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An Investigation into Loan Loss Provisioning Practices at U.S. Bank Holding Companies and the Impact of Corporate Governance Mechanisms

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Abstract

Loan loss provisions in banks are set aside to face a future deterioration of credit portfolio quality and are one of the main accrual expenses for banks. In the United States, the estimation of loan loss provisions is governed by the Generally Accepted Accounting Principles which have been a target for criticism by regulators, governments and academics. This thesis examines the two main caveats of these accounting standards; the discretion embedded in the estimation and timing of certain loan losses and the inherent procyclicality of loan loss provisions as their implications can damage shareholder value and compromise the ability of banks to absorb expected credit losses. Pertaining to the discretion bank managers can exercise over the estimation and timing of loan losses, the thesis re-examines the hypotheses of prior research which postulate that loan loss provisions are affected by income smoothing, capital management and signalling incentives. In addition, motivated by current debates, the thesis also investigates whether loan loss provisions are procyclical; banks delay provisioning for bad loans until too late when a cyclical downturn has already set in, thereby magnifying the impact of the economic cycle on banks' income and capital. The thesis implements a dynamic generalised method of moments estimator in a panel of 675 publicly traded U.S. bank holding companies over a period from 2002 to 2016- to account for unobserved heterogeneity and endogeneity- evidence in support of procyclicality, earnings management, capital management and signalling is found.

These results are then taken, along with the global economic crisis, to investigate the role of corporate governance at banks. Specifically, on whether corporate governance practices promoted in the non-regulated and non-financial industries can also effectively enhance the governance of banking firms and the role of these corporate governance mechanisms in motivating earnings management. Motivated by the lack of empirical research on the impact

of corporate governance mechanisms in the banking industry, the thesis investigates earnings manipulation with respect to both corporate governance oversight and executive compensation incentives. A measure for management discretion is developed and a two-stage analysis is used to address endogeneity concerns by employing a sample of 72 publicly traded U.S. bank holding companies over a period from 2006 to 2016. The number of board and audit committee meetings, CEO/Chair duality and institutional ownership concentration are found to be associated with income-increasing earnings management. It is found that board independence has no effect on earnings management whereas option-based compensation incentivises earnings management only when the proportion of the value of stock options to total compensation is sufficiently high. Overall, this research significantly adds to the narrow, yet growing literature regarding the interaction among executive compensation, board structure, and earnings management and suggests that "good governance" does not necessarily have to be in the best interest of shareholders.

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1 INTRODUCTION

1.1 Overview

This introductory chapter aims to set the context for this study investigating the loan loss provisioning practices at U.S. bank holding companies and the impact of corporate governance mechanisms. This includes describing the background to, and motivation for the research; describing the research objectives; and outlining the structure of the rest of the thesis.

1.2 Background & Research Objectives

This study investigates the manipulation and procyclicality of loan loss provisions. Loans compose the majority of a bank's assets thus, loans on a bank's balance sheet as the amount of funds lent without an adjustment for expected but uncertain future losses would mislead the bank's board of directors, creditors, regulators, and investors by overstating the bank's assets (Walter, 1991). Ideally, the value of assets reported in the balance sheet should reflect the portion of loans that will be collected. It is difficult, however, for a bank's management to determine which loans will not be repaid. As a result, banks set aside a provision for loan losses, recognised as an expense item in the income statement, to offset future losses on outstanding loans (Balla *et al.*, 2012). Most importantly, loan loss provisioning is a key accounting choice that directly influences the volatility and cyclicality of bank earnings, as well as information properties of a bank's financial reports with respect to reflecting loan portfolios' risk attributes (Bushman and Williams, 2012). Also, banks are highly leveraged (debt-financed) institutions which makes them vulnerable to volatility in asset values, prompting adequate loan loss provisions, which being the banks' main accrual has important effects on overall bank stability (Fonseca and González, 2008). However, in the context of the United States banking sector, the attributes and purpose of loan loss provisions can be compromised if bank managers exploit the discretion granted to them by the Generally Accepted Accounting Principles in determining the amount of provisions. This thesis examines the two main caveats of these accounting principles; the discretion embedded in the estimation and timing of certain loan losses and the inherent procyclicality of loan loss provisions as their implications can damage shareholder value and compromise the ability of banks to absorb expected credit losses.

Regarding the discretion bank managers can exercise over the estimation and timing of loan losses, the thesis revisits the hypotheses of prior research which postulates that loan loss provisions are affected by income smoothing, capital management and signalling incentives. The implication of these practices is that it deepens the information asymmetry between management and outside stakeholders such as creditors, shareholders, and regulators - potentially elevating social costs (Elyasiani *et al*., 2017). Also, this accrual expense may not reflect a fair representation of the expected evolution of a bank's loan losses which would obscure the objectivity and comparability of financial statements to facilitate bank monitoring (Balla and Rose, 2015).

Nonetheless, absent of managers' opportunistic behaviour, current accounting standards require an "incurred loss" methodology for recognising credit losses which delays recognition until it is probable a loss has been incurred and this is the second caveat. This methodology has been criticised for restricting the bank's ability to record credit losses that are expected, but do not yet meet the "probable" threshold (FASB, n.d.). The global financial crisis of 2007 underscored these concerns. The massive losses hitting banks' loan portfolios amidst the financial crisis sparked a debate among G20 leaders at their April 2009 summit over the backward-looking loan loss provisioning standards (El Sood, 2012). More specifically, from a regulatory perspective, the focus has been on whether loan loss provisions are adequate to cover expected credit losses over the life of the loan with emphasis being placed on the ability of banks to maintain solvency through changing economic environments. Thus, adequate provisioning is a safety and soundness issue because a deficit in loan loss provisions and subsequently loan loss reserves implies that the bank's capital ratios overstate its ability to absorb unexpected losses. As a result, the Basel Committee on Banking Supervision (2011) formally encouraged accounting regulatory bodies to pursue a forward-looking loan loss provisioning methodology whereby bank managers would be permitted to incorporate into their loan loss provisioning expectations about future losses due to changes in economic conditions that affect credit defaults - even if no event had yet occurred to indicate specific estimable losses. The tension between objective but backward-looking historical data on the one hand and subjective but forward-looking expectations on the other reflects a trade-off between two laudable goals, transparency of financial statements and safety and soundness (Balla and Rose, 2015). Thus, motivated by the exacerbating debate on loan loss provisioning amidst the financial crisis of 2007, the thesis investigates whether loan loss provisions of U.S. bank holding companies are affected by income smoothing incentives during the period 2002-

2016. Further, the thesis builds on prior research by examining whether income smoothing behaviour through loan loss provisions has changed, during the financial crisis of 2007-2009. The respective hypotheses are as follows:

H1a. The relationship between loan loss provisions and earnings before provisions and taxes will be positive in the period 2002-2016.

H1b. A negative relationship or a larger magnitude in the positive relationship between loan loss provisions and earnings before provisions and taxes is expected during the 2007-2009 financial crisis period compared to the pre- and post-crisis periods.

The provision for loan losses can also be used as a tool for capital management and to signal the financial strength of the bank. The hypotheses put forth to test these opportunistic objectives are as follows:

H2. Loan loss provisions are positively related to one-year ahead changes in earnings before loan loss provisions and taxes in the period 2002-2016.

H3. The relationship between loan loss provisions and the Tier I ratio will be positive in the period 2002-2016.

Pertinent to the criticisms of the existing objective but backward-looking "incurred loss" methodology for provisioning the thesis investigates whether loan loss provisions are procyclical; banks delay provisioning for bad loans until too late when a cyclical downturn has already set in, thereby magnifying the impact of the economic cycle on banks' income and capital (Laeven and Majnoni, 2003). By testing for the procyclicality of loan loss provisioning, the thesis aims to provide preliminary evidence in support of the issuance of the Accounting Standards Update No. 2016-13 in the United States under which expected credit losses are estimated using forward-looking information and are due to be implemented in year 2020. Thus, the procyclicality hypothesis is as follows:

H4. Loan loss provisions are expected to be negatively related with the annual growth in gross domestic product in the period 2002-2016.

To test these hypotheses, building on prior U.S. research which employ a static empirical model, a dynamic generalised method of moments estimator in a panel of 675 publicly traded U.S. bank holding companies over a period from 2002 to 2016 is employed. The purpose of

employing a dynamic panel data model is to account for unobserved heterogeneity, the endogeneity of explanatory variables and the dynamic adjustment of loan loss provisions.

Evidence in support of procyclicality and income decreasing earnings management during the financial crisis period supports the initiative of the Financial Accounting Standards Board to implement a new set of accounting standards under which expected credit losses are estimated using forward-looking information. Evidently, these accounting standards will explicitly permit managers to exercise their discretion over the estimation of loan loss provisions. Further, evidence in support of Tier I capital management suggests that managers may capitalise on the flexibility granted to them by these new accounting standards. However, the more stringent capital requirements of Basel III- which are in the process of being implemented- are expected to mitigate this incentive.

In addition, the role of executive compensation structures during the 2007 financial crisis in particular, have attracted increased academic and regulatory attention. Even though the principal role of financial reporting is to provide bank managers with a reliable means of signalling information regarding the bank's performance, it can often become intertwined with the executives' willingness to maximise their own compensation (Sun, 2014). Consequently, such motives can lead to earnings management practices which are widely defined as the managers' 'use of judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers' (Healy and Wahlen, 1999, p.368). According to the Securities and Exchange Commission (2000) final rule, earnings management is defined as 'the practice of distorting the true financial performance of a firm.'

It is of vital importance to clarify that the thesis does not focus on banks accused of fraudulently misstating earnings. As a matter of fact, earnings management, accounting restatements and fraud may have common traits but are different, nonetheless. According to Erickson *et al*. (2006), fraud and earnings management differ in that the latter can be within or outside of the Generally Accepted Accounting Principles whereas fraudulent accounting is always outside of the Generally Accepted Accounting Principles. Thus, the thesis focuses on earnings management that is practised within the Generally Accepted Accounting Principles and not fraudulent accounting.

As discussed previously, earnings management through loan loss provisions can take the form of income smoothing. This thesis builds on the notion of earnings management by investigating the impact corporate governance mechanisms, namely, option-based executive compensation, board structure and function and institutional ownership, have on the manipulation of loan loss provisions. In fact, reliable accounting standards are critical in ensuring the proper oversight of management. The board of directors uses this information to structure appropriate compensation incentives and award bonuses. Thus, if accounting standards lack transparency or if management manipulates their application, financial reporting will suffer, compensation incentives will be distorted and shareholders and stakeholders will be less effective in providing oversight and detecting agency problems (Larcker and Tayan, 2016).

Nonetheless, most empirical research studies investigating the impact of corporate governance mechanisms on earnings management exclude financial institutions because of the complication effects of regulations, high leverage, opacity, and the uniqueness of bank financials (Mehran *et al.*, 2011). However, these bank features do not preclude earnings management; they may even encourage it (Elyasiani *et al.*, 2017). Also, most studies investigating this topic and employed a sample of U.S. banks, study a time period that does not capture the impact of the 2007-2009 recessionary period. According to Adams and Mehran (2012), it has never been as important to investigate the effectiveness of the corporate governance mechanisms of banks following the subprime mortgage crisis. Indeed, the OECD Steering Group on Corporate Governance claims that board failures in financial institutions are a major cause of the financial crisis (Kirkpatrick, 2009). Therefore, the increased scrutiny of board governance in banks following the global financial crisis and certain regulatory reforms motivate the investigation of whether corporate governance mechanisms affect the extent to which bank managers engage in earnings management practices.

Further, Macey and O'Hara (2003) argue that governance structures are industry specific and specifically, that there are systematic differences between the corporate governance of banks and manufacturing firms which provides an additional impetus for this research. More specifically, many corporate governance reforms such as the Sarbanes-Oxley Act of 2002 and the NYSE and NASDAQ exchange listing rules have a "one-size-fits-all" approach (Adams and Mehran, 2012). Therefore, the effectiveness of corporate governance mechanisms in banks can be challenged as policymakers do not take into account the opaqueness, high leverage and the tight regulatory nature of their activities which makes them different from non-financial firms (Levine, 2004). Subsequently, 'governance arrangements that do not sufficiently take the

unique features of banks into account risk exacerbating existing agency conflicts that may have contributed to excessive risk-taking by banks before the recent crisis' (Hagendorff, 2010, p.140). As a result, the extent to which the corporate governance mechanisms of banks are effective in constraining earnings management practices can be challenged.

This research investigates earnings management with respect to both corporate governance oversight and executive compensation incentives. In detail, option-based executive compensation is considered to be a fundamental determinant of earnings management as 'one way managers can influence the stock price is to manipulate reported performance' (Baker *et al*., 2003, p.558). Thus, the hypothesis is as follows:

H1. The value of option-based compensation relative to total compensation is associated with higher levels of earnings management and the under-reporting of discretionary loan loss provisions in the period 2006-2016.

In addition, an effective board of directors can determine the legitimacy of accounting practices made by the management and, overall, the effectiveness of a board depends on its composition and other criteria (NYSE, 2002). Thus, in order to investigate the effectiveness of bank's governance in constraining earnings management the three main criteria which are considered are: board independence, the number of board meetings and CEO/Chairman duality. The respective hypotheses are as follows:

H2. Greater board oversight as measured by board independence leads to lower levels of earnings management and is associated with over-reporting of discretionary loan loss provisions in the period 2006-2016.

H3. Frequent board meetings are associated with lower levels of earnings management and over-reporting of discretionary loan loss provisions in the period 2006-2016.

H4. CEO duality is associated with higher levels of earnings management and the under-reporting of discretionary loan loss provisions in the period 2006-2016.

Lastly, institutional ownership is an important mechanism for mitigating agency costs because of institutional investors' stake and voting power in the bank gives them the incentive and the ability to influence managerial behaviour (Jensen and Meckling 1976, Shleifer and Vishny 1986; Bai and Elyaisiani, 2013). However, Booth *et al.* (2002) and Elyasiani and Jia (2008) claim that in the context of the banking sector, the relationship between regulation and market

discipline is one of substitution rather than complementarity implying less monitoring by institutional investors. Based on these divergent perspectives, the hypothesis is as follows:

H5. Greater institutional ownership concentration is high, institutional ownership is associated with higher levels of earnings management and the underreporting of discretionary loan loss provisions for the period 2006-2016.

To test these hypotheses, a measure for management discretion is developed and then a two-stage analysis is used to address endogeneity concerns by employing a sample of 72 publicly traded U.S. bank holding companies over a period from 2006 to 2016. The number of board and audit committee meetings, CEO/Chair duality and institutional ownership concentration are found to be associated with income-increasing earnings management. Board independence has no effect on earnings management whereas option-based compensation incentivises earnings management only when the proportion of the value of stock options to total compensation is sufficiently high.

Thus, corporate governance mechanisms in banking do not seem to achieve their intended objective which is to align the interests of bank managers with the interests of the shareholders (Jensen and Meckling, 1976). This implies that corporate governance reforms should take the unique features of banks into account and compensation committees should consider providing executive officers with compensation contracts which are not considerably reliant on a bank's performance. Overall, this research significantly adds to the narrow, yet growing literature regarding the interaction among executive compensation, board structure, and earnings management. Specifically, the evidence presented in this chapter will provide a more comprehensive understanding of earnings management and the motivations behind this. Further, the practice of earnings management reduces the comparability and transparency of financial statements which in the long-run can damage shareholder value (Scott, 2015). Thus, the findings of this research discuss the practical implications of the FASB initiative to implement a new set of accounting standards under which expected credit losses are estimated using forward-looking information. Specifically, this reform may in fact encourage earnings management by bank managers so that they can achieve their personal objectives. Most importantly, this research will be of value to policymakers as the thesis provides evidence in support of the need for regulatory authorities to introduce distinct corporate governance reforms and requirements for banks.

1.3 Thesis structure

The thesis is structured in three main parts.

The first part (Chapter 2) aims to provide the context in which the empirical research of Chapters 3 and 4 will be based on. More specifically, a financial ratio analysis of the U.S. banking sector is conducted by focusing on the assessment of the capital adequacy and asset quality indicators of publicly traded bank holding companies for the period 2000-2016. This chapter will demonstrate: (i) contextualisation of the impact of economic developments on the banking sector and (ii) the unique features of banks which warrant a separate analysis in terms of assessing the effectiveness of corporate governance mechanisms on banks.

The second part (Chapter 3) examines the use of loan loss provisions as a tool for income smoothing, signalling and capital management. In addition, the extent to which income smoothing practices are more prominent during periods of financial distress and whether loan loss provisions are procyclical are investigated. Once the related empirical research is reviewed and the hypotheses are presented, Chapter 3 proceeds with the discussion of the empirical methods and model specifications used to estimate the determinants of loan loss provisions. Finally, the empirical findings are presented, and a thorough analysis of the main findings and their practical implications are provided.

The third part (Chapter 4) builds on the finding of earnings management in Chapter 3. This part focuses on exploring the effects of corporate governance mechanisms on the use of loan loss provisions to manage reported earnings. More specifically, the corporate governance mechanisms are option-based compensation, board structure and function and institutional ownership concentration. Thus, the respective hypotheses are developed, and the related empirical research is presented. Then, the sampling procedure is outlined which is followed by the methodology used to decompose loan loss provisions to its discretionary and non-discretionary components. The discretionary loan loss provisions are then regressed against the corporate governance variables and the empirical results of the two-stage least squares regressions are presented. The final section of this chapter provides a discussion of the main findings and their policy implications.

Chapter 5 draws together the research findings and summarises their contribution. It also reflects on the practical implications of the findings on academic research, accounting standard setters, regulators and financial institutions.

2 AN ANALYSIS OF THE U.S. BANKING SECTOR

2.1 Introduction

The financial services industry in the United States is composed of financial intermediaries whose economic function is integral to the financial stability of its economy. Thus, it is of paramount importance to understand the functions financial intermediaries perform and establish a rationale for their existence first, given the instrumental role they play within the financial system that cause them to be singled out for special regulatory attention (Saunders and Cornett, 2008). Indeed, the overarching aim of the thesis is to investigate the impact of regulation and governance on bank operations. That is, to investigate whether managers of U.S. bank holding companies use a key accrual expense namely, loan loss provisions, as a tool for signalling, capital and earnings management and assess whether certain corporate governance mechanisms, accounting standards and regulatory capital requirements facilitate its manipulation. Therefore, in this chapter the main theories and functions of financial intermediation are presented first in order to demonstrate the importance and uniqueness of financial institutions. Then, bank operations are examined by analysing the composition of the banks' financial statements as these will form the basis of the subsequent analysis of key financial ratios. The financial ratio analysis is based on indicators of capital adequacy and asset quality of banks[1] and entails: (i) a discussion of the corporate governance implications of a highly leveraged banking sector, (ii) an assessment of the effects of the 2007 financial crisis on the structure and evolution of the U.S. banking industry and (iii) the components of financial ratios that will be utilised in the empirical analyses of Chapters 3 and 4 and facilitate the interpretation of their main findings.

2.2 What Do Banks Do?

Financial intermediaries perform the essential function of channelling funds from those with surplus funds to those with shortages of funds while transforming the attributes of the financial claims held by the suppliers of funds in the process (Greenbaum and Thakor, 2007). As

[1] The reason for focusing on these two components of financial ratio analysis is that they are interlinked; loan loss provisions and loan loss reserves compose regulatory capital. Thus, loan loss provisions can be utilised to manage capital levels which may compromise the banks' ability to absorb anticipated and unanticipated losses. In addition, this analysis will highlight the implications of the "incurred loss" methodology of loan loss provisioning.

explained by Niehans (1978), when the financial intermediary is perfectly hedged it acts exclusively as a "broker" and brings together borrowers and lenders without assuming any risk. However, when the financial intermediary modifies certain attributes of financial claims they are referred to as "asset-transformers."

2.2.1 Brokerage

As a broker, the financial intermediary acts as the investor's agent by providing information and transaction services but does not purchase any financial assets from its clients or issue financial assets to them (Dowd, 1996). Thus, the competitive advantage of the broker in providing information lies in its expertise in assessing a client's prospective investment by interpreting signals which are not readily observable (Greenbaum and Thakor, 2007). However, as information is an intangible service whose reliability is unmeasurable, the intermediary's compensation is based on how well its predictions have performed relative to the subsequent observed events (Ramakrishnan and Thakor, 1984). Therefore, future demand for its services will depend upon its established reputation. Furthermore, brokers have the advantage of information reusability both across customers and through time thus avoiding duplication of information (Bhattacharya and Thakor, 1993). Overall, in fulfilling a brokerage function, the financial intermediary plays an exceptionally important role by reducing transaction and information costs as well as informational asymmetries between investors and borrowers. As a result, the financial intermediary encourages a higher rate of savings than would otherwise exist (Saunders and Cornett, 2008). Nevertheless, financial intermediaries perform activities beyond that of a broker as they hold assets and provide liabilities (Dowd, 1996). Consequently, they become asset transformers and this function is explained next.

2.2.2 Qualitative Asset Transformation

As stated earlier, financial intermediaries perform the essential function of channelling funds from those with surplus funds such as depositors to those with shortages of funds such as borrowers. Specifically, the former composes the liabilities of a financial intermediary's balance sheet whereas the latter composes its assets. However, financial intermediaries transform the attributes of their liabilities as they become assets in terms of maturity, liquidity, risk and size and for this reason they are referred to as asset transformers (Webb, 2013).

First, the intermediary will shorten the maturity of its liabilities by holding assets of a relatively longer duration (Greenbaum and Thakor, 2007). Thus, they complement the needs of lenders who may demand immediate withdrawal of their deposits and the need of lenders to borrow for a long period of time (Webb, 2013). Secondly, it will finance illiquid assets which are inherently costly to convert into cash with liquid liabilities (Bhattacharya and Thakor, 1993). Thirdly, it holds assets that are more likely to default relative to its liabilities hence shifting risk from the depositor to the financial institution (Greenbaum and Thakor, 2007). Lastly, it will accumulate a large number of small amounts of funds from depositors and transform them into large amounts required by borrowers (Webb, 2013). Generally, whatever the form of asset transformation, a mismatched balance sheet implies the acceptance of some form of risk exposure and financial intermediaries can manage this risk by diversifying it, shifting the risk to others for example, through future or forward contracts or passively accept this exposure (Greenbaum and Thakor, 2007).

Overall, a financial intermediary can specialise in one or the other or both functions simultaneously (Saunders and Cornett, 2008). However, merely understanding the functions of financial intermediaries is not sufficient in appreciating their economic importance. Therefore, it is necessary to examine the main theories of financial intermediation which provide a rationale for their existence in order to establish their instrumental role within an economy and lay the foundation for the subsequent empirical analyses.

2.3 Why Do Financial Intermediaries Exist?

In an economy with perfect certainty and the absence of any transaction costs, as presented in the traditional Arrow and Debreu (1954) model of resource allocation, there would be no need for financial intermediaries. Consequently, deviations from this idealised economy create a role for financial intermediaries (Chant, 1992). Specifically, each financial intermediation theory focuses on a different set of market imperfections which cause the emergence of financial intermediaries. In the following discussion of each theory, it will be made evident that the complications that exist between borrowers and lenders cannot be resolved in a mutually beneficial way through a direct contact between these parties and consequently ‘an intermediary can then produce an outcome superior to any that could be obtained without it’ (Dowd, 1996, p.114).

2.3.1 Transaction & Search Costs

'The *raison d' être* for this industry [financial intermediation] is the existence of transactions costs' (Benston and Smith, 1976, p.215). Following this perspective, financial intermediaries have access to superior technology for overcoming transaction costs (Freixas and Rochet, 2008). This notion was first established in the seminal work of Gurley and Shaw (1960) who stated that 'financial intermediaries exploit economies of scale in lending and borrowing. On the lending side the intermediary can invest and manage investment in primary securities [debt and equity] at unit costs far below the experience of individual lenders' (p.194). Thus, financial intermediaries can reduce transaction costs by reducing the total number of transactions required and by offering standardised terms on which they are prepared to conduct business (Benston and Smith, 1976). Nonetheless, recent advances in information communication technology as well as the related development of sophisticated financial instruments, imply that the existence of financial intermediaries should be threatened if another more fundamental form of transaction costs were not present (Allen and Santomero, 1998; 2001; Freixas and Rochet, 2008). Indeed, various technological and financial innovations have been widespread and intensively adopted by the United States banking industry (Feng and Serletis, 2008). These include, but are not limited to, information processing and telecommunication technologies, the securitisation and sale of bank loans, and the development of derivatives markets. Most importantly, the intensive use of information technologies and financial innovation has facilitated the rapid transfer of information at low cost, increased the scope and volume of non-traditional activities, and helped facilitate the consolidation of the banking industry (Berger, 2003). Further, 'financial intermediaries continue to thrive in informationally-advanced economies like the U.S.' (Coval and Thakor, 2005, p.536). Thus, according to Bhattacharya and Thakor (1993), 'informational asymmetries are the most basic form of transaction costs and thus information-based theories of intermediation provide a more fundamental interpretation of the existence of financial intermediaries' and these are discussed next (p.8).

2.3.2 Asymmetric Information

Information asymmetry arises when borrowers generally know more about their investment projects than lenders do thus generating market imperfections (Akerlof, 1970). These asymmetries can be of an *ex-ante* nature, generating adverse selection, they can be interim, generating moral hazard, and they can be of an *ex-post* nature, resulting in auditing or costly

state verification and enforcement (Scholtens and Wensveen, 2003). [2] Subsequently, considering frictions that relate to the information lenders possess on their investment, numerous authors have stressed the role of asymmetric information as an alternative rationalisation for the importance of intermediaries.

2.3.2.1 Adverse Selection & Signalling

Leland and Pyle (1977) suggest that financial intermediaries are a natural response to the existence of *ex-ante* asymmetric information. In the context of financial intermediaries, the authors observe classes of assets such as mortgages for which it is possible to obtain private information by expending resources. An economic agent, by evaluating mortgage applicants, for example, can obtain an extensive documentation of their financial situation. Most importantly, in the presence of economies of scale it may be beneficial to create coalitions of borrowers who specialise in collecting information about particular asset types (Leland and Pyle, 1977). However, reselling this information to ultimate lenders can be problematic and even prevent economic agents from producing such information for the following reasons.

Firstly, given information is a public good, the appropriability problem posits that purchasers of information can sell or share the information with other agents without necessarily diminishing its usefulness to themselves (Gorton and Winton, 2003). As a result, the returns to producing the information could not be captured by the information producer. Secondly, the reliability problem, originally identified by Hirshleifer (1971), may arise as it would be impossible for the information producer to credibly ensure that the information produced is credible. In other words, adverse selection exists.

According to the theoretical model developed by Leland and Pyle (1977), both problems can be overcome if the information gathering agency becomes an intermediary by buying and holding assets on its own balance sheet based on its specialised information and ability to assess credit risk; the risk that borrowers will default on their loan. In this case, the returns to information collection will be privatised thus, solving the appropriability problem. With regards to the reliability problem, the financial intermediary can signal its informed status by

[2] An *ex-ante* information asymmetry arises when lenders cannot differentiate between borrowers with different credit risks before providing loans and leads to an adverse selection problem. Information asymmetry occurs *interim* when only borrowers, but not lenders, can observe actual returns after project completion consequently leading to a moral hazard problem. *Ex-post* verification costs are costs of assessing the eventual productivity of an investment once that investment has been identified.

investing its wealth in assets about which it has specialised knowledge. Alternatively, financial intermediaries can signal information on their credit risk assessment and informed status through an increase in loan loss provisions on the income statement. Beaver *et al*. (1989) suggest that an increase in loan loss provisions can indicate that the management recognises the strength of its earnings which in turn enables the financial intermediary to withstand a "hit to its earnings" in the form of additional loan loss provisions. Thus, in line with this reasoning, an increase in loan loss provisions conveys a "good news" signal about the strength of a bank's future earnings and asset quality and this is empirically investigated in Chapter 3. However, Leland and Pyle (1977) found that diversification increases the average signalling cost per project which is counter-intuitive (Bhattacharya and Thakor, 1993). Thus, elaborating on Leland and Pyle's (1977) model, Diamond (1984) demonstrated the value of diversification in reducing signalling costs as a means of justifying the existence of financial intermediaries.

Additionally, Diamond (1984) extended the rationale of informational asymmetries and developed a theory of financial intermediation which suggests financial intermediaries have a comparative advantage in monitoring borrowers on behalf of lenders thus alleviating information asymmetries of an *ex-post* nature.

2.3.2.2 Delegated monitoring

Diamond (1984) developed a model where the financial intermediary is an asset transformer as it provides its depositors a riskless claim while lending to risky entrepreneurs. Diamond (1984) developed a model in which the outcome from a firm's investment project is not known *ex-post* to external agents, unless information is gathered to assess the outcome (Townsend, 1979). This leads to a moral hazard problem because it provides an incentive for borrowers to default on a loan even when the project is successful. As a result, in Diamond's model, intermediaries are delegated the costly task of monitoring loan contracts (1984). Thus, the optimal contract structure -the one that minimises the delegation costs- is a two-sided debt contract comprised of a contract issued to intermediaries by the borrowers that they fund (bank loans) and a contract issued by intermediaries when they borrow from investors (bank deposits). The fact that the intermediary issues debt to its investors means that it receives the maximum return from its monitoring activity which in turn acts as an incentive to monitor (Dowd, 1996).

Overall, it can be deduced that the financial intermediaries' lending function is thought to involve the financing of non-marketable assets and is expected to perform the following functions: hold loans until maturity, monitor them until matured and guarantee them as well (Dowd, 1996). However, this process has been distorted in the quest of banks to reduce credit risk and the emergence of loan sales and securitisation led to the separation of these functions. Loan sales and securitisation entail the advantage of circumventing regulatory constraints by removing the loans from the asset portfolio and given the corresponding liability is liquidated in the balance sheet, reserve requirements are also avoided as explained in more detail in the financial ratio analysis in section 2.5.1 (Dowd, 1996; Saunders and Cornett, 2008). Pertinent to the reserve requirements and loan loss provisioning, off-balance-sheet assets may inhibit the accounting of expected loan losses from loans with high credit risk and would no longer reflect a fair representation of the expected evolution of a bank's loan losses. As a result, given loan sales and securitisation enable financial intermediaries to remove loans from their balance sheet and transfer the credit risk associated with those loans renders the task of monitoring to resolve post-lending moral hazard as relatively insignificant (Coval and Thakor, 2005). This observation is consistent with Gorton and Pennacchi (1995) who argue that if the loans are sold then the financial intermediaries' incentive to produce an efficient level of credit information and monitoring will be diluted as the financial intermediaries would not receive the rewards from this activity which is in direct contrast to the theory of delegated monitoring.

Thus far, recent developments in the financial services sector have been utilised to challenge the completeness of the transaction costs and asymmetric information theories of financial intermediation. Subsequently, the theory of liquidity provision is discussed in order to establish a more comprehensive theory of financial intermediation.

2.3.3 Liquidity Provision

A financial intermediation theory, distinct from the transaction costs and information-based theories, has been developed by Bryant (1980) and Diamond and Dybvig (1983). The authors argue that a central role of financial intermediaries is to create and enhance liquidity which is achieved by financing relatively illiquid assets with more liquid liabilities. In their model, Diamond and Dybvig (1983) account only for demand deposits as they are 'the vehicles

through which banks fulfil their role of turning illiquid assets into liquid assets (p.405).[3] According to Diamond and Dybvig (1983), the role of financial intermediaries is to pool deposits from many investors and provide a degree of insurance by providing each depositor the right to withdraw those deposits upon demand, while relying on the fact that few depositors would need to do so simultaneously (Goodhart, 1989; Chant, 1992). However, the critical point in Diamond and Dybvig's (1983) model is that a financial intermediary, which invests the funds of depositors on their behalf, can predict the total number of withdrawal requests and hold sufficient reserve assets to meet them. Subsequently, the remainder of the financial intermediary's asset portfolio can consist of high-yielding illiquid assets based on the rational expectation that it will not be forced to sell them prior to maturity in order to meet deposit withdrawal demands (Dowd, 1996). Overall, financial intermediaries attain an efficient allocation of recourses by transforming illiquid and longer-term assets into fully liquid short-term liabilities and in the process provide their debt holders with deposit insurance against the likelihood that they will face an unexpected consumption requirement.

However, the liquidity production function may cause a collective action problem among depositors because banks keep only a fraction of deposits on reserve at any one time. Depositors cannot obtain repayment of their deposits simultaneously because the bank will not have sufficient funds on hand to satisfy all depositors at once. This mismatch between deposits and liabilities becomes a problem in the unusual situation of a bank run. Bank runs are essentially a collective-action problem among depositors. In the United States, the Deposit Insurance Fund and other elements of the federal safety net are often justified on the grounds that they solve this problem by eliminating the incentive for any single depositor to rush to demand repayment of their deposits (Macey and O'Hara, 2003).

Overall, these theories of financial intermediation differ in terms of their theoretical underpinning in justifying the existence of financial institutions. However, they share a common thread in that bank operations are distinct to those of non-financial firms and thus, warrant a separate analysis. Indeed, as the theories posit, the nature of financial intermediation causes bank assets to be informationally opaque and difficult to assess and monitor for outsiders. Also, high bank leverage is partly due to deposit insurance and safety-net subsidies and predominantly the result of the banks' role as providers of liquidity. As such, assets and

[3] Individual investors could directly invest in investment assets but doing so entails the risk of selling their assets at a loss in the case of an unexpected future consumption requirement. Consequently, direct investment would not provide any insurance against early liquidity needs (Goodhart, 1989).

liabilities of banks are unique and dissimilar from those of non-financial firms and these are examined next to contextualise the subsequent financial ratio analysis.

2.4 The Unique Features of Bank Financial Statements

In this section, the main features of bank financial statements are discussed and provide discussions on important accounts in banks and varying accounting approaches that have potential economic implications in capital regulations and bank management behaviours. For this analysis, Table 2.1- as used in Beatty and Liao (2014)- provides United States bank holding company average balance sheet composition by the total asset-based peer groups used by bank regulators. Table 2.2 shows the relative importance of income statement accounts from 2006 to 2012 (Beatty and Liao, 2014).

Table 2.1: *Balance sheet breakdown of banks as of 2012, by bank size.*

Panel A: Assets

	Group 1 $10 B and above	Group 2 $3-$10 B	Group 3 $1-$3 B	Group 4 $500M-$1B
Loans and Leases	57.96%	61.71%	62.19%	62.94%
Debt Securities Over 1 Year	15.92%	17.30%	19.39%	18.74%
Debt Securities Less Than 1 Year	3.03%	2.02%	1.91%	2.09%
Interest Bearing Bank Balances	4.20%	4.12%	5.10%	5.18%
Non-Interest Cash and Due from Deposit Institutions	1.52%	1.84%	1.94%	2.00%
Other Assets	17.37%	13.01%	9.47%	9.05%

Panel B: Liabilities

	Group 1	Group 2	Group 3	Group 4
Core Deposits	55.65%	63.53%	68.64%	67.88%
Noncore Funding	24.83%	19.97%	18.90%	20.14%
Equity Capital	11.30%	11.03%	9.86%	9.69%
Other Liabilities or Equities	8.22%	5.47%	2.60%	2.29%

Source: Beatty and Liao (2014)

Table 2.2: *Bank income statement breakdown (relative to average total assets).*

	2006	2007	2008	2009	2010	2011	2012
Net Interest Income	3.18%	3.06%	2.95%	2.99%	3.19%	3.47%	3.16%
Non-Interest Income	1.08%	1.08%	0.80%	1.07%	1.16%	1.15%	1.25%
Loan Loss Provision	(0.16%)	(0.30%)	(0.84%)	(1.36%)	(1.00%)	(0.67%)	(0.40%)
Securities Gains (Losses)	0.02%	0.02%	(0.20%)	(0.04%)	0.06%	0.07%	0.08%
Net Income	0.89%	0.64%	(0.19%)	(0.54%)	0.04%	0.35%	0.72%

Source: Beatty and Liao (2014)

First, the structure of the banks' balance sheet is discussed. As shown in Table 2.1, banks' liabilities are largely in the form of deposits, which are available to the banks' creditors on demand, while their assets often take the form of loans that have longer maturities. In detail, Table 2.1 shows that the majority of the banks' assets are composed by loans; as of the end of 2012, net loans and leases averaged approximately 60% of total assets across all four peer groups and all four peer groups appear to have similar asset compositions. As explained in section 2.2, the essential function of banks is to channel funds from those with surplus funds such as depositors to those with shortages of funds such as borrowers. Thus, on the liability and equity side, core deposits which are used to fund assets compose 55%-68% of the banks' asset base. With regards to the capital structure of banks, in a non-financial firm, leverage is a source of financing, while in the banking sector it is a factor of production (Adams and Mehran, 2011). This demonstrates the uniqueness of bank operations as banks operate with equity capital that makes up around 10% of total assets indicating that they are highly leveraged institutions and the implications of this are discussed in section 2.5 where financial ratios are analysed. Indeed, equity funding in banking makes up the smallest proportion of the balance sheet than in any other major industry (Macey and O'Hara, 2003; Hagendorff, 2015).

