Fahlenbrach and Stulz (2011). I also consider the portion of total executive compensation that's paid in stock or equity (EXCEQT) Baber et al. (2015). Finally, I control for the total executive holdings in the bank (EXC%OS) i.e. the number of shares held by the executives as a percentage of total outstanding number of a bank's shares Beltratti and Stulz (2012). Insider representation stands for board composition in so far as the proportion of independent members on the board is concerned. The fraction of a bank's board constituted by insiders or affiliates (INDPBD) proxies for the proportion of independent directors on a bank board compared to non-independents Grove et al. (2011). I also consider the fraction of independent members on the audit committee (INDPAC) Baber et al. (2015). Finally, I control for the fraction of independent members that constitute the board vis-a-vis the affiliated members or insiders INDPCC. An outside director is classified as "affiliated" if he/she is a former employee or mentioned in the "certain transactions" section of the proxy statement.

The variables reflect and characterize five broad clusters of corporate governance i.e. board size, block-ownership, CEO power, compensation mix and insider representation. The variable definitions, sources and computations are outlined in detail in Table 4.1.

4.4.3. Financial misreporting variables

SEC Auditing & Accounting Enforcement Releases: i.e. the United States Securities and Exchange Commission's Auditing and Accounting Enforcement Releases (US SEC AAERs). I believe my analysis is strengthened by my use of SEC AAERs (i.e.

MISREP_AAER) as an objective-based proxy of financial misreporting. Unlike the accrual-based proxies used for earnings management for example, which tend to be subject to measurement error during the estimation process Kothari et al. (2015), SEC AAERs are more robust to estimation errors since they are publicly reported incidences of financial misreporting. The US SEC's AAERs primarily serve as evidence that a firm committed an accounting violation to warrant being charged for that violation by the SEC. Because AAERs are disclosed to the public via the medium of the SEC website well after the actual accounting violation has been committed, I have to read the AAER releases case by case to determine the period when the actual violation first occurred. Dechow et al. (2010) tout SEC AAERs as a robust financial misreporting proxy by remarking that "the AAER fraud sample represents the most egregious accounting manipulations that are identified by the SEC thereby providing us with a measure that unambiguously captures financial misreporting." SEC AAERs represent the main financial misreporting proxy for purposes of this study.

4.4.4. Control variables

In line with Markarian and Parbonetti (2007) I expect bank-specific characteristics to influence the corporate governance structure; and thus by extension also potentially affect how corporate governance impacts financial misreporting e.g. bank size may be crucial in influencing a board's financial disclosure policies. I constructed a plethora of variables to control for bank-specific characteristics that are suggested in extant / prior literature as potentially related to my dependent and explanatory variables Abbott et al. (2004); Larcker et al. (2007); Bowen et al. (2008). Firstly, I acknowledge the role of quality auditors in restraining financial misreporting by including a variable on whether a bank is audited by a large international auditing firm (BIG4AUD). It is an indicator variable which equals 1 when a bank is audited by a large auditor; otherwise equals 0 if not. I identify large auditing firms to be the large international auditing firms i.e. Arthur Andersen (before 2002), Ernst & Young, Deloitte & Touche, KPMG and Price Waterhouse Coopers (PWC). Consistent with the reasoning of Ivashina et al. (2009) who suggested that creditors may serve as corporate control in monitoring companies, I include financial leverage (FINLEV) to control for capital structure. I compute this as interest-bearing debt divided by total assets for the bank. I also build into the regressions the z-score introduced by Boyd and Graham (1986) to control for insolvency risk (ZSCORE). I compute bank size (LNTAS) as the natural log of a bank's total assets; I

however do not include size as a control variable in the alpha regressions because of multi-collinearity concerns. Additionally, I tag along with Pathan and Faff (2013) and account for the regulatory mandates in my analysis by introducing the Sarbanes-Oxley Act (SOX) of 2002 as an indicator variable (SOX_2002). This variable takes the value of 0 the years 2000 and 2001, otherwise its equal to 1 for all other years. Finally, I impose a crisis dummy (CRISIS_0710) in order to account for the financial crisis period De Jonghe et al. (2012); Pathan and Faff (2013). This variable takes the value of 1 if year is 2007–2010 and zero otherwise.

4.4.5. The regression specification

Dynamic Panel Analysis: I use a multiple regression model to examine the impact of the 16 corporate governance factors on financial misreporting. I opt for, adopt and utilise the two-step ‘system’ GMM estimator Arellano and Bover (1995); Blundell and Bond (2000) to account for and address potential endogeneity issues that could arise in examining the relationship between corporate governance and financial misreporting De Andres and Vallelado (2008); Pathan and Faff (2013). In line with Blundell and Bond (2000) the two-step estimates of standard errors are likely to be downward biased, I thus follow the finite sample correction introduced by Windmeijer (2005). To test for instrument validity, I subject my estimates to Hansen’s diagnostic test; and consistent with Arellano and Bond (1991) I then test for second-order autocorrelation of error terms. Against this background, my dynamic panel model specification takes the following form:

$$\begin{aligned} Misrep_{i,t} = & \alpha_0 + \varphi(Misrep)_{i,t-1} + \beta_j \sum_{j=1}^5 (Corp_Gov)_{i,t} + \\ & \gamma_k \sum_{k=1}^7 (Control)_{i,t} + \alpha_1 (SOX_2002)_t + \alpha_2 (CRISIS_0710)_t + \varepsilon_{i,t} \end{aligned} \quad (4.1)$$

where i signifies individual commercial bank ($i = 1, 2, \dots, 17$) and t is the period that we cover ($t = 2000, 2001, \dots, 2016$). α , β & γ are the parameters to be estimated, while $Misrep_{i,t}$ is the dependent variable and stands for incidences of financial misreporting in commercial banks as estimated by MISREP_AAER; $(Corp_Gov)_{i,t}$ comprise of the five unique dimensions of corporate governance variables: 1) board size, number of

directors on audit committee number of directors on compensation committee and gender diversity 2) fraction of outstanding shares owned by block-holders, number of block-holders and shareholding of largest block-holder 3) CEO duality, CEO tenure and CEO age 4) executive compensation that's cash, executive compensation that's equity / stock and executive shares as a fraction of total outstanding shares 5) fraction of the board that are independent directors, proportion of independent directors on the audit committee and proportion of independent directors on the compensation committee; $(Control)_{i,t}$ stands for the mix of bank-specific and regulatory control variables; $(Misrep)_{i,t-1}$ stands for the lagged misreporting dependent variable; (SOX_2002) is a dummy variable that takes the value of 0 in the post SOX period (2000–2001), otherwise equals 1. $(CRISIS_{0710})$ is a crisis dummy that takes the value of 1 if the year is 2007–2010, otherwise equals 0; while $\varepsilon_{i,t}$ denotes the error term.

4.4.6. Descriptive statistics

I provide the descriptive statistics for the corporate governance variables in Table 4.3. The sample mean of board size in Panel A of Table 4.3 is 10.50 which is broadly in line with the 12.48 in Xie et al. (2003) and the 9 in Francis et al. (2012). At 0.116 the sample mean of gender diversity is comparable to the 0.076 in Pathan and Faff (2013). In so far as CEO characteristics go, the sample mean of CEO Duality is 0.073 which is similar to that of 0.085 in Xie et al. (2003). The average sample CEO age at 57.81 (years) is well in sync with the 56.26 (years) in Cornett et al. (2008); and the average tenure of the sample CEO is 7.52 (years) which is consistent with the 8.85 in Pathan and Skully (2010). Similar to Baysinger and Butler (1985), independents account for 67.4% of total board seats with the balance split between insiders and affiliated directors. Even though these percentages are similar to those reported in the studies cited above, it is important to note that there are wide variations in the board compositions of my sample firms. At 74.1% and 100%, audit and compensation committees in my sample were composed of a majority of independent directors, perhaps largely testifying to the impact of more rigorous compliance enforcement on banks in the post-SOX and post-crisis dispensations.

I present the descriptive statistics for my control variables in Panel B of Table 4.3 i.e. LNTASS, FINLEV, AUDINT and ZSCORE. About 76.7% of the banks in the sample are audited by large international auditing firm (AUDINT). The banks are also lowly geared on average, a factor largely attributable to tighter requirements on bank equity

holdings and asset quality on bank balance sheets in the crisis aftermath. Another phenomenon showing the impact of SOX guidelines in relation to independent representation on boards of directors is the notable increase in the mean percentage of independent directors in Panel D. From about 60.1% in 2002, the average percentage of independent members rose to a high of 71.4% by 2006 and has since been largely above 65% ever since.

Table 4.5 displays the correlations among the governance characteristics and the control variables. I am particularly on the lookout for high correlations among the corporate governance variables as these could potentially introduce noise into my baseline in the form of multi-collinearity. Correlations between the corporate governance variables and the control variables are generally low (typically < 0.30), with the highest correlation of 0.502 between block-holder ownership (BHEQT%) and large international auditor (AUDINT). I find a negative association between the fraction of independent outsiders on the board (INDPBD) and the financial misreporting variable. This is in line with prior literature and further illustrates alternative evidence in favour of greater independent representation being associated with better monitoring. Against established wisdom in favour of smaller boards in terms of effective monitoring, I find larger boards associated with lower levels of enforcement releases. The main argument for larger boards is that they may bring a greater number of experienced directors to a board. Experienced directors seem to play a role in constraining financial misreporting.

4.5. Discussion of the empirical results

My first hypothesis predicts that there is a negative association between large boards and financial misreporting in commercial banks owing to better monitoring and access to a wider talent pool in comparison to smaller boards. In other words, I hypothesise that, all things being equal, the larger the bank board the less the incidences of misreporting. Support for H1 in our results is evidenced by a negative and linear relationship between board size (BRDSIZE) and AAER_ENF ($t = -1.817$) in Table 4.6. However, as a robustness check, I also run and report the results for BRDSIZE² and a positive association emerges (2.136) i.e. that a large board actually results in greater (not less) incidences of financial misreporting for commercial banks. Taken together, the direction and significance of the linear and quadratic coefficients for the AAER_ENF regressions suggest that the relationship between board size and financial misreporting could yet be non-linear. These findings are consistent with the findings of Andres &

Vallelado (2008) when analysing the relationship between corporate governance and performance. I posited that financial misreporting essentially results from a failure to hit set performance outcomes. Against this backdrop, it also follows that if a large board positively impacts bank performance, the improved performance outcomes ought to result in lower financial misreporting incidences as well. Board size is negatively associated with financial misreporting up to a certain point, beyond which size it actually starts to fuel (not impair) financial misreporting. The conflicting nature of the results of the linear and quadratic coefficients places a demand for the adoption of non-linear models in future research on the relationship between board size and financial misreporting.