Second, the banks' income statement is composed of net interest income, the provision for loan losses, net non-interest income and securities gains and losses as shown in Table 2.2. Critical to the research objectives of the thesis, is the role and purpose of loan loss provisions. Although the proportion of loan loss provisions to average total assets is seemingly small compared to net interest income and net non-interest income when economic conditions are good such as 2006-2007, the relative magnitude of this expense item can be drastically inflated during times

of financial and economic distress such those observed during the 2007-2009 financial crisis and this is illustrated in Table 2.2. Most importantly, the volatility of this accrual expense has a directly proportionate impact on the volatility of bank earnings which is the reason it is used by bank managers to signal financial strength, manage reported earnings and regulatory capital; these practices are empirically investigated in Chapter 3. Indeed, the Generally Accepted Accounting Principles that govern the estimation of loan loss provisions in the United States, are considered to allow a leeway for managers in preparing financial statements, particularly in reporting accruals, such as loan loss provisions. The relevant accounting standards and the ways in which loan loss provisions can be manipulated by bank managers to achieve opportunistic objectives are discussed in detail section 3.2.1. Overall, the volatility of loan loss provisions combined with the discretion in estimating this accrual expense and its impact on net income make it a very important component of the income statement and one worth investigating due to its practical and policy implications.

Having examined the main components of banks' financial statements, the following section introduces key financial ratios used by banks to assess solvency and performance using a sample of 881 publicly traded bank holding companies over the period 2000 to 2016.[4] In the context of the research objectives of the thesis, investigating key financial ratios to analyse the capital adequacy and asset quality of banks will make evident whether banks employ capital and earnings management techniques, the governance implications that result from a highly leveraged banking sector and the limitations of the current accounting standards. Overall, this assessment will allow the findings of the empirical research conducted in Chapters 3 and 4 to be placed in context of key performance measures.

[4] The choice of publicly traded bank holding companies and the 2000-2016 time period is for consistency with the sample selection criteria of the empirical research conducted in Chapters 3 and 4 of the thesis.

2.5 Analysis of Key Financial Ratios

2.5.1 Capital Adequacy

In general, outside of the banking sector, there are no laws requiring companies to maintain a specific level of capital as a protective cushion for creditors and other stakeholders. However, in the case of banking, capital requirements are a standard feature of bank regulation. More specifically, the main functions of regulatory capital are: to support the bank's operations, act as a cushion to absorb unanticipated losses and provide protection to uninsured depositors and debt holders in the event of liquidation (Peek and Rosengren, 1997). Consequently, capital requirements reduce the probability of failure and moral hazard by forcing bank shareholders to bear a larger share of the losses experienced by the claimants on the cash flows of financially distressed banks (Macey and O'Hara, 2016).[5] As such, the requirement of appropriate levels of capital is considered critical to achieving a "safe and sound" banking system (Basel Committee on Banking Supervision, 1999). Although loan loss provisions and cumulative loss reserves can provide early lines of defence against bad loans, it is the strength of a bank's capital that forms the ultimate line of defence against the risk of insolvency (Kosmidou *et al.*, 2005). Thus, the regulatory capital requirements that govern the U.S. banking sector and the overall capital adequacy of 881 publicly traded bank holding companies are analysed next.

2.5.1.1 Regulatory Capital Requirements

In the United States, banks fall under two regulatory capital requirements: the international agreement on risk-based capital namely, the Basel Accord and additional domestic leverage limits mandated jointly by the Federal Deposit Insurance Corporation, the Comptroller of the Currency, and the Federal Reserve (Wall and Koch, 2000). The capital requirements, based on the Basel Accord, are expressed as capital ratios that compare measures of Tier I and Tier II capital to risk-weighted assets. Tier I capital is the sum of permanent shareholders' equity and disclosed reserves composed of share premiums, retained earnings, general reserves and legal reserves. While regulators view large levels of Tier I capital as an essential buffer against unexpected losses, the riskier Tier II capital is generally viewed as a supplemental buffer (Craig and Koepke, 2012). In fact, Tier II capital is designed to absorb losses before they are borne

[5] Moral hazard occurs when banks use their equity capital in risky investments in an attempt to increase their return on equity (Hubbard and O'Brien, 2014).

by depositors and it includes, within certain specified limits, limited-life preferred stock, subordinated debt, and the loan loss reserves (Wall and Koch, 2000). These regulatory capital ratios are divided by the bank's risk-weighted assets which are assets whose value is reduced by certain statutory amounts based upon their perceived riskiness (El Sood, 2012). In addition to the Basel capital requirements, banks are required to maintain a leverage ratio, which is Tier I capital to tangible assets, of at least 4.0 percent.[6] In addition, set minimum ratios for both Tier I and Total capital are 4.0 and 8.0 percent respectively for banks to be classified as adequately capitalised as shown in Table 2.3.

Table 2.3: *Measuring Banks' Capital Adequacy.*

Category	Tier I Capital Ratio	Tier I Leverage Ratio	Total Capital Ratio
Well capitalised	6% or greater	5% or greater	10% or greater
Adequately capitalised	4% or greater	4% or greater	8% or greater
Undercapitalised	Less than 4%	Less than 4%	Less than 8%
Significantly undercapitalised	Less than 3%	Less than 3%	Less than 6%
Critically Undercapitalised	Less than 2%	Less than 2%	———

Source: Federal Deposit Insurance Corporation (2014)

The stricter supervisory and regulatory framework mandated by the Federal Deposit Insurance Corporation Improvement Act of 1991, imposes costly restrictions on banks with diminishing capital levels (DeYoung, 2007). In detail, banks with regulatory capital ratios judged insufficient by regulators may be refused permission to acquire other firms. Further, banks classified as "undercapitalised" may not pay dividends to their shareholders, may not pay management fees to their holding company, and are required to provide an acceptable plan for raising their capital ratios (Hubbard and O'Brien, 2014). Banks classified as "critically undercapitalised" may be closed by the regulators even though their accounting capital could be positive and they are otherwise able to repay creditors in a timely manner (Wall and Koch, 2000). Subsequently, bank managers can be incentivised to use loan loss provisions to manage capital levels 'to avoid the costs associated with the violation of capital adequacy requirements' (Curcio and Hasan, 2015, p.29). The way in which this can be achieved is explained in detail in section 3.2.3 and evidence in support of capital management is provided in section 3.4.4. To assess the capital strength of U.S. banks and discern any incentives for capital management, a

[6] Intangible assets, such as goodwill, are excluded as they cannot be easily valued upon liquidation (Craig and Koepke, 2012).

ratio analysis is conducted next based on bank-specific and macroeconomic data collected from the SNL Financial database.[7]

2.5.1.2 Ratio Analysis

To evaluate the capital strength of U.S. banks and observe the likelihood of capital management, the ratio of equity to total average assets is analysed first. Equity capital represents the stockholders' share of the bank, and thus supplies the long-term, relatively stable base of financial support which the bank will rely on to grow and cover any unexpected losses it incurs (Rose and Hudgins, 2013). The equity capital is defined as the total of common stock, surplus, perpetual preferred stock, undivided profits and capital reserves and is divided by average total assets. As a rule, average balance sheet data are employed to eliminate distortions caused by large changes in balance sheets before a quarter or year ending reporting period (Dietrich and Wanzenried, 2011). On average, U.S. publicly traded bank holding companies have an average equity capital ratio of 9.66 percent over 2000-2016 and the average values of this ratio lie between 9 to 10.11 percent as shown in Figure 2.1.

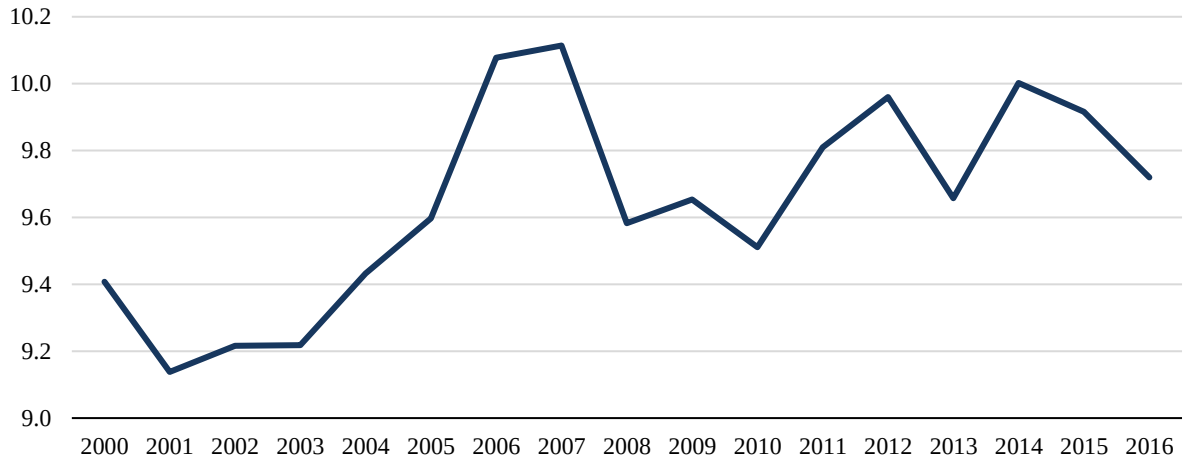


Figure 2.1: *Equity Capital Ratio (%), 2000-2016.*

This demonstrates that banks are heavily leveraged (debt-financed) institutions as in non-financial firms, leverage is a source of financing, while in the banking sector it is a factor of production (Adams and Mehran, 2011). In the United States, the Deposit Insurance Fund and other elements of the federal safety net provide banks with an incentive to increase their

[7] The SNL Financial database is part of the Standard & Poor's Global Market Intelligence platform and includes detailed profiles on more than 20,000 U.S. financial institutions, including all publicly-traded banks and thrifts, privately held institutions and credit unions.

leverage beyond what the market- in the absence of depositor protection- would permit (Federal Reserve, 2018). This is in fact an important reason why bank governance warrants separate analysis; equity funding in banking makes up the smallest proportion of the balance sheets of any other major industry (Hagendorff, 2015).

Corporate Governance Implications

To elaborate on this further, the reason high leverage complicates the governance of financial institutions is the number and importance of stakeholders other than equity holders. In addition to equity holders, the stakeholders in a bank include debtholders, the majority of which are the depositors and the holders of subordinated debt, as well as the government as both insurer of deposits and residual claimant on systemic externalities (Mehran *et al.*, 2011). Clearly, equity holders are a lot less important than creditors in terms of the funding they provide to banks. However, they control key governance devices such as the board of directors, director appointments (and dismissals) and executive compensation just like in any other industry where equity makes up a much more substantial proportion of funding and where equity holders have greater loss exposure (Larcker and Tayan, 2016). As a result, with risk-based profits going to equity holders, equity holders are thought to have strong incentives to put in place monetary risk-taking incentives that lead to higher returns for them at the expense of risk averse debtholders and by extension, the deposit insurer or taxpayer that acts as a fiscal backstop in the event of bank failure (Hagendorff, 2015). Indeed, high bank leverage is associated with increased risk-taking due to the safety-net subsidies and in part the result of the role of banks as providers of liquidity, which is intrinsic to the process of financial intermediation as discussed in section 2.3.3. Thus, the implication is that high leverage can lead to excessive risk-taking if bank shareholders become too dominant in the governance of the bank as in the case of bank failure where a major part of the losses are externalised to stakeholders, while gains are fully internalised by shareholders and managers (Ferrarini, 2017). Indeed, Anginer *et al.* (2018) using a sample of U.S. banks for the period 1990-2014 find that shareholder-friendly corporate governance is associated with greater risk-taking by large banks, consistent with larger banks benefiting from too-big-to-fail guarantees. In the context of the thesis, the implications of monetary risk-taking incentives put in place by shareholders such as institutional investors combined with need of banks to avert the costs of regulatory intervention mentioned earlier may motivate bank managers to use loan loss provisions to inflate earnings and/or regulatory capital (Elyasiani *et al.*, 2017).

Further, it is important to mention that the objectives of regulators and shareholders may not coincide, which could impact the governance, and in turn the conduct, of the bank. According to Adams and Mehran (2003), there is a conflict between the objective of regulators which is "safety and soundness" and that of shareholders which is value maximisation. When a conflict exists between value maximisation and the need to support prudent operations, regulators expect boards to balance these concerns effectively, by ensuring that bank performance as well as safety and soundness are taken into account. It is therefore the task of prudential regulation and supervision to reduce the excessive risk propensity of shareholders and managers in order to guarantee the solvency of financial institutions (White, 2012). In fact, capital requirements are critically important in reducing the incentives of shareholders to undertake excessive risks, while providing a cushion for the protection of depositors and other stakeholders, including the taxpayers to the extent that the chances of a bailout are diminished (Admati and Hellwig, 2013). Overall, 'governance arrangements that do not sufficiently take the unique features of banks into account risk exacerbating existing agency conflicts that may have contributed to excessive risk-taking by banks before the recent crisis' (Hagendorff, 2010, p.140). Indeed, White (2012) argues that the financial crisis of 2007 demonstrated that excessive risk-taking and leverage as a result of inadequate capital by large, complex, and interconnected financial institutions that were inadequately restrained by prudential regulation were the cause of the crisis and this is examined next.

The Effects of the 2007-2009 Recession

As shown in Figure 2.1, the equity capital ratio of banks has been steadily increasing over the period 2002 to 2006 which signifies that U.S. banks were safe, faced lower costs of going bankrupt and this would reduce their cost of funding (Growe *et al.*, 2014). However, the capital strength of banks has been adversely affected by the short-lived recession of 2001 and even more prominently by the 2007 financial crisis as the equity capital ratio declined by approximately 0.5 percent in the period 2007 to 2009.[8] Though in the financial crisis of 2007, the surge of credit losses caused increased loan charge offs and subsequently loan loss provisions, which adversely affected the banks' profitability and equity capital (BCBS, 2009).

[8] The National Bureau of Economic Research (NBER) (n.d.) classifies the fiscal years 2001, 2007, 2008 and 2009 as recessionary periods.

Pertaining to the impact on bank profitability, the return on assets- which is the ratio of net income after taxes to total average assets- reflects these developments. According to Golin and Delhaise (2013), the return on assets has emerged as the key ratio for the evaluation of bank profitability. It indicates how capable management has been in converting assets into net earnings (Kosmidou, 2008; Dietrich and Wanzenried, 2011). The negative return on assets in the 2007-2009 recessionary period, shown in Figure 2.2, was largely due to the decrease in net income from an average of $122 million in 2007 to a negative $31 million in 2008 as depicted in Figure 2.3. Overall, this verifies the inability of banks to convert their assets into earnings and augment capital internally during recessionary periods.

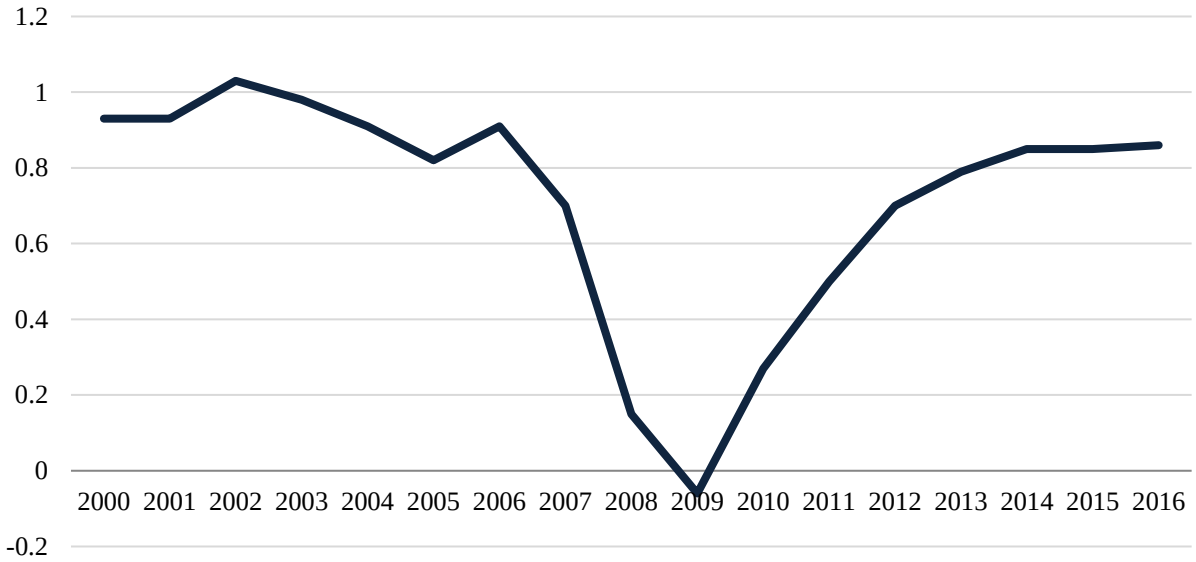


Figure 2.2: *Return on Assets (%), 2000-2016.*

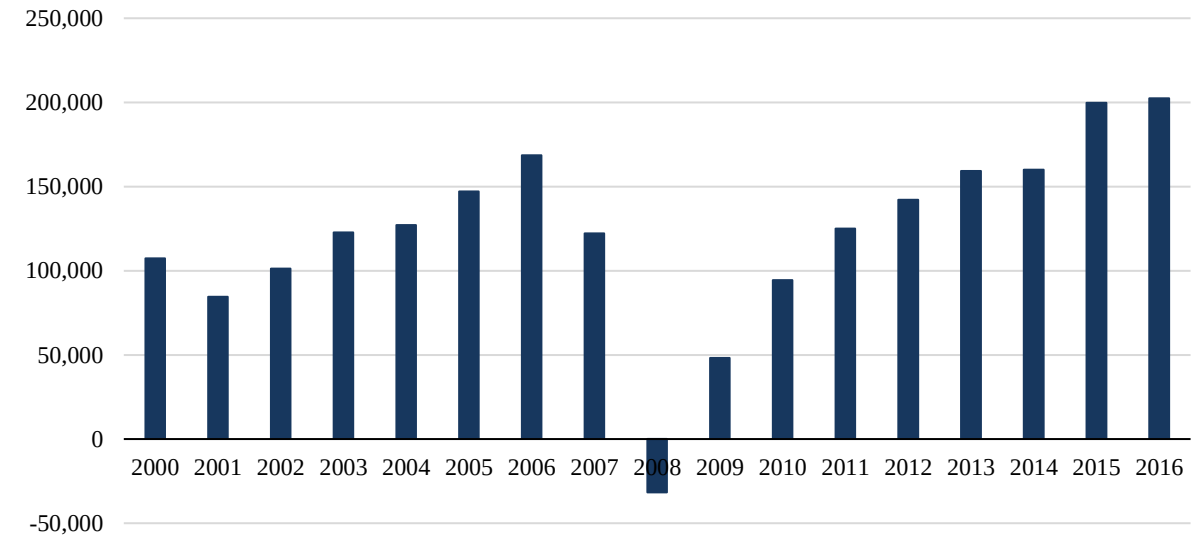


Figure 2.3: *Net Income in Thousands of U.S. Dollars, 2000-2016.*

Nonetheless, with regards to the regulatory capital requirements banks must comply with, it is evident in Figure 2.4 that, on average, bank holding companies have been "well-capitalised" over the time period 2000-2016. In detail, the Tier I and Leverage ratios were greater than 6.0 and 5.0 percent respectively even with the minor decline in 2007 and 2008. In addition, total capital to risk-weighted assets has been greater than 10 percent for all banks, on average.

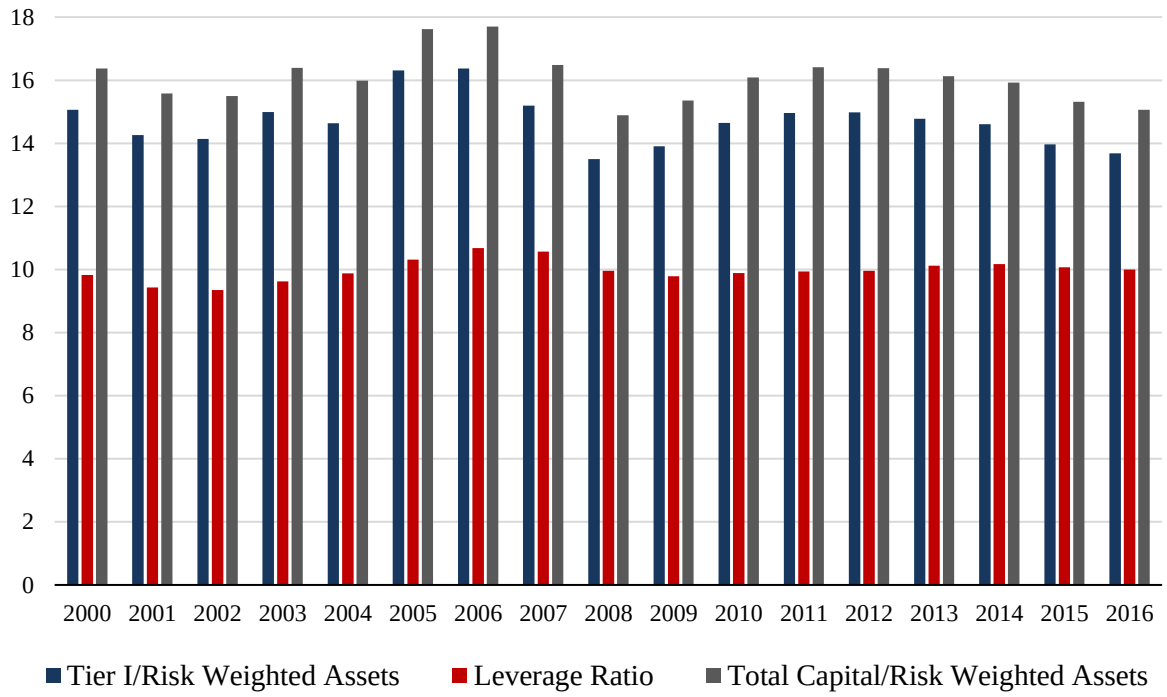


Figure 2.4: *Regulatory Capital Ratios (%), 2000-2016.*

However, the adequate levels of regulatory capital may have been incentivised by the enactment of the Gramm-Leach-Bliley Act of 1999 which requires bank holding companies to keep their subsidiary depository institutions "well capitalised" and "well managed" in order to qualify as a financial holding company. The financial holding company status allows a bank holding company to engage in riskier financial activities such as merchant banking, insurance underwriting, and securities underwriting (Avraham *et al.*, 2012). In fact, virtually all large bank holding companies are registered as financial holding companies (Cornett *et al.*, 2009). Therefore, for simplicity of presentation, here and throughout, financial holding companies are referred to as bank holding companies or banks. Most importantly, this Act enabled financial institutions to separate loan origination from the loan portfolio. In other words, banks were no longer obliged to keep their own loan portfolio. A plethora of banks have transformed themselves from traditional 'originate-and-hold' mortgage lenders to 'originate-and-securitise' mortgage bankers, relying less on traditional interest-based income and increasingly more on

non-interest income from loan origination fees, loan securitisation fees and loan servicing fees (De Young, 2010).[9] The growth in securitised mortgage lending was facilitated in large part by two government-sponsored enterprises; the Federal National Mortgage Association (Fannie Mae) and the Federal Home Loan Mortgage Corporation (Freddie Mac) were the dominant forces in U.S. residential mortgage markets (Casu *et al*., 2015). Approximately half of total existing residential mortgage debt in the U.S. has either been securitised by, or held in the portfolios of, these two institutions (DeYoung, 2010). In fact, the sheer size of these two companies raised fears about the systemic macroeconomic consequences should one or both ever become insolvent (Frame and Wall, 2002). Moreover, during the mid-2000s, "subprime" mortgage loans to households with low credit scores comprised a substantial portion of the credit expansion (Casu *et al.,* 2015*).* However, many of these borrowers defaulted on their loans, causing large investment losses for U.S. banks that held these mortgages as well as for other financial institutions that invested in securities backed by these mortgages (DeYoung, 2010).

Further, Macey and O'Hara (2016) argue that the caveat of relying too heavily on bank capital requirements to avoid financial crises is that 'banks can respond to higher capital requirements in ways that make them less rather than more safe' (p.100). Specifically, high levels of capital tend to lower the profitability of banks, as discussed earlier, since capital limits the extent to which banks can leverage any initial shareholder investment as well as accumulated retained earnings (Baily *et al.*, 2008). As result, in addition to likely capital management via loan loss provisions, banks found more ways to circumvent such requirements. In detail, there is general agreement that the risk classification determining capital requirements in the 1988 Basel Accord was too broad making it possible for banks to shift assets to relatively high-risk categories (Barth *et al*., 2014). According to the Basel Committee on Banking Supervision when presenting its first consultative paper on new bank capital rules in June 1999 (p.9):

'The current risk weighting of asset results, at best, in a crude measure of economic risk, primarily because degrees of credit risk exposure are not sufficiently calibrated as to adequately differentiate between borrowers' differing default risks. Another related and increasing problem with the existing Accord is the ability of banks to arbitrage their regulatory

[9] A loan securitisation is a trust that purchases existing home mortgage loans (or auto loans, or credit card receivables) from banks, using funds raised by selling 'mortgage-backed securities' (MBS) to third-party investors. The MBS yield returns based on the performance of the mortgage loans held in the trust. This process allows banks to sell their otherwise illiquid loans to the securitisation market and use the proceeds of these sales to fund additional loans or make other alternative investments (Howells and Bain, 2008).

capital requirement and exploit differences between true economic risk and risk measured under the Accord. Regulatory capital arbitrage can occur in several ways, for example, through some forms of securitisation, and can lead to a shift in banks' portfolio concentrations to lower quality assets.'

Hence, regulators believed that the risk-weighted capital requirements misjudged the actual risk of certain assets, such as residential mortgages, and as a result banks did not hold sufficient capital to absorb any losses during the crisis (BCBS, 2009). As such, banks overestimated the value of on-balance-sheet assets while holding a high percentage of their most vulnerable assets hidden off-balance-sheet and were, in fact, excessively leveraged as the 2007 financial crisis revealed (Crotty, 2009). The predominant means of circumventing the mandated capital requirements became what were known as Structured Investment Vehicles (SIVs hereafter), an off-balance-sheet Special Purpose Vehicle set up by banks to hold risky assets such as mortgage-backed securities, collateralised debt obligations and other long-term institutional debt with no capital required to support them (Macey and O'Hara, 2016).

With the United States corporate governance system being shareholder-centric, risk-taking may have been incentivised and the regulatory system seems to have encouraged banks to move as much of their assets off-balance-sheet as possible. SIVs were supposed to be stand-alone institutions that paid service fees to the originating banks, but to which the originating banks had no obligations or commitments (Crotty, 2009).[10] They allowed banks to leverage their holdings of these risky assets more than they could on their balance sheets. To fund these assets, the SIVs issued asset-backed commercial paper and medium term notes as their liabilities, mostly with very short-term maturity that needed to be rolled over constantly (Baily *et al.*, 2008).[11] Liquidity risk was not perceived as a problem, as SIVs could consistently obtain cheap and reliable funding, even as they turned to shorter term borrowing. However, in buying and selling securities, the SIVs benefited from their association with the sponsoring banks, by the time of the financial crisis, there were about 30 SIVs, holding about $320 billion assets (Hubbard and O'Brien, 2014). As the assets held by the SIVs lost value, a sponsoring bank was faced with the hard choice of allowing the SIV to fail or bringing it back on the bank's balance

[10] Technically, the SIVs were separate from the banks, constituting as a "clean break" from a bank's balance sheet as defined by the Basel Accord and hence did not add to the banks' capital or reserve requirements (Baily *et al.*, 2008).

[11] Innovation created important financial products so complex and opaque they could not be priced correctly; they therefore lost liquidity when the 2005 boom ended. Financial innovation has proceeded to the point where important structured financial products are so complex that they are inherently non-transparent. They cannot be priced correctly, are not sold on markets and are illiquid (Crotty, 2009).

sheet. Eventually, most banks chose the second course, increasing the damage to their balance sheets during the financial crisis but preserving their relationships with customers who had invested in commercial paper and other debt issued by SIVs and perhaps to avoid lawsuits (Arestis and Karakitsos, 2010).

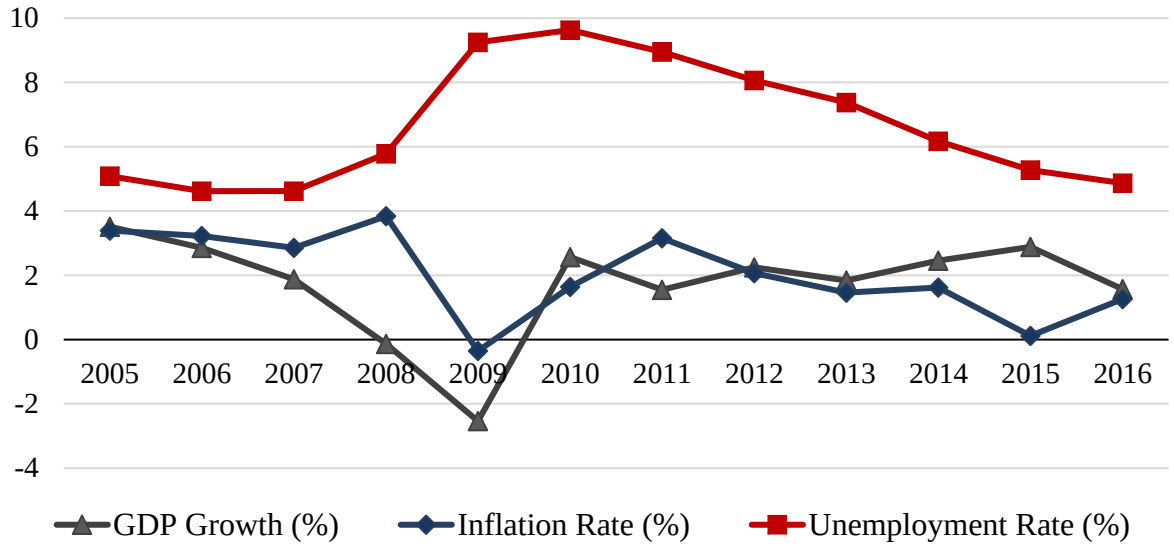


Figure 2.5: *GDP Growth, Inflation Rate and Unemployment Rate, 2005-2016.*

In response to these developments the Federal Reserve injected liquidity and cut interest rates aggressively from 5.25 percent to 0.25 percent over the period August 2007 to December 2008. To help stabilise financial markets, the U.S. Congress initially authorised a $700 billion Troubled Asset Relief Program (TARP) in October 2008; however, this was reduced to $475 billion by the Dodd-Frank Act in 2010 of which approximately $238.4 billion was committed to the stabilisation of the banking sector (U.S. Department of the Treasury, 2015). TARP measures aimed to remove bad or doubtful assets from bank balance sheets (or off-balance-sheet) to strengthen banks' financial position by indirectly helping them to boost their capital strength and provide greater confidence in the system and encourage lending (Casu *et al*., 2015). In the U.S., when all programmes are put together, the total liquidity injected into the system amounts to $7.4 trillion or 50 percent of nominal GDP (Arestis and Karakitsos, 2010). The liquidity injected since the outbreak of the crisis ultimately posed a threat to financial stability due to its adverse effect on CPI- inflation as shown in Figure 2.5. With regards to economic growth, GDP growth contracted until the third quarter of 2009 making this the deepest and longest downturn since the Great Depression. Moreover, the Federal Reserve bailed out of Bear Stearns in March 2008, which set a precedent for the bailouts of Fannie Mae,

Freddie Mac and AIG in September 2008 (Board of Governors of the Federal Reserve System, 2016). However, the bankruptcy of Lehman Brothers fuelled the losses of financial institutions and aggravated the financial crisis (Arestis and Karakitsos, 2010). After the collapse of Lehman Brothers, the U.S. policymakers did not allow anyone to fail, with the latest example being the Citigroup bank.

Overall, the financial crisis clearly demonstrated that existing capital regulation, in its design or implementation, was inadequate to prevent a panic in the financial sector, and the government had to intervene with emergency support to prevent a collapse. Interestingly, many of the banks that were rescued appeared to be in compliance with minimum capital requirements shortly before and even during the crisis (Demirguc-Kunt *et al.*, 2013). Thus, the banking sector entered the crisis with a definition of capital that was neither harmonised nor transparent, and allowed a number of banks to report high Tier I ratios but with low levels of common equity net of regulatory adjustments (BCBS, 2009). Thus, in response to the financial crisis, the Basel Committee on Banking Supervision proposed Basel III reforms to strengthen the soundness of the banking sector, to improve the banking sector's resilience to economic downturns, and to reduce the spillover from the financial sector to the real economy (Beatty and Liao, 2014). A major focus of the reforms is to raise both the quality and size of the regulatory capital base, as well as to build capital buffers at individual banks that can be used in stressed economic conditions and to protect banks at times of excess credit growth (BCBS, 2011). In the United States, the Federal Reserve approved the final rule on Basel III on July 2, 2013 with full implementation by 2019 (BIS, 2018). Subsequently, a discussion and assessment of the Basel III capital requirements is beyond the scope of the thesis as the time period employed runs up to 2016 and thus, their impact cannot be fully captured and examined. Nonetheless, taking into consideration the shortcomings of the pre-existing regulatory capital requirements, the means by which banks managed to circumvent capital requirements led banks to face growing losses and write downs whereby 'credit quality deteriorated in a highly correlated manner' (BCBS, 2009, p.36). Therefore, for a more comprehensive understanding of these shortcomings the asset quality of the U.S. bank holding companies is examined next.

2.5.2 Asset Quality

Asset quality refers mainly to the quality of the bank's earning assets and is one of the most critical areas in determining the overall condition of a bank (Kosmidou *et al.*, 2005; Yao, 2015). Indeed, the assessment of overall asset quality and the corresponding credit risk in the financial sector is an important element of macro-prudential surveillance as a thorough understanding of its drivers facilitates the identification of key vulnerabilities of the financial sector as well (Beck *et al.*, 2013). The primary factor affecting asset quality, is the quality of the loan portfolio as loans typically comprise a majority of a bank's assets and carry the greatest amount of risk to their capital (FDIC, 2012). As demonstrated in sections 2.4 and 2.5.1, banks tend to hold little equity capital relative to the aggregate value of their assets thus, 'only a small percentage of total loans needs to turn bad to push them to the brink of failure' (Rose and Hudgins, 2013, p.182). Therefore, asset quality is evaluated in terms of the dynamic relationship between four indicators of loan quality: loan loss reserves, non-performing loans, loan charge-offs and loan loss provisions; these indicators are key variables in the empirical research conducted in Chapters 3 and 4.

Loan loss reserves is a balance sheet account which deducts from total loans the portion of the loan principal not expected to be paid back (Walter, 1991). In detail, the cumulative stock for loan losses is calculated after new loan loss provisions have been added, and net loan charge-offs have been deducted (Growe *et al.*, 2014). Each bank must maintain loan loss reserves adequate to absorb estimated credit losses associated with the loans and leases portfolio (FDIC, 2016). Hence, the ratio of loan loss reserves to total loans reveals the extent to which the bank is preparing for loan losses by building up its loan loss reserves account through annual charges against current income through loan loss provisions (Rose and Hudgins, 2013). Given a similar charge-off policy, the higher the loan loss reserve ratio the poorer the credit quality and the higher the risk of the loan portfolio is likely to be (Kosmidou, 2008). Consequently, high risk loans can be expected to lead to non-performing loans which in turn increase loan loss provisions and reduce net income (Growe *et al.*, 2014). Nonetheless, the level of loan loss reserves may not indicate the level of problem loans they are meant to provide against hence, non-performing loans are examined first (Golin and Delhaise, 2013).

The reported non-performing loan ratio is the most widely used measure for determining the quality of an institution's loan portfolio (Yao, 2015). In the United States, non-performing loans are defined as income generating loans that are past due for 90 days or more (Rose and

Hudgins, 2013). A rising share of non-performing loans in the loan portfolio of banks signifies greater risks affecting both the liquidity and profitability of banks and represents a deteriorating balance sheet of banks as illustrated in the following economic developments that led to the 2007-2009 recession[12] (Ghosh, 2007).

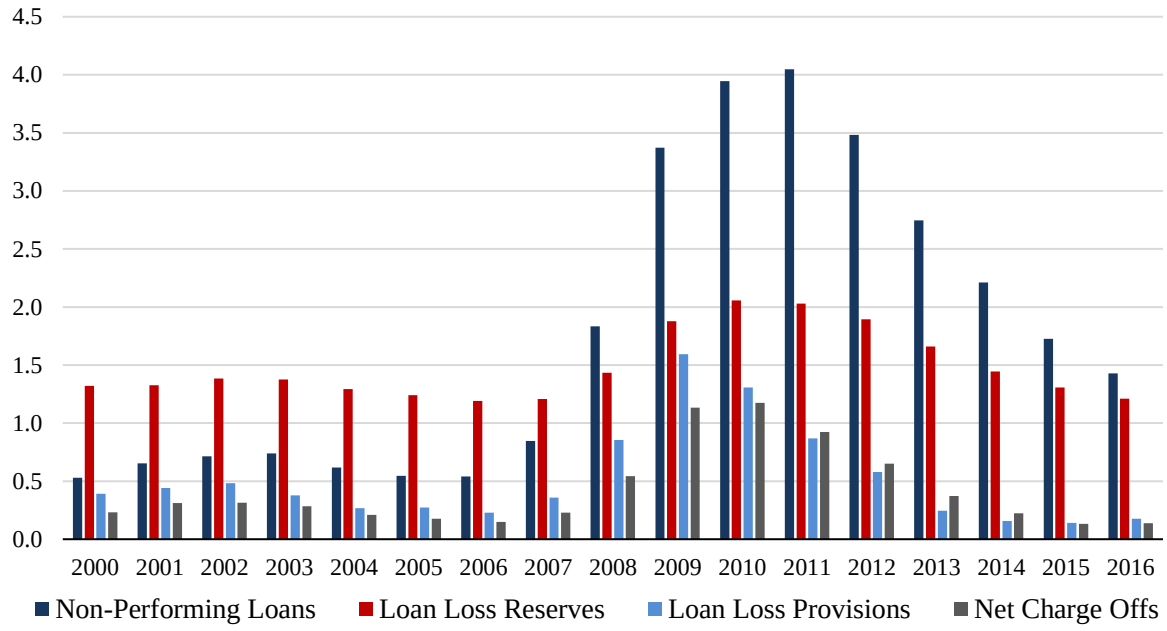


Figure 2.6: *Non-Performing Loans, Loan Loss Reserves, Loan Loss Provisions and Net Charge Offs as a Percentage of Total Loans (%), 2000-2016.*

In the United States, the rapid increase in household debt since 2002 had made it possible for households to maintain consumption and residential investment at higher levels than would have been feasible based on their income alone. In fact, the build-up of household debt and asset holdings increased from 76.7 percent to Gross Domestic Product to 97.6 percent of Gross Domestic Product between 1998 and 2007 (BIS, 2008). Clearly, this has made household expenditure more sensitive to short-term changes in interest rates. As a result, when house prices began to fall in late 2006 speculators and risky borrowers started defaulting in rising numbers as the opportunity to sell houses at a profit began to fade (Bruner and Carr, 2007). The impact of those defaults became apparent in November 2006, triggering failures and losses in first half of 2007. Indeed, the financial crisis of 2007-2009 was marked by a surge in non-performing loans and since then, non-performing loans have been linked to bank failures, and they are often a harbinger to banking crises (González-Hermosillo, 1999). As shown in Figure

[12] The National Bureau of Economic Research (n.d.) classifies the fiscal years 2007, 2008 and 2009 as recessionary periods.

2.6, during the financial crisis average non-performing loans to total loans rose from 0.8 percent in 2007 to nearly 4 percent in 2009 which led to a respective increase in loan loss reserves, loan loss provisions and net charge-offs. Therefore, the deterioration of asset quality is not only financially destabilising for the banking system but may also reduce economic efficiency, impair social welfare and decline economic activity as demonstrated in Figure 2.7 with the unemployment rate reaching 9.25% in 2009 and a corresponding negative GDP growth grate (Barseghyan, 2010).

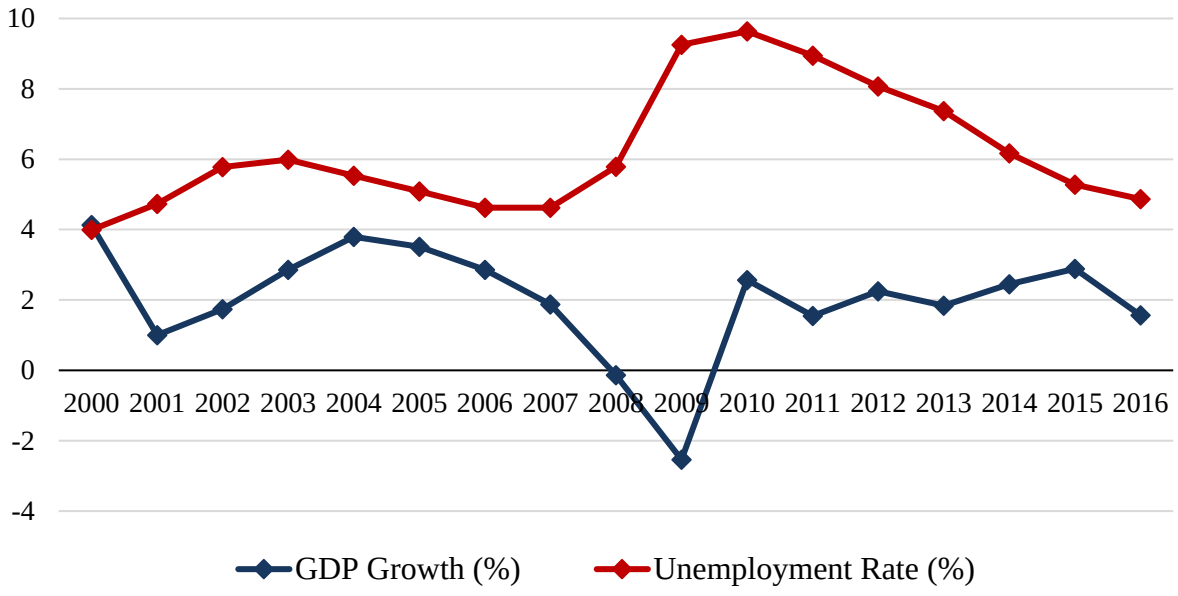


Figure 2.7: *GDP Growth and Unemployment Rate, 2000-2016.*

Moreover, Figure 2.6 provides an ocular view of all loan quality indicators for 881 publicly traded U.S. bank holding companies for the time period 2000 to 2016.[13] Figure 2.6 shows that all indicators, non-performing loans, loan loss reserves, net charge-offs and loan loss provisions increased sharply in the years 2008 and 2009. Further, loan loss provisions and loan loss reserves provide early lines of defence against bad loans whereas the strength of a bank's capital forms the ultimate line of defence against the risk of insolvency (Kosmidou *et al.*, 2005). This becomes apparent in the event where bank experiences a serious asset quality problem, such as the financial crisis, and loan loss reserves are insufficient to allow all bad loans to be written off, and the excess will have to be written off against shareholder's equity (Dietrich and Wanzenried, 2011). To demonstrate this linkage, the coverage ratio is examined; a composite indicator based on the ratio of equity capital plus loan loss reserves minus non-

[13] Bank-specific and macroeconomic data have been collected from the SNL Financial database.

performing loans to total assets (González-Hermosillo, 1999). Indeed, it is evident in Figure 2.8 that the resources of U.S. banks- equity capital and loan loss reserves- were insufficient to cover non-performing loans during the 2007-2009 recessionary period.

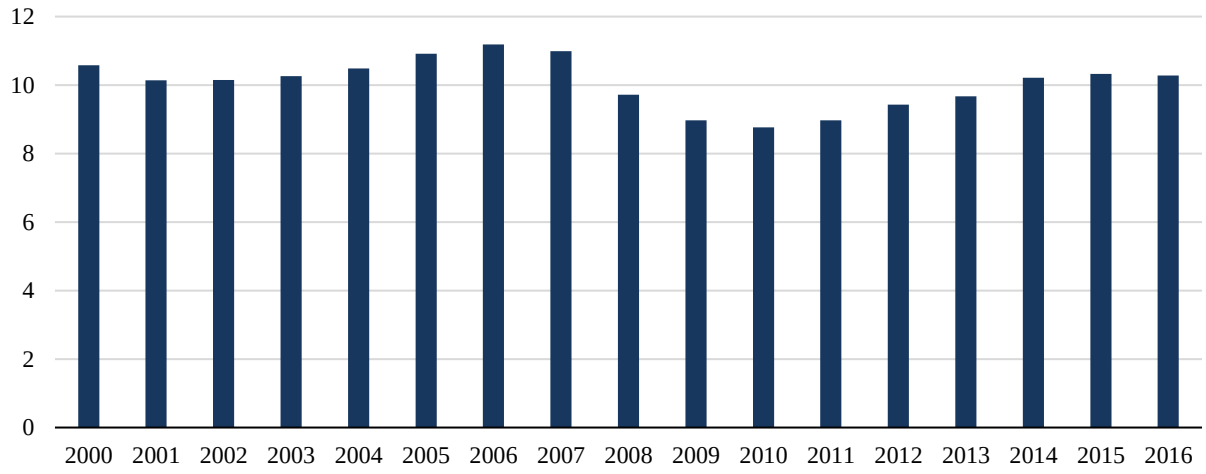


Figure 2.8: *Coverage Ratio (%), 2000-2016.*

The importance of asset quality and its impact on the financial health of banks is more clearly understood when analysed in conjunction with loan loss provisions and loan charge-offs. The provisions for loan losses is an income statement expense account showing amount added to loan loss reserves and reflects the riskiness of the bank's loan portfolio (Walter, 1991; Growe *et al.*, 2014). The ratio of loan loss provisions over total loans, specifically, is a measure of a bank's credit quality and a higher ratio indicates a lower credit quality (Dietrich and Wanzenried, 2011). As demonstrated previously in section 2.4, this accrual expense is of critical importance as its volatility has a directly proportionate impact on the volatility of bank earnings which is the reason bank managers use this accrual expense to signal financial strength, manage reported earnings and regulatory capital; these practices are empirically investigated in Chapter 3. In addition, loan charge-offs are loans that have been declared worthless and written off the balance sheet by subtracting the book value from loans and loan loss reserves (Walter, 1991). In the event where some of these loans ultimately generate income, the amounts recovered are deducted from gross charge offs to yield net charge-offs (Rose and Hudgins, 2013). This signifies increased credit risk and the probability of bank failure thus, these ratios are analysed next.

At the height of the economic boom, in 2005, the lowest loan loss reserves relative to total loans were recorded with an average value of 1.2 percent as shown in Figure 2.6. The respective

non-performing loans ratio was 0.5 percent which is expected as these indicators move together (Balla and McKenna, 2009). Subsequently, in 2005 and 2006, banks had historically high coverage ratios as depicted in Figure 2.8, not because reserves were high- they were at a historical low- but because non-performing loans were very low. Paradoxically, the period 2007 to 2009 revealed the critical importance of building loan loss reserves in an economic upturn in order to keep pace with the rapid deterioration in credit quality. As depicted in Figure 2.6, loan loss reserves increase just ahead of a recession such as the years 2007-2009 and continue increasing even after the recessionary period has ended. Further, it is evident that loan loss reserves tend to lag credit quality problems as they increase more slowly than non-performing loans during economic downturns and fall more slowly in periods of economic expansion. Subsequently, the surge in non-performing loans in the period 2008 to 2010 had a knock-on effect on loan loss reserves, loan loss provisions and net charge-offs which highlight the cyclicality of these asset quality indicators; they fluctuate in conjunction with the economy's short-term business cycles (Gonzales, 2009).

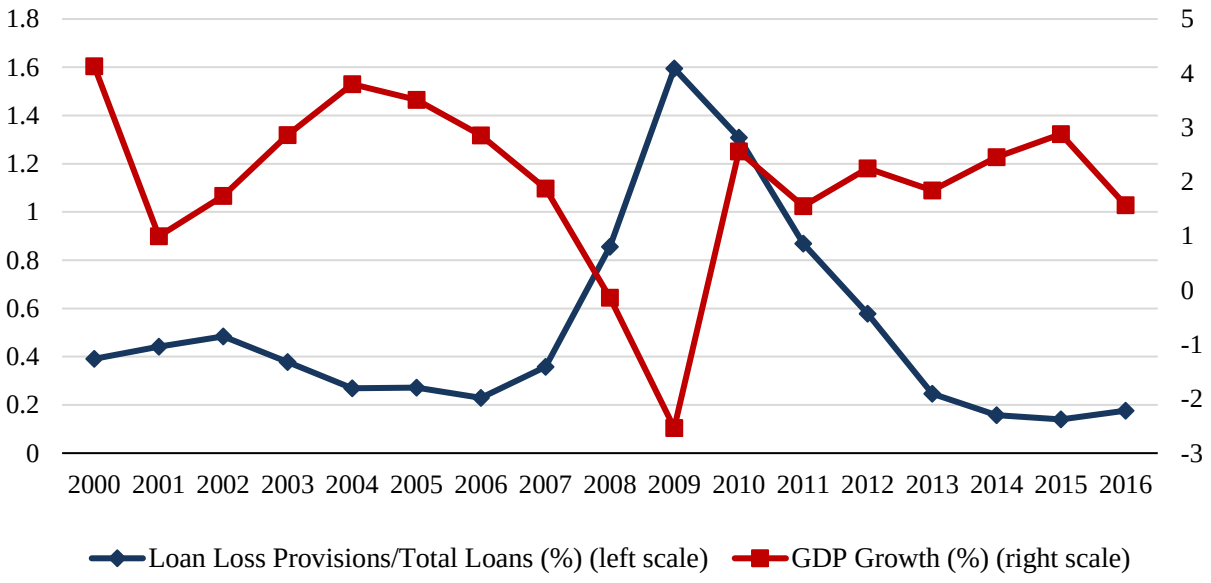


Figure 2.9: *Loan Loss Provisions to Total Loans and GDP Growth, 2000-2016.*

As one of the main research objectives of this thesis is to investigate the cyclicality of loan loss provisions, in particular, Figure 2.9 demonstrates this by showing that during periods of economic expansion, such as 2005, average loan loss provisions (as a percentage of loans) fall and, conversely, they rise during downturns such as 2007-2009. This is precisely the caveat of U.S. banks adopting an "incurred loss" methodology for estimating loan loss reserves and provisions. Indeed, the Generally Accepted Accounting Principles, which U.S. banks must

comply with, require impairment recognition when a loss is probable based on past events and conditions at the financial statement date. Under this incurred loss model, it is inappropriate to consider possible or expected losses based on the trends that may lead to additional losses (Beatty and Liao, 2014). As with bank regulatory capital, the concern is that with an approach in which banks must rapidly raise reserves and provisions during economic downturns, the downturns get prolonged and even amplify the impact of the economic cycle on banks' income and capital (Laeven and Majnoni, 2003; Bouvatier and Lepetit, 2008). Thus, in the aftermath of the 2007 financial crisis, bank regulators declared the need for flexibility in the recognition of loan loss provisions for bank safety and soundness and proposed a forward-looking provisioning model (BCBS, 2009). In fact, the Financial Accounting Standards Board has issued a new Accounting Standards Update No. 2016-13 in the United States under which expected credit losses are estimated using forward-looking information and are due to be implemented in year 2020. Thus, the extent to which bank managers engage in earnings management and the respective policy implications of a forward-looking provisioning model is an empirical issue and this will be investigated in the following Chapters.

2.6 Summary

This chapter provided a thorough analysis of the main capital adequacy and asset quality indicators which are utilised in Chapters 3 and 4 for contextualising the hypotheses and empirical findings. The approach to this analysis was to first establish the functions and rationale for the existence of financial institutions, and then through an illustration of the banks' financial statements demonstrate the importance and impact of the provision for loan losses. Indeed, following an analysis of the main capital adequacy and asset quality financial ratios using data for 881 publicly traded U.S. bank holding companies for the period 2000-2016, that loan loss provisioning proved to be a key accounting choice that directly influences the volatility and cyclicality of bank earnings, as well as information properties of banks' financial reports with respect to reflecting loan portfolios' risk attributes. Another important element of provisions is the discretion embedded in its estimation which may incentivise bank managers to use loan loss provisions as a tool for signalling, earnings and capital management thus, exacerbating agency costs; these considerations form the basis of the empirical analysis conducted in the following chapter.

3 LOAN LOSS PROVISIONING PRACTICES OF U.S. BANK HOLDING COMPANIES

3.1 Introduction

The provision for loan losses is one of the main accrual expenses for banks and has a negative relationship with net income thus, an increase in loan loss provisions leads to a respective decrease in earnings. As such, the role loan loss provisions play within a bank's financial statements is crucial, given the sensitive information they convey; loan loss provisions are set aside to face a future deterioration of credit portfolio quality (Curcio and Hasan, 2015). Therefore, they are expected to reflect a fair representation of the expected evolution of a bank's loan losses. However, this can be compromised if bank managers exploit the discretion granted to them by the Generally Accepted Accounting Principles to manipulate loan loss provisions. Indeed, empirical research investigating the determinants of loan loss provisions, propose the following three loan loss provisioning practices: income smoothing, capital management and signalling financial strength (Bouvatier and Lepetit, 2008). In this chapter, these determinants are examined by employing a sample of 675 U.S. bank holding companies over the period 2002 to 2016 in order to capture the impact of the 2007 financial crisis. The latter is critical for evaluating the current loan loss accounting standards which are based on an "incurred loss" methodology causing loan loss provisions to be procyclical and consequently, bank earnings to be susceptible to economic downturns. Therefore, the first section of this chapter presents the hypotheses and a review of the respective prior empirical research. The second section focuses on the sampling procedure and methodology employed to estimate the effects of income smoothing, capital management, signalling and economic growth on loan loss provisions. Finally, the third section provides a thorough analysis of the main findings and their practical implications.

3.2 Hypotheses Development & Related Research

3.2.1 Earnings Management

A bank's performance, as represented by its earnings, can be influenced through the manipulation of loan loss provisions (Beatty *et al*., 2002). Thus, this hypothesis focuses on a specific pattern of earnings management, namely, income smoothing which aims at using loans loss provisions to reduce the variability of net income over time (Curcio and Hassan, 2015). Indeed, stable earnings over time are a fundamental predicate for stable stock prices whereas earnings variability is perceived as a measure of risk thus, income smoothing is a way of improving the perception of the banks' riskiness to investors, regulators and supervisors (Greenawalt and Sinkey, 1988; Anandarajan *et al.*, 2007). In the context of the banking sector, the incentive to smooth income becomes particularly important since bank management carries a unique responsibility of promoting a high degree of public confidence in the financial institution system (Ma, 1988). Also, the appropriate evaluation of bank statements might be distorted if bank managers practice income smoothing as this tends to reduce the comparability and transparency of financial statements across banks which in the long run can damage shareholder value (Laeven and Majnoni, 2003; Scott, 2015). Indeed, the Generally Accepted Accounting Principles, which banks in the United States adhere to, allow a leeway for managers in reporting loan loss provisions which may facilitate the practice of income smoothing and this is discussed next.

3.2.1.1 Accounting for & Disclosures of Loan Losses

The procedure for loan loss accounting

In the United States, banks operate under the Generally Accepted Accounting Principles (GAAP hereafter) which is a common set of accepted accounting principles, standards, and procedures that must be followed when compiling financial statements (Esposito *et al*., 2004). Banks operating under the GAAP follow a multistep process to determine their loan loss reserves. At the end of each accounting period, a bank determines the *probable* value of the loan losses in its existing portfolio. The bank then debits its loan loss provisions by an amount equal to the difference between its estimated loan losses and the current balance in its loan loss

reserves (Hasan and Wall, 2004).[14] The offsetting credit increases the bank's loan loss reserves. The loan loss reserves are shown on the balance sheet as a reduction in the value of its outstanding loans (Balla *et al.*, 2012). In addition, a bank will recognise that it is unlikely to collect the full value of selected loans and charges off the portions of those loans that are unlikely to be collected (Walter, 1991). As individual loans are charged off, the offsetting entry is a reduction in loan loss reserves. In some cases, the bank will find that it can recover part or all of the value of a loan that had been previously charged off. The offsetting entry for these recoveries is an increase in loan loss reserves (Hasan and Wall, 2004). The combined effect of charge-offs and recoveries in the loan loss reserves are net charge-offs and these are reported separately in financial statement footnotes (Wahlen, 1994). At the end of the period, the process repeats. However, the GAAP are considered to allow a leeway for managers in preparing financial statements, particularly in reporting accruals, such as loan loss provisions, loan loss reserves, realised security gains and losses, loan charge-offs, deferred tax valuation allowance, depreciation, and unexpected pension provisions (Fudenberg and Tirole, 1995; Healy and Wahlen, 1999; Fields *et al.*, 2001). More specifically, the following two types of the Financial Accounting Standards Board[15] pronouncements govern the accounting for loan losses. These are the Statement of Financial Accounting Standards No.5: Accounting for Contingencies (1975) and No. 114: Accounting by Creditors for Impairment of a Loan (1993) and are examined next to demonstrate how managers can exercise their discretion over the estimation and timing of loan losses.

Statement of Financial Accounting Standards No. 5

The general standard for setting loan losses is established by the Statement of Financial Accounting Standards No. 5: Accounting for Contingencies (1975). Paragraph 8 of Statement No.5 sets the following two standards for accruing an estimated loss from a loss contingency (including losses on loans): '(a) Information available prior to issuance of the financial statements indicates that it is *probable* that an asset had been impaired or a liability had been incurred at the date of the financial statement. It is implicit in this condition that it must be

[14] A bank may decrease its loan loss reserves with a negative provision for loan losses, but this is rare. In order for the required loan loss reserves to drop at the end of the year, a bank must find that the likely recoveries on loans previously charged off exceed the likely loan losses on newly impaired loans (Hasan and Wall, 2004).

[15] The Financial Accounting Standards Board is a regulatory organisation that is responsible for establishing financial accounting and reporting standards and these standards govern the preparation of financial reports and regarded as reliable and credible by the Securities and Exchange Commission and the American Institute for Certified Public Accountants (Esposito *et al*., 2004).

probable that one or more future events will occur confirming the fact of loss, (b) The amount of the loss can be *reasonably estimated*' (FASB, 1975, p.6). Moreover, *probable* in this standard refers to the event or events that are likely to occur and, according to Besnton and Wall, it is characterised as 'more likely than not' or having at least 50% chance of occurring (2005, p.21). Thus, Besnton and Wall (2005) postulate that this leaves bank managers a judgemental leeway because the standard provides the factors banks should consider in setting loan loss provisions but does not provide the exact formula for calculating loan loss provisions (Wall and Koch, 2000). However, the implementation of Statement of Financial Accounting Standards No.114, which came into effect in 1994, is intended to provide stricter guidelines for recognising impairment of loans and measuring loan loss provisions to reflect the expected loan losses.

Statement of Financial Accounting Standards No.114

Under the Statement of Financial Accounting Standards (SFAS hereafter) No.114, bank managers are required to determine the *probable* criteria using the regular loan review process and the loan loss provisions amount is computed more accurately (El Sood, 2012; Jin *et al.*, 2016). As a result, SFAS No.114 provides less discretion to bank managers to manage earnings or capital ratios. However, SFAS No.114 has been criticised for its several limitations. It is considered to have a limited scope because it applies only to the large groups of homogenous loans that are collectively evaluated for impairment. Consequently, other higher risk loans such as smaller commercial loans, credit card loans, residential mortgages and consumer instalment loans, are not included within the scope of SFAS No.114 (Alali and Jaggi, 2010). Therefore, bank managers are still allowed a leeway in preparing financial statements and particularly in reporting accruals such as loan loss provisions. Most notably, in an October 1994 report, the General Accounting Office states that a sample of 'institutions maintained significant amounts of unsupported reserves ... not clearly linked to likely losses' (GAO, 1994). Indeed, in November 1998 the Securities and Exchange Commission required SunTrust Banks -which reported a high level of gross charge-offs that it recovered at a rate close to 40 percent from 1993 to 1997- to reduce its loan loss reserves by $100 million. Apparently, the public nature of this requirement was intended as a signal to all banks to either justify or reduce their allowances (Liu and Ryan, 2006). Moreover, in July 2001, the Securities and Exchange Commission staff issued the Staff Account Bulletin (SAB) No. 102, which requires that banks 'develop and document a systematic methodology to determine its provision for loan losses

and allowance for loan losses as of each financial reporting date' emphasizing that this methodology should be 'consistently applied' through time (SEC, 2001). Nonetheless, even after the issuance of SAB No. 102, there is still a degree of discretion embedded in the provisioning process as banks are expected to estimate loan losses for groups of loans through the application of loss rates to the aggregate loan balances of each group (El Sood, 2012). Such loss rates reflect the bank's historical loan loss experience for each group of loans, adjusted for relevant environmental factors over a specific period. Accordingly, the Securities and Exchange Commission (2001) outlines the following three factors which magnify the discretion inherent in the provisioning process. The first factor is deciding how loans are grouped and assessed for collectability based on loan type, past due status, and degree of risk. Second, managers engage in determining loss rates and other measures that are considered when establishing appropriate time frames over which to evaluate the loss experience. Third, there are qualitative factors such as industry, geographical, economic, and political factors that managers use to assess loss rates. Overall, the proper evaluation of bank statements can be inevitably distorted when bank managers capitalise on the flexibility granted to them by the current accounting standards. Indeed, the methods banks have used to account for losses on loans have been 'a principal target of criticism and there has been a growing concern in the financial community that commercial banks may have manipulated loan loss provisions for the purpose of smoothing reported earnings' (Ma, 1988, p. 487). Such criticisms provided the impetus to researchers to investigate whether bank managers utilise loan loss provisions to smooth reported earnings. Therefore, in the following section the findings of U.S. empirical research investigating the relationship between loan loss provisions and earnings are reviewed.

3.2.1.2 Review of Empirical Research on Income Smoothing

The significant number of bank failures in the late 1970s caused the re-examination of the quality of bank assets and their loan portfolios in particular (Ma, 1988). Thus, the studies of Ma (1988), Greenawalt and Sinkey (1988) and Wetmore and Brick (1994) are amongst the first studies investigating income smoothing by manipulating loan loss provisions. Ma (1988) employs a sample of the 45 largest U.S. commercial banks for the period 1980 to 1984 and provides evidence supporting that U.S. commercial banks use loan loss provisions to smooth reported earnings. Specifically, the findings indicate that bank management tends to raise (lower) loan loss provisions in periods of high (low) operating income and the net impact of these adjustments resulted in a lower volatility in reported earnings which is suggestive of

income smoothing. Greenawalt and Sinkey (1988) employ a larger sample size than Ma (1988) which consists of 106 large bank holding companies over 1976 to 1984. Moreover, the authors split their sample into regional bank holding companies and money-centre bank holding companies in order to observe any differences in income smoothing between these two sub-groups.[16] The authors' findings are consistent with those of Ma (1988) as they are supportive of income smoothing. However, the authors find that regional banking companies tend to engage more actively in income smoothing than money-centre bank holding companies. Nonetheless, Greenawalt and Sinkey (1988) emphasise that their results are not generalisable to the population of bank holding companies as they focused only on large bank holding companies. The issuance of Circular Number 201 provided the impetus for the research of Wetmore and Brick (1994).[17] The authors sought to investigate whether banks are using the criteria described in this Circular to determine loan loss provisions and whether banks practice income smoothing. With respect to the latter, utilising a sample of 82 commercial bank holding companies over the period 1986 to 1991, the authors find no evidence of income smoothing in contrast to Ma (1988) and Greenawalt and Sinkey (1988). Eventually, empirical research investigating income smoothing started incorporating additional determinants of loan loss provisions to their empirical analysis such as signalling and capital management. Although the studies which are discussed next do test for these additional determinants, only the findings pertaining to income smoothing are addressed.

Collins *et al.* (1995) examine the impact of individual banks' changing levels of capital, earnings and taxes on decisions to engage in seven capital-raising options: security gains and losses, loan loss provisions, loan charge-offs, capital notes, common stock, preferred stock, and dividends. The authors employ a sample of 160 banks covering the period 1971 to 1991 similar to Ma (1988), Greenawalt and Sinkey (1988) and Wetmore and Brick (1994). With regards to loan loss provisions, Collins *et al.* (1995) provide evidence in support of earnings management whereby banks smooth earnings over time to a bank-specific mean. Specifically, two thirds of the sample banks are found to have reported decreased (increased) loan loss

[16] The authors' rationale for doing so is that regional bank holding companies tend to engage in income smoothing more than money-centre bank holding companies, due to 'lack of market notoriety about regionals' during the sample period (Greenawalt and Sinkey, 1988, p.304). Specifically, prior to the emergence of regional interstate banking, the authors conjecture that many regional bank holding companies were not under as close investor and security-analyst scrutiny and subsequently expected regional bank holding companies to smooth income more than money-centre bank holding companies over the sample period.

[17] The issuance of Circular Number 201, by the Comptroller of the Currency Administrator of National Banks (1985), stated that banks were required to maintain an adequate allowance for loan losses and establish a policy ensuring that relevant criteria were considered in the loan loss allowance decision to address the disclosure of loan losses.

provisions in years of relatively low (high) earnings. Similarly, Beatty *et al.* (1995) examine the use of managerial discretion over loan charge-offs, loan loss provisions, miscellaneous gains and losses, gains from pension settlements and changes in external funds such as securities issuances to achieve objectives associated with earnings, capital and tax management. Although this approach may appear similar to Collins *et al.* (1995), the authors criticise the research study of these authors on the grounds that they assume that 'when managers make a particular accrual or transaction decision, all other decisions are fixed (i.e. exogenous)' (Beatty *et al*., 1995, p.231). Thus, Beatty *et al.* (1995) relax this assumption and allow these decisions to be determined simultaneously. Overall, for a sample of 148 large banks over the period 1985 to 1989, the authors demonstrate that taking account of simultaneity is important for three of the five determinants, namely, loan charge-offs, loan loss provisions, and the decision to issue securities. Beatty *et al.* (1995) find no evidence that loan loss provisions are used to smooth reported earnings contrary to the findings of Collins *et al.* (1995). However, the time period employed by these studies precedes the implementation of Basel I regulatory capital requirements and this is considered next.

The Effect of the Basel I International Regulatory Framework

The enactment of the Basel I capital adequacy regulations in 1992 substantially altered the bank managers' incentives to manage earnings by manipulating loan loss provisions. Specifically, these capital requirements limit the use of loan loss reserves, and subsequently loan provisions, as regulatory capital in the following two ways. According to the Basel Committee on Banking Supervision (1998), loan loss reserves no longer counted as part of primary capital and counted only as part of total capital up to 1.25 percent of risk-weighted assets. Consequently, increasing earnings by reducing loan loss provisions resulted in a greater reduction in capital under the old regulatory capital regime compared to Basel I. Thus, Ahmed *et al.* (1999, p.3) claim that 'smoothing earnings via loan loss provisions would be less costly under the new regime.' As a result, the implementation of Basel I gave an additional impetus for researchers to investigate the impact of the Basel I regulatory framework on the practice of income smoothing.

Ahmed *et al.* (1999) claim that the magnitude of the relationship between loan loss provisions and earnings would be greater under Basel I than in the previous regulatory regime due to the limited impact an increase in loan loss provisions would have on the capital ratio. Thus, the authors employ a sample of 113 bank holding companies over the period 1986 to 1995 and find a statistically insignificant relationship between earnings and loan loss provisions in the old

regulatory capital regime which is congruent with the findings of Beatty *et al.* (1995). However, the authors find a negative relationship between earnings and loan loss provisions in the post-Basel time period which does not support the income smoothing hypothesis. Additionally, Ahmed *et al.* (1999) estimate the empirical model employed by Collins *et al.* (1995) to justify the inconsistency in their findings. Surprisingly, they find a positive and significant relationship between earnings and loan loss provisions under the old regulatory regime which suggests that the income smoothing results in Collins *et al.* (1995) may be driven by the inclusion of the beginning of year non-performing loans as a control variable. Similar to Ahmed *et al.* (1999), Rivard *et al.* (2003) investigate the impact of Basel I on income smoothing for 96 large U.S. bank holding companies over the period 1992 to 1997. The authors follow the methodology employed by Greenawalt and Sinkey (1988) who dealt solely with income smoothing, as opposed to Beatty *et al.* (1995), Collins *et al.* (1995) and Ahmed *et al.* (1999) who examine signalling, tax and capital management alongside income smoothing. Interestingly, when comparing the economic significance of the coefficient on operating income with that of Greenawalt and Sinkey (1988), the coefficient was not only strongly significant but four times as large for the post-Basel I period. This finding suggests that banks have indeed increased their use of loan loss provisions to smooth income under Basel I, which is contrary to the finding of Ahmed *et al.* (1999).

The Effect of the 1990s Economic Boom

Liu and Ryan (2006) however, disregarded the impact of this regulatory change and investigate income smoothing at different stages of the business cycle instead. Specifically, the authors investigate how the banks' management of loan loss provisions and loan charge-offs changed from a period of poor financial health and ultimately a recession (1974 to 1990) to a period of recovery and economic boom throughout the 1990s using a sample of 329 bank holding companies.[18] The study of Liu and Ryan (2006) differs from other studies as it investigates the use of loan charge-offs for income smoothing which are typically treated as a non-discretionary[19] control variable; perhaps because charge-offs do not directly affect net

[18] The sample of Liu and Ryan (2006) covers the period 1991 to 2000, which includes the entire 1990s boom. However, the sample does not include the recessionary period up to 1990 due to lack of data availability thus, the authors contrast their results to those of prior research.

[19] Loan loss provisions made in order to cover expected future loan losses are referred to as non-discretionary loan loss provisions whereas loan loss provisions used for management objectives are referred to as discretionary loan loss provisions (Bouvatier and Lepetit, 2008). Loan charge-offs are used to determine the non-discretionary component of loan loss provisions.

income.[20] The findings of Liu and Ryan (2006) are supportive of income smoothing during the 1990s boom. Moreover, profitable banks, which held more homogeneous loans such as consumer loans show higher levels of income smoothing. In addition, Liu and Ryan (2006) discuss the reasons for the lack of consensus among research studies on income smoothing. The authors advocate that a principal reason for this bank management practice is that income smoothing is a more contextual and less purely symmetrical behaviour than it is captured by the usual research designs. In other words, Liu and Ryan (2006) suggest that banks may manage income downward during an economic boom differently from how they manage income upward during an economic recession and this is what the following research studies sought to investigate.

The Effect of the 2007 Global Financial Crisis

Similar to Liu and Ryan (2006), Alali and Jaggi (2010) compare the impact of the 2007 financial crisis on the use loan loss provisions to manage reported earnings to that of the pre-crisis period. In addition, the authors investigate whether the use of loan loss provisions to manage reported earnings differs between large and small banks and whether the riskiness of the bank portfolio plays a role. Alali and Jaggi (2010) also hypothesise that the issue of SFAS No. 114- which provides stricter and more detailed guidelines for the impairment of loan losses- restricted the flexibility of bank managers to use loan loss provisions for the purpose of income smoothing. Alali and Jaggi (2010) employ a substantially large sample of 11,315 commercial banks over the period 1992 to 2008. First, the authors find that bank size plays an important role in earnings management as large banks with assets greater than $300 million are found to manage reported earnings by adjusting loan loss provisions more than small banks. Secondly, banks with higher risk asset portfolios are found to adjust loan loss provisions to manage reported earnings more than banks with less risky asset portfolios. Thirdly, the detailed guidelines provided by SFAS No.114 have been found to be successful in constraining income smoothing. Lastly, Alali and Jaggi (2010) find that during financial crisis period of 2007-2008 banks engaged in higher levels of income smoothing compared to the pre-crisis period, as hypothesised.

[20] A loan charge-off is defined as completely removing a loan from the balance sheet by subtracting its book value from loans and from loan loss reserves (Walter, 1991).

El Sood (2012) employ a sample of 878 bank holding companies over the period 2001 to 2009 and find evidence in support of income smoothing. Specifically, the author finds that the effect of income smoothing on loan loss provisions is amplified when: (i) banks reach the regulatory minimum target, (ii) are in non-recessionary periods and (iii) are more profitable. Interestingly, El Sood (2012) find that the regulatory capital ratios banks set internally are relatively more statistically significant than regulatory-set ratios that could trigger income smoothing behaviour using loan loss provisions. Contrary to Alali and Jaggi (2010) and in line with Liu and Ryan (2006), when comparing the pre-crisis boom of 2000-2006 with the financial crisis period of 2007-2009 the author find evidence in support of income smoothing only in the pre-crises period. Overall, empirical evidence of prior research on whether bank managers use loan loss provisions for income smoothing is inconclusive and the respective hypothesis is presented in next.

3.2.1.3 Hypothesis

Income smoothing occurs when bank management tends to raise loan loss provisions in periods of high operating income and lower loan loss provisions in periods of low operating income. Consequently, the net impact of these adjustments results in a lower volatility in reported earnings. Following the review of the Generally Accepted Accounting Principles- which allow managers to exercise their discretion when determining loan loss provisions- evidence in support of income smoothing is expected. Further, the introduction of the Basel regulatory capital requirements may facilitate this practice as changes in loan loss provisions no longer have a substantial and direct impact on the capital adequacy ratio. As a result, there is less constraint or costs associated with income smoothing (Anandarajan *et al.*, 2007). Therefore, building on the prior research and considering the impact of the capital adequacy requirements and accounting standards governing the estimation of loan loss provisions, finding evidence in support of income smoothing is expected and the respective hypothesis is as follows:

H1a. The relationship between loan loss provisions and earnings before provisions and taxes will be positive in the period 2002-2016.