My second hypothesis investigates the association between block-ownership with financial misreporting. H2 predicts the existence of a negative association between increased equity ownership (block-ownership) and financial misreporting in commercial banks. In Table 4.6 I find and report a negative and significant association between block-ownership (BHEQT%) and financial misreporting (AAER_ENF) ($t = -2.286$). Given the strength and consistency of the association between block-ownership and financial misreporting, I conclude that large equity block-holders strongly account for the reduction in financial misreporting incidences in commercial banks in the aftermath of the financial crisis. These results lend solid support H2 i.e. that the existence of large equity block-holders has a restraining effect on executives' propensity to misreport. In other words, large equity block-holders have got a positive effect on the quality of financial accounting disclosures by commercial banks. To further augment this analysis on the impact of block-holders on the financial misreporting, I also report a negative association between the number of block-holders (BHEQT#) and financial misreporting (AAER_ENF). This implies that the greater the number of institutional ownership of a firm's equity, the less the likelihood of the bank misreporting its financials. These results strongly attest to the contention by Shleifer and Vishny (1997) who vouched for a negative relationship between large shareholders and financial misreporting on the basis that large shareholders often play an 'active monitoring role' of corporate managers. This "active monitoring role" of large shareholders leads to better alignment of managers' and shareholders' interests in line with agency theory Stein (1988); Giroud and Mueller (2010). I further surmise from this that closely monitored managers are less likely to engage in the extraction of private benefits and therefore they have less to conceal from shareholders

by misreporting. In fact, Prowse (1995) underlines the importance of the monitoring role of block-holders in the banking industry.

My third hypothesis predicts that there is a positive relationship between greater CEO power (i.e. CEO duality) and financial misreporting in commercial banks. In other words, I posit that concentrating power in an all too powerful CEO is detrimental to banks in so far as financial misreporting is concerned. The separation of the roles of CEO and chair of the board has since become embedded as best practice in corporate governance literature. This background guided and informed the formulation of H3 i.e. greater CEO power is anticipated to result in the escalation of financial misreporting incidences in commercial banks. In Table 4.7 I find some support for H3 from the positive and statistical significance of the Duality factor in the AAER_ENF regressions i.e. ($t = 2.174$). I extrapolate and further refine my analysis by restating the fact that financial misreporting as a phenomenon is basically a by-product resulting from a failure to hit set performance targets. Drawing from literature on the relationship between financial misreporting and bank performance, and consistent with my findings, Larcker et al. (2007) reported a negative association between CEO Duality and bank performance (proxied by ROA). I marry these findings with my own findings on the association between CEO duality and financial misreporting and they are suggestive that CEO duality accounts for or explains financial misreporting in commercial banks in some respect. An over-powerful CEO can hinder bank performance, and this in turn increases the propensity to misreport as a means of trying to plug gaps in performance and bring results to be in line with market expectations. Taking from this logic, the study of financial misreporting should therefore never be divorced from bank performance studies for a deeper and well-rounded insight to emerge. I also reported the results on how the variable CEOAGE is associated with financial misreporting to further augment my analysis on the relationship between CEO characteristics and financial misreporting. The coefficient for CEOAGE in the AAER_ENF regression is negative and significant ($t = -2.114$). These results suggest that older CEOs are associated with lower incidences of financial misreporting in commercial banks. Taking a detour to bank performance literature, Grove et al. 2011 found director age to be beneficial to bank performance up to a certain point before diminishing returns set in. I build from this and contend that the beneficial impact of CEOAGE on performance goes a long way in explaining the negative association between CEOAGE and financial misreporting. Older CEOs are naturally better networked in their market which helps them secure and generate more business for the bank, and thus the propensity

to misreport is significantly lower as a result. Another feasible line of thought would be that older CEOs generally tend to be more conservative than their younger peers since they no longer have nothing much to prove. My results are broadly consistent with agency theory in that they cast CEO duality as a weakness in corporate governance which negatively affects both financial misreporting and bank performance.

My fourth hypothesis predicts that higher levels of equity-based executive compensation have got a negative association with financial misreporting in commercial banks. In other words, in line with agency theory, equity incentives have got the effect of harmonising the interests of executives and shareholders in the long term. In the context of the relationship between executive compensation and financial misreporting, I expect equity-based compensation to have a beneficial impact on financial misreporting. The results show some variation based on the various kinds of compensation i.e. whether cash-based or equity-based compensation. In Table 4.7 I find a negative impact of the equity-based executive compensation (EXCEQT) on financial misreporting at the 10% significance level; whereas there exists a positive association between the cash-based executive compensation (EXCCSH) on financial misreporting at the 1% significance level. I find these results not surprising at all as they speak to and conform with the wider agency theory i.e. that equity-based compensation constitutes a mechanism through which the interests of executives and shareholders are better aligned Jensen & Murphy (1990). I thus expect equity-based compensation to result in a reduction in the incentives for executives to misreport. As far as cash-based compensation goes, I do not find these findings surprising at all because cash-based compensation is not thought to sufficiently incentivise executives to “maximise shareholder wealth”. I proceed to make the additional point that the impact of executive compensation on financial misreporting could vary owing to the complex nature of the bank intermediation model as well as the regulatory regime obtaining in a specific jurisdiction. A good example of this would be the existence of deposit insurance which tends to have the effect of diluting the level of monitoring by regulators and shareholders, thereby enabling executives to maximize short-term compensation through greater risk-taking.

My fifth hypothesis predicts that greater insider representation on the board of directors is positively related with financial misreporting in commercial banks. In other words, the more the proportion of insiders to independents on a bank’s board, the greater the likelihood of the bank engaging in financial misreporting. The positive impact of independents on a bank’s board is underlined by the listing requirements of all major US

stock exchanges having a stipulation that all public companies ought to have completely independent audit and compensation committees in conformity with the Sarbanes-Oxley Act. These rules do not however prohibit prior employees and other related parties (e.g. as family members) from sitting on the audit or compensation committees. I follow the lead of Larcker et al. (2007) and designate former employees sitting on either the audit or compensation committees as “affiliated” and I therefore consider “affiliated committee membership” as indicative of a deficit of independence on the board. I draw from agency theory and posit that a majority of affiliates and insiders on the board relative to independents will significantly compromise the effectiveness of the oversight and monitoring functions of the audit and compensation committees. Consistent with H5, in Table 4.8 I find the three corporate governance characteristics under the insider representation cluster negatively associated with financial misreporting. These are the fraction of independents on the board (INDPBD), the fraction of independents on the audit committee (INDPAC) and the fraction of independents on compensation committee (INDPCC) with coefficients of -0.783, -0.321 and -0.672 respectively. I do not find these results surprising at all given the impact SOX guidelines have had with regards to the constitution of company boards i.e. that there ought to be a majority of independents on boards of directors, with the audit and compensation committees almost exclusively composed of independent directors. I consider the oversight of independent audit committees particularly vital in banking given the discretionary nature of key accounting estimates such as loan loss provisions and investments. According to Zhou & Chen (2004), an independent audit committee is a crucial factor in constraining earnings management with respect to banks’ loan loss reserves. Similarly, the need for an independent compensation committee cannot be emphasised against the backdrop of the opacity and complexity that characterise the banking business model. An independent compensation committee is essential in ensuring that executive compensation packages result in better alignment of the interests of managers and shareholders. A board dominated by affiliates and insiders over independents does nothing but heighten agency conflict issues due to reduced monitoring, thereby culminating in greater financial misreporting ultimately.

4.6. Robustness / sensitivity analysis

To ensure the robustness of my results, I conduct a battery of other analyses across a range of the variables in Table 4.9. Firstly, I drop two of our five corporate governance dimensions i.e. executive compensation and insider representation and adopt CEO compensation (CEO Cash Compensation & CEO Equity Compensation) and operational complexity (number of different business segments & total number of subsidiaries) in their place. I proceed and use alternative corporate governance variables for the five factors / dimensions adopted i.e. board size, block-ownership, CEO power, CEO compensation and operational complexity. My results are robust to this change. I find both cash-based and equity-based portions of CEO positively associated with financial misreporting in US commercial banks. In addition, the dynamic panel estimations reveal a positive relationship between operational complexity and financial misreporting in US commercial banks over the study period. I use the number of different business segments and the total number of outstanding subsidiaries to proxy for operational complexity. I find that an increase in both the number of different business segments and the total outstanding number of subsidiaries increases bank financial misreporting. These findings imply that there is a greater likelihood for banks characterized by higher operational complexity to misreport compared to banks of lower operational complexity. This is so because in banks of high business complexity, co-ordination problems between specialists rise, and this can correspondingly increase the communication costs of the bank Lawrence and Lorch (1967). Secondly, I replace financial leverage and insolvency risk as control variables with fees and return on assets and my main results hold. Thirdly, I completely exclude SOX and CRISIS from the baseline regressions and my results still hold in the main. Finally, I run each of the regressions with no controls and then with two control variables and the results are comparatively similar across these regressions.

4.7. Concluding remarks

I probe the relationship between financial misreporting and a plethora of carefully selected corporate governance characteristics and dimensions i.e. board size, block-ownership, CEO Power, Compensation mix and insider representation. I summarise and outline the results from the dynamic panel regressions in line with the formulated hypothesis for this paper. Consistent with H1, I find a negative association between board size (BRDSIZE) and financial misreporting (AAER_ENF). The association reverses to positive when I use the squared BRDSIZE variable, suggesting that the relationship

between board size and financial misreporting could yet be non-linear. Consistent with H2, I report a negative and significant association between block-ownership (BHEQT%) and the financial misreporting variable (AAER_ENF). Consistent with H3, I find support for the positive and statistical significance of the relationship between the Duality factor (CEODUA) and the misreporting variable (AAER_ENF). Consistent with H4, I find a negative impact of the equity-based executive compensation (EXCEQT) on financial misreporting; whereas there exists a positive association between the cash-based executive compensation (EXCCSH) and financial misreporting. Consistent with H5, I find the three corporate governance characteristics under the insider representation (i.e. INDPBD, INDPAC, INDPCC) cluster negatively associated with financial misreporting.

My research has got both theoretical and practical implications. Firstly, my research amplifies the how important it is to simultaneously probe multiple corporate governance dimensions in one study. Investigating a single dimension in isolation e.g. compensation mix could reveal a significant association with misreporting; yet when studied as an element of a set of corporate governance dimensions, the result could yet be just about marginally significant Baysinger & Butler (1985). Secondly, I believe the applicability and explanatory power of the conventional agency theory is limited in so far as the banking industry is concerned. There is therefore a need to carefully consider peculiarities in terms of the organizational settings and regulatory environment which may markedly interfere with and compromise the monitoring power of different corporate governance mechanisms e.g. while agency theory touts the virtues of stronger independent representation on the board, the role some of the insider-related mechanisms e.g. CEO duality and insider representation play in curtailing financial misreporting – as contended by stewardship theory – warrants further examination according to alternative theoretical paradigms. In so far as practical implications go, my study speaks to the wider discussion around executive compensation as a critical aspect of bank regulation. I contribute to and motivate compliance monitors, regulators and shareholders alike with regards to the ongoing agenda for reforms to executive compensation packages. The direction of travel should be towards the adoption of compensation packages with a long-term orientation e.g. via options or restricted stock. I conclude by re-emphasising that financial misreporting essentially results from the need to paint a rosier picture of the financials after a failure to hit set performance targets in line with market expectations. A study of the impact of corporate governance on financial misreporting has to therefore

borrow heavily from literature on the corporate-governance-performance nexus for richer insight.