The sample period employed in this research covers the financial crisis period which the National Bureau of Economic Research (n.d) classifies as the years 2007, 2008 and 2009. Thus, in line with Liu and Ryan (2006), Alali and Jaggi (2010) and El Sood (2012), the impact of the financial crisis on income smoothing behaviour is also investigated. Pinto and Picoto (2018)

posit that the effect of the 2007-2009 financial crisis on earnings management is ambiguous and present the following two outcomes. On the one hand, in periods of economic stress, managers may have higher incentives to underreport loan loss provisions to smooth earnings to meet or beat thresholds or to give a better image of the bank's performance to investors. On the other hand, in troubled times, managers may over-report loan loss provisions to perform income-reducing earnings management because it may be favourable in the contexts of debt restructuring, labour union renegotiations, and when obtaining government support in times of financial distress. Further, banks are subject to higher monitoring from different stakeholders such as institutional investors, regulators and the government. Thus, if this increases pressure for conservative earnings and higher quality in financial reports, lower earnings would be associated with higher levels of loan loss provisions to reflect the loan losses incurred during the recessionary period (Francis *et al*., 2012).

Therefore, aiming to contribute to this strand of research by analysing the impact of the financial crisis on managers' discretion in the U.S. banking sector, the following hypothesis is put forward:

H1b. A negative relationship or a larger magnitude in the positive relationship between loan loss provisions and earnings before provisions and taxes is expected during the 2007-2009 financial crisis period compared to the pre- and post-crisis periods.

In addition to income smoothing, loan loss provisions can be used to signal good news about future earnings changes in an attempt to convey a signal of conservatism and confidence that management can withstand a "hit" to earnings. The signalling hypothesis and related empirical research are discussed in the following section.

3.2.2 Signalling Future Earnings

Signalling theory assumes that managers tend to signal private information about their firm to reduce information asymmetry and to communicate positive inside information to investors (Akerlof, 1970). Thus, in order to address information asymmetries between better informed managers and less informed investors or regulators, bank managers may have incentives to use loan loss provisions to convey their private information. More specifically, the need for signalling through loan loss provisions arises when managers- with information indicating that the bank's market value is higher than that assessed by the market- aim to have the market

values revised upward (Lobo and Yang, 2001). An approach that can be employed to achieve this objective is to signal that the bank is strong enough to absorb future potential losses by increasing current loan loss provisions. In other words, an increase in current loan loss provisions is considered "good news" because that bank managers are more likely to withstand a "hit to earnings" when the prospects of future earnings are favourable (Musumeci and Sinkey, 1990). Therefore, in this section the empirical research investigating whether loan loss provisions are used to signal financial strength and the respective hypothesis are presented.

3.2.2.1 Review of Empirical Research on the Signalling Effects of Loan Loss Provisions

To understand the information content of loan loss provisions, one stream of research has sought to investigate the association between stock returns and the level of provisions, and a second stream of research investigates the association between loan loss provisions and future earnings. The former stream of research is discussed first.

Liu and Ryan (1995) propose that loan loss provisions contain both good and bad news about loan default. Good news suggest that the bank is willing and able to take a "hit to earnings" and the bad news about loan default are largely pre-empted by more timely changes in non-performing loans. Therefore, good news signalled by the act of increasing loan loss provisions cannot be pre-empted by changes in non-performing loans, which are relatively non-discretionary and do not affect earnings. Moreover, Liu and Ryan (1995) maintain that the bad news about loan default dominate good news when loan loss provisions are made on a timely basis. In detail, Liu and Ryan (1995) argue that loan provisioning timeliness decreases with provisioning discretion, thereby affecting the information content of provisions. Thus, using loan portfolio composition, Liu and Ryan (1995) identify banks that provide for loan losses on a sufficiently timely basis to yield a negative market reaction to loan loss provisions.[21] The authors obtained quarterly data from the fourth quarter of 1983 to the second quarter of 1991 for 140 U.S. banks. Liu and Ryan (1995) hypothesised and found that the market reaction to loan loss provisions is positive (negative) for banks with a high (low) proportion of large and frequently renegotiated loans and that the market anticipation of loan loss provisions is more

[21] Liu and Ryan (1995) use loan portfolio composition to test the market reaction to loan loss provisions because loan portfolio composition affects the degree to which bad news are conveyed to the market by such provisions rather than by other sources of information about loan default.

negative and further in advance of the provision for banks with a higher proportion of large and frequently renegotiated loans.

Further, Liu *et al.* (1997) sought to determine for which banks discretionary increases in loan loss provisions have positive valuation implications. The authors employ a sample of 104 banks using quarterly data over the period 1983 to 1991 and find that loan loss provisions are perceived as good news, hence, are positively related to stock market reactions and future cash flows but only for "at risk" banks in the fourth quarter. On the contrary, loan loss provisions for "not at risk" banks and during the first through third quarters are perceived as bad news. The findings related to the fourth quarter provision are interesting because presumably, they reflect the effects of the audit process. However, Liu *et al.* (1997) do not examine the role of the auditor in the context of market valuation of discretionary loan loss provisions and note that 'auditor involvement is critical, though the specific ways in which auditors exert their influence is largely unknown and requires additional research (p. 145).' Beatty and Liao (2014) highlight two unexplored yet important interpretations of the findings of Liu *et al.* (1997). First, a higher provision level during an economic boom may indicate that banks are timelier in recognising provisions. Thus, based on the studies one can argue that banks that are timelier, are less procyclical and less affected by recessions consequently, markets may react positively to these banks (Bushman and Williams, 2012). Secondly, as the time period employed by Liu *et al.* (1997) predates the implementation of Basel I, an increase in loan loss provisions would have led to a respective increase in regulatory capital. Therefore, a positive market reaction may have reflected an increase in the capital adequacy ratio. For example, the finding of positive valuations of provisions for low capital ratio banks by Liu *et al.* (1997) seems to be consistent with this argument because low capital banks could benefit more from increased provisions (Beatty and Liao, 2014). In accordance with this argument, Ahmed *et al.* (1999) find that loan loss provisions are negatively correlated with stock returns in the post-Basel regime where an increase in loan loss provisions can cause a decrease Tier I capital. Based on this finding, it appears that regulatory capital can explain both the positive pre-Basel and negative post-Basel relationship between stock returns and loan loss provisions.

Regarding the second stream of research, Ahmed *et al.* (1999) also examine whether loan loss provisions are used as to signal future expected cash flow by examining 113 banks over 1987 to 1995. Ahmed *et al.* (1999) fail to observe a positive relation between the one-year ahead change in earnings and loan loss provisions. Indeed, Ahmed *et al.* (1999), assert that the signalling results in prior research are specific to the time period of the study. To address

whether different sample periods might be driving this difference, Lobo and Yang (2001) partitioned their sample of 50 banks into two sub-periods consisting of the years 1981 to 1988 and 1989 to 1996. Two major features of their results are noteworthy. First, partly consistent with the results of Ahmed *et al.* (1999), the relation between future earnings changes and loan loss provisions is negative but not significantly different from zero in the 1989 to 1996 time period. Indeed, the results weakly confirm the tendency of a negative relationship between one-year ahead changes in earnings and provisions in this period. Second, for any sub-period, the authors' findings do not support the signalling hypothesis which predicts a statistically positive relation between a one-year ahead change in earnings and loan loss provisions.

Building on prior research, the thesis aims to re-examine the use of loan loss provisions to signal future earnings in order to observe whether this holds in a more recent time period after controlling for important economic determinants of loan loss provisions. Thus, the signalling hypothesis is presented next.

3.2.2.2 Hypothesis

To develop the signalling hypothesis, Wahlen (1994) suggests that loan loss provisions will contain some positive signals about loan quality after controlling for other non-discretionary indicators of loan default such as changes in non-performing loans and loan charge-offs. Following this reasoning, if bank managers believe that investors view abnormal increases in loan loss provisions as a signal of loan quality, a positive relation between loan loss provisions and future earnings can be expected. Moreover, Beaver *et al.* (1989) and Anandarajan *et al.* (2007) suggest that an increase in loan loss provisions can convey a signal of conservatism and indicate that management perceives the earnings power of the bank to be sufficiently strong that it can withstand a "hit to earnings." Implicit in their reasoning is that the increase in loan loss provisions conveys a signal of good news about the strength of a bank's future earnings. However, an increase in loan loss provisions can also be viewed as bad news especially if it is not accompanied by other, more timely indicators of loan default because loan loss provisions will then serve as the primary source of information on loan default. Banks generally disclose information on the change in non-performing loans, which is an important indicator of loan default. Thus, by virtue of controlling for timely indicators of loan default in the empirical model specification, any excess loan loss provisions will contain only the good news component (Wahlen, 1994; Liu and Ryan, 1995).

The objective of examining the use of loan loss provisions to signal future earnings is to disentangle the different motives underlying bank managers' use of discretion over loan loss provisions. Specifically, knowledge of such factors will enable users of financial statements to better understand and interpret the information conveyed by reported accounting earnings (Kanagaretnam *et al*., 2004). In addition, by understanding the conditions under which managers use their discretion over the estimation of loan loss provisions to communicate their private information, regulators can distinguish between managers' use of accounting discretion for opportunistic purposes and their use of accounting discretion to increase the informativeness of reported earnings. Overall, if signalling is an important motive for deciding the level of loan loss provisions then a positive relation between loan loss provisions and changes in future earnings is expected. Hence, the signalling hypothesis is stated as follows:

H2. Loan loss provisions are positively related to one-year ahead changes in earnings before loan loss provisions and taxes in the period 2002-2016.

In addition to income smoothing and signalling, loan loss provisions can be used to manage regulatory capital which section 3.2.1.2 demonstrated. As such, the means by which capital management can be practiced, the empirical research investigating this, and the respective hypothesis are discussed next.

3.2.3 Capital Management

The use of loan loss provisions to manage regulatory capital ratios stems from the notion that bank managers use provisions 'to avoid the costs associated with the violation of capital adequacy requirements' (Curcio and Hasan, 2015, p.29). In fact, these costs should not be underestimated as the penalties for falling below the minimum capital requirements subjects U.S. banks to Prompt Corrective Action restrictions, including ceasing dividends, filing and implementing a capital restoration plan and prohibiting acceptance, renewal or rolling-over of broker certificates of deposit (Baker and Wurgler, 2013). Nonetheless, the impact loan loss provisions have on adjusting the levels of regulatory capital has gradually diminished following the implementation of Basel I and even more so under the Basel II regulatory frameworks. Therefore, the impact the Basel Accords have on the use of loan loss provisions for the purpose of capital management is examined first.

3.2.3.1 The Effects of the Basel I International Regulatory Framework

In the United States, loan loss reserves were fully incorporated in regulatory capital prior to the implementation of the Basel I minimum regulatory capital requirements in 1992; regulators required banks to hold primary capital and total capital exceeding 5.5% and 6% of total assets, respectively (Ahmed *et al.*, 1999). In detail, primary capital included book value of equity, loan loss reserves, perpetual preferred stock and mandatory convertible debt and total capital was defined as the sum of primary capital, subordinated debt and limited life preferred stock. Thus, the inclusion of loan loss reserves in defining regulatory capital had had a direct and significant impact on regulatory capital as one dollar increase in the loan loss reserves increased regulatory capital by the tax rate times one dollar (Moyer, 1990). Consequently, managers of banks with low regulatory capital had incentives to increase loan loss provisions which in turn would increase loan loss reserves. However, increasing regulatory capital entailed a trade-off as increasing loan loss provisions would result in a respective decrease in net income (Kim and Kross, 1998). Nonetheless, with the introduction of Basel I in 1988, the composition and computation of capital ratios drastically changed. In detail, total capital was divided into Tier I capital and Tier II capital. According to the Basel Committee on Banking Supervision (1998), Tier I capital is defined as the sum of shareholder's equity, non-cumulative perpetual preference stock and minority interests thus, excluding loan loss reserves. Instead, loan loss reserves count as an important component of Tier II capital. Specifically, Tier II capital is defined as a sum of loan loss reserves (up to 1.25% of risk-weighted assets), preference shares, hybrid capital instrument, subordinate term debt and perpetual debt (BCBS, 1998). In addition, the minimum capital requirement level is 4% of Tier I capital ratio and 8% of total capital ratio, instead of the primary capital ratio of 5.5% and total capital ratio over 6% requirement prior to Basel I. Therefore, it is worth investigating how bank managers adjust their manipulation mechanisms in response to these regulatory policy changes.

The effect of loan loss provisions on total capital following the implementation of Basel I is twofold. First, any growth in loan loss reserves via loan loss provisions lowers Tier I capital because it reduces shareholders' equity. Second, regulatory capital guidelines allow loan loss reserves to be added back as capital up to a limit of 1.25% of risk-weighted assets. Thus, if loan loss reserves prior to the provision already exceed 1.25% of risk-weighted assets, there is no effect beyond the decline in Tier I capital. However, if loan loss reserves are below the 1.25% limit, the increase in the reserves via an increase in loan loss provision is added back to

regulatory capital as a component of Tier II capital. Thus, the add-back has the potential of generating a situation where total capital does not decline and may even increase when there is an increase in loan loss reserves. Ng and Roychowdhury (2014) illustrate the role of loan loss reserve increases in influencing regulatory capital by providing the following numerical example. At first, it is assumed that a bank increases its loan loss reserves by reporting a loan loss provision of $100 and that the statutory tax rate is 40%. This transaction, ceteris paribus, has two effects on regulatory capital: (i) a Tier I effect and (ii) a Tier II effect. The loan loss provision of $100 reduces after-tax income by $100 × (1 - tax rate), or $60, which in turn reduces shareholders' equity and hence Tier I capital by $60. However, since banking capital regulations allow loan loss reserves to be added back to Tier II capital, Tier II capital increases by the provision amount of $100. As a result, total regulatory capital (the sum of Tier I and Tier II) increases by $ (-60 + 100) or $40 as a result of the loan loss provision, that is, the tax rate times the provision amount. It must be emphasised though that if loan loss reserves prior to the provision were already equal to or greater than 1.25% of risk-weighted assets, the $100 provision in the above example would not increase Tier II capital. Moreover, if loan loss reserves were below the 1.25 % threshold but significantly close to it, it is possible that only a portion of the $100 loan loss provision would count towards Tier II capital and not the entire amount. Overall, this example proves that an increase in loan loss reserves can increase regulatory capital but the effect of such an increase on regulatory capital depends on the size of total available Tier II capital relative to the maximum limit allowable under current regulations. As such, the first Basel Accord introduced in 1988 and widely implemented in 1992 gave a new impetus to researchers to investigate the use of loan loss provisions to manage regulatory capital ratios. Therefore, the empirical research investigating capital management prior to Basel I and under the Basel I regulatory framework is discussed next.

3.2.3.2 Review of Empirical Research on Capital Management

The findings of Collins *et al.* (1995) and Beatty *et al.* (1995) are discussed first as the authors investigate the relationship between loan loss provisions and regulatory capital over the pre-Basel I time period. In this way, the findings of these authors can act as a basis of comparison for post-Basel I studies. Collins *et al*. (1995), as discussed in section 3.2.1.2, examine the impact of individual banks' changing levels of capital, earnings and taxes on decisions to engage in seven capital-raising options: security gains and losses, loan loss provisions, loan charge-offs, capital notes, common stock, preferred stock, and dividends using a sample of 160

U.S. banks in the period 1971 to 1991. With regards to loan loss provisions, the authors estimate the effect of capital on bank-by-bank variation in loan loss provisions and find a positive relation between capital and loan loss provisions. In other words, banks with low levels of capital tend to decrease, rather than increase, loan loss provisions. Ahmed *et al.* (1999) who replicate the methodology adopted by Collins *et al.* (1995) suggest that this counter-intuitive result was driven by the authors' assumption that the target variable for capital management is the bank-specific time-series mean capital ratio rather the minimum ratios specified by the bank regulators. Accordingly, Beatty *et al.* (1995) apply a methodology that takes into account the simultaneity of bank accounting, financing, and operating decisions as they claim that conflicting earnings, tax and capital management objectives are likely to be traded off. Thus, Beatty *et al.* (1995) employ a sample of 148 large banks over the period 1985 to 1989 and, contrary to Collins *et al.* (1995), find that loan loss provisions are used to manage regulatory capital levels.

However, as already discussed, the enforcement of Basel I drastically transformed the composition of minimum capital requirements and is thought to have distorted the incentives for capital management. Thus, motivated by this regulatory policy change, Kim and Kross (1998) and Ahmed *et al.* (1999) test the effects of the changes in capital adequacy regulations. Kim and Kross (1998) employ a sample of 193 U.S. bank holding companies from 1984 to 1992 and, as hypothesised, bank managers are found to decrease lower loan loss provision after the Basel I regulatory changes. In detail, banks with low capital ratios show lower loan loss provisions during 1990-1992 than during 1985-1988. In contrast, the change in the capital standards has no apparent effect on the loan loss provisions of banks with high capital ratios. Ahmed *et al.* (1999) expected a lower magnitude in the relationship between loan loss provisions and capital under Basel I and an even weaker relationship for banks with loan loss reserves exceeding 1.25% of risk-weighted assets due to the negligible capital benefits. Using a sample of 113 bank holding companies over the period 1986 to 1995, their findings support their hypotheses. Specifically, Ahmed *et al.* (1999) find that under Basel I the magnitude of the negative relationship between loan loss provisions and capital has significantly diminished. In addition, similar to Kim and Kross (1998), this is indeed more prominent for banks with loan loss reserves exceeding the upper bound level of loan loss reserves as these banks face diminishing incentives to use loan loss provisions for capital management.

The study of Lobo and Yang (2001) focuses on replicating the methodologies adopted by Collins *et al.* (1995) and Ahmed *et al.* (1999), using a sample of 50 U.S. banks over the period

1978 to 1996, to identify the source of the inconsistency in their results. Lobo and Yang (2001) find that the coefficient of capital management is sensitive to the research designs employed in those studies. That is, they have estimated the relationship between loan loss provisions and capital management using four distinct model specifications and the results from all four have failed to find evidence in favour of capital management. In fact, their results are supportive of those of Collins *et al.* (1995) in that bank managers with low capital appear to decrease, rather than increase, their discretionary loan loss provisions. However, this congruency in results is because Lobo and Yang (2001) adopted the same definition of capital as Collins *et al.* (1995) which was a time series bank-specific capital ratio. Thus, when they implemented definition of capital of Ahmed *et al.* (1999), which was the minimum ratio specified by regulators, they found a negative relationship between loan loss provisions and capital management. Overall, Lobo and Yang (2001) support that bank managers appear to use loan loss provisions to manage their regulatory capital levels by comparing them with the minimum ratios specified by regulators rather than with a time-series bank-specific ratio or pooled time-series cross-sectional mean ratio hence, supporting the findings of Ahmed *et al.* (1999).

Finally, Alali and Jaggi (2010) conduct a relatively more comprehensive study by investigating capital management with respect to the riskiness of a bank's asset portfolio, the size of a bank, the impact of the 2007-2008 financial crisis and SFAS No.114. Moreover, the authors employ a sample of 11,315 U.S. commercial banks over the period 1992 to 2008 to fully capture the impact of regulatory changes and the financial crisis. Interestingly, Alali and Jaggi (2010) find no significant difference in the use of loan loss provisions to manage capital ratios between large and small banks. However, banks with high risk asset portfolios were found to use more loan loss provisions to manage capital ratios compared to banks with low risk asset portfolios. Lastly, the authors find inconclusive evidence on the moderating effect of SFAS No.114 on the use of loan loss provisions to manage capital ratios as well as on the use of loan loss provisions to manage capital ratios during the financial crisis.

Overall, the Basel I capital requirements seem to have diminished the extent to which bank managers use loan loss provisions to manage capital. Nonetheless, the capital management hypothesis is presented in the following section and the impact of the Basel II regulatory capital requirements is considered.

3.2.3.3 Hypothesis

In 2004, the Basel Committee on Banking Supervision passed a revision of its accord on capital regulation, which was intended to come into force in 2007. The new Basel Accord, referred to as Basel II, sought to better align regulatory capital with economic risk and, in contrast to Basel I, the capital charges are based on asset quality rather than on asset type for which banks can choose among several approaches (Heid, 2007). Specifically, the Standardised approach to credit risk is based on the borrower's public ratings by attributing specific risk weights to the respective rating classes. However, more sophisticated banks are eligible for the two Internal Ratings Based approaches (IRB), which permit the use of the banks' own internal rating systems to quantify the creditworthiness of their debtors. Similar to Basel I, total capital charges are 8% of risk-weighted assets (BCBS, 2006). Moreover, the enforcement of Basel II aimed to alter the effect of loan loss provisions on the capital ratio. In detail, when banks apply the Standardised approach, loan loss provisions still count for up to a maximum of 1.25% of Tier II capital but under the IRB approach loan loss provisions are excluded from Tier II capital thus, disincentivising capital management (BCBS, 2006). Therefore, based on the Basel II regulatory framework it would be appropriate to consider only the banks which adopt the Standardised approach to credit risk for investigating capital management. However, according to the SNL Financial database which reports the *regulatory financials* of U.S. financial institutions, the capital adequacy methods used for the period 2002-2016 is Basel I and for some banks Basel III suggesting that Basel II was never fully implemented as a method for reporting regulatory capital requirements. Indeed, Dugan and Xi (2011, p.4) provide evidence in support of this observation by stating the following:

'Now US supervisors- primarily the Federal Reserve Board and the Office of the Comptroller of the Currency (OCC)- must individually approve each of these banks as having adequate systems to reliably run the complex models necessary for the "advanced approaches" of Basel II. To date [2011], US supervisors have not provided that approval for any US bank, and it is not clear when such approvals will occur. As a result, although US banks have raised over USD 300 billion in new equity capital since the start of the financial crisis in 2007, they remain subject to the Basel I capital requirements, not Basel II.'

Evidently, the findings of this research and their interpretation will be based on the Basel I regulatory framework. Overall, taking into account these regulatory policy changes and the empirical findings on capital management, the impact of Tier I capital on loan loss provisions

is expected to be positive. In other words, low capital banks are expected lower loan loss provisions in order to increase retained earnings and subsequently, Tier I capital. Thus, the respective hypothesis is as follows:

H3. The relationship between loan loss provisions and the Tier I ratio will be positive in the period 2002-2016.

In the absence of manipulation of loan loss provisions for the purpose of signalling, earnings and capital management, loan loss provisions are inherently procyclical. This is due to the "incurred loss" methodology used to recognise this accrual expense which rests on ex-post data (Handorf and Zhu, 2006). Thus, the procyclicality of loan loss provisions, the related empirical research and the respective hypothesis are discussed next.

3.2.4 Procyclicality of Loan Loss Provisioning

The discretion bank managers can exercise in determining loan loss provisions has evidently attracted considerable attention from both regulators and researchers. More recently, however, researchers have expanded the research on loan loss provisions by investigating their timeliness over the business cycle and the associated effects on the banks' lending behaviour and financial stability (Laeven and Majnoni, 2003; Bikker and Metzemakers, 2005, Beatty and Liao, 2011). Specifically, bank loan loss provisions are considered to behave in a procyclical manner as their actions tend to 'reinforce the momentum of underlying economic cycles- their lending, credit rating policy and provisioning practices move in correlation with the economy's short-term business cycles' (Gonzales, 2009, p.1). Indeed, loan loss provisions being a key accrual expense, they directly influence the volatility and cyclicality of bank earnings, as discussed in section 2.4, as well as information properties of banks' financial reports with respect to reflecting the loan portfolios' risk attributes (Bushman and Williams, 2012). Specifically, it has been argued that Basel regulatory framework can cause the procyclicality of capital requirements and, alternatively, GAAP could encourage procyclical behaviour through loan loss provisions (Curcio and Hasan, 2015). Thus, the scope of the thesis is to examine the alleged procyclicality of loan loss provisioning and the ways in which it affects the procyclicality of capital requirements with the purpose of linking these findings to accounting and regulatory implications. Therefore, the procyclicality of loan loss provisions and the related empirical research are analysed in this section.

3.2.4.1 The "Incurred Loss" Methodology for Loan Loss Provisioning

The procyclicality of loan loss provisions can be attributed to the guidelines of the Generally Accepted Accounting Principles which U.S. banks must comply with (Wall and Koch, 2000). These accounting standards utilise an "incurred loss" methodology in reporting loan loss provisions where loan losses are recognised: (i) only after loss events have occurred, (ii) prior to the reporting date and (iii) are likely to result in future non-payment of loans (Bushman and Williams, 2012). However, this accounting principle does not generally allow for consideration of future expected losses based on trends suggestive of additional future losses (El Sood, 2012). Thus, during an economic upturn banks tend to be excessively optimistic about the economy and hence their customers' position. As a result, banks advance loans against poorer collateral, reduce the applied risk premia and allocate less loan loss provisions to cover expected risks based on the incurred loss approach (Balla and Rose, 2015). Subsequently, bank procyclicality during an economic upturn contributes to rapid credit growth, the rise in collateral values, artificially low lending spreads and a decline in loan loss provisions as bank managers cannot account for additional future expected losses (Gonzales, 2009; El Sood, 2012). On the contrary, during an economic downturn, when business cycles trend downwards and the optimism exhibited during a cyclical upswing vanishes, formerly hidden shortcomings become visible (Bikker and Metzemakers, 2005). During these times, banks will typically behave in a way that further aggravates the situation- responding, for instance, with an excessive cutback in lending, which can result in a credit crunch, or setting up disproportionately large loss provisions, which can undermine their profitability, worsen their capital situation and prolong the downturn (Laeven and Majnoni, 2003; Bouvatier and Lepetit, 2008). Most empirical research investigating the procyclicality of loan loss provisions use cross-country data for example, Bikker and Metzemakers (2005), Bouvatier and Lepetit (2008), Cavallo and Majnoni (2002) and Laeven and Majnoni (2003). In the context of the U.S. banking sector, one study has been found investigating the procyclicality of loan loss provisions and is discussed next.

3.2.4.2 Review of Empirical Research on the Procyclicality of Loan Loss Provisioning

Handorf and Zhu (2006) employ a sample of 1,331 U.S. banks over the period 1990 to 1999 and hypothesise that, in general, U.S. banks exercise prudential behaviour by following the regulatory guidance and accounting standards in setting up provisions. Thus, evidence in support of procyclicality is expected. The authors' findings, however, are not supportive of the

procyclical behaviour of loan loss provisions for average-sized banks, which may also indicate that these banks engage in income smoothing activities that lead to a countercyclical pattern. Nonetheless, procyclicality of loan loss provisions is found among the smaller and largest banks in the United States. Also, it must be considered that the only recessionary period which is accounted for in their sample period is the last two quarters of 1990 and the first quarter of 1991. This time period predates the issue of the Statement of Financial Accounting Standards No. 114 which introduced stricter guidelines on the implementation of the "incurred loss" methodology and ends before the issuance of Staff Accounting Bulletin (SAB) 102 which may have affected the provisioning practices of average-sized banks. Further, Laeven and Majnoni (2003), include U.S. banks in their sample of 45 countries and a total of 1,419 banks. Similar to Handorf and Zhu (2006), they study the period 1988 to 1999 to capture both the economic slowdown in the United States of the early 1990s and the following upswing in the mid and late 1990s. The authors find evidence in support of procyclicality; banks in the United States provision less during times of high GDP growth suggesting the cyclical behaviour of provisioning. Thus, employing a more recent time period that encompasses the 2007-2009 financial crisis and the enactment of more stringent accounting reforms, procyclicality of loan loss provisions is expected and the respective hypothesis is presented next.

3.2.4.3 Hypothesis

Overall, the findings of prior research on loan loss provisioning practices reflect the responsiveness of bank management behaviour towards changes to accounting requirements in utilising their discretion over the estimation of loan loss provisions. Moreover, the extent of procyclicality of loan loss provisions depends on whether bank managers engage in earnings management practices. Specifically, based on the income smoothing hypothesis, during an economic upturn when banks are more profitable, loan loss provisions would increase and during an economic downturn, when profitability declines, loan loss provisions would decrease. As a result, net income would be less variable over the phases of the economic cycle and would potentially reduce the procyclical behaviour of provisioning which is viewed as undesirable by the accounting profession. Thus, in the absence of income smoothing, evidence in support of the procyclicality of loan loss provisions is expected. If this is the case, loan loss provisions should be negatively related to the business cycle, which implies that banks under-provision during economic expansions and then over-provision during economic downturns.

Gross domestic product growth is employed as a macroeconomic indicator as in Handorf and Zhu (2006) and Laeven and Majnoni (2003) and the hypothesis is as follows:

H4. Loan loss provisions are expected to be negatively related with the annual growth in gross domestic product in the period 2002-2016.

3.2.5 Summary

This section presented three loan loss provisioning practices namely, income smoothing, signalling and capital management. The empirical research investigating these opportunistic practices has been reviewed and the respective hypotheses developed. In the absence of these practices, loan loss provisions would fluctuate in conjunction with the economy's business cycle thus, the procyclicality hypothesis was also established. In the following section, the data and methodology employed to conduct this research are presented.

3.3 Data and methodology

3.3.1 Introduction

This section introduces the research design developed to test the hypotheses discussed in section 3.2 and is split in three parts. First, section 3.3.2 outlines the data sources and the sample selection procedure used to derive the final dataset of 9,171 bank-year observations for the period 2002-2016. Second, section 3.3.3 presents and describes the static and dynamic empirical models used to test the hypotheses. Third, section 3.3.4 evaluates the econometric methods employed to estimate these models and presents the empirical results.

3.3.2 Sample Selection

To investigate the relationship between loan loss provisions and its discretionary and non-discretionary determinants, a sample of documentary data is collected for the 2002-2016 period. Specifically, bank-specific data and macroeconomic are collected from the SNL Financial database.[22] The bank balance-sheet and income statement data consist of 675 publicly

[22] The SNL Financial database is part of the Standard & Poor's Global Market Intelligence platform and includes detailed profiles on more than 20,000 U.S. financial institutions, including all publicly-traded banks and thrifts, privately held institutions and credit unions.

traded U.S. bank holding companies[23] over the period 2002 to 2016.[24] Following Curcio and Hasan (2015), the sample selection strategy is based on the following three criteria. First, to grant business model homogeneity, only listed U.S. bank holding companies are selected. Indeed, listed bank holding companies comply with the Generally Accepted Accounting Principles which means that these banks follow the same accounting standards when determining loan loss provisions (Wall and Koch, 2000). Hence, this will allow a more accurate assessment of the extent to which the current accounting standards facilitate the practice of income smoothing, signalling and/or capital management. In addition, banks' incentives to hold capital might differ depending on their organisational structure. According to Sengupta and Hogue (2014), bank holding companies can take advantage of tax-deductible interest on bank holding company debt which makes it less costly for bank holding companies to raise capital for their subsidiary banks when needed. Therefore, with regards to the capital management hypothesis, a weaker relationship between regulatory capital and loan loss provisions may be observed if this is the case. Second, only financial information from consolidated balance sheets is considered in order to avoid duplications. The third selection criterion is to select a sample of banks that is as homogeneous as possible in their investment activities and financing methods. Therefore, government development banks, cooperative, thrift, mutual and savings banks are excluded as they operate in a way that is not comparable to bank holding companies (Anandarajan *et al.*, 2007). The total number of bank-year observations following the application of these three criteria is 10,125. Further, banks which- according to the SNL Financial database- have implemented the Basel III regulatory capital adequacy method are eliminated. The reason for this is that the Basel III capital requirements are still in the process of being implemented thus, incentives for capital management cannot be fully captured and this may bias the coefficient estimates. This results in losing 954 observations and the final dataset is comprised of a sample of 9,171 bank-year observations. Table 3.1 reports the sample distribution by year and shows that the sample is evenly distributed from 2002 to 2014 and less so in the years 2015 and 2016 due to the exclusion of banks that have adopted the Basel III capital adequacy requirements.

[23] The Gramm-Leach-Bliley Act of 1999 allows bank holding companies to provide a wide variety of financial services through nonbank subsidiaries such as insurance underwriting, merchant banking and securities dealing (Rose and Hudgins, 2013). These bank holding companies are now chartered as financial holding companies. For simplicity of presentation, here and throughout, financial holding companies are referred to as bank holding companies or banks.

[24] In the context of this research, as it is of interest to capture the impact of the 2007-2009 financial crisis, the beginning year of the time period employed is 2002 to omit the impact of the short-lived recession of 2001 (NBER, n.d.).

Table 3.1: *Sample distribution by year.*

Year	No. of Observations	Percentage of Pooled Sample
2002	675	7.36
2003	675	7.36
2004	675	7.36
2005	675	7.36
2006	675	7.36
2007	675	7.36
2008	675	7.36
2009	675	7.36
2010	675	7.36
2011	675	7.36
2012	674	7.35
2013	674	7.35
2014	665	7.25
2015	205	2.24
2016	203	2.21
Total	9,171	100.00

Thus, due to missing observations the data distribution is an unbalanced panel. In detail, a panel dataset is a type of pooled cross-section time-series dataset which consists of measurements on the same banks over several periods and may be either balanced or unbalanced. According to Baum (2006) in a balanced panel, each of the units, $i = 1, \dots, N$, is observed in every period $t = 1, \dots, T$, resulting in $N \times T$ observations in the dataset. However, due to missing observations, financial data are not available each year for each bank in the sample which results in having an unbalanced dataset and this is in fact 'likely to be the norm in typical economic empirical settings' and this case is no exception (Baltagi, 2005, p.165). It is indeed preferable to work with an unbalanced panel as the alternative of constraining this analysis to a balanced panel, would most likely create survivorship bias (Baum, 2006).[25] Lastly, to mitigate potential heteroscedasticity due to bank size differences, all bank-specific variables are scaled by total assets as in Kim and Kross (1998), Hasan and Wall (2004) and El Sood (2012). The empirical models employed for examining the determinants of loan loss provisions are presented in the following section.

[25] In addition, *Stata*, the statistical software utilised to estimate all empirical models, has tools for panel data which make it easy to work with unbalanced panels according to Baum (2006).

3.3.3 Empirical Analysis

3.3.3.1 Model Specification

To examine the loan loss provisioning practices of U.S. banks and the cyclicality of loan loss provisions the following empirical model is employed. According to Lobo and Yang (2001), this is a model of investors' expectations of loan loss provisions which takes the form of a bank-specific time-series regression model.

$$\begin{aligned} LLP_{it} = \beta_0 \; &+ \beta_1 EBTP_{it} + \beta_2 \Delta EBTP_{it+1} + \beta_3 TierI_{it} + \beta_4 GDPGR_{it} + \beta_5 LLR_{it-1} \\ &+ \beta_6 \Delta LCO_{it} + \beta_7 LTA_{it-1} + \beta_8 \Delta LTA_{it} + \beta_9 NPL_{it-1} + \beta_{10} \Delta NPL_{it} \\ &+ \beta_{11} LnTA_{it} + \beta_{12} T_t + c_i + u_{it} \end{aligned} \quad (3.1)$$

where:

i = bank holding company identifier;
t = year (2002 to 2016);
LLP_{it} = Loan loss provisions scaled by total assets;
$EBTP_{it}$ = Earnings before extraordinary items, tax expense and loan loss provisions scaled by total assets;
$\Delta EBTP_{it+1}$ = 1-year ahead change in earnings before taxes and provisions scaled by total assets;
$TierI_{it}$ = Tier I capital scaled by total risk-weighted assets;
$GDPGR_{it}$ = Percentage change in real GDP, over previous period;
LLR_{it-1} = Beginning of period loan loss reserves scaled by total assets;
ΔLCO_{it} = Change in the value of net loan charge-offs scaled by total assets;
LTA_{it-1} = Beginning of period net loans scaled by total assets;
ΔLTA_{it} = Change in the value of net loans scaled by total assets;
NPL_{it-1} = Beginning of period non-performing loans scaled by total assets;
ΔNPL_{it} = Change in the value of non-performing loans scaled by total assets;
$LnTA_{it}$ = Natural logarithm of total assets;
T_t = A series of dummy variables where 1 if the bank is drawn from year 't'; 0 otherwise.

The dependent variable of the regression model is LLP_{it} which is the ratio of loan loss provisions to total assets at time t for the bank i. To test for income smoothing, capital management and signalling, the respective variables, $EBTP_{it}$, $Tier1_{it}$, $\Delta EBTP_{it+1}$, are chosen as predictors. These are commonly used in the empirical research studies and are classified as the discretionary component of loan loss provisioning. In other words, bank managers exercise their discretion in estimating loan loss provisions to achieve these objectives. However, absent of management discretion, loan loss provisions are inherently procyclical and reflect the level of "bad" loans which managers cannot manipulate or control and these are based on the asset

quality indicators analysed in section 2.5.2. Therefore, the variables which are associated with the discretionary and non-discretionary components of loan loss provisioning are discussed next.