Table 4.1 *Variables, abbreviations and descriptions and sources.* Appendix presents all the variables that we utilize in our econometric analysis in this study. The abbreviations, descriptions and sources of each variable we use are also presented.

Variable	Abbreviation	Description & computation	Data source
<i>Financial misreporting variables:</i>			
SEC AAERs	<i>MISREP_AAER</i>	The percentage of banks that are cited by the SEC for committing accounting fraud. Banks that commit fraud in a given year are identified from the SEC investigations in AAERs	SEC AAER Website
<i>Corporate governance variables:</i>			
Total board size	<i>BRDSZE</i>	Number of directors serving on the board	DEF 14A Proxy Stmts
No. of directors serving on audit committee	<i>BRDADT</i>	Number of directors serving on the Audit committee	DEF 14A Proxy Stmts
No. of directors serving on compensation committee	<i>BRDCMP</i>	Number of directors serving on the Compensation committee	DEF 14A Proxy Stmts
Gender diversity	<i>BRDFML</i>	The percentage of female directors on the board	DEF 14A Proxy Stmts
Fraction of outstanding shares owned by block-holders	<i>BHEQT%</i>	Fraction of outstanding shares owned by block-holders	10-K Annual Reports
Number of block-holders	<i>BHEQT#</i>	Number of block-holders	10-K Annual Reports
Shareholding of the largest block-holder	<i>BHOEQT</i>	Shareholding of the largest block-holder	10-K Annual Reports
CEO duality	<i>CEODUA</i>	Indicator variable equal to 1 if CEO also holds the position of board chair	10-K Annual Reports
CEO tenure	<i>CEOTNR</i>	The number of years that the CEO has served in the position (we use the natural log in our panel estimations)	10-K Annual Reports
CEO age	<i>CEOAGE</i>	The age of the CEO (we use the natural log in our panel estimations)	10-K Annual Reports
Executive compensation: cash	<i>EXCCSH</i>	The proportion of total Executive annual compensation that's base salary and cash bonus incentive	Execucomp

Executive compensation: equity	<i>EXCEQT</i>	The proportion of total executive compensation that's stock / equity options and grants	Execucomp
Executive shares as a % of outstanding shares	<i>EXC%OS</i>	The proportion of a bank's total outstanding shares that's held by the top executives	Execucomp
Fraction of board: insiders	<i>INDPBD</i>	The proportion of the total board membership that's comprised of insiders / executives or affiliated directors	10-K Annual Reports
Fraction of independents on audit committee	<i>INDPAC</i>	The percentage of independent members of the board Audit committee	10-K Annual Reports
Fraction of independents on compensation committee	<i>INDPCC</i>	The percentage of independent members of the board Compensation committee	10-K Annual Reports
<i>Control variables:</i>			
Financial leverage	<i>FINLEV</i>	is equal to a bank's interest-bearing debt as a percentage of total assets sum of long-term debt and debt in current liabilities divided by total assets	Thomson Financial Banker
Large international auditor	<i>AUDINT</i>	An indicator variable for whether a bank is audited by one of the big international audit firms i.e. PWC, Deloitte, KPMG and Ernst & Young	10-K Annual Reports
Insolvency risk	<i>ZSCORE</i>	The inverse proxy for bank insolvency	Bankscope
Bank size	<i>LNTASS</i>	The natural log of a bank's total assets	Bankscope
Sarbanes-Oxley Act	<i>SOX_2002</i>	A dummy variable which takes the value of 1 if the year is 2000 and 2001, and 0 otherwise	
Global financial crisis	<i>CRISIS_0710</i>	A dummy variable which takes the value of 1 if the year is 2007 – 2010, otherwise its equal to 0 for all other years.	

Table 4.2 *Auditing and accounting enforcement releases breakdown.* This table presents the breakdown of the AAERs showing how we arrived at the industry-year observations used in our study at a glance.

Description	Observations
Total SEC AAERs from 2000-2016 (All SIC codes)	2 604
Auditing enforcement actions & individual CPAs, LLCs & LLPs	(1 923)
Corporate accounting enforcement actions	(585)
Of which financial services enforcement actions (SIC codes 6000 – 6999)	(74)
Of which duplicates or appearing twice	(5)
Commercial banks (SIC codes 6020 – 6029)	17

Table 4.3 *Descriptive statistics.* The table reports the descriptive statistics of the variables employed in the dynamic panel regressions. All variables are in absolute values except of the compensation determinants (EXCCSH, EXCEQT) which are stated in million dollars. BRDSIZE: the total number of members on the board; BRDADT: the % of total board in Audit Committee; BRDCMP: the % of total board in Compensation Committee; BRDFML: the % of female directors on board; BHEQT%: the % of outstanding shares owned by block-holders; BHEQT#: the number of block-holders; BHOEQT: the % of outstanding shares held by the largest block-holder; CEODUAL: a dummy that takes the value of 1 if the CEO chairs the board as well, and 0 otherwise; CEOTEN: the number of years that the CEO has served in the position; CEOAGE: the age of the CEO; EXCCSH: the cash compensation of executive management (including base salary & bonus); EXCEQT: the equity compensation of executive management (including restricted stock and stock options); EXC%OS: executive shares as a % of outstanding shares; INDPBD: the fraction of independents on the board; INDPAC: the fraction of independents in Audit Committee; INDPCC: the fraction of independents on Compensation Committee; LNTASS: bank size; FINLEV: financial leverage; AUDINT: audited by large international auditor; ZSCORE: insolvency risk. . *, ** & *** correspond to 10%, 5% and 1% significance level respectively.

Variables	Mean.	Std. Dev	Minimum	Maximum	Median
PANEL A: Corporate governance variables					
BRDSIZE	10.498	3.545	5	17	9
BRDADT	0.367	1.370	2.000	4.492	2.370
BRDCMP	0.266	1.260	3.000	4.396	2.327
BRDFML	0.116	0.101	0.000	0.413	0.114
BHEQT%	0.509	0.266	0.000	0.972	0.572
BHEQT#	4.100	1.476	0.000	8.000	1.000
BHOEQT	0.107	0.139	0.000	0.194	0.911
CEODUA	0.073	0.482	0.000	1.000	1.000
CEOTNR	7.523	8.632	0.000	43	5.000
CEOAGE	57.810	9.231	41.000	74	57
EXCCSH	42 122.160	21 600	0.000	152 000	8 132
EXCEQT	52 398.300	32 300	0.000	227 000	7 386
EXC%OS	0.073	0.083	0.000	0.781	0.043
INDPBD	0.674	0.263	0.401	0.961	0.742
INDPAC	0.741	0.162	0.000	1.000	0.183
INDPCC	1.001	0.191	0.000	1.000	0.280
PANEL B: Bank-specific & regulatory variables					
LNTASS	16.470	1.729	2.287	10.471	6.738
FINLEV	0.889	0.216	0.000	0.893	0.236
AUDINT	0.767	0.321	0.000	1.000	1.000
ZSCORE	24.415	6.230	-46.276	53.714	2.108
PANEL C: Financial misreporting variables					
MISREP_AAER	0.015	0.009	0.003	0.022	0.018

Table 4.4 *Descriptive statistics.* Corporate governance variables: Year-by-year

Year	Board size	Block-ownership	CEO power	Compensation mix	Insider representation
2000	8.723	10.402	0.801	6.780	0.656
2001	8.217	9.751	0.923	5.682	0.649
2002	7.832	9.892	0.874	6.921	0.601
2003	7.461	11.110	0.802	6.911	0.613
2004	8.942	9.232	0.874	7.973	0.694
2005	8.547	9.641	0.811	7.452	0.682
2006	9.086	13.573	0.832	7.301	0.714
2007	8.574	14.201	0.822	6.394	0.662
2008	8.108	13.052	0.601	2.843	0.641
2009	8.462	14.844	0.593	7.354	0.661
2010	8.116	12.912	0.560	5.270	0.660
2011	8.032	14.573	0.472	4.081	0.663
2012	8.411	14.050	0.461	3.732	0.674
2013	8.255	14.095	0.522	5.109	0.665
2014	8.204	13.907	0.504	4.548	0.665
2015	8.225	14.156	0.490	4.368	0.667
2016	8.274	14.052	0.494	4.439	0.668

Table 4.5 *Correlation matrix.* This table presents the Pearson correlation coefficients for our corporate governance proxies and control variables for a sample of US commercial banks over the 2000 – 2016 periods. BRDSIZE: the total number of members on the board; BRDADT: the % of total board in Audit Committee; BRDCMP: the % of total board in Compensation Committee; BRDFML: the % of female directors on board; BHEQT%: the % of outstanding shares owned by block-holders; BHEQT#: the number of block-holders; BHOEQT: the % of outstanding shares held by the largest block-holder; CEODUAL: a dummy that takes the value of 1 if the CEO chairs the board as well, and 0 otherwise; CEOTEN: the number of years that the CEO has served in the position; CEOAGE: the age of the CEO; EXCCSH: the cash compensation of executive management (including base salary & bonus); EXCEQT: the equity compensation of executive management (including restricted stock and stock options); EXC%OS: executive shares as a % of outstanding shares; INDPBD: the fraction of independents on the board; INDPAC: the fraction of independents in Audit Committee; INDPCC: the fraction of independents on Compensation Committee; LNTASS: bank size; FINLEV: financial leverage; AUDINT: audited by large international auditor; ZSCORE: insolvency risk. The variable abbreviations, sources and outlines are presented by way of Appendix A right at the bottom of the paper. *, ** & *** correspond to 10%, 5% and 1% significance level respectively.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
BRDSIZE 1	1.000																			
BRDADT 2	0.725** *	1.000																		
BRDCMP 3	0.129	0.598** *	1.000																	
BRDFML 4	0.054	-0.058	0.002	1.000																
BHEQT% 5	0.095*	0.017	0.142**	0.006	1.000															
BHEQT# 6	0.235** *	-0.004	0.086	-0.037	0.245** *	1.000														
BHOEQT 7	0.044	0.039	0.208** *	0.004	0.176** *	0.188** *	1.000													
CEODUA 8	0.004	-0.019	-0.039	0.014	-0.171 ^c	-0.11**	-0.12**	1.000												
CEOTNR 9	0.139**	0.011	0.002	-0.001	-0.041	-0.074	-0.090*	-0.010	1.000											
CEOAGE10	-0.123	0.108*	0.136**	-0.013	0.092*	0.156** *	0.090*	-0.095*	-0.080	1.000										
EXCCSH 11	-0.109*	0.078*	-0.040	-0.104*	-0.078	-0.11**	-0.200 ^c	-0.14**	0.010	0.076	1.000									
EXCEQT 12	-0.15**	-0.028	-0.084	0.080	0.066	-0.168 ^c	0.142** *	-0.036	-0.022	-0.052	0.008	1.000								
EXC%OS13	-0.089	-0.006	-0.089*	-0.078	-0.014	-0.212 ^c	-0.169 ^c	-0.042	0.057	-0.022	0.263** *	0.086	1.000							
INDPBD 14	-0.164 ^c	0.027	0.059	-0.026	0.018	0.148** *	0.049	0.008	-0.036	0.019	-0.016	-0.051	-0.057	1.000						
INDPAC 15	0.159** *	-0.030	-0.016	0.020	-0.041	0.506** *	0.086	-0.046	0.002	0.049	-0.009	-0.163*	-0.204 ^c	-0.018	1.000					
INDPCC 16	0.078	-0.089	-0.008	0.066	-0.226 ^c	0.250** *	0.152** *	0.275** *	-0.106*	0.014	-0.281 ^c	-0.219 ^c	-0.256 ^c	0.055	0.200** *	1.000				
LNTASS 17	0.146**	0.043	0.111**	0.008	0.043	0.102*	0.211** *	0.037	0.004	0.024	-0.191 ^c	-0.078	-0.090*	-0.094	-0.055	0.095*	1.000			
FINLEV 18	-0.068	-0.076	0.054	0.067	-0.048	-0.087*	-0.050	0.133**	0.009	-0.032	-0.159 ^c	-0.057	-0.11**	0.042	0.006	0.284** *	-0.192 ^c	1.000		
AUDINT 19	0.035	0.034	0.095*	0.005	0.502	0.231** *	0.044	0.011	-0.129	0.004	-0.085	-0.022	-0.024	-0.041	-0.025	0.111** *	0.402** *	-0.202	1.000	
ZSCORE 20	-0.077	0.106*	-0.072	-0.092*	-0.041	-0.13**	-0.068	-0.168 ^c	-0.078	0.049	-0.249 ^c	0.071	0.051	0.038	-0.057	-0.352	0.067	-0.210	-0.048	1.000

Table 4.6 *Regression analysis for BOARD SIZE & BLOCK-OWNERSHIP governance factors.* The table reports the dynamic panel regression results for US commercial banks subject to SEC enforcement actions over the period 2000 to 2016. The dependent variable is AAER_ENF i.e. the US SEC Auditing & Accounting Enforcement Releases (SEC AAERs). As independent variables I employ BRDSIZE: the total number of members in the board; BRDADT: the number of directors serving on the audit committee; BRDCMP: the number of directors serving on the compensation committee; BRDFML: the percentage of female directors; BHEQT%: the fraction of shares owned by block-holders; BHEQT#: the number of block-holders holding a firm's shares; BHOEQT: the shareholding of the largest block-holder; FINLEV: is the interest-bearing debt scaled by total assets; AUDINT: a dummy which takes the value of 1 if the firm is audited by a Big 4 firm, and 0 otherwise; ZSCORE: bank insolvency risk = $(1+ROE) / \text{Standard Deviation of ROE}$; LNTASS: the natural log of total assets; SOX_2002: dummy which takes the value of 1 if year is 2000–2001, and 0 otherwise; CRISIS_0710: a dummy which takes the value of 1 if year is 2007–2010, and 0 otherwise. *, ** & *** correspond to 10%, 5% and 1% significance level respectively.

Variables	BOARD SIZE		BLOCK OWNERSHIP	
	Coefficient	Test-statistic	Coefficient	Test-statistic
BRDSIZE	-1.817	0.032		
BRDADT	0.473	0.0001		
BRDCMP	-0.604	-0.0002		
BRDFML	0.126	0.753		
BHEQT%			-2.286***	0.0031
BHEQT#			-0.807	0.0028
BHOEQT			0.013**	0.006
LAGMRP	0.342**	0.148	0.196*	0.123
FINLEV	0.376	0.462	-0.013	0.241
AUDINT	0.048	0.059	0.057*	0.022
ZSCORE	0.007	0.011	0.007	0.014
LNTASS	-0.028	0.041	-0.041	0.017
SOX_2002	-0.087**	0.036	-0.088	0.106
CRISIS_0710	-0.092	0.045	-0.138***	0.029
Constant	-0.138	0.374	0.275	0.372
Wald chi ²	322.16***		452.86***	
Hansen J-statistic	1.000		0.511	
Instruments	17		17	
Observations	145		145	
Number of banks	17		17	

Table 4.7 *Regression analysis for CEO POWER & COMPENSATION MIX governance factors.* The table reports the dynamic panel regression results for US commercial banks subject to SEC enforcement actions over the period 2000 to 2016. The dependent variable is AAER_ENF: the US SEC Auditing & Accounting Enforcement Releases (SEC AAERs). As independent variables I employ CEODUA: a dummy that takes the value of 1 if the CEO chairs the board as well, and 0 otherwise; CEOTNR: the number of years that the CEO has served in the position; CEOAGE: the age of the CEO; EXCCSH: the cash compensation of executive management which includes the base salary and bonus; EXCEQT: the equity compensation of executive management which includes restricted stock and stock options; EXC%OS: executive management shares as a percentage of total outstanding shares; FINLEV: is the interest-bearing debt scaled by total assets; AUDINT: a dummy which takes the value of 1 if the firm is audited by a Big 4 firm, and 0 otherwise; ZSCORE: bank insolvency risk = $(1+ROE) / \text{Standard Deviation of ROE}$; LNTASS: the natural log of total assets; SOX_2002: dummy which takes the value of 1 if year is 2000–2001, and 0 otherwise; CRISIS_0710: a dummy which takes the value of 1 if year is 2007–2010, and 0 otherwise. *, ** & *** correspond to 10%, 5% and 1% significance level respectively.

Variables	CEO POWER		COMPENSATION MIX	
	Coefficient	Test-statistic	Coefficient	Test-statistic
CEODUA	2.174**	0.118		
CEOTNR	-0.143	0.067		
CEOAGE	-2.114	0.263		
EXCCSH			-0.045	0.029
EXCEQT			-0.017	0.013
EXC%OS			0.007**	0.002
LAGMRP	0.198**	0.091	0.371**	0.184
FINLEV	-1.438	0.231	-1.952***	0.721
AUDINT	0.552***	0.136	-0.027	0.054
ZSCORE	-0.0003	0.006	0.012*	0.061
LNTASS	0.024	0.026	-0.032	0.078
SOX_2002	0.057***	0.019	0.031	0.047
CRISIS_0710	0.034	0.017	-0.122	0.058
Constant	-0.134	1.352	0.876	0.662
Wald chi ²	122 367.42***		338.24***	
Hansen J-Statistic	0.664		0.874	
Instruments	17		17	
Observations	145		145	
Number of banks	17		17	

Table 4.8 *Regression analysis for INSIDER REPRESENTATION governance factors.* The table reports the dynamic panel regression results for US commercial banks subject to SEC enforcement actions over the period 2000 to 2016. The dependent variable is AAER_ENF: the US SEC Auditing & Accounting Enforcement Releases (SEC AAERs). As independent variables I employ INDPBD: the fraction of the board that's insiders; INDPAC: the fraction of independents on the audit committee; INDPCC: the fraction of independents on the compensation committee; FINLEV: is the interest-bearing debt scaled by total assets; AUDINT: a dummy which takes the value of 1 if the firm is audited by a Big 4 firm, and 0 otherwise; ZSCORE: bank insolvency risk = $(1+ROE) / \text{Standard Deviation of ROE}$; LNTASS: the natural log of total assets; SOX_2002: dummy which takes the value of 1 if year is 2000–2001, and 0 otherwise; CRISIS_0710: a dummy which takes the value of 1 if year is 2007–2010, and 0 otherwise. *, ** & *** correspond to 10%, 5% and 1% significance level respectively.

INSIDER REPRESENTATION		AAER_ENF
Variables	Co-efficient	Test-statistic
INDPBD	-0.783	-0.0002
INDPAC	-0.321	-0.0001
INDPCC	-0.672	-0.0007
LAGMRP	0.178***	0.062
FINLEV	0.219	0.447
AUDINT	0.015	0.017
ZSCORE	0.021***	0.007
LNTASS	0.013	0.009
SOX_2002	-0.087	0.024
CRISIS_0710	-0.153***	0.038
Constant	-0.321	0.334
Wald chi ²	82.742***	
Hansen J-statistic	0.776	
Instruments	17	
Observations	145	
Number of banks	17	

Table 4.9 *Robustness tests.* The table reports the dynamic panel regression results for US commercial banks subject to SEC enforcement actions over the period 2000 to 2016 for BOARD SIZE, BLOCK-OWNERSHIP, CEO POWER, CEO COMPENSATION & OPERATIONAL COMPLEXITY governance factors. The dependent variable is AAER_ENF: the US SEC Auditing & Accounting Enforcement Releases (SEC AAERs). As independent variables we employ BRDCMP: the number of directors serving on the compensation committee; BRDFML: the percentage of female directors; BHOEQT: the shareholding of the largest block-holder; CEOAGE: the age of the CEO; CEOCSH: the cash compensation of the CEO which includes base salary and bonus; CEOEQT: the cash compensation of the CEO which includes base salary and bonus; NUMSEG: the number of different business segments; NUMSUB: number of subsidiaries; EXC%OS: executive management shares as a percentage of total outstanding shares; INDPCC: the fraction of independents on the compensation committee; FEES: of net fees, commission and net trading income over total assets; ROAA: net income before interest and taxes as a proportion of the average book value of total assets; FINLEV: is the interest-bearing debt scaled by total assets; AUDINT: a dummy which takes the value of 1 if the firm is audited by a Big 4 firm, and 0 otherwise; ZSCORE: bank insolvency risk = $(1+ROE) / \text{Standard deviation of ROE}$; LNTASS: the natural log of total assets; SOX_2002: dummy which takes the value of 1 if year is 2000–2001, and 0 otherwise; CRISIS_0710: a dummy which takes the value of 1 if year is 2007–2010, and 0 otherwise. *, ** & *** correspond to 10%, 5% and 1% significance level respectively.