The discretionary component of loan loss provisions results from three different management objectives. Under the income smoothing hypothesis, following prior research such as Ahmed *et al.* (1999), Lobo and Yang (2001), Hasan and Wall (2004), among others, the ratio of earnings before extraordinary items, tax expense and loan loss provisions to total assets, $EBTP_{it}$ is employed. This hypothesis is supported if the variable coefficient has a positive sign, meaning that bank management can understate (overstate) loan loss provisions when earnings are expected to be low (high) (Alali and Jaggi, 2010; Bouvatier *et al.*, 2014). With regards to the signalling hypothesis, loan loss provisions can also be used to signal financial strength. That is, bank managers increase reported loan loss provisions when they expect an improvement in future earnings or permanent earnings prospects (Lobo and Yang, 2001). This implies that loan loss provisions will be positively related to change in future earnings, $\Delta EBTP_{it+1}$, as in Ahmed *et al.* (1999), Kanagaretnam *et al.* (2004) and Anandarajan *et al.*, (2007). To test the capital management hypothesis, the ratio of Tier I capital to total risk-weighted assets, $TierI_{it}$, is computed. Specifically, the Tier I capital ratio is expected to be positively related to loan loss provisions as an increase in Tier I capital implies affordability of the available capital cushion to make more loan loss provisions (Ahmed *et al.*, 1999; El Sood, 2012). On the contrary, managers of banks with low Tier I capital are incentivised to decrease loan loss provisions in order to increase retained earnings and subsequently Tier I capital.[26] In addition to the discretionary component of loan loss provisions, the macroeconomic variable representing the real growth in Gross Domestic Product, $GDPGR_{it}$, is used to proxy the business cycle and to test for the procyclicality of loan loss provisions (Bikker and Metzemakers, 2005; Handorf and Zhu, 2006). Thus, to support the procyclicality hypothesis loan loss provisions should be negatively correlated with GDP growth (Laeven and Majnoni, 2003).

With reference to prior research, the non-discretionary component is proxied through variables representing the current level and the dynamics of losses within the loan portfolio (Ahmed *et*

[26] The Tier II capital ratio is not employed to test for capital management. As loan loss reserves comprise only 1.25% of risk-weighted assets (in Tier II capital), an increase in loan loss provisions has a negligible impact on Tier II capital. Indeed, when including the Tier II capital ratio as an explanatory variable to each empirical model presented in this chapter, the coefficient was consistently statistically insignificant.

al., 1999; Hasan and Wall, 2004; Anandarajan *et al.*, 2007; Bouvatier and Lepetit, 2008; Curcio and Hasan, 2015). Hence, to control for the non-discretionary component of loan loss provisioning, the following variables are used. First, the beginning balance of loan loss reserves, LLR_{it-1}, is controlled for as it results from past accumulations of loan loss provisions and serves as an inventory in setting the current level of loan loss provisions (Lobo and Yang, 2001; Fonseca and González, 2008). Thus, this variable is expected to have a negative effect on loan loss provisions because higher initial loan loss reserves will require a smaller provision in the current period (Kanagaretnam *et al.*, 2004; Alali and Jaggi 2010). Secondly, loan charge-offs net of recoveries, is a determinant of estimated future losses (Wetmore and Brick 1994; Kim and Kross 1998; Lobo and Yang 2001). Thus, the growth in net charge-offs, ΔLCO_{it}, is included to proxy for information regarding future net charge-offs based on which an increase in loan loss provisions will be required, suggesting a positive coefficient for this variable. Thirdly, LTA_{it-1}, measured by the beginning balance of net loans to total assets represents the risk of default for the overall credit portfolio (El Sood, 2012; Bouvatier *et al.*, 2014). A positive association with loan loss provisions is expected due to the presumption that loans are generally considered to be riskier than other types of bank assets such as cash. Indeed, an increase in the volume of loans with respect to total assets can be associated with a higher probability of default and that banks are bearing a higher risk for holding loans in their credit portfolio which in turn necessitates higher loan loss provisions (Handorf and Zhu, 2006). In addition, according to Kim and Kross (1998) and El Sood (2012) the change in the value of total loans to total assets in the current period, ΔLTA_{it}, is a proxy for real growth in the magnitude of loans and is also adopted as a non-discretionary variable. This variable is thought to be positively associated with bank risk, given that rapid growth of bank lending is generally associated with lower monitoring efforts and a deterioration of the quality of loan portfolios (Laeven and Majononi, 2003). Therefore, a prudent bank should show a positive association between the amount of loan loss provisions and the growth rate of its loan portfolio. Nevertheless, Kanagaretnam *et al.* (2004) argue that the effect of change in the total loan portfolio on loan loss provisions is unpredictable due to the uncertainty in the quality of incremental loans. Furthermore, based on the premise that loan loss provisions are backward-looking as their estimation is reliant on identified impaired loans, an appropriate non-discretionary variable is non-performing loans. In detail, non-performing loans is an *ex-post* measure of bank loan quality and, more specifically, an indicator of the risk of default of a bank's loans and a positive relationship with loan loss provisions is expected (Handorf and Zhu, 2006). These are disclosed

as supplemental financial statement information (Wahlen, 1994). Thus, the beginning balance of non-performing loans to total assets, NPL_{it-1}, and the change in the value of non-performing loans to total assets in the current period, ΔNPL_{it}, are used as explanatory variables as in Lobo and Yang (2001), Bouvatier and Lepetit (2008) and Alali and Jaggi (2010). Lastly, the log of total assets, $LnTA_{it}$, is also employed following Ahmed *et al.* (1999), Lobo and Yang (2001) and Alali and Jaggi (2010), among others, to ensure that the results do not merely capture the size effect and the inherent default risk element. In other words, banks of greater size are associated with an increase in default risk and subsequently higher loan loss provisions (El Sood, 2012). Moreover, year control dummies, T_t, are intended to capture time-specific effects such as trends in the regulatory stance. Overall, based on this empirical model specification, descriptive statistics of bank-specific and macroeconomic variables are presented in the following section.

Descriptive Statistics

Descriptive statistics on the dependent variable and independent variables for the total sample are provided in Table 3.2 and variable definitions in Table 3.3. The results show that the mean scaled value of loan loss provisions, LLP_{it}, is approximately 0.4% with a maximum value of 7.3%. These values confirm that loan loss provisions are a relatively important accrual expense for banks and the findings are similar to Kim and Kross (1998) and Alali and Jaggi (2010). The minimum ratio of loan loss provisions to total assets is -1.1%. In fact, negative loan loss provisions can arise because of loan recoveries and/or charge-offs of previously recorded provisions which brought down the balance of the loan loss reserves (El Sood, 2012). As to the profitability of the sample banks, the ratio of earnings before taxes and loan loss provisions to total assets, $EBTP_{it}$, is approximately 0.9% with a substantial minimum of -25.3%. Further, the banks' capital endowment is measured by the regulatory Tier I ratio, $TierI_{it}$, which has a mean value of 14.7% and exceeds the regulatory minimum ratio of 6% for banks to be classified as "well-capitalised" (BCBS, 1998). This result is consistent with prior evidence that banks keep their regulatory capital far above the minimum required and this is discussed in more detail in section 2.5.1 (Berger at al., 2008). With regards to GDP growth, $GDPGR_{it}$, the average growth over the 2002-2016 period is 1.82% and with a minimum of -2.73% and a maximum of 3.79%. Chapter 2 (sections 2.5.1 and 2.5.2 in particular) clearly demonstrates the sensitivity of earnings to fluctuations in loan loss provisions and the interconnectedness of these variables with the phases of the business cycle.

Interestingly, results for net loan charge-offs, LCO_{it}, are similar to the scaled value of loan loss provisions, with an average of 0.3%, a minimum of -1.4% and a maximum of 6.9%. The unscaled average of loan loss provisions and the unscaled average of net loan charge-offs are also similar with values of $92.42 million and $90.40 million respectively. Thus, it can be presumed that, on average, there is limited or no discretionary addition to the loan loss reserves by charging more than needed for current charge-offs (Kanagartenam *et al.*, 2004). Further, beginning of period loan loss reserves to total assets, LLR_{it-1}, are 1%, on average, with a maximum of 36.4%. The ratio of net loans to total assets, LTA_{it-1}, supports the fact that loans compose the majority of the entire sample banks' total assets, with an average ratio of 65.7% and banks have increased their loan portfolio over the period 2002 to 2016 by 3.8%. With regards to the credit quality of the sample banks, average beginning of period non-performing loans to total assets, NPL_{it-1}, are 1.4% and banks have recognised more non-performing loans by 0.1% on average.

Table 3.2: *Descriptive statistics.*

Variable	Mean	Std. Dev.	Minimum	Maximum
$GDPGR_{it}$ (%)	1.8209	1.5981	-2.7755	3.7857
	Data in percentage points			
LLP_{it}	0.004	0.006	-0.011	0.073
$EBTP_{it}$	0.009	0.013	-0.253	0.137
$\Delta EBTP_{it+1}$	0.0009	0.0108	-0.1915	0.1450
$TierI_{it}$	0.147	0.132	0.015	5.498
LLR_{it-1}	0.010	0.009	0.000	0.364
LCO_{it}	0.0032	0.0057	-0.0135	0.0693
ΔLCO_{it}	-0.00003	0.0052	-0.0593	0.0545
LTA_{it-1}	0.657	0.138	0.000	3.278
ΔLTA_{it}	0.038	0.097	-2.604	0.760
NPL_{it-1}	0.014	0.019	0.000	0.234
ΔNPL_{it}	0.001	0.012	-0.143	0.150
$LnTA_{it}$	13.568	1.647	9.607	21.596
	Data in Millions of U.S. Dollars			
Total Assets	15,100	133,000	13.518	2,570,000
Loan Loss Provisions	92.417	1.179	-98.082	48,400
Net Loan Charge-Offs	90.398	1.068	-14.364	34,300

See Table 3.3 for variable definitions.

Table 3.3: *Variable definitions.*

Variable	Definition
LLP_{it}	Loan loss provisions scaled by total assets.
$EBTP_{it}$	Earnings before extraordinary items, tax expense and loan loss provisions scaled by total assets.
$\Delta EBTP_{it+1}$	1-year ahead change in earnings before taxes and provisions scaled by total assets.
$TierI_{it}$	Tier I capital scaled by total risk-weighted assets.
$GDPGR_{it}$	Percentage change in real GDP, over previous period.
LLR_{it-1}	Beginning of period loan loss reserves scaled by total assets.
LCO_{it}	Net loan charge-offs scaled by total assets.
ΔLCO_{it}	Change in the value of net loan charge-offs scaled by total assets.
LTA_{it-1}	Beginning of period net loans scaled by total assets.
ΔLTA_{it}	Change in the value of net loans scaled by total assets.
NPL_{it-1}	Beginning of period non-performing loans scaled by total assets.
ΔNPL_{it}	Change in the value of non-performing loans scaled by total assets.
T_t	A series of dummy variables where 1 if the bank is drawn from year 't'; 0 otherwise.

Moreover, Table 3.4 provides Pearson correlation coefficients among the variables. Among the independent variables: $\Delta EBTP_{it+1}$, LLR_{it-1}, ΔLCO_{it}, LTA_{it-1}, NPL_{it-1}, ΔNPL_{it} and $LnTA_{it}$ are significantly and positively associated with the LLP_{it} variable, whereas the correlation coefficients of $EBTP_{it}$, $TierI_{it}$, $GDPGR_{it}$ and ΔLTA_{it} are significantly and negatively associated with LLP_{it}. The reported correlations coefficients indicate a statistically significant correlation between loan loss provisions and each of the explanatory variables. The correlation between loan loss provisions and earnings before extraordinary items, tax expense and loan loss provisions, $EBTP_{it}$, which is negative and around 55%, suggests that banks do not practice income smoothing, on average. The correlation between loan loss provisions and loan growth, ΔLTA_{it}, is -23.91%, suggesting imprudent behaviour by the average bank. The correlation between ΔLCO_{it} and LLP_{it} is high, with a value of 44.4%, highlighting the need to control for net charge-offs (Kim and Kross, 1998). The correlation between loan loss provisions and GDP growth, $GDPGR_{it}$, is also negative at around 33%, providing preliminary support for the cyclical effects of loan loss provisions. In other words, banks provision less during good economic periods and dramatically increase provisions during times of economic distress (Handorf and Zhu, 2006). Following the description of the sample dataset, the empirical methods employed to estimate model (3.1) are evaluated in the following section.

Table 3.4: *Sample correlation.*

	LLP_{it}	LTA_{it-1}	ΔLTA_{it}	ΔNPL_{it}	NPL_{it-1}	ΔLCO_{it}	LLR_{it-1}
LLP_{it}	1						
LTA_{it-1}	0.1800*	1					
ΔLTA_{it}	-0.2391*	-0.0599*	1				
ΔNPL_{it}	0.2811*	0.1055*	0.0524*	1			
NPL_{it-1}	0.3313*	0.0795*	-0.3505*	-0.3827*	1		
ΔLCO_{it}	0.4438*	0.0783*	0.0272*	0.3007*	-0.1666*	1	
LLR_{it-1}	0.1760*	0.1220*	-0.1616*	-0.1251*	0.3532*	-0.0766*	1
$EBTP_{it}$	-0.5545*	-0.0079	0.1132*	-0.1180*	-0.3527*	-0.2128*	-0.1164*
$\Delta EBTP_{it+1}$	0.2997*	-0.0239*	-0.0238*	-0.0724*	0.1660*	0.0744*	0.0890*
$TierI_{it}$	-0.0642*	-0.3661*	0.0299*	-0.0370*	-0.0842*	-0.0377*	-0.0875*
$LnTA_{it}$	0.0803*	-0.0888*	-0.0369*	0.0054	-0.0503*	0.0089	0.0151
$GDPGR_{it}$	-0.3296*	-0.1193*	0.0966*	-0.2737*	-0.0337*	-0.2287*	-0.0037

	$EBTP_{it}$	$\Delta EBTP_{it+1}$	$TierI_{it}$	$LnTA_{it}$	$GDPGR_{it}$
$EBTP_{it}$	1				
$\Delta EBTP_{it+1}$	-0.3916*	1			
$TierI_{it}$	-0.1032*	-0.0699*	1		
$LnTA_{it}$	0.1760*	-0.0048	-0.1786*	1	
$GDPGR_{\boldsymbol{it}}$	0.2654*	-0.0243*	0.0377*	-0.0111	1

These tables show Pearson pairwise sample correlations. * represents 5% significance. See Table 3.3 for variable definitions.

3.3.4 Econometric Methods

To estimate model (3.1) three estimation techniques are employed: ordinary least squares, fixed effects and random effects. In this section, each estimation technique is discussed and applied, estimation tests are conducted, and the empirical results are presented.

3.3.4.1 Ordinary Least Squares Method

To estimate model (3.1), presented in section 3.3.3.1, the ordinary least squares (OLS) method is analysed and applied first as this estimation method has been employed in the empirical studies reviewed in section 3.2[27] and provides the basis for alternative estimation methods. Thus, the loan loss provision equation (3.2) is specified as:

$$y_{it} = \beta'_t X_{it} + \varepsilon_{it} \tag{3.2}$$

where y_{it} denotes loan loss provisions as a percentage of total assets for an individual bank i at time t and i represents the number of observations in each year and $t = 1, \dots, 15$ is the number of years. The symbol X_{it} represents a vector of observed time-variant variables as well as time dummy variables (Cameron and Trivedi, 2005). Moreover, it is assumed that the composite error term takes the following form:

$$\varepsilon_{it} = c_i + u_{it} \tag{3.3}$$

Therefore, the general model is

$$y_{it} = \beta'_t X_{it} + c_i + u_{it} \tag{3.4}$$

whereby the term c_i is an unobserved time-constant individual-specific effect and u_{it} is a random error term. Initially, the parameters of the panel data model are estimated through the OLS technique. According to Wooldridge (2016), this estimation method relies on the following five assumptions to ensure OLS estimators of the parameters are best, linear and unbiased. First, model (3.4) is linear on the unknown parameters of interest $\beta_0, \beta_1, .., \beta_k$. Second, it is based on a random sample of n observations $\{[X_{i1}, X_{i2}, \dots, X_{in},\ y_{it} : i = 1,2, \dots, n]\}$ following model (3.4). Third, there is no perfect collinearity; there are no exact linear relationships among the independent variables. Fourth, strict exogeneity is assumed

[27] The empirical research studies reviewed in section 3.2 which employ the OLS method are those of: Ahmed *et al.* (1999), Alali and Jaggi (2010), Liu and Ryan (1995) and Lobo and Yang (2001).

whereby the error term has mean zero conditional on past, current, and future values of the independent variables where, $E(u_{it}|\, X_{it}, c_i) = 0,\ i = 1, \ldots, N, t = 1, \ldots, T$. Lastly, the error term, u_{it}, has the same variance given any values of the independent variables known as homoscedasticity. In other words, $Var(u_{it}|X_{it}) = \sigma^2$. Although all bank-specific variables are scaled by total assets to mitigate potential heteroscedasticity, as mentioned in section 3.3.2, the Breusch-Pagan Lagrange multiplier test is conducted in the following section to testify this.

Heteroscedasticity

In the event where the key assumption of homoscedasticity is violated, the error term, u_{it}, no longer has the same variance given any values of the independent variables. In other words, $Var(u_{it}|X_{it}) \neq \sigma^2$ resulting to the issue of heteroscedasticity. In detail, the variability in loan loss provisions about its mean is assumed to be constant which may not be realistic in the context of this empirical model. In fact, a larger σ^2 means larger sampling variances for the OLS estimators and the greater the magnitude of the variance the more difficult it becomes to estimate the partial effect of any of the explanatory variables on loan loss provisions and this is reflected in higher variances for the OLS slope estimators (Wooldridge, 2016). Thus, to ensure the assumption of homoscedasticity is not violated the Breusch-Pagan Lagrange multiplier test is conducted which tests for constant variance against the alternative hypothesis of a non-constant variance in the error term (Cameron and Trivedi, 2009). With a p-value of zero the null hypothesis can be rejected, and there is sufficient evidence to support the presence of heteroscedasticity which means OLS is no longer efficient (Wooldridge, 2016). Therefore, OLS is still useful but using robust standard errors to correct for heteroscedasticity is more appropriate. Thus, having applied robust standard errors, the coefficients of the pooled OLS model are estimated and the results are presented in Table 3.5.

Table 3.5: *OLS, random effects and fixed effects regressions estimation results*.

In this table, the results from the estimation of the following empirical model are reported:

$$LLP_{it} = \beta_0 + \beta_1 EBTP_{it} + \beta_2 \Delta EBTP_{it+1} + \beta_3 TierI_{it} + \beta_4 GDPGR_{it} + \beta_5 LLR_{it-1} + \beta_6 \Delta LCO_{it} + \beta_7 LTA_{it-1} + \beta_8 \Delta LTA_{it} + \beta_9 NPL_{it-1} + \beta_{10} \Delta NPL_{it} + \beta_{11} LnTA_{it} + \beta_{12} T_t + \varepsilon_{it}$$

Dependent Variable: LLP_{it}	Pooled OLS	Random Effects	Fixed Effects
$Intercept$	-0.00963***	-0.00643***	-0.00749
	(-11.44)	(-3.966)	(-1.263)
$EBTP_{it}$	-0.162***	-0.159**	-0.157**
	(-6.744)	(-2.564)	(-2.162)
$\Delta EBTP_{it+1}$	0.0509***	0.0491***	0.0479***
	(3.580)	(4.182)	(3.136)
$TierI_{it}$	0.00455***	0.00289	0.000439
	(3.420)	(1.572)	(0.264)
$GDPGR_{it}$	-0.000847***	-0.000267***	-0.000255**
	(-13.38)	(-2.597)	(-1.989)
LLR_{it-1}	0.0270**	0.00620	-0.0133
	(2.279)	(0.671)	(-1.213)
ΔLCO_{it}	0.385***	0.387***	0.389***
	(13.55)	(11.63)	(10.31)
LTA_{it-1}	0.00555***	0.00436***	0.00208
	(9.441)	(3.926)	(1.381)
ΔLTA_{it}	-0.00515***	-0.00676***	-0.00871***
	(-6.001)	(-6.561)	(-7.148)
NPL_{it-1}	0.107***	0.105***	0.103***
	(10.51)	(5.111)	(4.767)
ΔNPL_{it}	0.115***	0.114***	0.113***
	(9.502)	(7.159)	(6.420)
$LnTA_{it}$	0.000649***	0.000629***	0.000865**
	(14.93)	(6.125)	(2.067)
Year Fixed Effects	Yes	Yes	Yes
No. of Observations	6,919	6,919	6,919
R^2	0.662	0.660	0.750

***, **, * represent 1%, 5% and 10% significance, respectively.

t-statistics are reported in parentheses. All t-statistics are based on robust standard errors.

LLP_{it} = loan loss provisions/total assets. $EBTP_{it}$ = earnings before taxes and loan loss provisions/total assets. $\Delta EBTP_{it+1}$ = one-year ahead change in earnings before taxes and provisions/total assets. $TierI_{it}$ = Tier I regulatory capital/total risk-weighted assets. $GDPGR_{it}$ = percentage change in real GDP, over previous period. LLR_{it-1}=beginning of period loan loss reserves/total assets. ΔLCO_{it} = change in the value of net loan charge-offs/total assets. LTA_{it-1} = beginning of period net loans/total assets. ΔLTA_{it}= change in the value of net loans/total assets. NPL_{it-1} = beginning of period non-performing loans/total assets. ΔNPL_{it} = change in the value of non-performing loans /total assets. $LnTA_{it}$ = natural logarithm of total assets. T_t= year dummies. i = bank holding company identifier. t = year (2002 to 2016).

The coefficient estimates provide evidence in support of the capital management and procyclicality hypotheses but not of the income smoothing hypotheses. The negative relationship between the income smoothing variable, $EBTP_{it}$, and loan loss provisions is indicative of the procyclicality of loan loss provisions. In detail, an increase in earnings before taxes and provisions is associated with a decrease in loan loss provisions which indicates that when banks are profitable, most likely during an economic upturn, lower provisions are reported. Indeed, this is supported by the negative coefficient for GDP growth, $GDPGR_{it}$, as it suggests the under-reporting of loans loss provisions during periods of economic growth. To validate the robustness of these results, it is worth examining alternative estimation methods that take into account unobserved heterogeneity. That is, individual banks' characteristics such as risk attitudes of bank management in the estimation of the expected losses of a given loan portfolio are likely to vary across banks in ways which cannot always be observed or measured (Cameron and Trivedi, 2005; Floro, 2010). Statistical models that account for unobserved individual heterogeneity are the random effects model and fixed effects model and these are discussed next.

3.3.4.2 Random Effects Model

In the case of the pooled OLS model strict exogeneity is assumed, as discussed earlier, and this holds for the random effects model (REM) too however, the difference lies in the composite error term, ε_{it}, of the REM which has a component capturing individual effects c_i. According to Wooldridge (2016), it is assumed that the unobserved effect c_i is uncorrelated with each regressor in all time periods:

$$Cov\,(X_{it}, c_i) = 0, \quad t = 1, 2, \dots, T\;;\; i = 1, 2, \dots, N \tag{3.5}$$

Therefore, when considering c_i being uncorrelated with the explanatory variables it is more appropriate to use the REM as it is more efficient than the OLS estimator (Wooldridge, 2016). Indeed, when conducting the Breusch and Pagan Lagrange-multiplier test for which the null hypothesis is that variances across banks is zero, this is rejected with a p-value of zero suggesting the presence of individual-specific random effects (Cameron and Trivedi, 2005). In fact, Greenawalt and Sinkey (1988) and Collins *et al.* (1995) employ a random effects model and state that OLS may not be an appropriate as residuals may be serially correlated. The key advantage for choosing a REM over the alternative fixed effects model (FEM) is that it enables the inclusion of time-constant variables such as dummy variables for regional and money-centre banks used by Greenawalt and Sinkey (1988). Indeed, time-constant variables cannot be included in the in the FEM as their effects cannot be distinguished from the time-constant unobservable c_i (Wooldridge, 2002). However, in the context of this research, this is not an issue as time-constant variables are not employed by any of the empirical models estimated in this chapter.

Despite this advantage of the REM, assuming that c_i is uncorrelated with the explanatory variables, in general, may not be reasonable. Indeed, Kim and Santomero (1993) argue that a positive correlation between earnings and provisions may well be the result of optimal statistical forecasting with respect to loan losses (which is unobserved) rather than misleading provisioning behaviour. In addition, Perez *et al.* (2008) advocate that risk preferences of bank managers, which are also unobserved, may be correlated with non-performing loans or the regulatory capital ratios. Moreover, the case where $Cov\,(X_{it}, c_i) = 0$ 'should be considered the exception rather than the rule…in most cases the regressors are themselves outcomes of choice processes and likely to be correlated with individual preferences and abilities as captured by c_i' (Wooldridge, 2016, p.444). To formally test whether there is a statistically

significant difference between the within and the random effects estimators the Hausman test is conducted (Cameron and Trivedi, 2005). The null hypothesis is that the individual-specific effects, c_i, are uncorrelated with regressors against the alternative hypothesis that the regressors are correlated to c_i. With a Hausman test p-value being zero, the null hypothesis is rejected and there is strong evidence to support that individual effects are correlated with the regressors and interpreting the results of the FEM, presented in Table 3.5, would be more appropriate. Therefore, the fixed effect model is examined next.

3.3.4.3 Fixed Effects Model

As the presence of unobserved heterogeneity is well grounded, individual fixed effects are controlled for. Subsequently, the unobserved effect, c_i would disappear and a pooled OLS estimator that is based on time-demeaned variables called the within estimator is employed (Wooldridge, 2016). In fact, the majority of empirical research studies reviewed in section 3.2 employ a fixed effects model.[28] The coefficient estimates of the pooled OLS, random effects and fixed effects models are presented in Table 3.5. It can be discerned that the signs of the coefficients for most variables are the same with three exceptions. Specifically, the variables representing the beginning of the period total loans to total assets, LTA_{it-1}, the beginning of the period loan loss reserves total assets, LLR_{it-1}, and the Tier I capital ratio, $TierI_{it}$, are statistically insignificant for the random and fixed effects models. Moreover, the income smoothing variable,$EBTP_{it}$, maintains a negative sign and $GDPGR_{it}$ a positive sign hence, the income smoothing and procyclicality hypotheses cannot be supported. Nevertheless, in the following section a generalised method of moments estimator, developed in a series of papers by Holtz-Eakin *et al.* (1988), Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998) for dynamic panel models, is considered as it addresses three important econometric issues. According to Ozili (2017) and Wintoki *et al.*(2012) these issue are: (i) unobservable heterogeneity which can be included by taking first-differences of all variables, (ii) the autoregressive process in the data regarding the behaviour of loan loss provisions; the need to use a lagged dependent variable to capture the dynamic nature of loan loss provisions and (iii) the likely endogeneity of the explanatory variables. In this respect, a generalised method of moments estimator is adopted, and this is evaluated next.

[28] The empirical research studies reviewed in section 3.2 which employ a fixed effect model are those of: El Sood (2012), Handorf and Zhu (2006), Liu and Ryan (2006), Liu *et al*., (1997) and Lobo and Yang (2001).

3.3.4.4 Generalised Method of Moments Estimation

Thus far, a static empirical model is considered for investigating the determinants of loan loss provisions following the model specification employed by all U.S. empirical research studies reviewed in section 3.2. However, according to Laeven and Majnoni (2003) and Fonseca and González (2008), a dynamic model may be more appropriate in this context. Therefore, in this section a dynamic empirical model is considered using a generalised method of moments (GMM) panel estimation technique. In addition, particular attention is paid to issues of endogeneity, as this is important not only econometrically but in terms of substantive issues of the causal relationships between specific explanatory variables.

Equation (3.1) has been estimated using three estimation methods: ordinary least squares (OLS), fixed and random effects. These estimation methods are appropriate for a static model but not for a dynamic model. In other words, the change of the speed of adjustment of loan loss provisions to an equilibrium level is accounted for by including the lagged value of the dependent variable, LLP_{it-1}, as explanatory variable as in Bouvatier and Lepetit (2008), Fonseca and González (2008) and Laeven and Majnoni (2003). The respective dynamic empirical model specification is stated in the following equation.

$$\begin{aligned} LLP_{it} = \beta_0 &+ \beta_1 LLP_{it-1} + \beta_2 EBTP_{it} + \beta_3 \Delta EBTP_{it+1} + \beta_4 TierI_{it} + \beta_5 GDPGR_{it} \\ &+ \beta_6 LLR_{it-1} + \beta_7 \Delta LCO_{it} + \beta_8 LTA_{it-1} + \beta_9 \Delta LTA_{it} + \beta_{10} NPL_{it-1} \\ &+ \beta_{11} \Delta NPL_{it} + \beta_{12} LnTA_{it} + \beta_{13} T_t + c_i + u_{it} \end{aligned} \tag{3.6}$$

In addition to equation (3.6), to test whether banks are motivated to smooth income through loan loss provisions during the 2007-2009 financial crisis period (to test Hypothesis 1b in section 3.2.1.3), two variables are added to the above model specification and take the form of equation (3.7). Following El Sood (2012) and Ozili (2017), this model includes a dummy variable, GFC_{it}, that takes the value "1" for the 2007-2009 financial crisis period[29] and "0" otherwise as well as the interaction of the earnings before taxes and provisions to total assets variable with the financial crisis dummy variable, $EBTP_{it}GFC_{it}$.

$$\begin{aligned} LLP_{it} = \beta_0 &+ \beta_1 LLP_{it-1} + \beta_2 EBTP_{it} + \beta_3 EBTP_{it} GFC_{it} + \beta_4 \Delta EBTP_{it+1} + \beta_5 TierI_{it} \\ &+ \beta_6 GFC_{it} + \beta_7 LLR_{it-1} + \beta_8 \Delta LCO_{it} + \beta_9 LTA_{it-1} + \beta_{10} \Delta LTA_{it} \\ &+ \beta_{11} NPL_{it-1} + \beta_{12} \Delta NPL_{it} + \beta_{13} LnTA_{it} + \beta_{14} T_t + c_i + u_{it} \end{aligned} \tag{3.7}$$

[29] The National Bureau of Economic Research (NBER) (n.d.) classifies the fiscal years 2007, 2008 and 2009 as recessionary periods.

where:

i = bank holding company identifier;
t = year (2002 to 2016);
LLP_{it} = Loan loss provisions scaled by total assets;
$EBTP_{it}$ = Earnings before extraordinary items, tax expense and loan loss provisions scaled by total assets;
GFC_{it} = A dummy variable that equals to 1 for years 2007, 2008 and 2009; 0 otherwise;
$\Delta EBTP_{it+1}$ = 1-year ahead change in earnings before taxes and provisions scaled by total assets;
$TierI_{it}$ = Tier I capital scaled by total risk-weighted assets;
$GDPGR_{it}$ = Percentage change in real GDP, over previous period;
LLR_{it-1} = Beginning of period loan loss reserves scaled by total assets;
ΔLCO_{it} = Change in the value of net loan charge-offs scaled by total assets;
LTA_{it-1} = Beginning of period net loans scaled by total assets;
ΔLTA_{it} = Change in the value of net loans scaled by total assets;
NPL_{it-1} = Beginning of period non-performing loans scaled by total assets;
ΔNPL_{it} = Change in the value of non-performing loans scaled by total assets;
$LnTA_{it}$ = Natural logarithm of total assets;
T_t = A series of dummy variables where 1 if the bank is drawn from year 't'; 0 otherwise.

The variable representing GDP growth, $GDPGR_{it}$, is omitted from equation (3.7) due to the presence of multicollinearity. [30] Using the Variance Inflation Factor (VIF) to detect multicollinearity, the variables GDP growth, $GDPGR_{it}$, the financial crisis dummy, GFC_{it}, and the year dummies, T_t, are highly correlated with a mean VIF of 526.6 which is greater than 10. When omitting $GDPGR_{it}$ the mean VIF is 1.96. This, however, does not hinder the empirical analysis of equation (3.6) which employs $GDPGR_{it}$ to test for procyclicality. Indeed, the financial crisis dummy, GFC_{it}, in equation (3.7) can be used to test for procyclicality as well; this would be supported if a positive association with loan loss provisions is found. In other words, during the financial crisis higher loan loss provisions would be reported to reflect the losses already incurred from loan defaults and the overall deterioration of the banks' loan portfolios.

With regards to the dynamic models employed, the rationale for this choice is based on the presumption that banks may adjust their provisions slowly to recognise potential losses against loans or if default events are concentrated in time thus, the provisions could exhibit time

[30] Multicollinearity is present when an explanatory variable is an exact linear combination of the other independent variables (Wooldridge, 2016). The most common statistic that is computed to detect multicollinearity is the Variance Inflation Factor (VIF) and a rule of thumb states that there is evidence of collinearity if the mean VIF is greater than 10 (Baum, 2006).

dependency (Bouvatier and Lepetit, 2008; Floro, 2010). Further, the superiority of a dynamic panel data model lies in the difficulty of random and fixed effects models to estimate such a model, particularly in the "small T, large N" context.[31] According to Nickell (1981), the problem which arises is the correlation between the lagged dependent variable and the error term, u_{it}. The author shows that the resulting correlation creates a "dynamic panel bias" in the estimate of the coefficient of the lagged dependent variable, which is not mitigated by increasing the sample (N). Moreover, the zero-conditional mean assumption where $E(u_{it}|\, X_{it}, c_i) = 0$ must hold for the OLS estimators of the parameters to be best, linear and unbiased. However, this assumption is violated in the presence of endogeneity, omitted-variable bias and measurement error in explanatory variables (Baum, 2006). In detail, endogeneity refers to simultaneous causality bias such as endogenous explanatory variables whereas omitted-variable bias occurs from a variable that is correlated with X_{it} but is unobserved so it cannot be included in the regression. In the case of errors on variables, if the error is correlated with any of the independent variables, then OLS estimates are biased and inconsistent (Wooldridge, 2016). Although each problem arises for different reasons, they share a common solution which is the instrumental variable estimator in the context of the generalised method of moments (GMM) estimator.

Specifically, by first differencing the equation, unobserved heterogeneity, c_i, is removed thus eliminating a potential source of omitted variable bias in the estimation. However, in first differences, predetermined variables such as the lagged dependent variable become endogenous.[32] Arellano and Bond (1991) developed a GMM estimator that treats the model as a system of equations, one for each time period. In this case, the predetermined and endogenous variables in first differences are instrumented with suitable lags of their own levels. However, a problem with the original Arellano-Bond estimator is that lagged levels are often poor instruments for first differences, especially for variables that are close to a random walk. Hence, Arellano and Bover (1995) described how- if the original equations in levels were added to the system- additional moment conditions could be applied to increase efficiency. In these equations, predetermined and endogenous variables in levels are instrumented with suitable lags of their own first differences. In a nutshell, the first is the Arellano-Bond (1991) estimator which is referred to as the *difference GMM* estimator and the second is an augmented version

[31] Small T, large N refers to a short time frame (T) and a large sample (N). This is in accordance to our sample which is composed of only 15 time periods and 675 banks.

[32] Predetermined variables are variables that are not strictly exogenous; they are independent of current disturbances, but they are influenced by past disturbances.

outlined in Arellano and Bover (1995) and fully developed in Blundell and Bond (1998) known as *system GMM*.

However, before proceeding with the choice and application of a GMM estimator the important issues of endogeneity and the presence of outliers are discussed. With regards to endogeneity, other explanatory variables (apart from the lagged dependent variable) may be endogenous and these must be determined in order to ensure the robustness of the empirical model. The empirical research studies of Beatty *et al.* (1995) and Kim and Kross (1998), reviewed in section 3.2, use a model of simultaneous equations and a three-stage least squares estimation to accommodate the joint dependency between loan loss provisions and net loan charge-offs. For example, simultaneity arises between net charge-offs and loan loss provisions as bank managers can manage capital by using loan charge offs and/or loan loss provisions (Alali and Jaggi, 2010). Perez *et al.* (2008), Floro (2010) Packer and Zhu (2012) and Olszak *et al.* (2016) go as far as to suggest that all bank-specific variables should be treated as endogenous. Therefore, following these authors, the bank-specific explanatory variables treated as endogenous are: $EBTP_{it}$, $\Delta EBTP_{it+1}$, $TierI_{it}$, ΔLCO_{it}, LLR_{it-1}, LTA_{it-1}, ΔLTA_{it}, NPL_{it-1} and ΔNPL_{it}. Further, according to Roodman (2009b), the number of instruments must be less than the number of groups which in turn must be less than the number of observations. Thus, as lagged values of the endogenous variables are used as instruments, their lag range is restricted to two- and six- year lags in order to limit the number of instruments.[33] The resulting instrument count is 652 which is less than the number of banks, 670, and less than the number of 6,914 observations as shown in Table 3.6. Also, to ensure that the results are robust to outlier values, all dollar value variables are winsorised at the top and bottom 1% as in Alali and Jaggi (2010), Gebhardt and Novotny-Farkas (2011) and Jin *et al.* (2016). Nonetheless, in Table 3.6, the results of winsorised and unwinsorised estimators are presented to discern any meaningful differences between the two. Thus, based on the results presented in Table 3.6, all coefficient estimates are similar in terms of statistical significance except for the beginning of period loan loss reserves to total assets, LLR_{it-1}, the beginning of period total loans to total assets, LTA_{it-1} and change in the value of total loans to total assets in the current period, ΔLTA_{it}, variables. The estimates of each of these variables are statistically insignificant in Model 1 and the estimates of the former two variables are statistically insignificant in Model 2 where the

[33] According to Wintoki et al. (2012), if regressors are predetermined the most recent lag can be set as 1. Thus, for the lagged dependent variable, the lag range is restricted to one- and four- year lags. However, in the case of endogenous regressors the most recent lag can be set 2 or greater.

variables have not been winsorised. As the issues of outliers and endogeneity have been addressed, the empirical techniques which will be applied are discussed next.