CORPORATE GOVERNANCE					
Variables	Board size	Block-ownership	CEO power	CEO compensation	Operational complexity
BRDFML	0.126				
BRDCMP	-0.604				
BHOEQT		0.013**			
CEOAGE			-2.114		
CEOCSH				0.0263***	
CEOEQT				0.0074**	
NUMSEG					0.0323
NUMSUB					0.0467
LAGMRP	0.342**	0.196*	0.198**	0.371**	0.178***
FINLEV	0.376	-0.013	-1.438	-1.952***	0.219
AUDINT	0.048	0.057*	0.552***	-0.027	0.015
ZSCORE	0.007	0.007	-0.0003	0.012*	0.021***
LNTASS	-0.028	-0.041	0.024	-0.032	0.013
SOX_2002	-0.087**	-0.088	0.057***	0.031	-0.087
CRISIS_0710	-0.092	-0.138***	0.034	-0.122	-0.153***
Constant	-0.138	0.275	-0.134	0.876	-0.321
Wald chi ²	322.16***	452.86***	122367.42***	338.24***	82.742***
Hansen J-statistic	1.000	0.511	0.664	0.874	0.776
Instruments	17	17	17	17	17
Observations	145	145	145	145	145
Number of banks	17	17	17	17	17

Chapter 5 - Conclusion

In this thesis, I broadly examine the impact of competition and corporate governance on financial stability and financial misreporting in the context of the global financial crisis of 2007-10 using the setting of the G7 bloc and the US financial services industry. Firstly, I investigate the relationship between market power, bank risk and financial stability in the G7 group from 2000-15. I find support for the competition-fragility view; yet without necessarily disproving the competition-stability view i.e. the results are mixed based on the individual risk proxies used for purposes of this study. Even though overall bank risk (insolvency risk) as proxied by the z-score falls with greater banking sector concentration, loan portfolio risk (credit risk) increases. The explanation lies in the results relating to the liquidity and capital risk proxies. The key takeaway therefore is greater concentration in the banking industry leads to an increase in credit risk, but also in lower insolvency risk. This can be attributed to banks maintaining higher capitalisation thresholds and liquidity profiles as they compete more. The individual risks must be analysed for a much more refined picture of the results to emerge. By way of policy implications, as a key policy response during and after the crisis of 2007-10, many countries adjusted and made their deposit insurance schemes more generous. This ultimately exacerbated moral hazard risk in more competitive environments. With generous deposit insurance schemes in place in the post-crisis period, the sensitivity of the z-score (or profit volatility) to changes in the lerner index and Boone indicator increased. This strongly suggests a reduction in banks' pricing power after the crisis. My findings underline the overbearing influence of banking regulatory policies and market structure on financial stability. Not only do these policies directly affect banks' risk-taking incentives, they also influence the effect of competition on banks' riskiness. The international dimension of banking competition is a potential limitation in so far as the results and dataset used for this study are concerned. It is a fair assumption to make that if banks operate internationally, they also compete on an international basis and the price-cost margins ought to be reflective of this reality. Because I use consolidated data, there is a real likelihood of conflict in terms of the measurement of market power between domestic and international banks. It is unfortunate that bank-level data on the decomposition of bank assets and liabilities between domestic or cross-border origin is not available, even though most smaller banks still operate virtually entirely domestically.

Further research on a truly international sample (not just the G7) could be useful in bolstering understanding around the influence of market power on financial stability across diverse banking jurisdictions internationally. The results could yet provide far richer and broader insights on the subject than is the case based on a G7 sample.

Secondly, I probe and provide novel evidence on the relationship between competition and financial misreporting in the US financial services industry from 2000-2016. I formulate hypotheses based on the interrelationships among three factors i.e. competition, the financial crisis and financial misreporting. I document a positive relationship between the intensity of competition and incidences of financial misreporting in the US financial services industry. I also examine whether an exogenous increase in competition via the financial crisis culminated in the proliferation of financial misreporting incidences in the US financial services industry. There is wider convergence and awareness in mainstream economics about the potential for competition to undermine economic outcomes and the efficient operation of the markets. Left unchecked, competition potentially can reverse and undermine the economic benefits associated with healthy levels of competition. Financial misreporting (e.g. earnings management) has a damaging and harmful effect on firms and a country's wider economy Kedia and Philippon (2009; Durnev and Mangen (2009). My findings are suggestive of the fact that governments, regulators and academia ought to critically consider the perverse effects of competition on policymaking, welfare and other economic deliberations. My study contributes to existing literature in broadening understanding on the impact product market competition has in shaping the corporate financial information environment. I advance the notion that product market competition operates through an agency channel, in itself a key departure from the proprietary cost view widely examined up to this point in existing accounting literature. In so far as my analysis of the relationship between competition and financial misreporting is concerned, the use of an objective proxy for financial misreporting i.e. the Accounting and Auditing Enforcement Releases of the US Securities and Exchange Commission (SEC AAERs) is an undoubted strength. However, broadening the study sample beyond the remit of the US SEC AAERs to factor in violations from other regulatory jurisdictions will lend credibility to my findings in this study. The challenges of gathering, as well as the validity and authenticity of the acquired data, are obvious considerations before going this route with this study. I believe a comparison of the results across national regulatory regimes will offer so much more breath and scope to the study.

Thirdly, I empirically examine the impact five carefully selected corporate governance dimensions on financial misreporting. To this end, I adopt and utilise five dimensions of corporate governance i.e. board size, block-ownership, CEO Power, compensation mix and insider representation. I analyse the relevant literature and formulate hypotheses based on these five corporate governance dimensions. I find a negative association between board size & block-ownership and the financial misreporting proxy. The relationship between CEO power and financial misreporting is however positive, implying separation of the roles of CEO and Board Chair as the best way to combat financial misreporting in banks. In so far as compensation mix is concerned, a mixed picture is returned i.e. the association between equity-based compensation and misreporting is negative, whereas it is positive for cash-based compensation. Finally, I also find our three characteristics under the insider representation dimension all negatively associated with financial misreporting. The results remain robust after controlling for the effects of alternative corporate governance dimensions, dropping the exogenous variables (i.e. financial crisis & SOX) from the controls, using alternative control variables and running the regressions with no controls at all. My results indicate that the governance structure at commercial banks does indeed influence the actions of bank managers. Indeed, governance mechanisms, whether they pertain to executive, compensation, board independence, board size, CEO power or block-ownership of shares, really affect the CEO's ability to misreport financial information (e.g. manage earnings). As regulators formulate and implement codes of best practice in so far as corporate governance standards are concerned, they should consider the collective impact of all governance mechanisms employed rather than consider the effect of each governance mechanism in isolation. Hagendorff, Collins, & Keasey (2010) argue that there is a complementary association between regulation and some governance mechanisms. This therefore suggests that they ought to be developed in synchrony. Given the central role that banks play in the financial markets, their effective and synchronous regulation is vital. The repercussions resulting from improperly managed and regulated banks can be paralysing as evidenced by the global financial crisis of 2007-10. Last but not least, with regards to my analysis of the relationship between corporate governance and financial misreporting, it will be useful for future research to incorporate bank performance as an additional variable to this study over and above corporate governance and financial misreporting. Financial misreporting essentially arises from the need to massage accounting disclosures after a bank's failure to hit set performance targets; thus,

factoring in bank performance proxies to go with the corporate governance and misreporting ones would fundamentally enrich current insights on the corporate governance-misreporting nexus in banking.

References

- Abbott, L. J., Parker, S. & Peters, G. F. 2004. Audit committee characteristics and restatements. *Auditing: A Journal of Practice & Theory*, 23, 69-87.
- Abed, S., Al-Attar, A. & Suwaidan, M. 2012. Corporate governance and earnings management: Jordanian evidence. *International Business Research*, 5, 216.
- Acharya, V. V. & Richardson, M. 2009. Causes of the financial crisis. *Critical Review*, 21, 195-210.
- Adams, R. B., Almeida, H. & Ferreira, D. 2005. Powerful CEOs and their impact on corporate performance. *Review of financial studies*, 18, 1403-1432.
- Adams, R. B. & Mehran, H. 2005. Corporate performance, board structure and its determinants in the banking industry.
- Adams, R. B. & Mehran, H. 2012. Bank board structure and performance: Evidence for large bank holding companies. *Journal of financial Intermediation*, 21, 243-267.
- Aggarwal, R. K., & Samwick, A. A. (1999). Executive compensation, strategic competition, and relative performance evaluation: Theory and evidence. *The Journal of finance*, 54(6).
- Agrawal, A. & Chadha, S. 2005. Corporate governance and accounting scandals. *The Journal of Law and Economics*, 48, 371-406.
- Ahn, S. (2002). *Competition, Innovation and Productivity Growth: A Review of Theory and Evidence*. Retrieved from
- Akins, B., Li, L., Ng, J., and Rusticus, T.O., 2016. Bank competition and financial stability: evidence from the financial crisis, *Journal of Financial and Quantitative Analysis* 51, 1-28.
- Ali, A. & Zhang, W. 2015. CEO tenure and earnings management. *Journal of Accounting and Economics*, 59, 60-79.
- Allen, F., Carletti, E., and Marquez, R., 2011. Credit market competition and capital regulation, *Review of Financial Studies*, 24, 983-1018.
- Allen, F., and Gale, D., 2004. Competition and financial stability, *Journal of Money, Credit and Banking* 36, 453-480.
- Anginer, D., Demircug-Kunt, A. and Zhu, M., 2014. How does competition affect bank systemic risk? *Journal of Financial Intermediation*, 23(1), pp.1-26.
- Arellano, M. & Bond, S. 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The review of economic studies*, 58, 277-297.
- Arellano, M. & Bover, O. 1995. Another look at the instrumental variable estimation of error-components models. *Journal of econometrics*, 68, 29-51.
- Armstrong, C. S., Balakrishnan, K. & Cohen, D. 2012. Corporate governance and the information environment: Evidence from state antitakeover laws. *Journal of Accounting and Economics*, 53, 185-204.
- Armstrong, C. S., Guay, W. R. & Weber, J. P. 2010. The role of information and financial reporting in corporate governance and debt contracting. *Journal of Accounting and Economics*, 50, 179-234.
- Armstrong, C. S., Jagolinzer, A. D., & Larcker, D. F. (2010). Chief executive officer equity incentives and accounting irregularities. *Journal of Accounting Research*, 48(2), 225-271.
- Athanasoglou, P.P., Brissimis, S.N. and Delis, M.D., 2008. Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *Journal of international financial Markets, Institutions and Money*, 18(2), pp.121-136.