The Arellano-Bover/Blundell-Bond method of system GMM is implemented as it has superior efficiency and overcomes the econometric shortcomings of "difference GMM" (Tregenna, 2009). In detail, the `xtabond2` command developed by Roodman (2009a) is composed of both estimators. This user-written command carries 'several novel capabilities' which enhance its supremacy over the conventional `xtabond` command (Roodman, 2009a, p.87). First, it includes the Arellano-Bond test for autocorrelation, which is applied to the first-difference equation residuals in order to eliminate the unobserved and perfectly autocorrelated fixed effect, c_i. First-order autocorrelation is expected in first differences, because $\Delta u_{it} = u_{it} - u_{it-1}$ should correlate with $\Delta u_{it-1} = u_{it-1} - u_{it-2}$ since they share the u_{it-1} term. However, higher-order autocorrelation would indicate that some lags of the dependent variable, which might be used as instruments, are in fact endogenous, thus bad instruments: that is, y_{it-s}, where s is the lag, would be correlated with u_{it-s}, which would be correlated with Δu_{it-1}, which in turn would be correlated with Δu_{it} if there is higher-order autocorrelation (Wintoki *et al.*, 2012). Indeed, first-order autocorrelation for all empirical models presented in Table 3.6 is found but cannot reject the null hypothesis of no autocorrelation of second order and above.

Second, the Arellano-Bond and Blundell-Bond estimators have one- and two-step variants. Nevertheless, though asymptotically more efficient, the two-step estimates of the standard errors tend to be severely downward biased (Arellano and Bond 1991; Blundell and Bond 1998). To compensate, `xtabond2` - unlike `xtabond` - makes available a finite-sample Windmeijer correction to the two-step covariance matrix which improves accuracy (Tregenna, 2009). Specifically, it can make two-step estimates of the standard errors more efficient than one-step estimates, especially in the context of system GMM.

Third, first-differencing suggested by Arellano and Bover (1995) tends to magnify gaps in unbalanced panels and as the panel dataset employed is unbalanced, the forward orthogonal deviations transformation is applied thus, preserving the sample size (Roodman, 2009a). In addition, the Hansen J statistic test of over-identifying restrictions is reported. This tests whether the instruments, as a group, appear exogenous and is robust to heteroscedasticity and autocorrelation (Wintoki *et al.*, 2012). The Hansen J statistic for each model presented in Table 3.6, is very close or exceeds the 0.25 benchmark proposed by Roodman (2009a; 2009b) thus, verifying the validity of the GMM instruments.

Having evaluated the GMM estimators of the dynamic panel data models employed and conducted the appropriate estimation tests, the results are presented in Table 3.6. Table 3.6 shows that the lagged dependent variable, LLP_{it-1}, has a positive coefficient, indicating that a dynamic specification to model bank provisioning is recommended. The variables used to control for the non-discretionary component of loan loss provisions are statistically significant except for the beginning of period loan loss reserves to total assets, LLR_{it-1}, and beginning of period total loans to total assets, LTA_{it-1}, variables for the unwinsorised estimates. The coefficients on NPL_{it-1} and ΔNPL_{it} are significantly positive at the 1% level. This former result implies that the evolution of non-performing loans influences provisioning and the latter reflects the possibility that some banks may use forward-looking information on non-performing loans (that are less discretionary and more timely) in estimating loan loss provisions (Beatty and Liao, 2014). The coefficients on the growth in net charge-offs, ΔLCO_{it}, is significantly positive at the 1% level as expected; net charge-offs represent loan loss that have already been incurred and thus, necessitate the recording of higher levels of loan loss provisions. The coefficient on the change in the value of total loans to total assets in the current period, ΔLTA_{it}, is negative and statistically significant except in the results for Model 1 where it is insignificant. Nonetheless, this suggests that the growth of bank lending which may be associated with lower monitoring efforts and a deterioration of the quality of loan portfolios is not matched with increased loan loss provisions to absorb future credit losses (Laeven and Majononi, 2003). The coefficient on the beginning balance of net loans to total assets, LTA_{it-1}, is positive and statistically significant only for the winsorised estimates. This positive association suggests that banks record higher loan loss provisions in response to an increase in the volume of loans. Similarly, the coefficient on beginning balance of loan loss reserves, LLR_{it-1}, is negative and statistically significant only for the winsorised estimates. This result suggests that higher initial loan loss reserves will require a smaller provision in the current period, and vice versa (Kanagaretnam *et al.*, 2004; Alali and Jaggi 2010). Lastly, the log of total assets, $LnTA_{it}$, is positively associated with loan loss provisions thus, banks of greater size are associated with an increase in default risk and subsequently higher loan loss provisions (El Sood, 2012). The interpretation of variables which have been employed to test the hypotheses of this research are discussed in the following section.

Table 3.6: *System GMM regressions estimation results.*

In this table, the results from the estimation of the following empirical models are reported:

Model 1: $$LLP_{it} = \beta_0 + \beta_1 LLP_{it-1} + \beta_2 EBTP_{it} + \beta_3 \Delta EBTP_{it+1} + \beta_4 TierI_{it} + \beta_5 GDPGR_{it} + \beta_6 LLR_{it-1} + \beta_7 \Delta LCO_{it} + \beta_8 LTA_{it-1} + \beta_9 \Delta LTA_{it} + \beta_{10} NPL_{it-1} + \beta_{11} \Delta NPL_{it} + \beta_{12} LnTA_{it} + \beta_{13} T_t + c_i + u_{it}$$

Model 2: $$LLP_{it} = \beta_0 + \beta_1 LLP_{it-1} + \beta_2 EBTP_{it} + \beta_3 EBTP_{it} GFC_{it} + \beta_4 \Delta EBTP_{it+1} + \beta_5 TierI_{it} + \beta_6 GFC_{it} + \beta_7 LLR_{it-1} + \beta_8 \Delta LCO_{it} + \beta_9 LTA_{it-1} + \beta_{10} \Delta LTA_{it} + \beta_{11} NPL_{it-1} + \beta_{12} \Delta NPL_{it} + \beta_{13} LnTA_{it} + \beta_{14} T_t + c_i + u_{it}$$

Dependent Variable (LLP_{it})	Model (1)	Model (1)^a	Model (2)	Model (2)^a
$Intercept$	-0.00586***	-0.0109***	-0.00747***	-0.0137***
	(-4.311)	(-6.818)	(-4.822)	(-9.186)
LLP_{it-1}	0.495***	0.414***	0.494***	0.448***
	(10.84)	(17.42)	(12.28)	(17.54)
$EBTP_{it}$	-0.0933**	-0.186***	-0.0684*	-0.127***
	(-1.980)	(-11.75)	(-1.705)	(-9.144)
$EBTP_{it} GFC_{it}$			-0.0665**	-0.0462***
			(-2.551)	(-3.005)
$\Delta EBTP_{it+1}$	0.0376***	0.0740***	0.0319***	0.0888***
	(3.094)	(5.599)	(2.578)	(6.500)
$TierI_{it}$	0.00387**	0.00966***	0.00400**	0.0132***
	(2.072)	(4.825)	(2.102)	(5.983)
$GDPGR_{it}$	-0.000109*	-0.000088*		
	(-1.896)	(-1.857)		
GFC_{it}			0.00151***	0.000754***
			(3.260)	(2.821)
LLR_{it-1}	-0.0135	-0.0921***	-0.0133	-0.0946***
	(-1.065)	(-3.620)	(-1.008)	(-3.740)
ΔLCO_{it}	0.537***	0.484***	0.524***	0.501***
	(10.97)	(18.41)	(13.06)	(18.18)
LTA_{it-1}	0.00111	0.00603***	0.00108	0.00632***
	(1.173)	(5.566)	(1.093)	(5.823)
ΔLTA_{it}	-0.00220	-0.00506***	-0.00264**	-0.00525***
	(-1.415)	(-5.000)	(-1.968)	(-5.244)

(continued)

NPL_{it-1}	0.0723***	0.0474***	0.0727***	0.0607***
	(3.893)	(4.799)	(4.903)	(6.284)
ΔNPL_{it}	0.180***	0.132***	0.169***	0.141***
	(5.824)	(7.394)	(7.010)	(7.811)
$LnTA_{it}$	0.000519***	0.000736***	0.000537***	0.000814***
	(5.633)	(8.805)	(4.773)	(10.32)
Year Fixed Effects	Yes	Yes	Yes	Yes
No. of Instruments	652	652	653	653
No. of Banks	670	670	670	670
No. of Observations	6,914	6,914	6,914	6,914
AR(1) Test (p-value)	(0.000)	(0.000)	(0.000)	(0.000)
AR(2) Test (p-value)	(0.596)	(0.606)	(0.621)	(0.672)
Hansen Test of over-identification (p-value)	(0.265)	(0.245)	(0.253)	(0.263)

***, **, * represent 1%, 5% and 10% significance, respectively.
a All dollar value variables are winsorised at top and bottom 1%.
t-statistics are reported in parentheses. All t-statistics are based on robust standard errors.
LLP_{it} = loan loss provisions/total assets. $EBTP_{it}$ = earnings before taxes and loan loss provisions/total assets. $\Delta EBTP_{it+1}$= one-year ahead change in earnings before tax and provision $TierI_{it}$ = Tier I regulatory capital /total risk-weighted assets. $GDPGR_{it}$ = percentage change in real GDP, over previous period. GFC_{it}=dummy variable that takes the value of 1 if the year is 2007, 2008, or 2009 and zero otherwise. LLR_{it-1}= beginning of period loan loss reserves/total assets. ΔLCO_{it} = change in the value of net loan charge-offs/total assets. LTA_{it-1}= beginning of period net loans/total assets. ΔLTA_{it}= change in the value of net loans/total assets. NPL_{it-1} = beginning of period non-performing loans/total assets. ΔNPL_{it} = change in the value of non-performing loans /total assets. $LnTA_{it}$ = natural logarithm of total assets. T_t= year dummies. i = bank holding company identifier. t = year (2002 to 2016). AR(1) and AR(2) are tests for first-order and second-order serial correlation in the first differenced residuals, under the null of no serial correlation. The Hansen test for over-identification is under the null that all instruments are valid.

3.3.5 Summary

In this section, the empirical analysis conducted extends the methodology of prior research on U.S. banks investigating the earnings management, signalling, capital management and procyclicality hypotheses. First, following prior research, a static model is employed which is estimated using the OLS, random and fixed effects estimation methods. Then, building on prior research, two dynamic panel data models are specified and the system GMM estimator is applied to control for unobservable bank effects, the endogeneity of explanatory variables and the dynamic behaviour of loan loss provisions. Having conducted the appropriate estimation tests and ensured the robustness of the dynamic panel data models, the empirical findings are analysed in the following section.

3.4 Discussion of Empirical Results

3.4.1 Introduction

The purpose of the research conducted in this chapter is to re-examine the earnings management, signalling, capital management and procyclicality hypotheses presented in section 3.2. Thus, having conducted a thorough empirical analysis in section 3.3, the results of the dynamic panel data models shown in Table 3.6 are discussed in this section and the earnings management and signalling hypotheses are discussed first.

3.4.2 Earnings Management & Signalling

Empirical research investigating the use of loan loss provisions to manage reported earnings focuses on a specific pattern of earnings management namely, income smoothing. Thus, to re-examine this opportunistic behaviour, the income smoothing hypothesis developed in section 3.2.1.3 is stated as follows:

H1a. The relationship between loan loss provisions and earnings before provisions and taxes will be positive in the period 2002-2016.

The review of empirical research investigating the practice of income smoothing in section 3.2.1.2 provides inconclusive evidence. Adding to this ambiguity, the results shown in Table 3.6 are congruent only with those of Ahmed *et al.* (1999). Specifically, a negative relationship between the income smoothing variable, $EBTP_{it}$, and loan loss provisions is found as seen in the results of Models 1 and 2 in Table 3.6. However, this is contrary to the income smoothing hypothesis which is based on the premise that 'bank management carries a unique responsibility of promoting a high degree of public confidence in the depository financial institution system' (Ma, 1988, p.490). This can be achieved by maintaining stable earnings through income smoothing which further supports the minimisation of stock price volatility and maximisation of shareholders' wealth. Moreover, the fact that income smoothing using loan loss provisions is less costly following the implementation of the Basel I regulatory capital requirements, as explained in Section 3.2.1.2, reinforced the expectation of income smoothing behaviour (Ahmed *et al.*, 1999). However, the negative relationship between earnings and loan loss provisions suggests otherwise and this leads to supporting two alternative interpretations. One interpretation of this finding is that instead of income smoothing, bank managers practice

income-increasing earnings management. In other words, an increase in earnings is associated with lower loan loss provisions which further inflates earnings. The second interpretation postulates that this finding is evidence in support of bank managers adhering to the backward-looking accounting standards governing the measurement of loan loss provisions which are based on an "incurred loss" methodology. Thus, the rationale behind each perspective is explained next.

With regards to bank managers using loan loss provisions for income-increasing earnings management it is important to view earnings management in a broader perspective first. According to Scott (2015), in addition to income smoothing, earnings management encapsulates three more patterns, and these are: income minimisation, income maximisation and "taking a bath." The negative coefficient of the earnings variable, $EBTP_{it}$, shown in Table 3.6 is suggestive of the latter two patterns of earnings management. Further, the underlying principle surrounding accrual-based earnings management is that accruals, such as loan loss provisions, reverse (Scott, 2015).[34] For example, in the case of income maximisation, loan loss provisions are underreported for the purpose of increasing earnings to an amount greater than can be sustained. The bank will then find that the reversal of loan loss provisions in subsequent periods will force future earnings downwards. Subsequently, even more earnings management is needed if the reporting of losses is to be further postponed. In effect, if the bank is performing poorly, 'earnings management cannot indefinitely postpone the day of reckoning' (Scott, 2015, p.446). Thus, the negative coefficient of the earnings variable, $EBTP_{it}$, implies that an eventual decrease in earnings is associated with an increase in loan loss provisions which would cause earnings to decrease further suggesting the third pattern of earnings management, namely, "taking a bath." This is associated with the additional earnings management hypothesis presented in section 3.2.1.3 and is stated as follows:

H1b. A negative relationship or a larger magnitude in the positive relationship between loan loss provisions and earnings before provisions and taxes is expected during the 2007-2009 financial crisis period compared to the pre- and post-crisis periods.

To test this hypothesis the respective empirical model is specified in equation (3.7). More specifically, a period when banks performed poorly was the 2007-2009 financial crisis period and this is evident in the analysis of key financial ratios in section 2.5.1.2. Thus, by adding the

[34] Accrual based earnings management refers to the practice of using loan loss provisions, a discretionary accrual, to manage earnings.

interaction of the earnings variable with the financial crisis dummy, $EBTP_{it}GFC_{it}$, to the baseline model specification this study can test whether income smoothing behaviour is more prominent in times of financial distress or whether banks use earnings management to eventually and indiscreetly "take a bath." The results presented in the Model 2 columns in Table 3.6 show a negative sign for this interaction term thus, supporting the latter scenario. In other words, bank managers 'report one drastic earnings decline after hiding a series of smaller declines in previous years' (Cohen *et al.*, 2014, p.175). Moreover, according to Scott (2015), this is indeed commonly observed during periods of organisational stress such as the financial crisis and the inevitable accrual reversal enhances the probability of future reported profits that could benefit the bank eventually. This view can be reinforced by taking into account the inherent opacity of banks which allows managers to conceal the quality of loans for long periods of time (Levine, 2004). In fact, Levine (2004) goes so far as supporting that bank managers can adjust the risk composition of the bank's assets rather quickly and can hide problems by extending loans to customers who are no longer able to service prior debt obligations. This leads to the presumption that bank managers who have insider information on the potential deterioration of the bank's loan portfolio can foresee that substantially lower earnings will be incurred and report higher levels of loan loss provisions as a result.

Further, the evidence in support earnings management is supportive of the signalling hypothesis which posits that loan loss provisions can be used by bank managers to signal the financial strength of the banks:

H2: Loan loss provisions are positively related to one-year ahead changes in earnings before loan loss provisions and taxes in the period 2002-2016.

The signalling hypothesis is supported by the positive relation between loan loss provisions and changes in one year ahead earnings, $\Delta EBTP_{it+1}$ as shown in Table 3.6. This finding is contrary to the empirical findings of studies discussed in section 3.2.1 which do not find evidence in support of this hypothesis. Pertaining to the need for signalling through loan loss provisions, this arises when managers with information indicating that bank values are higher than those assessed by the market desire to have their market values revised upward (Lobo and Yang, 2001). In other words, bank managers aim to reduce information asymmetry between the bank and investors by communicating positive inside information. One approach to doing so is to signal that the bank is strong enough to absorb future potential losses by increasing current loan loss provisions. A common explanation for increasing current loan loss provisions

is that they constitute good news as bank managers are more likely to withstand a "hit to earnings" when the prospects of future earnings are favourable (Liu and Ryan, 1995). Thus, loan loss provisions are accumulated when banks record strong earnings and signal their strong earnings power. This finding provides clarity on the different motives underlying bank managers' use of discretion over loan loss provisions. Specifically, evidence in support of signalling can enable users of financial statements to better understand and interpret the information conveyed by reported accounting earnings (Kanagaretnam *et al*., 2004). In addition, by understanding the conditions under which managers use their discretion over the estimation of loan loss provisions to communicate their private information, regulators can distinguish between managers' use of accounting discretion for opportunistic purposes such as income smoothing and their use of accounting discretion to increase the informativeness of reported earnings.

Alternatively, the evidence in support of earnings management can be challenged on the grounds that U.S banks merely follow the "incurred loss" methodology of loan loss provisioning. The recognition of loan loss provisions is governed by Statement of Financial Accounting Standards (SFAS) No. 5, *Accounting for Contingencies* (1975), and SFAS No. 114, *Accounting by Creditors for Impairment of a Loan* (1994). Although SFAS No. 5 and SFAS No. 114 provide detailed rules for the recognition and measurement of loan loss reserves and loan loss provisions, as explained in section 3.2.1.1, there is still a degree of management discretion inherent in the provisioning process. In addition, loan loss provisions are a large accrual for banks and subsequently have a significant impact on earnings and regulatory capital. As a result, the Securities and Exchange Commission issued SAB 102 *"Selected Loan Loss Allowance Methodology and Documentation Issues"* in July 2001 responding to the inadequate documentation of procedures for measuring loan loss provisions. The aim was to provide further guidelines on recognition and valuation issues related to these loans with the aim of establishing an incurred loss model for reporting loan loss provisions. Therefore, as the sample period employed commences in 2002, the effectiveness of these amendments to the accounting standards in establishing an "incurred loss" methodology for reporting loan loss provisions may be supported. In other words, the absence of income smoothing signifies that, in general, U.S. banks exercise prudential behaviour by following the regulatory guidance and accounting standards in setting up provisions. That is, the recognition of credit losses is delayed until it is probable that a loan loss has been incurred such as in times of financial distress when lower earnings are reported. Subsequently, the adherence to an "incurred loss" methodology

indicates that provisioning practices are more than likely to move in correlation with the economy's short-term business cycle which is termed as procyclical behaviour. Therefore, the income maximisation and "taking a bath" earnings management patterns which have been suggested as a plausible interpretation to the negative relationship between earnings, $EBTP_{it}$, and loan loss provisions may not be intentional per se but a by-product of the "incurred loss" methodology. Therefore, this negative association may be indicative of the procyclicality of loan loss provisions and this is discussed next.

3.4.3 Procyclicality of Loan Loss Provisioning

The Comptroller of the Currency, John Dugan (2009), argues that the limitation on judgment in applying the current "incurred loss model," was a fundamental constraint leading 'loan loss provisioning [to] become decidedly pro-cyclical, magnifying the impact of the [2007-2009] downturn' (p.2). Motivated by this argument, this study investigates the procyclicality of loan loss provisions by testing the following hypothesis.

H4. Loan loss provisions are expected to be negatively related with the annual growth in gross domestic product in the period 2002-2016.

In line with the findings of Handorf and Zhu (2006) and Laeven and Majnoni (2003), evidence in support of procyclicality is found. Specifically, the macroeconomic variable GDP growth, $GDPGR_{it}$, employed to represent the economic cycle, is negatively associated with loan loss provisions as shown in the results for Model 1 in Table 3.6. Thus, an increase in GDP growth is associated with a decrease in loan loss provisions which can be justified by the limited judgement permitted to bank managers in reporting expected future loan loss provisions based on the accounting standards SFAS No.114 and SAB No.102. As already discussed in section 2.5.2, Figure 2.9 clearly depicted the inverse relationship between GDP growth and the sample banks' ratio of loan loss provisions to total loans between 2002 and 2016; a dramatic increase in loan loss provisions corresponds to the recession of 2007 to 2009. The peak in loan loss provisions coincided with the greatest decline in GDP growth during the decade of the 2000s which reached -2.78% in 2009. On the contrary, during years of higher economic growth, such as 2005, loan loss provisions as a percentage of total loans appear to be lower. Overall, this co-movement of financial and economic indicators demonstrates that loan loss provisions tend to reinforce the momentum of underlying economic cycles, hence, are rightly referred to as procyclical (González, 2009). Therefore, it comes as no surprise that the interpretation of

Figure 2.9 is supported by the empirical finding of a negative relationship between GDP growth and loan loss provisions.

Even though the sign of the GDP growth variable, $GDPGR_{it}$, is negative it is also very close to zero as shown in the results of Model 1 in Table 3.6. As the magnitude of this coefficient is small, Model 2 uses the financial crisis dummy, GFC_{it}, instead of GDP growth, to test whether the banks' loan loss provisioning is backward looking. Indeed, the positive sign of the GFC_{it} coefficient estimate as shown in the Model 2 columns in Table 3.6 suggests that banks report higher levels of loan loss provisions during the financial crisis period when loan losses are incurred. As shown in the analysis of the asset quality indicators in section 2.5.2, banks entered the financial crisis of 2007-2009 with low loan loss reserves, and then had to sharply increase provisions in recognition of pending losses.

Overall, U.S. banks do not seem to provision enough during economic expansions to cover losses during a recession or slow recovery. This can be problematic since during economic downturns banks might be forced to reduce earnings or deplete capital to make provisions for loan losses.

3.4.3.1 The impact on regulatory capital

In addition, the proyclicality of loan loss provisions can have an adverse effect regulatory capital. According to BCBS (2005), the unexpected losses- losses banks know will occur but cannot know in advance their timing and severity- should be covered by bank capital. Moreover, expected losses which is a cost component for doing business, should be covered by loan loss provisions (Laeven and Majnoni, 2003). However, as Bikker and Metzemakers (2005) rightly point out, the distinction may be blurred as provisions (linked to impaired loans even though they are created against the possibility of future losses) build up accumulated loan loss reserves which constitute 1.25% of Tier II capital (BCBS, 2006). Therefore, when loan loss provisions and subsequently loan loss reserves are inadequate to cover expected losses due, for instance, a deterioration of the business cycle, greater loan loss recognition reduces capital adequacy, potentially causing banks to reduce lending and so exacerbate the downturn (Wall and Koch, 2000; Sun, 2014). Therefore, the inherent procyclicality of loan loss provisioning indirectly causes the procyclicality of regulatory capital requirements which would further amplify the development of the business cycle and the impact of the 2007-2009 financial crisis is a clear reflection of this (Barth and Landsman, 2010).

3.4.3.2 The 2016 Accounting Standards Update

The focus of bank provisioning practices has shifted abruptly, partly in response to the rampant bank failures during the 2007 to 2009 financial crisis, to anticipate losses not necessarily identifiable from current loss exposures (Dahl, 2013). In detail, in the aftermath of the 2007-2009 global financial crisis, as part of the Basel III communications, the Basel Committee on Banking Supervision formally encouraged accounting regulatory bodies to pursue a forward-looking loan loss provisioning methodology (BCBS, 2011).

In the United States, the Financial Accounting Standards Board (FASB) issued an Accounting Standards Update (ASU) that improves financial reporting by requiring timelier recording of credit losses on loans and other financial instruments held by financial institutions. In detail, in 2016, the FASB issued ASU No. 2016-13, *Financial Instruments- Credit Losses* which will be effective in 2020. This standard requires banks to measure all expected credit losses for financial assets held at the reporting date based on historical experience, current conditions as well as reasonable and supportable forecasts that affect the collectability of the reported amount (FASB, 2017). Thus, the use of forward-looking information to estimate credit losses is permitted and the standard does not require a specific credit loss method. This would allow bank managers to use judgment in determining the relevant information and estimation methods that are appropriate in its circumstances (FASB, 2017). To assess further the implications of allowing bank managers to exercise their discretion over loan loss provisions, the findings in support of capital management are discussed next.

3.4.4 Capital Management

In testing the capital management hypothesis, the relationship between the Tier I capital ratio and loan loss provisions is examined. The reason for investigating only Tier I capital management and omitting Tier II is due to the changes in capital regulation that took place during 1988 to 1992. In detail, this eliminated the over-provisioning incentive for the purpose of meeting the minimum capital requirements as loan loss reserves were no longer counted as "primary capital" toward the regulatory requirement. The Basel regime requires that loan loss reserves only be included as a component of Tier II capital (previously known as "secondary capital") up to 1.25% of the bank's risk-weighted assets (Handorf and Zhu, 2006). As a result, to meet regulatory capital requirements, it is more efficient to allocate income to retained

earnings which boosts Tier I capital than to loan loss reserves and Tier II capital (Kwan and O'Toole, 1997). Thus, the hypothesis put forth to test for capital management is as follows:

H3. The relationship between loan loss provisions and the Tier I ratio will be positive in the period 2002-2016.

In line with the rationale of prior studies investigating capital management, a positive coefficient for Tier I capital is expected which the empirical findings of the thesis are supportive of. As shown in Table 3.6, the Tier I capital ratio, $TierI_{it}$, estimate is positive and statistically significant. In detail, a reduction in of Tier I capital which would be coupled with the costs of violating regulatory capital targets may lead banks to tighten lending practices to counteract the shrinking capital base by reducing the risk-weighted assets base (Kim and Kross, 1998). Subsequently, this may incentivise bank managers to delay the provisioning process for the purpose of inflating the regulatory capital base through an increase in retained earnings without the need to issue capital on a timely basis (El Sood, 2012). Therefore, the positive coefficient for Tier I capital is indicative of capital management which indirectly supports our lack of evidence for income smoothing as these two bank management behaviours tend to be traded-off. The reason for this is that both practices encompass discretion over loan loss provisions thus, bank managers may have to favour capital management which in a given year may necessitate a decrease in loan loss provisions at the expense of income smoothing which may require an increase in loan loss provisions. Also, in the analysis of capital adequacy ratios in 2.5.1 sample banks have been shown to be classified as "well-capitalised," on average, throughout the 2002-2016 time period and capital management may have contributed to this. Overall, the finding of capital management is aligned with the findings of all prior U.S. studies on capital management which have been discussed in section 3.2.3.2 with the exception of Alali and Jaggi (2010). Additionally, a reason for including only bank holding companies in the sample is to observe whether holding-company banks might have the incentive not to use loan loss provisions to increase their regulatory capital base. The rationale behind this is that these banks are considered to have better access to external sources of finance. Indeed, a bank holding company has been referred to as a "source of strength" for banks, whereby equity injections from bank holding companies into "problem bank" subsidiaries can help recapitalise banks in financial distress (Sengupta and Hogue, 2014). However, the empirical evidence in support of Tier I capital management suggests that U.S. bank holding companies do not rely on their inherent advantage of better access to external sources of finance.

3.4.5 Summary

Overall, evidence in support of the procyclicality of loan loss provisions and income decreasing earnings management during the financial crisis period supports the initiative of the Financial Accounting Standards Board to implement a new set of accounting standards under which expected credit losses are estimated using forward-looking information (FASB, 2017). The level of provisioning resulting from this approach would generally be less subject to sharp swings stemming from the cyclical nature of economic activity than those prescribed by the backward-looking approach. Evidently, these accounting standards will explicitly permit managers to make judgmental decisions about loan losses. Thus, the evidence in support of capital management suggests that managers may capitalise on the flexibility granted to them by the new set of accounting standards. However, the Basel III capital requirements- which are in the process of being implemented- are expected to mitigate this incentive as they require an increase in both the quality and size of the regulatory capital base, as well as to build capital buffers at individual banks that can be used in stressed economic conditions and to protect banks at times of excess credit growth (BCBS, 2011).

4 THE IMPACT OF CORPORATE GOVERNANCE MECHANISMS ON LOAN LOSS PROVISIONING

4.1 Introduction

The empirical evidence in support of a relationship between earnings and loan loss provisions in Chapter 3 provides the impetus for investigating the impact of corporate governance mechanisms on the use of discretionary loan loss provisions to manage reported earnings. Corporate governance is defined as 'dealing with the ways that suppliers of finance to corporations assure themselves of getting a return on their investment' (Shleifer and Vishny, 1997, p. 737). In the context of the banking industry, this is achieved through outside investors and other stakeholders, such as the government and regulatory authorities, exercising control over senior management and other corporate insiders in order to protect their interests (Adams and Mehran, 2003).

The rationale for investigating corporate governance in relation to earnings management is multifaceted. First, following the premise of agency theory, the separation of ownership from management is expected to lead bank managers to taking action that may not maximise shareholder wealth. Thus, capitalising on their bank-specific knowledge and expertise to serve their own self-interest rather than that of shareholders. Hence, corporate governance mechanisms are especially designed to protect shareholder interests (Jensen and Meckling, 1976; Fama, 1980; Fama and Jensen, 1983). The purpose of these mechanisms is fundamental in aligning shareholder and manager interests and, as a result, constraining earnings management practices. Specifically, Jensen (1993) argues that four forces operate to promote effective governance: legal and regulatory systems, external control mechanisms, product and factor markets and internal control mechanisms controlled by the boards of directors. This chapter focuses on investigating the internal and external control mechanisms which encompass board structure and function, performance-based compensation and institutional ownership as they are all intended to 'encourage managers to make operating and investing decisions that maximise shareholder wealth' thus, reducing agency costs such as earnings management (Jensen and Meckling, 1976; Baker *et al.*, 2003, p.558). Secondly, Macey and O'Hara (2003) claim that governance structures are industry specific and that there are systematic differences between the corporate governance of banks and non-financial firms.

However, the vast majority of research examining the relationship between earnings management and corporate governance focuses on non-financial firms thus, employing a sample of bank holding companies is of paramount importance. This is because many corporate governance reforms such as the Sarbanes-Oxley Act of 2002 and the NYSE and NASDAQ exchange listing rules have a "one-size-fits-all" approach (Adams and Mehran, 2012). In other words, policymakers do not take into account the opaqueness, high leverage and the tight regulatory nature of their activities which makes them different from non-financial firms as discussed in section 2.5.1.2 (Levine, 2004). As a result, the extent to which the corporate governance mechanisms of banks are effective in constraining earnings management practices can be challenged. Finally, these empirical research studies do not take in to account the impact of the 2007-2009 recessionary period. According to Adams and Mehran (2012), it has never been as important to investigate the effectiveness of the corporate governance mechanisms of banks following the subprime mortgage crisis. Indeed, the OECD Steering Group on Corporate Governance claims that board failures in financial institutions were a major cause of the financial crisis (Kirkpatrick, 2009). Therefore, the increased scrutiny of board governance in banks following the 2007 financial crisis and certain regulatory reforms motivate the investigation of whether corporate governance mechanisms incentivise bank managers to use loan loss provisions to manage reported earnings. Thus, in order to investigate the impact of the banks' corporate governance on earnings management the five main determinants which will form the hypotheses developed in the next section are: option-based executive compensation, board independence, the number of board meetings, Chief Executive Officer/Chairman duality and institutional ownership. Once the hypotheses are established, this chapter proceeds with a review of related empirical research studies. Then a sample of 72 publicly traded U.S. bank holding companies for the period 2006-2016 is employed to conduct the empirical analysis and test the established hypotheses. The final section presents the results and provides an analytical discussion of the main findings.

4.2 Hypotheses Development

4.2.1 Option-Based Executive Compensation

The separation between ownership and control in the 1970s and 1980s has long been recognised as a root cause of corporate governance problems (Berle and Means, 1932). Specifically, the managers' insulation from the bank's performance is assumed to lead to management behaviour that may adversely affect shareholder value (Bergstresser and Philippon, 2006). In fact, Berle and Means (1932, p.139) observed that top corporate executives, 'while in office, have almost complete discretion in management' and Jensen and Meckling (1976) identify the problem of managerial power and discretion as an "agency problem." That is, managers may not automatically seek to maximise shareholder value and subsequently use their discretion to benefit themselves personally in a variety of ways (Shleifer and Vishny, 1997). Thus, any discussion of executive compensation must proceed based on the fundamental agency problem afflicting management decision-making as managers' pay arrangements are considered a (partial) remedy to the agency problem (Bebchuk and Fried, 2003). Indeed, as advocated in the seminal study of Jensen and Meckling (1976), the use of stock options (among other forms of performance-based compensation plans) can, at least in theory, achieve this objective as well as reduce moral hazard behaviour (Jensen and Murphy, 1990; Gomez-Mejia, 1994; Core and Guay, 1999). Monks and Minow (2011, p.374) claim that 'stock options, of course, are supposed to be the ultimate example of compensation for performance.' Thus, the thesis focuses on examining Chief Executive Officer (CEO hereafter) incentive compensation in the form of stock option awards because: (i) incentive compensation is considered to be a key component of effective corporate governance systems (Jensen and Murphy, 1990; Denis, 2001); (ii) stock options are commonly used to compensate CEOs (Knight, 2002; Baker *et al*., 2003); (iii) the role of the CEO is of integral importance as their insights and actions can have an impact on the bank's operations and, eventually, bank performance (Daft *et al.*, 1988; Priem, 1994); and (iv) CEO stock options are visible to all bank stakeholders through public records, such as the bank's proxy statements, and thereby act as a signal for stakeholders that the objective of the bank's CEO is to increase shareholder value (O'Connor *et al.*, 2006). Most importantly, as Stiglitz (2009) argues, there is a collateral problem with stock options in that 'they provide incentives for bad accounting: top management has every incentive to provide distorted information in order to pump up share prices' which is what the thesis seeks to investigate. Therefore, the components of executive

compensation and the relationship between option-based compensation and earnings management are examined next.

According to Suntheim (2010), executive pay in the banking industry typically consists of the following three main components. First, it is the base salary which is commonly determined according to industry and bank size benchmarks and acts as a basis for the calculation of bonuses and stock option awards. Second, are short term bonuses which are functions of pre-specified performance measures as well as bonuses that are capped above a performance threshold and are not paid below a certain level of performance. In detail, these are accounting-based measures of performance and have the advantage of being easily verifiable, which makes it easier for managers to relate their own actions to the bonus payments. Third, are stock options which give the right to executives to buy shares of the bank at the pre-specified exercise price (Hall and Liebman, 1998). Although option design varies across banks, the typical option contract expires in ten years and the exercise price is usually equal to the share price on the award date which must be approved by the compensation committee (Baker *et al.*, 2003; 2009). Typically, a grant of stock options cannot be exercised immediately, but only over time; for example, 25 percent might become exercisable in each of the four years following the grant (Hall and Murphy, 2003). Therefore, if the stock price rises between the time of the award and the time the option is exercised, the executive will get the benefit of the gain, without having to make the capital expenditure to buy the stock (Monks and Minow, 2011). With few exceptions, the theoretical and empirical research on employee stock options treats options as part of an optimal incentive arrangement that mitigates agency problems between shareholders and self-interested managers by tying pay directly to stock-price appreciation (Hall and Murphy, 2003). Further, according to Murphy (1999, p.2532), 'stock ownership provides the most direct link between shareholder and CEO wealth.' As executives understand how their actions affect share prices, option holdings provide incentives for executives to take actions that increase share prices and avoid actions that decrease share prices. In addition, offering employee stock options in lieu of cash compensation allows banks to attract highly motivated and entrepreneurial executives and stock options are typically structured so that only executives who remain with the bank can benefit from them, thus also providing retention incentives (Hall and Murphy, 2003).