- Baber, W. R., Kang, S. H., Liang, L. & Zhu, Z. 2015. External corporate governance and misreporting. *Contemporary Accounting Research*, 32, 1413-1442.
- Bagnoli, M., & Watts, S. G. (2010). Oligopoly, disclosure, and earnings management. *The Accounting Review*, 85(4), 1191-1214.
- Balakrishnan, K., & Cohen, D. A. (2013). Competition and financial accounting misreporting. *Available at SSRN 1927427*.
- Ballinger, G. A. & Marcel, J. J. 2010. The use of an interim CEO during succession episodes and firm performance. *Strategic Management Journal*, 262-283.
- Barney, J. 1991. Firm resources and sustained competitive advantage. *Journal of management*, 17, 99-120.
- Barth, J.R., Caprio Jr, G., and Levine, R., 2013. Bank Regulation and Supervision in 180 Countries from 1999 to 2011. *Journal of Financial Economic Policy* 5, 111-219.
- Baysinger, B. & Hoskisson, R. E. 1990. The composition of boards of directors and strategic control: Effects on corporate strategy. *Academy of Management review*, 15, 72-87.
- Baysinger, B. D. & Butler, H. N. 1985. Corporate governance and the board of directors: Performance effects of changes in board composition. *Journal of Law, Economics, & Organization*, 1, 101-124.
- Beasley, M. S. 1996. An empirical analysis of the relation between the board of director composition and financial statement fraud. *Accounting review*, 443-465.
- Beasley, M. S., Carcello, J. V. & Hermanson, D. R. 1999. *Fraudulent Financial Reporting: 1987-1997: An Analysis of US Public Companies: Research Report*, AICPA.
- Beatty, A.L., Ke, B. and Petroni, K.R., 2002. Earnings management to avoid earnings declines across publicly and privately held banks. *The Accounting Review*, 77(3), pp.547-570.
- Beaver, W.H. and Engel, E.E., 1996. Discretionary behavior with respect to allowances for loan losses and the behavior of security prices. *Journal of Accounting and Economics*, 22(1), pp.177-206.
- Bebchuk, L., Cohen, A. & Ferrell, A. 2009. What matters in corporate governance? *Review of Financial studies*, 22, 783-827.
- Beck, T., De Jonghe, O., and Schepens, G., 2013. Bank competition and stability: cross-country heterogeneity, *Journal of Financial Intermediation* 22, 218-244.
- Beck, T., Demirgüç-Kunt, A., and Levine, R., 2006. Bank concentration, competition, and crises: First results, *Journal of Banking and Finance* 30, 1581-1603.
- Becker, C. L., DeFond, M. L., Jambalvo, J., & Subramanyam, K. (1998). The effect of audit quality on earnings management. *Contemporary Accounting Research*, 15(1), 1-24.
- Beltratti, A. & Stulz, R. M. 2012. The credit crisis around the globe: Why did some banks perform better? *Journal of Financial Economics*, 105, 1-17.
- Bennett, V. M., Pierce, L., Snyder, J. A., & Toffel, M. W. (2013). Customer-driven misconduct: How competition corrupts business practices. *Management Science*, 59(8), 1725-1742.
- Berg, S.A., and Kim, M., 1994. Oligopolistic interdependence and the structure of production in banking: an empirical evaluation, *Journal of Money, Credit and Banking* 26, 309-322.
- Berger, A.N., Bonime, S.D., Covitz, D.M. and Hancock, D., 2000. Why are bank profits so persistent? The roles of product market competition, informational

- opacity, and regional/macroeconomic shocks. *Journal of Banking & Finance*, 24(7), pp.1203-1235.
- Berger, A.N., Demirgüç-Kunt, A., Levine, R., and Haubrich, J.G., 2004. Bank concentration and competition: An evolution in the making. *Journal of Money, Credit and Banking*, 433-451.
- Berger, A.N., Klapper, L.F., and Turk-Ariss, R., 2009. Bank competition and financial stability. *Journal of Financial Services Research* 35, 99-118.
- Bergstresser, D. & Philippon, T. 2006. CEO incentives and earnings management. *Journal of financial economics*, 80, 511-529.
- Bertrand, M., Duflo, E., & Mullainathan, S. (2004). How much should we trust differences-in-differences estimates? *The Quarterly Journal of Economics*, 119(1), 249-275.
- Besley, T., & Prat, A. (2006). Handcuffs for the grabbing hand? Media capture and government accountability. *The American economic review*, 96(3), 720-736.
- Bloom, N., Sadun, R., & Van Reenen, J. (2010). Does Product Market Competition Lead Firms to Decentralize? *The American economic review*, 100(2), 434-438.
- Blundell, R. & Bond, S. 2000. GMM estimation with persistent panel data: an application to production functions. *Econometric reviews*, 19, 321-340.
- Boone, J. 2008. A new way to measure competition. *The Economic Journal*, 118, 1245-1261.
- Boone, J., Griffith, R. & Harrison, R. Measuring competition. Encore Meeting, 2004.
- Bowen, R. M., Rajgopal, S. & Venkatachalam, M. 2008. Accounting discretion, corporate governance, and firm performance. *Contemporary Accounting Research*, 25, 351-405.
- Bordo, M.D., Rockoff, H., and Redish, A., 1995. A comparison of the stability and efficiency of the Canadian and American banking systems: 1870-1925. National Bureau of Economic Research Historical Paper 67.
- Boyd, J.H., and De Nicolo, G., 2005. The theory of bank risk-taking and competition revisited. *The Journal of Finance* 60, 1329-1343.
- Boyd, J.H., De Nicolo, G., Jalal, A.M., 2006. Bank risk-taking and competition revisited: new theory and new evidence. IMF Working Paper 06/297.
- Boyd, J. H., De Nicoló, G., and Jalal, A.M., 2009. Bank competition, risk, and asset allocations, International Monetary Fund Working Paper 09/143.
- Boyd, J. H. & Graham, S. L. 1986. Risk, regulation, and bank holding company expansion into nonbanking. *Quarterly Review*, 2-17.
- Boyd, J.H., and Graham, S.L., 1991. Investigating the banking consolidation trend. *Federal Reserve Bank of Minneapolis Quarterly Review* 15, 3-15.
- Bresnahan, T.-F. (1992). Sutton's Sunk Costs and Market Structure: Price Competition, Advertising, and the Evolution of Concentration. *The RAND Journal of Economics*, 23(1), 137-152.
- Brunnermeier, M.K., and Lasse, HP., 2009. Market Liquidity and Funding Liquidity. *Review of Financial studies* 22, 2201-2238.
- Burns, N., & Kedia, S. (2006). The impact of performance-based compensation on misreporting. *Journal of financial Economics*, 79(1), 35-67.
- Busta, I. 2007. Board effectiveness and the impact of the legal family in the European banking industry. FMA European Conference, Barcelona–Spain.
- Caminal, R., Matutes, C., 2002. Market power and bank failures. *International Journal of Industrial Organization* 20, 1341-1361.
- Campbell, K. & Minguez-Vera, A. 2008. Gender diversity in the boardroom and firm financial performance. *Journal of business ethics*, 83, 435-451.

- Carletti, E., and Leonello, A., 2014. Credit Market Competition and Liquidity Crises. *CESifo Working Paper*.
- Caves, R. E. (1980). Industrial Organization, Corporate Strategy and Structure. *Journal of Economic Literature*, 18(1), 64-92.
- Chen, C. R., Steiner, T. L. & Whyte, A. M. 2006. Does stock option-based executive compensation induce risk-taking? An analysis of the banking industry. *Journal of Banking & Finance*, 30, 915-945.
- Chen, X., Cheng, Q. & Wang, X. 2015. Does increased board independence reduce earnings management? Evidence from recent regulatory reforms. *Review of Accounting Studies*, 20, 899-933.
- Cheng, Q., Lee, J. & Shevlin, T. 2015. Internal governance and real earnings management. *The Accounting Review*, 91, 1051-1085.
- Cheng, Q., & Warfield, T. D. (2005). Equity incentives and earnings management. *The Accounting Review*, 80(2), 441-476.
- Ching, K. M., Firth, M. & Rui, O. M. 2006. Earnings management, corporate governance and the market performance of seasoned equity offerings in Hong Kong. *Journal of Contemporary Accounting & Economics*, 2, 73-98.
- Christie, A. A., Joye, M. P., & Watts, R. L. (2003). Decentralization of the firm: theory and evidence. *Journal of Corporate Finance*, 9(1), 3-36.
- Claessens, S., and Laeven, L., 2004. What drives bank competition? Some international evidence, *Journal of Money, Credit and Banking* 36, 563-583.
- Clerides, S., Delis, M.D., and Kokas, S., 2015. A new data set on competition in national banking markets, *Financial markets, Institutions & Instruments* 24, 267-311.
- Committee, Basel., 2008. Liquidity Risk: Management and Supervisory Challenges. Basel: Bank for International Settlements
- Cook, R.D., 1977. Detection of influential observation in linear regression. *Technometrics*, 19(1), pp.15-18.
- Cornett, M. M., Marcus, A. J. & Tehranian, H. 2008. Corporate governance and pay-for-performance: The impact of earnings management. *Journal of financial economics*, 87, 357-373.
- Cornett, M.M., McNutt, J.J. and Tehranian, H., 2009. Corporate governance and earnings management at large US bank holding companies. *Journal of Corporate finance*, 15(4), pp.412-430.
- Craig, B.R., and Dinger, V., 2013. Deposit market competition, wholesale funding, and bank risk, *Journal of Banking and Finance* 37, 3605-3622.
- Crawford, A. J., Ezzell, J. R. & Miles, J. A. 1995. Bank CEO pay-performance relations and the effects of deregulation. *Journal of Business*, 231-256.
- Cremers, K. & Nair, V. B. 2005. Governance mechanisms and equity prices. *The Journal of Finance*, 60, 2859-2894.
- Dalton, D. R., Daily, C. M., Ellstrand, A. E. & Johnson, J. L. 1998. Meta-analytic reviews of board composition, leadership structure, and financial performance. *Strategic management journal*, 19, 269-290.
- Dalton, D. R., Daily, C. M., Johnson, J. L. & Ellstrand, A. E. 1999. Number of directors and financial performance: A meta-analysis. *Academy of Management journal*, 42, 674-686.
- Darrough, M. N., & Stoughton, N. M. (1990). Financial disclosure policy in an entry game. *Journal of Accounting and Economics*, 12(1), 219-243.
- Davidson, R., Goodwin-Stewart, J. & Kent, P. 2005. Internal governance structures and earnings management. *Accounting & Finance*, 45, 241-267.