Nevertheless, the incentives provided by stock options have been under scrutiny and associated with incentivising earnings management practices. Specifically, the accounting scandals at Enron, WorldCom, Global Crossing and other companies in the early 2000's have been linked

to excessive risk-taking and an excessive fixation on stock prices, both allegedly caused by the escalation in option awards (Cassidy, 2002). Therefore, when manager incentives are based on the bank's financial performance, it may be in their self-interest to give the appearance of superior performance through earnings management (Xie *et al.*, 2003). As discussed in section 3.2.1.1, bank managers can use loan loss provisions to manage reported earnings by exploiting the latitude that the Generally Accepted Accounting Principles provide for measuring this expense (Rajgopal and Venkatachalam, 1997). Indeed, according to Sun (2014, p.282), the 'management in the financial sector is better able to manipulate financial records than that in the manufacturing sector, due to a larger fraction of the firm's assets being intangible.' As a result, the combination of the managers' discretion over loan loss provisions and subsequently over reported earnings and the direct effect earnings can have on their compensation may contribute towards, instead of mitigate, agency costs.[35] As such, CEOs may have the incentive to influence share prices by manipulating reported earnings through loan loss provisions (Subramanyam, 1996).

Overall, whether option-based CEO compensation encourages income-increasing or income-decreasing earnings management is ambiguous. On the one hand, Cornett *et al.* (2009, p.414) state that option-based compensation is a 'particularly direct route by which management can increase its wealth by inflating stock prices' as the value of the shares will be higher than the exercise price. One the other hand, Baker *et al.* (2003) argue that managers are inclined to use loan loss provisions to report lower earnings in order to suppress stock prices in the short-term. Nonetheless, management decisions that increase or decrease short-term share prices through earnings management often do not benefit shareholders in the long-term (O'Connor *et al.*, 2006). Therefore, option-based compensation is expected to incentivise earnings management and the respective hypothesis is as follows:

H1. The value of option-based compensation relative to total compensation is associated with higher levels of earnings management and the under-reporting of discretionary loan loss provisions in the period 2006-2016.

[35] Capital markets use financial information to set security prices which investors use to decide whether to buy, sell, or hold securities and market efficiency is based upon the information flow to capital markets. Thus, when the information is incorrect, it may not be possible for the markets to value securities correctly. In other words, earnings management obscures real performance and lessens the ability of shareholders to make informed decisions hence, it is perceived as an agency cost (Xie *et al.*, 2003).

Hence, if there is strong empirical evidence in support of this hypothesis, it can be assumed that option-based compensation does not achieve its intended purpose of mitigating agency costs by better aligning managers' and shareholders' interests. Further, Bebchuck and Fried (2003) argue that as it cannot be presumed with certainty that managers aim to maximise shareholder value by default, it cannot be expected that directors will either. Indeed, the actions of directors can be susceptible to an agency problem, which can potentially challenge their capability in resolving the agency problems between managers and shareholders. This is because directors generally aim to be re-appointed to the board and CEOs play an important role in the re-nomination process (Larcker and Tayan, 2016). Consequently, as compensation decisions are made by the board of directors, directors may support the CEO's compensation arrangements provided that the compensation contract can be reasonably defended and justified (Chhaochharia and Grinstein, 2009). Jensen (1993) also argues that CEOs often control a board's agenda, especially when the CEO is also the chairman, leaving little opportunity for boards to question CEOs. In addition, Bebchuk and Fried (2003) claim that such problems have a significant effect on compensation arrangements and that lack of board oversight can lead to suboptimal compensation practices. Therefore, based on these arguments, the impact of the structure and function of the board of directors in resolving agency problems and constraining earnings management practices is examined next.

4.2.2 Board Structure & Function

A successful corporate governance structure is considered to improve public accountability, create value, minimise risk exposure, and boost operational efficiency (BCBS, 2006; Fu *et al.*, 2014). In addition, shareholders, regulators and banks themselves share an interest in understanding whether efforts to establish sound corporate governance leads to improvements in organisational performance despite their divergent objectives (Salim *et al.*, 2016). In detail, the aim of the shareholders is value for money in paying board members, regulators seek to reduce the probability of bank failures and achieve greater stability whereas banks intend their corporate governance arrangements to deliver stronger oversight of management (Roth and Saporoschenko, 2001). Hence, good corporate governance requires a board of directors that fulfils its statuary duty to oversee the management of the bank, to guard the interests of shareholders and to ensure conformity with regulatory requirements (BCBS, 2015). Therefore, to evaluate the effectiveness of corporate governance, the thesis focuses on examining whether

board independence, the number of board meetings and CEO/Chair duality are associated with earnings management practices and the respective hypotheses are developed in this section.

4.2.2.1 Board Independence

Effective directors are individuals who are capable of successfully undertaking the advisory and oversight functions of the board (Larcker and Tayan, 2016). In fact, the board of directors is likely to be more important as a governance mechanism in banks than it is in non-banking firms since the fiduciary responsibilities of directors are not restricted to shareholders but extend to other stakeholders such as regulators and depositors as discussed in section 2.5.1.2 (Macey and O'Hara, 2003). Indeed, regulatory authorities of banks and policymakers highlight the crucial importance of bank board governance. For example, the Basel Committee on Banking Supervision (2006), states that the board of directors plays an integral role in the banks' regulatory reforms. Moreover, the Basel II regulation considers the role of the board to be an essential aspect of risk management (BCBS, 2005).

Most importantly, from a regulatory perspective, for board members to be effective in their advisory and oversight capacity they should exhibit independence (Fama and Jensen, 1983; Yermack, 1996). In other words, independent directors should have no direct financial, family or interlock ties with the management in order to be classified as independent (Adams and Mehran, 2012). With respect to earnings management, the extent to which a board of directors with a majority of independent directors can facilitate this practice must be considered. This is because, over the last decades, investors and governments have become even more concerned about the role of the board, especially in the wake of major corporate collapses including Enron and WorldCom in the United States (Salim *et al*., 2016). The Sarbanes-Oxley Act of 2002 was drafted in response to these corporate failures aiming to enhance corporate governance and the accountability of board of directors, corporate directors and company auditors (Esposito *et al*., 2004). More specifically, the Sarbanes-Oxley Act of 2002 and rules promulgated by the Securities and Exchange Commission, New York Stock Exchange and National Association of Securities Dealers, incorporate the idea that independent directors are important custodians of shareholder interests by requiring greater participation of independent directors on the board and key committees (Duchin *et al.*, 2010). Consequently, the importance of independent directors was more strictly imposed following the introduction of the Sarbanes-Oxley Act in 2002 and the listing rule changes of various self-regulatory organisations which focus on the boards' structure and composition introduced in 2003; Section 301 of the Sarbanes-Oxley Act

necessitates entirely independent audit committees and Section 303A.01 of New York Stock Exchange and Section 4350(c) of the NASDAQ stock exchange listing rules require that boards have a majority of independent directors.

These developments suggest that the prevailing view among regulators is that it is in the interest of shareholders for the board of directors to be controlled by independent directors. This view seems to be driven by agency considerations. That is, only independent directors can effectively curtail agency problems (Harris and Raviv, 2006). Moreover, independent directors are considered to be more effective in monitoring bank managers as they are less beholden to management, hence, are more likely to oppose the management if and when it is required (Hermalin and Weisbach, 2003; Duchin *et al.*, 2010). In addition, independent directors perform an important function; they select, monitor, and reward or punish managers (Agrawal and Knoeber, 2001). Subsequently, when these are performed successfully, they assist directors in preventing any potential conflict of interest between inside directors and shareholders who in turn help resolve the fundamental agency problem (Andres and Vallelado, 2008). Moreover, independent directors have the advantage of adding value with their expertise in problem solving, knowledge of technological advancements and markets unfamiliar to bank managers (Agrawal and Knoeber, 2001). However, it must be emphasised that these advantages rely on the assumption that independent directors will have extensive business insight and an understanding of the inherent complexity of bank operations (Mehran *et al.*, 2011). As Huse (2007) postulates, independence of incentives alone is not sufficient; board members also need knowledge and information so that they can independently approve decision formulation and monitor implementation, including managerial opportunism. Overall, taking these factors into account, independent directors are likely to ensure or at least improve the quality of financial statements and provide suitable compensation incentives to executive officers (Mishra and Nielsen, 2000; Cornett *et al.*, 2009).

Yet, the goal of increasing the proportion of independent directors on the board has been viewed with scepticism as this could have an adverse effect on the advisory role of the board as this may inhibit bank executives from being part of the board. Harris and Raviv (2008) argue, that regardless of the assumed agency problem, having executive directors in control of the board, given they possess insiders' information, may be optimal. Hence, inside directors can assist with the transfer of information between board directors and management more effectively (Adams and Ferreira, 2007; Coles *et al.*, 2008). Most importantly, banks by design have high information asymmetry (see section 2.3.2) and operate in a more dynamic and

seemingly fragile economic environment within which their role is pivotal thus, they may benefit from more inside directors as they have greater bank-specific knowledge (Fama and Jensen, 1983). Therefore, corporate governance reforms such as the Sarbanes–Oxley Act of 2002 and the NYSE and NASDAQ exchange listing rules have a "one-size-fits-all" approach and their effectiveness can be challenged as policymakers do not take into account the opaqueness, high leverage and the tight regulatory nature of banks' activities which makes them different from non-financial firms (Levine, 2004; Adams and Mehran, 2012). Subsequently, 'governance arrangements that do not sufficiently take the unique features of banks into account risk exacerbating existing agency conflicts' and may result in facilitating managerial opportunism such as earnings management (Hagendorff, 2010, p.140).

Overall, the board of directors is responsible for monitoring bank managers in order to protect shareholders' interests. Taking these arguments into account, it is plausible to hypothesise that a board with a majority of independent directors can either constrain or facilitate the practice of earnings management. Thus, to assess the effectiveness of corporate governance reforms and the extent to which independent directors monitor management more effectively than inside directors, it is hypothesised that:

H2. Greater board oversight as measured by board independence leads to lower levels of earnings management and is associated with over-reporting of discretionary loan loss provisions in the period 2006-2016.

To clarify, over-reporting of discretionary loan loss provisions is expected as it is an indicator of prudent accounting; higher loan loss provisions are recorded for the bank to be able to cover expected losses. In addition to board independence, the frequency of board meetings is an important determinant of good governance, and this is discussed next.

4.2.2.2 Number of board meetings per year

The efficiency with which the board of directors operates and its impact on earnings management may depend on how frequently the board meets. Indeed, Conger *et al.* (1998) claim that the frequency of board meetings is positively associated with corporate governance and supervision which leads to reduced agency costs and lower risk-taking. Thus, it can be expected that a board that meets frequently can dedicate more time to issues regarding the quality of financial statements and in detecting earnings management. In fact, Adams and Mehran (2003) and Grove *et al.* (2011) point out that banks require more frequent board

meetings, compared to non-financial firms, due to complexity of their operations. Adams (2003) suggests that in addition to a bank's board structure, the frequency of board meetings is a reliable indicator of the overall capability of corporate governance mechanisms to control management behaviour. Nevertheless, it is of vital importance for directors to undertake effectively their responsibility in monitoring the managers' actions and behaviour. Otherwise, managers may still act against the interests of the shareholders (Cohen *et al.*, 2014). Overall, the frequent board meetings are expected to constrain earnings management and the respective hypothesis is as follows:

H3. Frequent board meetings are associated with lower levels of earnings management and over-reporting of discretionary loan loss provisions in the period 2006-2016.

However, the effectiveness of a board with a majority of independent directors and the frequency of board meetings in constraining earnings management can be undermined if the CEO is also the chairman of the board and this is examined next.

4.2.2.3 CEO Duality

'CEO duality' refers to a situation in which the CEO of a bank is also the Chairman of the board of directors (Pathan and Skully, 2010). The alternative- which may be reasonably referred to as an independence structure- describes the case in which different individuals serve in these capacities (Rechner and Dalton, 1991). The role of the Chairman is to oversee board meetings and is responsible for scheduling meetings, planning agendas and distributing material in advance (Larcker and Tayan, 2016). Hence, the Chairman determines the timing and the way in which the board addresses governance matters and plays a critical role in communicating the bank's priorities both internally and externally and in managing stakeholder concerns (Larcker and Tayan, 2016). Advocates of the CEO duality structure argue that 'the reason the positions of chairman and CEO are usually combined is that this provides a single focal point for company leadership. There is never any question about who is boss or who is responsible. This is an important issue... [otherwise] this is guaranteed to produce chaos both within the organization and in relationships with the board' (Anderson and Anthony, 1986, p.54).

However, when the CEO undertakes the role of the Chair, the effectiveness of the bank's corporate governance may be compromised according to O'Connor *et al.* (2016). Indeed, CEO duality is renowned for exacerbating the conflict of interest between managers and

shareholders, partly because it is an indicator of CEO power (Daily and Dalton, 1994; Coles and Hesterly, 2000). If CEO duality exacerbates the potential for agency problems, then the presence of a dual CEO-Chair may increase the extent of earnings management. In detail, CEOs may have incentives to manage earnings as they are generally evaluated and compensated based on the bank's financial performance. Therefore, as the CEOs cannot directly control stock market performance, they may seek to control accounting-based measures such as loan loss provisions (Davidson *et al.*, 2004). Further, Tuggle *et al.* (2010) argue that CEO duality acts as a detriment to the monitoring capability of the board of directors which leads to increased internal governance costs and risks. Thus, CEOs who are also Chairmen can bypass the governance process hence, CEO duality provides the CEOs with the advantage of using their authority to achieve their own personal objectives (Lipton and Lorsch, 1992; Lasfer, 2006). In other words, CEOs will either ensure the shareholders' interests are foremost, according to the agency theory, or to pursue their own interests unchecked (O'Connor *et al.*, 2006).

Overall, the dual appointment of the CEO and Chairman of the board concentrates power in the position of the CEO may enable the CEO to control the information available to the board of directors which would impede effective monitoring (Jensen, 1993). Accordingly, the hypothesis is as follows:

H4. CEO duality is associated with higher levels of earnings management and the under-reporting of discretionary loan loss provisions in the period 2006-2016.

Brickley *et al.*, (1997) propose that the agency costs of unitary leadership can be mitigated by institutional mechanisms that help to align the incentives of the CEO with shareholders such as an effective oversight by institutional shareholders. Thus, the impact institutional investors have on whether managers focus on opportunistic or self-serving behaviour is one of utmost importance. Indeed, in the most recent decades, institutional investors have become the largest owners of the U.S. corporations (Roth and Saporoschenko, 2001; Gillan and Starks, 2003). In the United States institutional investment grew from 6.1% of aggregate ownership of equities in 1950 to over 50% by 2002 (Gillan and Starks, 2003). Thus, the rise of institutional ownership leads to the following hypothesis which evaluates the influence of institutional ownership concertation on opportunistic managerial behaviour such as earnings management.

4.2.3 Institutional Ownership

The agency costs that arise from the potential divergence or conflict of interest between shareholders and managers can become more prevalent in the presence of diffused outside shareholdings that do not provide sufficient incentives for these shareholders to monitor managers (Berle and Means, 1932; Jensen and Meckling, 1976).[36] Indeed, the lack of incentives to monitor managers can result from high information search costs, organisation costs and heterogeneity of interests among the diffused outside shareholders (Watts and Zimmerman, 1986). However, an increasingly important external control mechanism affecting governance is the emergence of institutional investors as equity owners. Institutional investors have the potential to influence management's activities directly through their ownership, and indirectly by trading their shares (Gillan and Starks, 2003). Indeed, institutional shareholders by virtue of possessing economies of scale in information gathering and a larger share ownership, inter alia, may have economic incentives to monitor and engage in the governance of the bank (Koh, 2003). Thus, through active engagement in corporate governance, institutional investors may reduce agency costs by constraining managers from earnings management practices. Yet, their degree of effectiveness in controlling opportunistic managerial practices such as earnings management is controversial. On the one hand, institutional investors are assumed to play an active role in monitoring and disciplining managerial discretion (Benkraiem, 2008; Njah and Jarboui, 2010). On the other hand, institutional investors are characterised as myopic investors who focus excessively on current earnings rather than long-term earnings in determining stock prices (Porter, 1992). As a result, this is likely to increase managerial incentives to adopt an aggressive earnings management strategy (Koh, 2003; 2007; Cheng and Reitenga, 2009). Owing to these ambiguities the way in which managers' financial reporting discretion is associated with institutional ownership is an empirical issue which the thesis aims to investigate. Thus, in order to establish a hypothesis taking these ambiguities into account, the two perspectives are analysed next.

Institutional shareholders, typically including holders of pension funds, investment trusts, and insurance companies, are considered to be sophisticated investors who have superior information gathering and processing abilities (O'Brien and Bhushan, 1990; Walther 1997). Indeed, according to Cohen *et al.* (2014), institutional shareholders are generally able to

[36] Jensen and Meckling (1976) define agency costs as the sum of the costs of designing, implementing, and maintaining appropriate incentive and control systems and the residual loss resulting from not solving these problems completely.

allocate more time in researching the bank, and the industry as a whole, as opposed to individual shareholders who tend to have limited time to monitor the bank. In addition, institutional shareholders- especially those with large equity stakes and longer-term investment horizons- have strong incentives to serve as monitors to limit managerial opportunism and risky accounting practices when these are detrimental to the interest of the bank (Elyasiani *et al.*, 2017). Therefore, institutional ownership is considered an important mechanism in mitigating agency costs because institutional investors have the incentives, voting power, and investment skills to monitor, discipline and influence managerial behaviour (Jensen and Meckling 1976; Shleifer and Vishny 1986; Monks and Minow, 2011). Subsequently, institutional shareholders play an important role as an effective corporate governance tool as enhanced monitoring can mitigate the agency conflict and can improve the quality of managerial decisions. Thus, the ability of managers to manage earnings opportunistically can be constrained by the effectiveness of external monitoring by institutional investors (Chung *et al.*, 2002).

On the contrary, it is possible for managers to feel more compelled to meet the earnings goals of these investors and may be incentivised to engage in earnings management as a result. According to Bushee (2001), some institutions face competitive pressures for strong short-term performance and/or stringent fiduciary responsibilities that can foster an excessive short-term focus. Thus, institutional shareholders can be viewed as short-term oriented and are often referred to as myopic, or transient, investors who focus excessively on current earnings rather than long-term earnings in determining stock prices (Porter, 1992; Bushee, 1998). Indeed, regular performance assessments and industry performance ranking of institutional investors create incentives for these investors to adopt a short investment horizon (Porter, 1992; Black and Coffee 1994; Stapledon, 1996). Such short investment horizon deters institutional shareholders from incurring monitoring costs, as the benefits of governing the portfolio firms are unlikely to accrue to investors in the short run (Porter, 1992). In addition, the need to rebalance their portfolio to maintain or to improve their own performance does not allow sufficient time or resources for institutional investors to be actively involved in the monitoring of their portfolio firms beyond their performance assessment cycle (Black and Coffee, 1994; Stapledon, 1996). Consequently, the excessive focus on current earnings by such institutional shareholders may create incentives for bank managers to manage earnings upwards.

Moreover, Roth and Saporoschenko (2001) posit that institutional investors are generally passive investors who do not play an active governance role. In fact, former U.S. SEC Commissioner Joseph Grundfest (1990) agreed that in the United States institutional investors

exert little influence on the companies whose stock they hold. The argument that institutional investors are passive seems particularly relevant in the context of the U.S. banking industry given its highly regulated nature. Flannery (1998) argues that the regulatory monitoring of banks decreases the incentives of outside investors to monitor and discipline bank managers. Booth *et al.* (2002) support this view by claiming that the relationship between regulation and market discipline is one of substitution rather than complementarity. Subsequently, there will be less monitoring by institutional investors causing the relationship between earnings management and institutional ownership stability to be more tenuous (Elyasiani and Jia, 2008). Also, the effectiveness of monitoring may be weaker in banking than in non-financial industries since banks are highly leveraged institutions as discussed in section 2.5.1.2. In fact, empirical research shows that fewer institutional investors hold shares of a bank holding company relative to a manufacturing firm, and that institutional investors hold a smaller percentage of bank holding company's equity, than their counterparts holding corporate firm stocks (Adams and Mehran, 2003).[37] Nonetheless, while equity investors are a lot less important than creditors in terms of the funding they provide to banks, equity investors still control the key governance devices such as the board of directors, director appointments (and dismissals) and executive compensation. As a result, with risk-based profits going to equity holders, equity holders such as institutional shareholders have strong incentives to put in place monetary risk-taking incentives that may motivate earnings management (Hagendorff, 2015). Indeed, Anginer *et al*. (2018) using a sample of U.S. banks for the period 1990-2014 find that shareholder-friendly corporate governance is associated with greater risk-taking by large banks, consistent with larger banks benefiting from too-big-to-fail guarantees.

Overall, these contradictory views on the association between institutional ownership and earnings management suggest that institutional investors either create incentives for portfolio firm managers to manage earnings upward or limit earnings management through enhanced monitoring unless this is disincentivised due to bank regulation. As such, this hypothesis focuses on the association between institutional ownership and income-increasing earnings management. When the concentration of institutional ownership is low, institutional investors are unlikely to have sufficient influence on the portfolio firms' direction to justify regular involvement. In this instance, the exit option becomes a more feasible action than engaging in

[37] Adams and Mehran (2003) report that, on average, 535 institutions held shares of each manufacturing firm in the S&P 500, versus 204 for bank holding companies. Institutions held 54.6% of each manufacturing firm, compared to 42.4% of the bank holding companies, with the difference being statistically significant.

time consuming and high cost monitoring. However, as concentration of institutional ownership increases this is expected to provide incentives for managers to manage earnings upward or institutional investors to get involved in monitoring of their portfolio firms given the exit option becomes unattractive. Nonetheless, as enhanced monitoring may be disincentivised due to bank regulation, higher institutional ownership concentration is expected to incentivise earnings management and the respective hypothesis is as follows:

H5. Greater institutional ownership concentration is high, institutional ownership is associated with higher levels of earnings management and the underreporting of discretionary loan loss provisions for the period 2006-2016.

Having developed and established the hypotheses for testing the impact of corporate governance mechanisms on earnings management through the manipulation of loan loss provisions, the related empirical research studies are reviewed in the following section.

4.3 Review of Empirical Research

A plethora of empirical and theoretical research studies have been devoted in exploring the relationship between incentive-based compensation structures with earnings management but not many studies account for additional corporate governance mechanisms. Most importantly, the vast majority of these studies are based on industrial firm data which cannot be generalised to banks as banks 'have fewer growth options, substantially greater leverage and coverage by the Federal Deposit Insurance Corporation' as discussed in section 2.5.1.2 (Bai and Elyasiani, 2013, p.799). Nevertheless, as the empirical research on earnings management with respect to corporate governance in the banking industry is scarce, the findings of key studies on U.S. non-financial firms are also analysed in order to gain an extensive understanding of this research topic.

One stream of empirical research suggests that earnings management is the outcome of managerial incentives to maximise performance-based bonuses. The study which provides the earliest evidence on earnings management is that of Healy (1985) who investigates discretionary accruals as a measure for earnings management using a sample of the 250 largest U.S. industrial corporations for the years 1964 to 1980. Healy (1985) finds that performance-based bonus plans incentivise managers to select specific accounting measures as a means of maximising their total compensation. Even though it is rational to expect that this can be

achieved by maximising current-year earnings, Healy (1985) also finds that managers can deliberately decrease (instead of increase) earnings so that the bonus in the following year will be easier to obtain. Gaver *et al.* (1995) create a similar empirical model to that of Healy (1985) for a sample of 102 firms for the period 1980 to 1990. However, the authors take into account only discretionary accruals than total accruals.[38] Contrary to Healy (1985), Gaver *et al.* (1995) find that managers engage in income-increasing accounting practices regardless of the "bonus threshold." Moreover, the findings of Holthausen *et al.* (1995) are contrary to those of Gaver *et al.* (1995). Specifically, Holthausen *et al.* (1995), by employing a sample of 443 observations during the 1980's, find no evidence supporting the hypothesis that managers manipulate earnings to maximise the value of their bonus. Holthausen *et al.* (1995, p. 45) conclude that their evidence 'provides some caution against accepting the general notion that top executives of corporations consistently manipulate earnings in economically significant ways to maximise the current value of the bonus payments.'

A relatively more recent empirical study by Bergstresser and Philippon (2006), employs a sample of publicly held corporations with 4,671 observations for the period 1993 to 2001 and provides evidence that firms with CEOs whose total compensation is more sensitive to the firm's share prices have higher levels of earnings management. Specifically, these CEOs are inclined to use discretionary components of earnings for the purpose of influencing their firm's reported performance. Moreover, Bergstresser and Philippon (2006) demonstrate that stock and option holdings incentivise the CEOs to increase reported earnings. In addition, the likelihood of earnings management is greater for CEOs who hold more unexercisable options and they are likely to increase the sales of stocks following the earnings management. Contrary to Bergstresser and Philippon (2006), Baker *et al.* (2003), employ a sample of 168 firms for the period 1992 to 1998 and find that firms which compensate their executives with a greater proportion of options relative to other forms of compensation engage in income-decreasing earnings management. In detail, managers who receive large option awards appear to make income-decreasing accrual choices as a means of decreasing the exercise price of their option awards. Overall, the empirical research discussed so far provides inconclusive evidence on the extent to which managers engage in income-increasing or decreasing earnings management practices. Also, these studies employ discretionary accruals as the dependent variable and

[38] Total accruals consist of both discretionary and non-discretionary components. By using total, rather than discretionary accruals, Healy (1985) assumes that non-discretionary accruals are zero.

executive compensation as the explanatory variable. However, some studies examine the reverse relationship of these variables and these are discussed next.

Another stream of research examines the impact of earnings management on executive compensation. For example, Balsam (1998) employs a sample of 3,439 firm observations from 1980 to 1993 to study the effect of discretionary accruals on CEO cash compensation. Balsam (1998) finds a positive association between discretionary accruals and cash compensation. Thus, the author's evidence is consistent with the notion that managers use discretionary accruals for the purpose of increasing compensation. Overall, these two streams of empirical research suggest that executive compensation is simultaneously determined with earnings management behaviour (Sun and Hovey, 2013). In other words, while executive compensation prompts managers to engage in opportunistic earnings management, earnings manipulation may allow managers to maximise the value of their compensation and this simultaneity will influence the choice of empirical methods discussed in section 4.5.4. Further, these studies exclude financial institutions from their sample as managers of financial institutions may have different incentives to manage earnings due to the tight regulatory nature of bank activities, high leverage, opacity and the uniqueness of bank financials (Burgstahler and Eames, 2003; Hagendorff, 2015; Elyasiani *et al*., 2017).

Nevertheless, there are two studies which employ a sample of U.S. banks and provide some evidence on whether managers with performance-based compensation are more likely to manage earnings. First, Cheng *et al.* (2011) examine the relationship between equity incentives and earnings management in the banking industry by employing a sample of 71 commercial banks and 17 savings institutions for the period from 1994 to 2007. Cheng *et al.* (2011) find that bank CEOs, compared to CEOs of non-financial firms, are not likely to engage in income-increasing earnings management. Also, the authors find that it is more likely for bank managers with high equity incentives to manage earnings only when regulatory capital levels are close to the minimum required by regulators. Thus, this finding suggests that in the banking industry the likelihood of regulatory intervention encourages, rather than constrains, earnings management. Second, Cornett *et al.* (2009) investigate earnings management with respect to executive compensation as well as other corporate governance mechanisms in the context of the U.S. banking industry. In detail, Cornett *et al.* (2009) employ a sample of the 100 largest bank holding companies over the period 1994 to 2002 and find evidence supporting that corporate governance is associated with earnings management to some extent. Specifically, they find that bank performance, board independence, the number of audit committee meetings

per year and Tier I regulatory capital are negatively associated with earnings management. For example, an independent board of directors is associated with higher levels of loan provisions and fewer recorded securities gains which lead to a net decrease in reported earnings. Also, more frequent audit committee meetings would mean that the monitoring of the bank increases and the bank is less likely to inflate income by underreporting loan losses and/or over reporting securities gains. Further, CEO Duality and CEO pay-for-performance sensitivity are positively related to earnings management. Thus, when the CEO is also the board chair and pay-for-performance sensitivity is high, bank managers record fewer loan loss provisions and more securities gains leading to an increase in reported earnings. Overall, Cornett *et al.* (2009) provide sufficient evidence in support of their hypotheses that the governance structure at bank holding companies does indeed affect the actions of bank managers. In other words, corporate governance mechanisms such as board independence constrain earnings management whereas CEO pay-for performance encourage it.

An additional determinant of earnings management related to the governance of banks that the thesis seeks to investigate is that of institutional ownership. In the context of the U.S. banking industry, Elyasiani *et al*. (2017) explore the role of institutional investors as a source of market discipline in mitigating earning management. The authors employ a sample of 930 publicly traded U.S. bank holding companies for 1993 to 2013. Further, Elyasiani *et al.* (2017) classify institutional investors into four types: (i) monitoring institutions, (ii) dedicated non-independent institutions, (iii) quasi-indexing institutions and (iv) transient institutions. Their findings point to heterogeneity among institutional investors in terms of their incentives to monitor and their effectiveness in doing so. In detail, only monitoring institutions (those with long investment horizons, high ownership concentrations, and independence from the investee firms) stand out in terms of strength and efficacy of monitoring and disciplining investee banks. Further, Elyasiani *et al*., (2017) find that the effect of monitoring institutions on constraining earnings management is statistically significant only for the subsample of large banks. The incentive of large banks to manage earnings is attributed to two factors. One is that large bank holding companies have greater stakes owned by monitoring institutions and second, they are under greater scrutiny by regulators, analysts, and large clients who are highly sensitive to any negative announcements. As these factors are considered to motivate large banks more strongly to engage in earnings management, they necessitate a greater role for monitoring. This finding is consistent with agency theory, which suggests concentrated ownership is the most effective

means of alleviating agency costs associated with the separation of ownership and control (Jensen and Meckling 1976).

4.4 Summary

The primary role of bank managers is to make decisions on the behalf of shareholders however, a conflict of interests between these parties has potential agency costs. One such agency cost, which this chapter seeks to investigate, is that of earnings management via the manipulation of loans loss provisions as the release of financial reports that do not present an accurate economic picture of the bank may lead shareholders to make suboptimal investment decisions as a result (Davidson et al., 2004). Thus, in developing the hypotheses pertaining to the impact of corporate governance mechanisms on earnings management, the thesis builds on agency theory to test its theoretical implications in the banking industry. Specifically, the corporate governance mechanisms that are hypothesised to be associated with earnings management are: option-based compensation, board independence, board activity, CEO/Chair duality and institutional ownership. Related empirical research studies found that these may not achieve their intended purpose which is to better align the interests of managers and shareholders. Therefore, to test the validity of this concluding remark and the respective hypotheses, the empirical analysis is conducted in the following section.

4.5 Data and Methodology

4.5.1 Introduction

This section introduces the research design developed to test the hypotheses discussed in section 4.2 and is split in three parts. First, section 4.5.2 outlines the data sources and the sample selection procedure used to derive the final dataset of 792 bank-year observations for the period 2006-2016. Second, section 4.5.3 describes the method used to decompose loan loss provisions into its discretionary and nondiscretionary components and presents the empirical models used to test the hypotheses. Third, section 4.5.4 evaluates the econometric methods employed to estimate these models and presents the empirical results.

4.5.2 Sample Selection

The data collected for investigating the impact of corporate governance mechanisms on earnings management are sourced from the following four databases for the 2006-2016 period. Bank-specific data are collected from the SNL Financial database.[39] Executive compensation data are obtained from the Standard & Poor's ExecuComp database which provides data on all components of executive compensation for 133 financial institutions. Further, missing executive compensation data in ExecuComp and detailed information on board structure and meetings are hand collected from the DEF 14A proxy statements of annual meetings sourced from the Securities and Exchange Commission's EDGAR filings.[40] In addition, data on institutional ownership are collected from the Thomson Reuters database and the final sample is described next.

The final sample employed for the empirical analysis consists of 72 publicly traded U.S. bank holding companies for which commercial banking is their main line of business. Indeed, the Standard Industrial Classification (SIC) codes these bank holding companies are assigned to are 6021 and 6022 which represent national and state commercial banks. In addition, following Pathan and Faff (2013), bank holding companies such as savings and thrift institutions are excluded from the sample for the purpose of comparability and generalisability of the empirical findings. The final sample is derived from the intersection of the available data on bank holding companies with SIC codes 6021 and 6022 in ExecuComp, DEF 14A proxy statements, SNL financial statements and with a minimum of four consecutive years of data over 2006 to 2016. Most importantly, for consistency, this is a sub-sample of the main sample of 675 bank holding companies employed in the empirical analysis of Chapter 3. To be precise, this dataset consists of bank holding companies which are classified as *large* and *giant*. In line with Handorf and Zhu (2006) and following the Federal Deposit Insurance Corporation and Federal Reserve guidelines, the average total assets of the former group lie within the range of $500million to $10 billion and represents 54% of the sample whereas the average total assets of the latter category are in excess of $10 billion and represents 46% of the sample. The rationale for focusing on large banks is that typically these are the more sophisticated institutions with complex balance sheets that may make it difficult for investors to detect earnings management

[39] The SNL Financial database is part of the Standard & Poor's Global Market Intelligence platform.
[40] A company is required to file its annual proxy statement with the Securities and Exchange Commission no later than the date proxy materials are first sent or given to shareholders. It is called a "DEF 14A" because it is the "definitive," or final, proxy statement and "14A" refers to the fact that proxy statements are filed pursuant to Section 14(a) of the Securities Exchange Act of 1934 (SEC, 2003a).

yet are under greater scrutiny by regulators, analysts, and large clients who are highly sensitive to any negative announcements (Lobo and Zhou 2006; Demirguc-Kunt *et al.*, 2013; Elyasiani *et al.*, 2017). Therefore, these factors may motivate managers of large banks more strongly to engage in earnings management.

With regards to the time period for which data are collected, this commences at the beginning of the fiscal year 2006 as data for a key variable employed in the empirical analysis of this chapter, the value of option awards, are not available in the ExecuComp database and proxy statements. This is because between the years 1995 and 2005 banks accounted for equity-based compensation under the Financial Accounting Standards (FAS) 123. In the year 2004, the Financial Accounting Standards Board issued a revised version of FAS 123 that required the use of fair values in the income statement and FAS 123R and became effective for all firms with fiscal year-ends beginning in January 2006 (Hayes *et al.*, 2012).[41] The most notable accounting difference resulting from the passage of FAS 123R relates to the treatment of stock options, in which the number of shares and exercise price are known at the grant date. Prior to FAS 123R, the intrinsic value method of Accounting Principles Board (APB) Opinion 25 was used whereby the exercise price of fixed stock options was commonly set to the stock price on the grant date, and as a result no compensation expense was recorded on the income statement under this method. However, under FAS 123R, the compensation costs of all employee stock options are measured using fair value thus, fixed options count as part of the compensation expense on the income statement.

As to the organisation of the dataset, as in Chapter 3, a panel dataset is utilised which is a type of pooled cross-section time-series dataset. Due to missing observations, data is not available each year for each bank in the sample which results in having an unbalanced dataset which is in fact 'likely to be the norm in typical economic empirical settings' and this research is no exception (Baltagi, 2005, p.165). It is indeed preferable to work with an unbalanced panel as the alternative of constraining the analysis to a balanced panel, would most likely create survivorship bias (Baum, 2006).[42] Overall, the final sample consists of a total of 792 bank-year observations and the empirical analysis is conducted next.

[41] In 1972, the APB issued APB Opinion 25, which provided that stock-based compensation cost be recorded at its intrinsic value (the difference between the market price of the stock and the exercise price, if any) on the measurement date (the first date when both the number of shares and the exercise price are known).
[42] In addition, Stata, the statistical software is chosen to estimate all empirical models, has tools for panel data which make it easy to work with unbalanced panels according to Baum (2006).

4.5.3 Empirical Analysis

4.5.3.1 Empirical Model Specification

To establish an empirical model specification for evaluating the relationship between corporate governance mechanisms and earnings management, a measure of earnings management is developed first. Empirical research studies on earnings management which employ a sample of non-financial firms, measure earnings management by identifying discretionary accruals composed of total accruals and non-discretionary accruals. To estimate these accruals, these studies adopt the empirical model specification created by Jones (1991) or the "modified" Jones model developed by Dechow *et al.* (1995). Specifically, non-discretionary accruals are estimated from an empirical model based on firm assets, property, plant and equipment and change in sales and account receivables. Discretionary accruals are the residuals between actual accruals and the predicted accruals from the (modified) Jones model (Cohen *et al.*, 2014). Thus, firms with large discretionary accruals are the ones which are considered to manipulate earnings. Evidently, the variables used to compute discretionary accruals proposed by Jones (1991) must be modified for banks as banks are not engaged in sales driven businesses. Instead, as discussed in section 3.2.1.1, bank managers can exercise their discretion over reported earnings by manipulating loan loss provisions (Rajgopal and Venkatachalam, 1997).