- De Andres, P. & Vallelado, E. 2008. Corporate governance in banking: The role of the board of directors. *Journal of banking & finance*, 32, 2570-2580.
- De Franco, G., Kothari, S. P., & Verdi, R. S. (2011). The benefits of financial statement comparability. *Journal of Accounting Research*, 49(4), 895-931.
- De Jonghe, O., Disli, M. & Schoors, K. 2012. Corporate governance, opaque bank activities, and risk/return efficiency: pre-and post-crisis evidence from Turkey. *Journal of Financial Services Research*, 41, 51-80.
- Dechow, P., Ge, W., & Schrand, C. (2010). Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of Accounting and Economics*, 50(2), 344-401.
- Dechow, P. M., Ge, W., Larson, C. R., & Sloan, R. G. (2011). Predicting Material Accounting Misstatements*. *Contemporary Accounting Research*, 28(1), 17-82.
- Dechow, P. M., Sloan, R. G., & Sweeney, A. P. (1995). Detecting earnings management. *Accounting Review*, 193-225.
- Dechow, P. M., Sloan, R. G. & Sweeney, A. P. 1996. Causes and consequences of earnings manipulation: An analysis of firms subject to enforcement actions by the SEC. *Contemporary accounting research*, 13, 1-36.
- DeFond, M. L., & Park, C. W. (1999). The effect of competition on CEO turnover. *Journal of Accounting and Economics*, 27(1), 35-56.
- Delis, M.D., and Staikouras, P.K., 2011. Supervisory effectiveness and bank risk, *Review of Finance* 15, 511-543.
- Delis, M. D. 2012. Bank competition, financial reform, and institutions: The importance of being developed. *Journal of Development Economics*, 97, 450-465.
- Demirgüç-Kunt, A., and Huizinga, H., 2010. Bank activity and funding strategies: The impact on risk and returns, *Journal of Financial Economics* 98, 626-650.
- Demirgüç-Kunt, A., Kane, E.J., and Laeven, L., 2008. Determinants of deposit-insurance adoption and design, *Journal of Financial Intermediation* 17, 407-438.
- De Nicoló, G., and Loukoianova, E., 2007. Bank ownership, market structure and risk, International Monetary Fund Working Paper 07/215.
- Diamond, DW., and Philip, H.D., 1983. Bank Runs, Deposit Insurance, and Liquidity. *The Journal of Political Economy*, 401-19.
- Djankov, S., McLiesh, C., and Shleifer, A., 2007. Private credit in 129 countries, *Journal of Financial Economics* 84, 299-329.
- Doidge, C., Karolyi, G.A. and Stulz, R.M., 2007. Why do countries matter so much for corporate governance? *Journal of financial economics*, 86(1), pp.1-39.
- Donaldson, L. & Davis, J. H. 1991. Stewardship theory or agency theory: CEO governance and shareholder returns. *Australian Journal of management*, 16, 49-64.
- Dou, Y., Hope, O. K., Thomas, W. B. & Zou, Y. 2016. Individual Large Shareholders, Earnings Management, and Capital-Market Consequences. *Journal of Business Finance & Accounting*, 43, 872-902.
- Drehmann, M., and Nikolaou, K., 2013. Funding Liquidity Risk: Definition and Measurement, *Journal of Banking & Finance* 37, 2173-82.
- Durnev, A., & Mangen, C. (2009). Corporate investments: Learning from restatements. *Journal of Accounting Research*, 47(3), 679-720.
- Erkens, D. H., Hung, M. & Matos, P. 2012. Corporate governance in the 2007–2008 financial crisis: Evidence from financial institutions worldwide. *Journal of Corporate Finance*, 18, 389-411.
- Fahlenbrach, R. & Stulz, R. M. 2011. Bank CEO incentives and the credit crisis. *Journal of Financial Economics*, 99, 11-26.

- Farber, D. B. 2005. Restoring trust after fraud: Does corporate governance matter? *The Accounting Review*, 80, 539-561.
- Feng, M., Ge, W., Luo, S. & Shevlin, T. 2011. Why do CFOs become involved in material accounting manipulations? *Journal of Accounting and Economics*, 51, 21-36.
- Ferguson, R.W., 2007. International Financial Stability. Centre for Economic Policy Research
- Finkelstein, S. 1992. Power in top management teams: Dimensions, measurement, and validation. *Academy of Management journal*, 35, 505-538.
- Finkelstein, S. & D'aveni, R. A. 1994. CEO duality as a double-edged sword: How boards of directors' balance entrenchment avoidance and unity of command. *Academy of Management journal*, 37, 1079-1108.
- Fiordelisi, F. and Mare, D.S., 2014. Competition and financial stability in European cooperative banks. *Journal of International Money and Finance*, 45, pp.1-16.
- Francis, B.B., Hasan, I. and Wu, Q., 2012. Do corporate boards affect firm performance? New evidence from the financial crisis.
- Fungáčová, Z., Shamshur, A. and Weill, L., 2017. Does bank competition reduce cost of credit? Cross-country evidence from Europe. *Journal of Banking & Finance*, 83, pp.104-120.
- Furfine, C. H. 2001. Banks as monitors of other banks: Evidence from the overnight federal funds market. *The Journal of Business*, 74, 33-57.
- Gal-Or, E. (1985). Information sharing in oligopoly. *Econometrica: Journal of the Econometric Society*, 329-343.
- Gan, J., 2004. Banking market structure and financial stability: Evidence from the Texas real estate crisis in the 1980s, *Journal of Financial Economics* 73, 567-601.
- Gentzkow, M., & Shapiro, J. M. (2006). Media bias and reputation. *Journal of political economy*, 114(2), 280-316.
- Gertner, R., Gibbons, R., & Scharfstein, D. (1988). Simultaneous signalling to the capital and product markets. *The RAND Journal of Economics*, 173-190.
- Ghosh, A., Marra, A. & Moon, D. 2010. Corporate boards, audit committees, and earnings management: pre-and post-SOX evidence. *Journal of Business Finance & Accounting*, 37, 1145-1176.
- Gillan, S. L. & Starks, L. T. 2000. Corporate governance proposals and shareholder activism: The role of institutional investors. *Journal of financial Economics*, 57, 275-305.
- Giroud, X. & Mueller, H. M. 2010. Does corporate governance matter in competitive industries? *Journal of Financial Economics*, 95, 312-331.
- Goetz, M.R., 2017. Competition and bank stability. *Journal of Financial Intermediation*.
- Gompers, P., Ishii, J., & Metrick, A. (2003). Corporate Governance and Equity Prices. *The Quarterly Journal of Economics*, 107-155.
- Grove, H., Patelli, L., Victoravich, L. M. & XU, P. T. 2011. Corporate governance and performance in the wake of the financial crisis: Evidence from US commercial banks. *Corporate Governance: An International Review*, 19, 418-436.
- Gwartney, J., Lawson, R., and Norton, S., 2008. Economic freedom of the world 2008 annual report: The Fraser Institute.
- Hagendorff, J. 2014. Corporate governance in banking. *The Oxford Handbook of Banking*, 139.

- Hagendorff, J., Collins, M. and Keasey, K., 2010. Board monitoring, regulation, and performance in the banking industry: Evidence from the market for corporate control. *Corporate Governance: An International Review*, 18(5), pp.381-395.
- Hall, B. J. & Liebman, J. B. 1998. Are CEOs really paid like bureaucrats? *The Quarterly Journal of Economics*, 113, 653-691.
- Haniffa, R., Abdul Rahman, R. & Haneem Mohamed Ali, F. 2006. Board, audit committee, culture and earnings management: Malaysian evidence. *Managerial Auditing Journal*, 21, 783-804.
- Hansen, L.P., 1982. Large sample properties of generalized method of moments estimators. *Econometrica* 50, 1029-1054.
- Harris, M. S. (1998). The association between competition and managers' business segment reporting decisions. *Journal of Accounting Research*, 36(1), 111-128.
- Hart, O. D. (1983). The market mechanism as an incentive scheme. *The Bell Journal of Economics*, 366-382.
- Hellmann, T.F., Murdock, K.C., and Stiglitz, J.E., 2000. Liberalization, moral hazard in banking, and prudential regulation: Are capital requirements enough? *American Economic Review* 90, 147-165.
- Hermalin, B. E. & Weisbach, M. S. 2003. Boards of directors as an endogenously determined institution: a survey of the economic literature. *Economic Policy Review*, 7-26.
- Hong, H., & Kacperczyk, M. (2010). Competition and bias. *Quarterly Journal of Economics*, 125(4).
- Houston, J. F., Lin, C., Lin, P., and Ma, Y., 2010. Creditor rights, information sharing, and bank risk taking. *Journal of Financial Economics* 96, 485-512.
- Hribar, P., & Craig Nichols, D. (2007). The use of unsigned earnings quality measures in tests of earnings management. *Journal of Accounting Research*, 45(5), 1017-1053.
- Hutchison, M. and McDill, K., 1999. Are all banking crises alike? *Journal of the Japanese and International Economies*, 12(3), pp.155-180.
- Inderst, R., 2013. Prudence as a competitive advantage: On the effects of competition on banks' risk-taking incentives, *European Economic Review* 60, 127-143.
- Irvine, P. J., & Pontiff, J. (2009). Idiosyncratic return volatility, cash flows, and product market competition. *Review of Financial Studies*, 22(3), 1149-1177.
- Ivashina, V., Nair, V. B., Saunders, A., Massoud, N. & Stover, R. 2009. Bank debt and corporate governance. *Review of Financial Studies*, 22, 41-77.
- Jensen, M. C. 1993. The modern industrial revolution, exit, and the failure of internal control systems. *the Journal of Finance*, 48, 831-880.
- Jensen, M. C. & Meckling, W. H. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, 3, 305-360.
- Jensen, M. C. & Murphy, K. J. 1990. Performance pay and top-management incentives. *Journal of political economy*, 98, 225-264.
- Jiang, J. 2008. Beating earnings benchmarks and the cost of debt. *The Accounting Review*, 83, 377-416.
- Jiang, L., Levine, R. and Lin, C., 2016. Competition and bank opacity. *The Review of Financial Studies*, 29(7), pp.1911-1942.
- Jiménez, G., Lopez, J.A., and Saurina, J., 2013. How does competition affect bank risk-taking? *Journal of Financial Stability* 9, 185-195.
- Johnston, D. 2004. OECD Principles of Corporate Governance OECD.
- Karuna, C. (2007). Industry product market competition and managerial incentives. *Journal of Accounting and Economics*, 43(2), 275-297.

- Kedia, S. and Philippon, T., 2007. The economics of fraudulent accounting. *The Review of Financial Studies*, 22(6), pp.2169-2199.
- Keeley, M.C., 1990. Deposit insurance, risk, and market power in banking, *The American Economic Review* 80, 1183-1200.
- Kim, M.S. and Kross, W., 1998. The impact of the 1989 change in bank capital standards on loan loss provisions and loan write-offs. *Journal of Accounting and Economics*, 25(1), pp.69-99.
- Klein, A. 2002. Audit committee, board of director characteristics, and earnings management. *Journal of accounting and economics*, 33, 375-400.
- Kothari, S. P., Leone, A. J. & Wasley, C. E. 2005. Performance matched discretionary accrual measures. *Journal of accounting and economics*, 39, 163-197.
- Laeven, L., and Levine, R., 2009. Bank governance, regulation and risk taking, *Journal of Financial Economics* 93, 259-275.
- Larcker, D. F., Richardson, S. A. & Tuna, I. 2007. Corporate governance, accounting outcomes, and organizational performance. *The Accounting Review*, 82, 963-1008.
- Lasfer, M. A. 2006. The interrelationship between managerial ownership and board structure. *Journal of Business Finance & Accounting*, 33, 1006-1033.
- Lee, C.-C., and Hsieh, M.-F., 2013. Beyond bank competition and profitability: Can moral hazard tell us more? *Journal of Financial Services Research* 44, 87-109.
- Lepetit, L., and Strobel, F., 2013. Bank insolvency risk and time-varying Z-score measures, *Journal of International Financial Markets, Institutions and Money* 25, 73-87.
- Levine, R. The Corporate Governance of Banks.
- Lin, X. & Zhang, Y. 2009. Bank ownership reform and bank performance in China. *Journal of Banking & Finance*, 33, 20-29.
- Linck, J. S., Netter, J., & Shu, T. (2013). Can managers use discretionary accruals to ease financial constraints? evidence from discretionary accruals prior to investment. *The Accounting Review*, 88(6), 2117-2143.
- Lipton, M. & Lorsch, J. W. 1992. A modest proposal for improved corporate governance. *The business lawyer*, 59-77.
- Lisic, L. L., Neal, T. L., Zhang, I. X. & Zhang, Y. 2015. CEO Power, Internal Control Quality, and Audit Committee Effectiveness in Substance Versus in Form. *Contemporary Accounting Research*.
- Liu, H., and Wilson, J.O., 2013. Competition and risk in Japanese banking, *The European Journal of Finance* 19, 1-18.
- Lopez, T. J. & Rees, L. 2002. The effect of beating and missing analysts' forecasts on the information content of unexpected earnings. *Journal of Accounting, Auditing & Finance*, 17, 155-184.
- Männasoo, K. and Mayes, D.G., 2009. Explaining bank distress in Eastern European transition economies. *Journal of Banking & Finance*, 33(2), pp.244-253.
- Markarian, G. & Parbonetti, A. 2007. Firm complexity and board of director composition. *Corporate governance: an international review*, 15, 1224-1243.
- Martinez-Miera, D., and Repullo, R., 2010. Does competition reduce the risk of bank failure? *Review of Financial Studies* 23, 3638-3664.
- Matutes, C., and Vives, X., 1996. Competition for deposits, fragility, and insurance, *Journal of Financial Intermediation* 5, 184-216.
- Matutes, C., and Vives, X., 2000. Imperfect competition, risk taking, and regulation in banking, *European Economic Review* 44, 1-34.
- Mccahery, J. A., Sautner, Z. & Starks, L. T. 2016. Behind the scenes: The corporate governance preferences of institutional investors. *The Journal of Finance*.

- Mehran, H. 1992. Executive incentive plans, corporate control, and capital structure. *Journal of Financial and Quantitative analysis*, 539-560.
- Miles, M.A., Holmes, K. R., O' Grady, M.A., Eiras, A. I., Schaefer, B. D., and Kim, A. B., 2006. 2006 Index of economic freedom: Heritage Foundation.
- Milgrom, P. Roberts J., (1992) Economics, organization and management: Prentice Hall, New York.
- Mirzaei, A., Moore, T., and Liu, G., 2013. Does market structure matter on banks' profitability and stability? Emerging vs. advanced economies, *Journal of Banking and Finance* 37, 2920-2937.
- Mishra, C. S. & Nielsen, J. F. 2000. Board independence and compensation policies in large bank holding companies. *Financial Management*, 51-69.
- Mishkin, F.S., 1999. Financial consolidation: Dangers and opportunities. *Journal of Banking and Finance* 23, 675-691.
- Moch, N., 2013. Competition in fragmented markets: New evidence from the German banking industry in the light of the subprime crisis, *Journal of Banking and Finance* 37, 2908-2919.
- Mullainathan, S., & Shleifer, A. (2005). The market for news. *American economic review*, 1031-1053.
- Murphy, K. J. 1999. Executive compensation. *Handbook of labor economics*, 3, 2485-2563.
- Narayanan, M. (1985). Managerial incentives for short-term results. *The Journal of finance*, 40(5), 1469-1484.
- Nevo, A. (2001). Measuring market power in the ready-to-eat cereal industry. *Econometrica*, 69(2), 307-342.
- O'connor, J. P., Priem, R. L., Coombs, J. E. & Gilley, K. M. 2006. Do CEO stock options prevent or promote fraudulent financial reporting? *Academy of Management Journal*, 49, 483-500.
- Panzar, J.C. and Rosse, J.N., 1987. Testing for "monopoly" equilibrium. *The journal of industrial economics*, pp.443-456.
- Pathan, S. 2009. Strong boards, CEO power and bank risk-taking. *Journal of Banking & Finance*, 33, 1340-1350.
- Pathan, S. & Faff, R. 2013. Does board structure in banks really affect their performance? *Journal of Banking & Finance*, 37, 1573-1589.
- Pathan, S. and Skully, M., 2010. Endogenously structured boards of directors in banks. *Journal of Banking & Finance*, 34(7), pp.1590-1606.
- Peasnell, K. V., Pope, P. F. & Young, S. 2005. Board monitoring and earnings management: Do outside directors influence abnormal accruals? *Journal of Business Finance & Accounting*, 32, 1311-1346.
- Peng, L. & Roell, A. 2008. Executive pay and shareholder litigation. *Review of Finance*, 12, 141-184.
- Pfeffer, J. 1972. Size and composition of corporate boards of directors: The organization and its environment. *Administrative science quarterly*, 218-228.
- Prowse, S. D. 1995. Alternative methods of corporate control in commercial banks. *Economic Review-Federal Reserve Bank of Dallas*, 24.
- Raith, M. (2003). Competition, Risk, and Managerial Incentives. *American economic review*, 93(4), 1425-1436.
- Repullo, R., 2004. Capital requirements, market power, and risk-taking in banking, *Journal of Financial Intermediation* 13, 156-182.
- Sarbanes, P. Sarbanes-oxley act of 2002. The Public Company Accounting Reform and Investor Protection Act. Washington DC: US Congress, 2002.

- Schaeck, K., and Cihák, M., 2012. Banking competition and capital ratios, *European Financial Management* 18, 836-866.
- Schaeck, K., and Cihák, M., 2014. Competition, efficiency, and stability in banking, *Financial Management* 43, 215-241.
- Schaeck, K., Cihák, M., and Wolfe, S., 2009. Are competitive banking systems more stable? *Journal of Money, Credit and Banking* 41, 711-734.
- Schmidt, K. M. (1997). Managerial incentives and product market competition. *The Review of Economic Studies*, 64(2), 191-213.
- Shleifer, A. (2004). Does Competition Destroy Ethical Behavior? *American economic review*, 94(2), 414-418.
- Shleifer, A. & Vishny, R. W. 1997. A survey of corporate governance. *The journal of finance*, 52, 737-783.
- Smith, A. (1776). An Inquiry into the Nature and Causes of the Wealth of Nations.
- Smith, B.D., 1984. Private information, deposit interest rates, and the 'stability' of the banking system, *Journal of Monetary Economics* 14, 293-317.
- Smith, B.D., 1984. Private information, deposit interest rates, and the 'stability' of the banking system, *Journal of Monetary Economics* 14, 293-317.
- Stein, J. C. 1988. Takeover threats and managerial myopia. *The Journal of Political Economy*, 61-80.
- Stiglitz, J. E., and Weiss, A., 1981. Credit rationing in markets with imperfect information, *The American Economic Review* 71, 393-410.
- Strahan, P., 2008. Liquidity Production in 21st Century Banking. National Bureau of Economic Research.
- Sutton, J. (1991). *Sunk costs and market structure: Price competition, advertising, and the evolution of concentration*: MIT press.
- Tabak, B.M., Fazio, D.M. and Cajueiro, D.O., 2013. Systemically important banks and financial stability: The case of Latin America. *Journal of Banking & Finance*, 37(10), pp.3855-3866.
- Tanna, S., Pasiouras, F. & Nnadi, M. 2011. The effect of board size and composition on the efficiency of UK banks. *International Journal of the Economics of Business*, 18, 441-462.
- Turk Ariss, R., 2010. On the implications of market power in banking: Evidence from developing countries, *Journal of Banking and Finance* 34, 765-775.
- Vafeas, N. 2000. Board structure and the informativeness of earnings. *Journal of Accounting and Public policy*, 19, 139-160.
- Vallascas, F. & Hagendorff, J. 2013. CEO bonus compensation and bank default risk: evidence from the US and Europe. *Financial Markets, Institutions & Instruments*, 22, 47-89.
- Valta, P., & Frésard, L. (2012). *Competitive Pressure and Corporate Policies*. Paper presented at the 4th Paris Spring Corporate Finance Conference.
- Verrecchia, R. E. (1999). Disclosure and the cost of capital: A discussion. *Journal of Accounting and Economics*, 26(1), 271-283.
- Verrecchia, R. E. (1983). Discretionary disclosure. *Journal of Accounting and Economics*, 5, 179-194.
- Verrecchia, R. E. (1990). Endogenous proprietary costs through firm interdependence. *Journal of Accounting and Economics*, 12(1), 245-250.
- Verrecchia, R. E., & Weber, J. (2006). Redacted disclosure. *Journal of Accounting Research*, 44(4), 791-814.
- Vives, X. (2008). Innovation and competitive pressure. *The Journal of Industrial Economics*, 56(3), 419-469.

- Von Thadden, E.-L. (1995). Long-term contracts, short-term investment and monitoring. *The Review of Economic Studies*, 62(4), 557-575.
- Wagner, W., 2010. Loan market competition and bank risk-taking. *Journal of Financial Services Research* 37, 71-81.
- Wagenhofer, A. (1990). Voluntary disclosure with a strategic opponent. *Journal of Accounting and Economics*, 12(4), 341-363.
- Westphal, J. D. 1999. Collaboration in the boardroom: Behavioral and performance consequences of CEO-board social ties. *Academy of Management Journal*, 42, 7-24.
- Windmeijer, F. 2005. A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of econometrics*, 126, 25-51.
- Wintoki, M.B., Linck, J.S. and Netter, J.M., 2012. Endogeneity and the dynamics of internal corporate governance. *Journal of Financial Economics*, 105(3), pp.581-606.
- Wiseman, R. M. & Gomez-Mejia, L. R. 1998. A behavioral agency model of managerial risk taking. *Academy of management Review*, 23, 133-153.
- Xie, B., Davidson, W. N. & Dadalt, P. J. 2003. Earnings management and corporate governance: the role of the board and the audit committee. *Journal of corporate finance*, 9, 295-316.
- Yermack, D. 1996. Higher market valuation of companies with a small board of directors. *Journal of financial economics*, 40, 185-211.
- Zhou, J. and Chen, K.Y., 2004. Audit committee, board characteristics and earnings management by commercial banks. *Unpublished Manuscript*.
- Zhao, Y. & Chen, K. H. 2008. Staggered boards and earnings management. *The Accounting Review*, 83, 1347-1381.