Thus, Beatty *et al.* (2002) developed an empirical model and estimation technique for earnings management through loan loss provisions which adapts to the uniqueness of banks. The authors consider their empirical model to be equivalent to the modified Jones model used to derive non-discretionary accruals for non-financial firms whereby the residuals are used as a measure of discretionary accruals. Thus, similar to accruals, loan loss provisions are the combination of a non-discretionary and a discretionary component whereby the latter implies management choices as opposed to the former which is affected by factors such as the performance of the loan portfolio (Elyasiani *et al*., 2017). In detail, according to Cohen *et al.* (2014), the recording of loan loss provisions ought to reflect the level of non-preforming loans and thus, the management of the non-discretionary loan loss provisions of the bank. However, as explained in detail in section 3.2.1.1, bank managers can exercise their discretion in the recording of loan loss provisions by exploiting the latitude the Generally Accepted Accounting Principles provide. Consequently, loan loss provisions have a non-discretionary component that brings loan loss reserves to an acceptable level and a discretionary component that managers can

manipulate. In addition to loan loss provisions, Cornett *et al.* (2009) propose that banks can also manage earnings through the realisation of security gains and losses, and this will also be considered. Overall, earnings management is measured by combining a measure of discretionary loan loss provisions and the discretionary realisation of securities gains and losses. The empirical model for estimating earnings management that has been developed by Beatty *et al.* (2002) was subsequently employed by Cornett *et al.* (2009), Cohen *et al.* (2014), Leventis and Dimitropoulos (2012), Grougiou *et al.* (2014) and Elyasiani *et al.* (2017) and is specified by the following fixed effects regression model.[43]

$$NDLLP_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 NPL_{it} + \beta_3 LLR_{it} + \beta_4 LOANR_{it} + \beta_5 LOANC_{it} + \beta_6 LOAND_{it} + \beta_7 LOANA_{it} + \beta_8 LOANI_{it} + \beta_9 LOANF_{it} + \beta_{10} T_t + \varepsilon_{it} \quad (4.1)$$

where:

i = bank holding company identifier;
t = year (2006 to 2016);
$NDLLP$ = non-discretionary loan loss provisions as a percentage of total loans;
$SIZE$ = the natural logarithm of total assets;
NPL = non-performing loans (includes loans past due 90 days or more and still accruing interest and loans in nonaccrual status) as a percentage of total loans;
LLR = loan loss allowance as a percentage of total loans;
$LOANR$ = real estate loans as a percentage of total loans;
$LOANI$ = commercial and industrial loans as a percentage of total loans;
$LOAND$ = loans to depository institutions as a percentage of total loans;
$LOANA$ = agriculture loans as a percentage of total loans;
$LOANC$ = consumer loans as a percentage of total loans;
$LOANF$ = loans to foreign governments as a percentage of total loans;
T = year dummies;
ε = error term.

The value of $NDLLP$ in equation (4.1) represents loan loss provisions determined by bank size ($SIZE$), measured as the natural logarithm of total assets; non-performing loans scaled by total loans (NPL); loan loss reserves scaled by total loans (LLR); and loan mix, measured by the shares of six main categories of loans as percentages of total loans. These loan categories include: real estate loans ($LOANR$), commercial and industrial loans ($LOANI$), loans to depository institutions ($LOAND$), agricultural loans ($LOANA$), consumer loans ($LOANC$) and foreign loans ($LOANF$). Times effects (T) are also included in the model and standard errors

[43] As in Cornett *et al*. (2009), the Cook's (1977) distance criterion is used to identify outliers. However, no outliers have been detected, as expected, given the sample is composed of banks classified only as *large* or *giant.*

are clustered at bank level which is important when using panel data as nonclustered standard errors would be biased according to Petersen (2009). The error term of the regression represents the discretionary component of loan loss provisions. According to Cornett *et al*. (2009), this method is equivalent to the modified Jones model used to derive "normal" accruals for non-financial firms whereby the residuals of the empirical model are used as a measure of discretionary accruals. Further, as the variables in equation (4.1) are a percentage of total loans, the measure of discretionary loan loss provisions is scaled by total assets as in Cornett *et al.* (2009) and $DLLPLA_{it}$ is defined as:

$$DLLPLA_{it} = \varepsilon_{it} \times \frac{LOANS_{it}}{ASSETS_{it}} \tag{4.2}$$

where:

$LOANS$ = total loans;
$ASSETS$ = total assets.

An additional component of earnings management is discretionary realised security gains and losses. Unlike loan loss provisions, security gains and losses used to be 'relatively unregulated and unaudited discretionary choices' (Cohen *et al*., 2014, p.174). Subsequently, it is less likely that auditors, regulators or directors would raise an objection to a manager's decision to sell an investment security. Therefore, as in Beatty *et al.* (1995), Cornett *et al.* (2009) and Elyasiani *et al.* (2017) the following fixed effects regression model is employed.

$$RSGL_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 URSGL_{it} + \beta_3 T_t + \varepsilon_{it} \tag{4.3}$$

where:

i = bank holding company identifier;
t = year (2006 to 2016);
$RSGL$ = realised security gains and losses as a percentage of total assets (includes realised gains and losses from available-for-sale securities and held-to-maturity securities);
$SIZE$ = the natural logarithm of total assets;
$URSGL$ = unrealised security gains and losses (includes only unrealised gains and losses from available-for-sale securities) as a percentage of total assets;
T = year dummies;
ε = error term.

In equation (4.3), the realised securities gains and losses ratio ($RSGL$) is a function of size ($SIZE$) and the unrealised securities gains and losses ratio ($URSGL$). Beatty *et al.* (2002)

suggest that realised security gains or losses tend to be higher when there are higher unrealised security gains or losses. Time effects are included in the regression and standard errors are clustered at the bank level. Similar to equation (4.1), the discretionary component of realised security gains and losses ($DRSGL_{it}$) is the error term of equation (4.3). Higher (lower) $DRSGL$ values suggest greater likelihood of upward (downward) earnings management because higher (lower) security gains raise (lower) the profitability of the bank (Elyasiani *et al.*, 2017). Appendix 1 provides summary statistics for the variables used to find discretionary and non-discretionary components as well as the results of the regressions in Equations (4.1) and (4.3). Overall, earnings management is the joint effect of discretionary loan loss provisions and realised security gains and losses whereby higher levels of loan loss provisions decrease earnings while higher levels of realised securities gains increase earnings (Cornett *et al.*, 2009). Thus, high levels of earnings management amount to underreporting loan loss provisions and higher levels of realised securities gains, which, ceteris paribus, increase operating income. On the contrary, low levels of earnings management would suggest that loan loss provisions are over-reported and fewer security gains are realised, which decreases operating income. Accordingly, earnings management is defined as:

$$EMGT_{it} = DRSGL_{it} - DLLPLA_{it} \quad (4.4)$$

Table 4.1: *Descriptive statistics.*

	Mean	Median	Std. Dev	1st%ile	99th%ile
$DLLPLA$ (%)	0.00816	0.08951	0. 76695	-1.72944	1.89085
$DRSGL$ (%)	0.00000	-0.00978	0. 18297	-0. 49456	0. 71522
$EMGT$ (%)	-0.0084	-0. 07334	0. 76556	-1.6811	1.72676
$Return\ on\ Assets$ (%)	1.04281	1.28342	1.31587	-4.12451	2.94977
$DLLPTL$ (%)	0.00000	0.15094	1.16579	-3.02241	2.58208
$DLLPTA$ (%)	0.00000	0.09004	0.78714	-1.87355	1.68647

$EMGT$ = discretionary earnings as a percent of total assets = $DRSGL - DLLPLA$, $DLLPLA$ = discretionary loan loss provisions as a percentage of total assets, DRSGL = discretionary realised security gains and losses as a percentage of total assets; $Return\ on\ Assets$ = net income/total assets; $DLLPTL$ (%) = discretionary loan loss provisions are residuals of regression model (4.1); $DLLPTA$ (%) = discretionary loan loss provisions are residuals of regression model (4.5).

The average level of both discretionary loan loss provisions and realised securities gains are measured as variations from non-discretionary behaviour and are represented by the regression residuals which, by construction, are approximately zero (Cohen *et al.*, 2014). However, there is an important variation in these estimates which is worth analysing. A shown in Table 4.1, discretionary loan loss provisions, $DLLPLA$, range from a 1st percentile value of -1.729% to a

99th percentile value of 1.891% of assets, with a standard deviation of 0.496% of assets. The corresponding range for $DRSGL$ is from -0.495% to 0.715% of assets, with a standard deviation of 0.183% of assets. The standard deviation of discretionary earnings, $EMGT$, is 0.766% of assets which suggests that a significant part of the variation in reported bank performance- represented by Return on Assets with standard deviation of 1.32%- is due to management's discretionary accounting and security sales choices.

Further, as shown in Table 4.1, the residual estimates for discretionary realised security gains or losses are substantially lower than those of discretionary loan loss provisions, hence their impact on the earnings management variable, $EMGT$, is negligible. The reason for this is the implementation of the Statement of Financial Accounting Standards (SFAS) No.157 in 2007 which restricted the degree to which earnings can be manipulated through the recording of security gains or losses. According to the Financial Accounting Standards Board (n.d.), prior to SFAS No.157, there were various definitions of fair value and insufficient guidance for applying those definitions in the Generally Accepted Accounting Principles. This guidance was disseminated among the many accounting pronouncements that required fair value measurements. Consequently, this led to inconsistencies which enhanced further the complexity of implementing the Generally Accepted Accounting Principles. Therefore, under SFAS No.157 fair value accounting requires liabilities and assets to be reported on the balance sheet at current values (FASB, n.d.). As a result, earnings can be affected by the sales of securities only to the degree to which values have changed over the very short term (Cohen *et al.*, 2014). As the sample period employed runs from 2006 through 2016, the latitude managers have in managing earnings by intentionally realising securities gains or losses is diminished. As a result, earnings management will be represented only by discretionary loan loss provisions, $DLLPLA$, derived by the regression model (4.1) and equation (4.2) rather than the composite $EMGT$ variable. The additional measure of discretionary loan loss provisions is derived from the following fixed effects regression model. This model is estimated by scaling all variables employed in equation (4.1) by total assets (instead of total loans) to ensure the robustness of the empirical findings and discern any potential inconsistencies in the final set of results.

$$NDLLP_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 NPL_{it} + \beta_3 LLR_{it} + \beta_4 LOANR_{it} + \beta_5 LOANC_{it} + \beta_6 LOAND_{it} + \beta_7 LOANA_{it} + \beta_8 LOANI_{it} + \beta_9 LOANF_{it} + \beta_{10} T_t + \varepsilon_{it} \quad (4.5)$$

where:

i = bank holding company identifier;
t = year (2006 to 2016);
$NDLLP$ = non-discretionary loan loss provisions as a percentage of total assets;
$SIZE$= the natural logarithm of total assets;
NPL = non-performing loans (includes loans past due 90 days or more and still accruing interest and loans in nonaccrual status) as a percentage of total assets;
LLR = loan loss allowance as a percentage of total assets;
$LOANR$ = real estate loans as a percentage of total assets;
$LOANI$ = commercial and industrial loans as a percentage of total assets;
$LOAND$ = loans to depository institutions as a percentage of total assets;
$LOANA$ = agriculture loans as a percentage of total assets;
$LOANC$ = consumer loans as a percentage of total assets;
$LOANF$ = loans to foreign governments as a percentage of total assets;
T = year dummies;
ε = error term.

The error term of this regression, $DLLPTA$, represents the discretionary component of loan loss provisions. Appendix 1 provides summary statistics for the variables used to estimate regression model (4.5) and the empirical results. Table 4.1 reports descriptive statistics for the variable $DLLPTA$. The average level of discretionary loan loss provisions for the sample banks is 0.000% with a range from a 1st percentile value of -1.874% to a 99th percentile value of 1.685% and a standard deviation of 0.787% showing that banks may manipulate loan loss provisions.

Overall, fitted values from the estimates of equations (4.1) and (4.5) reflect non-discretionary loan loss provisions while residuals from these models and those calculated in equation (4.2) provide estimates for discretionary loan loss provisions. Thus, the following empirical models employ these residuals, as dependent variables, to evaluate the relationship between corporate governance mechanisms and earnings management.

Model 1:

$$DLLPTL_{it} = \beta_0 + \beta_1 OPTIONS_{it} + \beta_2 INSTOWN_{it} + \beta_3 BINDEP_{it} + \beta_4 CEODUAL_{it} + \beta_5 BMEET_{it} + \beta_6 AUDMEET_{it} + \beta_7 EBTP_{it} + \beta_8 SIZE_{it} + \beta_9 T_t + \varepsilon_{it} \quad (4.6)$$

Model 2:

$$DLLPLA_{it} = \beta_0 + \beta_1 OPTIONS_{it} + \beta_2 INSTOWN_{it} + \beta_3 BINDEP_{it} + \beta_4 CEODUAL_{it} + \beta_5 BMEET_{it} + \beta_6 AUDMEET_{it} + \beta_7 EBTP_{it} + \beta_8 SIZE_{it} + \beta_9 T_t + \varepsilon_{it} \quad (4.7)$$

Model 3:

$$DLLPTA_{it} = \beta_0 + \beta_1 OPTIONS_{it} + \beta_2 INSTOWN_{it} + \beta_3 BINDEP_{it} + \beta_4 CEODUAL_{it} + \beta_5 BMEET_{it} + \beta_6 AUDMEET_{it} + \beta_7 EBTP_{it} + \beta_8 SIZE_{it} + \beta_9 T_t + \varepsilon_{it} \quad (4.8)$$

where:

i = bank holding company identifier;
t = year (2006 to 2016);
$DLLPTL$ = discretionary loan loss provisions are residuals of regression model (4.1);
$DLLPLA$ = discretionary loan loss provisions as a percent of total assets calculated in equation (4.2);
$DLLPTA$ = discretionary loan loss provisions are residuals of regression model (4.5);
$OPTIONS$ = CEO option-based compensation is measured as:

$$\frac{\text{value of annual option awards}}{\text{value of annual option awards} + \text{annual salary} + \text{annual bonus} + \text{annual other income}}$$

$INSTOWN$ = aggregate holdings of the five institutional investors with the largest number of shares divided by the total holdings of all institutional shareholders;
$BINDEP$ = board independence = independent directors / board size;
$CEODUAL$ = a dummy variable equal to 1 if the CEO is also the chairman of the board and 0 otherwise;
$BMEET$ = the number of board meetings per year;
$AUDMEET$ = the number of the audit committee meetings per year;
$EBTP$ = earnings before extraordinary items, taxes and provisions to total assets;
$SIZE$ = the natural logarithm of total assets;
T = year dummies;
ε = error term.

As the dependent variables $DLLPTL_{it}$, $DLLPLA_{it}$ and $DLLPTA_{it}$ have been defined and summarised, the independent variables employed to test the hypotheses established in section 4.2 are discussed next.

4.5.3.2 Corporate Governance Data

Option-based compensation

CEO option-based compensation, $OPTIONS_{it}$, is represented by the ratio of the value of annual option awards to the sum of value of annual option awards, salary, bonus, and all other compensation as in Cornett *et al.* (2009). Indeed, option-based compensation has been used as a measure for incentives to manage earnings in various studies such as Bergstresser and Philippon (2006) and Cheng *et al.* (2011). Specifically, as 'compensation is tied to firm performance and the value of options is linked to the stock price, management compensation is a direct function of contemporaneous operating performance' (Cornett *et al.*, 2009, p.420). This is expected to incentivise CEOs to increase reported earnings by underreporting loan loss provisions, suggesting a negative coefficient for this variable.

The variable $OPTIONS_{it}$ for this sample is 13% on average, ranging from 0% to 82.4% as shown in Table 4.2. Compared to the sample of bank holding companies employed by Cornett *et al.* (2009) for the period 1994 to 2002, the range is similar with a minimum of 0% and a maximum of 80%. However, the average value reported by the authors is 41% which is higher. In fact, as depicted in Figure 4.1, this difference may represent the declining trend of the value of option awards relative to other forms of compensation for the sample banks over the period 2006 to 2016.

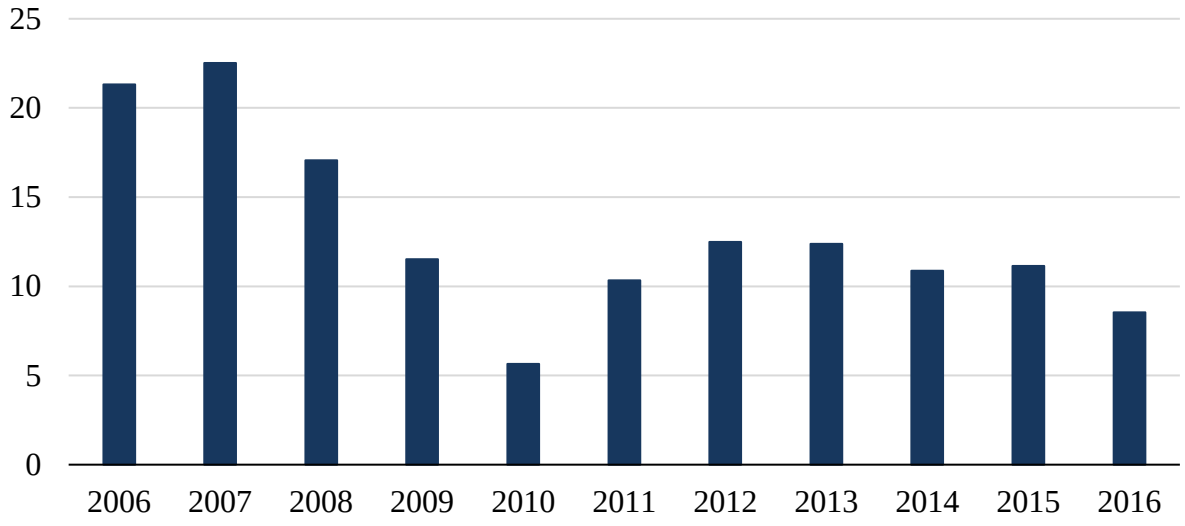


Figure 4.1: *Value of Option Awards to Total Compensation (%), 2006-2016.*

Table 4.2: *Descriptive Statistics.*

Variable	Mean	Std. Dev.	Minimum	Maximum
$OPTIONS_{it}$	0.1303	0.1888	0	0.8235
$INSTOWN_{it}$	0.2898	0.0834	0.0839	0.7906
$BINDEP_{it}$	0.819	0.104	0	1.3
$CEODUAL_{it}$	0.506	0.500	0	1
$BMEET_{it}$	10.122	4.497	4	38
$AUDMEET_{it}$	9.275	4.200	0	32
$EBTP_{it}$	0.0104	0.0132	-0.1575	0.0532
$SIZE_{it}$	16.2337	1.2078	13.5020	19.7192
$Total\ Assets$	26.70	48.70	0.73	366.00

Note: Descriptive statistics are in percentage points except for the variable *Total Assets* which is in billions of U.S. dollars. $OPTIONS_{it}$ = CEO option-based compensation is measured as: value of annual option awards/(value of annual option awards + annual salary + annual bonus + annual other income); $INSTOWN_{it}$ = aggregate holdings of the five institutional investors with the largest number of shares divided by the total holdings of all institutional shareholders; $BINDEP_{it}$ = board independence = independent directors/ board size; $CEODUAL_{it}$ = a dummy variable equal to 1 if the CEO is also the chairman of the board and 0 otherwise; $BMEET_{it}$ = the number of board meetings per year; $AUDMEET_{it}$ = the number of the audit committee meetings per year; $EBTP_{it}$ = earnings before extraordinary items, taxes and provisions to total assets; $SIZE_{it}$ = the natural logarithm of total assets; i = bank holding company identifier; t = year (2006 to 2016).

Board Structure & Function

Board independence, $BINDEP_{it}$, is defined as the percentage of independent directors to the total number of directors. Specifically, independent directors are directors who are not employed by the bank and have no pervious business relationship with the bank or any family relationship with its officers (Adams and Mehran, 2012). A growing trend for a larger proportion of independent directors on the board for the sample banks over the period 2006-2016 can be observed in Figure 4.2. Moreover, based on the descriptive statistics presented in Table 4.2 the sample bank holding companies have a higher percentage of outsiders on the board than non-financial firms on average; 81.9% compared to 61% in Adams and Mehran (2003) and 54% in Yermack (1996). This average value is higher even when compared to those reported in banking studies as well. For example, Pathan and Faff (2013) report 71%, Adams and Mehran (2012) 69%, Pathan and Skully (2010) 65% and Cornett *et al.* (2009) 68%. Thus, based on the rationale that independent directors on the board enhance monitoring, this variable

is expected to be positively related to discretionary loan loss provisions suggesting prudent accounting by bank managers.

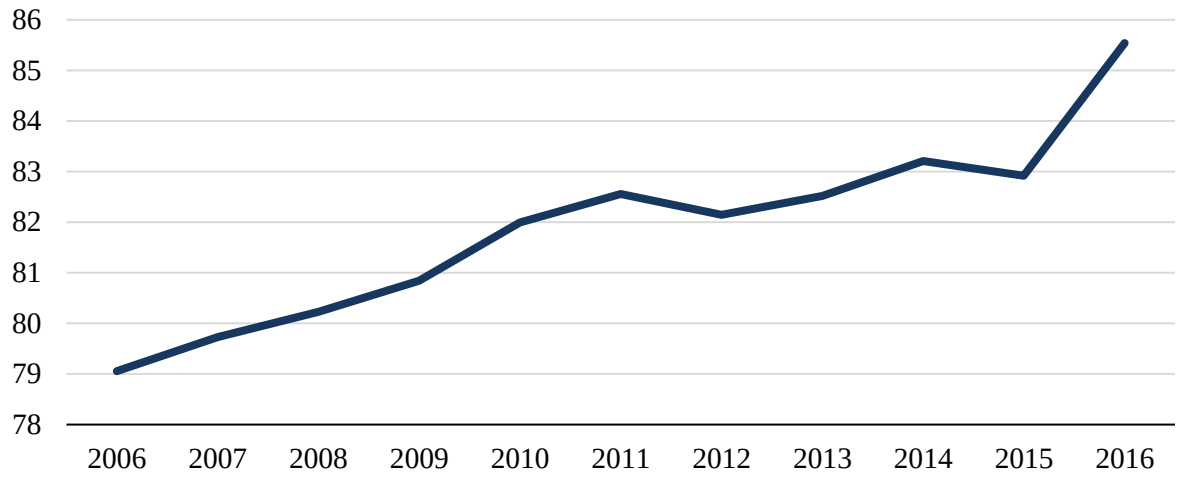


Figure 4.2: *Fraction of Independent Directors (%), 2006-2016.*

In addition, CEO duality, $CEODUAL_{it}$, is a dummy variable which equals to one if the Chief Executive Officer is also the Chairman of the board of directors and zero otherwise. As shown in Table 4.2, out of the 792 bank-years for which data is collected, 50.6% of the sample banks combine both the CEO and board Chair titles which is slightly lower to the 58% reported by Pathan and Skully (2010) for U.S. banks. As CEO duality concentrates power in the position of the Chief Executive Officer, more management discretion may be allowed. Subsequently, a negative relationship with discretionary loan loss provisions is expected as this is associated with income-increasing earnings management.

With regards to board meetings, $BMEET_{it}$, the average number of board meetings is 10 per year which is higher than the 8.33 and 8.45 reported by Cornett *et al.* (2009) and Pathan and Skully (2010) for U.S. banks respectively. This indicates that a greater involvement and oversight by the board of directors is likely to be associated with more effective monitoring and subsequently, less earnings management (Vafeas, 1999).

Institutional Ownership

With regards to institutional ownership, a variable representing institutional ownership concentration, $INSTOWN_{it}$, is used. This is defined as the aggregate holdings of the five institutional investors with the largest number of shares divided by the total holdings of all institutional shareholders as in Hartzell and Starks (2003) and Victoravich *et al.* (2012). On

average, institutional ownership concentration is 29% with a minimum of 8% and a maximum of 79% as shown in Table 4.2. As already discussed in section 4.2.3, institutional ownership is considered to be an important mechanism for reducing agency costs as the stake and voting power of institutional investors gives them the incentive and ability to monitor and influence managerial behaviour (Jensen and Meckling 1976, Shleifer and Vishny 1986). In this instance a positive coefficient is expected.

In addition to the test variables, audit committee meetings, bank profitability and bank size are used as control variables.

4.5.3.3 Control Variables

Audit Committee Meetings

With regards to audit committee meetings, $AUDMEET_{it}$, the sample average is 9 meetings per year with a maximum of 32 meetings as shown in Table 4.2. This is an important variable to control for as in 2003 the Securities and Exchange Commission adopted rules which require banks to have at least one "audit committee financial expert"[44] serving on their audit committee, and if so, state the name of the expert and whether he or she is independent of management (SEC, 2003b). Therefore, these requirements suggest the financial expertise of the audit committee members is expected to ensure the quality of financial reporting and constrain the ability of managers to exercise their discretion in determining loan loss provisions (Xie *et al*., 2003).

Bank Profitability

In Chapter 3 of the thesis, a negative association between the earnings variable, $EBTP_{it}$, and loan loss provisions is found as shown in Table 3.6. In the discussion of this finding in section 3.4.2, this association was interpreted as potentially income-increasing earnings management and bank managers eventually reporting one drastic earnings decline after hiding many smaller

[44] The SEC (2003b) defines this term as an individual who the board determines to possess all the following attributes: (i) an understanding of financial statements and generally accepted accounting principles, (ii) an ability to assess the general application of GAAP in connection with accounting for estimates, accruals, and reserves, (iii) experience preparing, auditing, analysing, or evaluating financial statements that present a breadth and level of complexity of accounting issues generally comparable to what can reasonably be expected to be raised by the company's financial statements, or experience actively supervising those engaged in such activities, (iv) an understanding of internal control over financial reporting and (v) an understanding of the audit committee's functions.

declines in previous years. Contrary to this interpretation, this finding may merely reflect the limitation inherent in the "incurred loss" methodology for loan loss provisioning. To shed light on these contradictory interpretations, the same variable, $EBTP_{it}$, defined as earnings before extraordinary items, taxes and provisions to total assets, is added to equations (4.6)-(4.8) to test whether bank managers use discretionary loan loss provisions for earnings management. A positive association would be supportive of the income smoothing hypothesis presented in section 3.2.1.3, a negative association would suggest income-increasing and/or income-decreasing earnings management whereas a lack of association would suggest backward-looking provisioning.

Bank Size

As to bank size, $SIZE_{it}$, this is represented by natural logarithm of total assets and may have an impact on the degree to which managers exercise their discretion over loan loss provisions. Larger banks are more likely to be tightly monitored by regulators due to their potential to severely impact the banking industry and the overall economy should problems arise (Cornett *et al*., 2009). This is relevant as the sample banks are classified as *large* or *giant* (based on average total assets) and have an average year-end book value of total assets at $26.7 billion and range from $730 million to $366 billion as shown in Table 4.2. Nonetheless, these are the typically more sophisticated institutions with complex balance sheets that may make it difficult for investors to detect earnings management (Demirguc-Kunt *et al*., 2013). Therefore, larger banks are potentially more likely to manipulate earnings and a negative coefficient is expected.

Having discussed the variables employed by the empirical model specified in equations (4.6)-(4.8), the econometric methods which are applied to estimate this model are analysed in the following section.

4.5.4 Econometric Methods

To estimate the relationship between corporate governance mechanisms and earnings management through loan loss provisions two estimation techniques are employed: ordinary least squares and two-stage least squares. In this section, each estimation technique is discussed and applied, estimation tests are conducted, and the empirical results are presented.

A key assumption of standard linear regression analysis is that the explanatory variables are statistically independent of the error term of the model (Wooldridge, 2016). In other words, the zero-conditional mean assumption, where $E(u_{it}|\, X_{it}, c_i) = 0$, must hold to use the ordinary least squares (OLS hereafter) estimator (Sun and Hovey, 2013).[45] In this case, the explanatory variables are considered exogenous which means that they are determined outside of the model. However, if this assumption is violated and any of the explanatory variables vary systematically with the error term hence, $E(u_{it}|\, X_{it}, c_i) \neq 0$, then coefficients estimated by OLS are biased and inconsistent (Bound *et al.*, 1995). Consequently, a reliable inference based on these estimates cannot be made (Wintoki *et al.*, 2012). However, with respect to the empirical model specified in equations (4.6)-(4.8), prior empirical research finds that executive compensation and board structure are simultaneously determined with earnings management (Andres and Vallelado, 2008; Pathan and Faff, 2013). As demonstrated in section 4.3, where two streams of empirical research are reviewed, it has been deduced that while executive compensation prompts managers to engage in opportunistic earnings management, earnings manipulation may allow managers to maximise the value of their compensation (Sun and Hovey, 2013). Similarly, bank profitability can influence earnings management behaviour (for the purpose of income smoothing, for example) and earnings management can be practised to improve bank profitability. In addition, Hermalin and Weisbach (2003) strongly support that the board of directors is determined endogenously thus; the variable representing board independence may be endogenous. This is supported by Cornett *et al.*, (2009) who state that independent directors are attracted to banks with superior profitability (achieved via income-increasing earnings management), consequently a positive relationship between board independence and bank performance can be observed even if board independence is not directly beneficial to performance. Further, Elyasiani *et al.* (2017) propose that discretionary loan loss provisions and institutional ownership might be simultaneously determined by some common

[45] $E(u_{it}|\, X_{it}, c_i) = 0$; X_{it} represents the explanatory variable, c_i is the unobserved time-constant bank-specific effect and u_{it} is the random error term.

variables. For instance, institutional investors may choose to invest in banks with certain characteristics that are also significantly related to earnings management, resulting in co-movements between institutional ownership and earnings management and the captured association between the two variables. Therefore, if these variables are endogenous, OLS estimates will be biased and inconsistent as they will fail to be independent from the error term and are simultaneously determined along with the dependent variable (Greene, 2002). To test for strict exogeneity of these variables, a test of *strict exogeneity* proposed by Wooldridge (2002, p.285) and applied by Wintoki *et al.* (2012) is conducted and is estimated by the following fixed effects model.

$$y_{i,t} = \alpha + \beta X_{i,t} + \Omega W_{i,t+1} + \eta_i + \varepsilon_{it} \quad \text{t = 2006, 2007,…, 2016,} \tag{4.9}$$

where $X_{i,t}$ contains the explanatory governance and control variables, $W_{i,t+1}$ is a subset of future values of the corporate governance and control variables. Under the null hypothesis of strict exogeneity, $\Omega = 0$, future realisations of these variables are unrelated to current discretionary loan loss provisions. The results of this model are presented in Appendix 2. The null hypothesis is rejected for bank profitability ($EBTP_{it}$) and option-based compensation ($OPTIONS_{it}$) at 5% significance level and for institutional ownership concertation ($INSTOWN_{it}$) at 10% significance level.

Therefore, to take the endogeneity of these variables into account, a two-equation system model is employed which is estimated by two-stage least squares (2SLS) estimators (Hill *et al.*, 2012). Specifically, the first-stage regressions require each endogenous variable to be regressed on the exogenous variables and the set of instrumental variables and the second-stage regression is the 2SLS estimates for equations (4.6)-(4.8) (Wooldridge, 2016). This estimation method is in line with Cornett *et al*. (2009) and Elyasiani *et al.* (2017) who also employ a two-stage least squares estimation method to account for simultaneity. In employing this estimation method, instrumental variables which are correlated with the endogenous variables and exogenous to the error term must be chosen (Baum, 2006). Thus, to ensure the robustness of the 2SLS estimates, it is critical to ensure that the chosen instrumental variables are relevant and valid (Baum *et al.*, 2003). Therefore, the analysis of the relevant post-estimation tests is provided in the following section and then the final empirical results are presented.

4.5.4.1 Post-estimation tests

In the following subsections, the relevant post-estimation tests for evaluating: the presence of heteroscedasticity, the relevance and validity of the instrumental variables and the overall model specification by employing the two-stage least squares estimation technique are examined.

Heteroscedasticity

According to Baum *et al.* (2003, p.1), an 'omnipresent problem in empirical work is heteroscedasticity' as the standard errors of the variables will be inconsistent thus preventing their valid interpretation. Thus, to test for the presence of heteroscedasticity the *ivhettest* command is applied in Stata. Under the null of homoscedasticity, with a significant t-statistic, there is evidence to support the presence of heteroscedasticity. According to Baum *et al.* (2003) this problem can be solved by applying robust standard errors in the syntax of the instrumental-variable regression. An alternative solution is to apply the generalised method of moments estimator. This estimator is thought to be more efficient than the common instrumental-variable estimator when heteroscedasticity is present (Baum *et al.*, 2003). Further, as the purpose of applying a two-stage least squares estimation method is to resolve the issue of endogeneity, the following subsection examines whether the variables representing option-based compensation and bank profitability, are endogenous and whether the respective instrumental variables employed are relevant and valid.

Tests for the Relevance and Validity of Instrumental Variables

As option-based compensation and bank performance are suspected to be endogenous, instrumental variables which must be correlated with the endogenous variables and exogenous to the error term must be employed (Baum, 2006).[46] The former requirement can be assessed by examining the significance of the instrumental variables in the first-stage regressions and this is examined next.

[46] The variable representing institutional ownership, $INSTOWN_{it}$, is not treated as endogenous as any attempt to treat it as endogenous failed the endogeneity post-estimation test even in the presence of valid and relevant instrumental variables.

Relevance of Instrumental Variables

Instrumental variables must be correlated with the endogenous variables so that their estimated coefficients are not biased. In detail, the relevance of the instrumental variables can be determined by examining the fit of the first-stage regressions where the endogenous variables, option-based compensation ($OPTIONS_{it}$) and bank profitability ($EBTP_{it}$), are regressed on the instrumental variables (Wooldridge, 2016). The instrumental variables employed are: market to book value of equity and the second, third and fourth lag of option-based compensation. The market-to-book ratio of equity is defined as the total year-end market value of equity of the bank divided by the total year-end book value of equity. Moreover, the market-to-book ratio of equity is an indicator of the banks' growth prospects and managers of banks with more growth prospects are found to receive stock options as part of their compensation plan and positively affect bank performance (Cornett *et al.*, 2009).[47] In each first-stage regression an F-test for joint significance of the instrumental variables is provided. However, as there is more than one endogenous variable, the F-test may not be sufficiently informative (Baum *et al.*, 2003). Thus, the Sanderson-Windmeijer first-stage chi-squared test of under identification is more appropriate. The null hypothesis of this test is that the equations are under identified. With regards to both option-based compensation and bank profitability, the null hypothesis of Sanderson-Windmeijer first-stage chi-squared test is strongly rejected indicating that each first-stage equation is (over)identified and that the instrumental variables are correlated with each endogenous variable. The same conclusion is drawn for the Kleibergen-Paap rk statistic which tests whether the instrumental variables are correlated with *both* endogenous regressors. The null hypothesis is also that the equations are underidentified but this test is robust to heteroscedasticity (Baum *et al.*, 2007).[48] Therefore, based on the rk statistic proposed by Kleibergen and Paap (2006) and shown in Table 4.3, the null hypothesis of underidentification is rejected for Models 1-3 and the alternative which is that the equations are identified can be supported at 1% significance level. Although these tests validate the correlation between the endogenous and instrumental variables, it is of integral importance to test whether they are strongly related.

[47] The average market-to-book ratio of equity ratio for the sample banks for the period 2006-2016 is 1.39 times which is lower than the 2.46 times reported by Cornett *et al.* (2009). Thus, on average, sample banks trade for approximately one-and-a-half times their book value of equity.

[48] Underidentification is the situation where there are fewer instrumental variables than there are endogenous variables (Baum *et al.*, 2007). The equation must be exactly identified or overidentified for the instrumental variables to be considered relevant i.e. correlated with the endogenous variables.

Table 4.3: *Two-stage least squares post-estimation tests*.

Model 1:

$$DLLPTL_{it} = \beta_0 + \beta_1 OPTIONS_{it} + \beta_2 INSTOWN_{it} + \beta_3 BINDEP_{it} + \beta_4 CEODUAL_{it} + \beta_5 BMEET_{it} + \beta_6 EBTP_{it} + \beta_7 AUDMEET_{it} + \beta_8 SIZE_{it} + \beta_9 T_t + \varepsilon_{it}$$

Model 2:

$$DLLPLA_{it} = \beta_0 + \beta_1 OPTIONS_{it} + \beta_2 INSTOWN_{it} + \beta_3 BINDEP_{it} + \beta_4 CEODUAL_{it} + \beta_5 BMEET_{it} + \beta_6 EBTP_{it} + \beta_7 AUDMEET_{it} + \beta_8 SIZE_{it} + \beta_9 T_t + \varepsilon_{it}$$

Model 3:

$$DLLPTA_{it} = \beta_0 + \beta_1 OPTIONS_{it} + \beta_2 INSTOWN_{it} + \beta_3 BINDEP_{it} + \beta_4 CEODUAL_{it} + \beta_5 BMEET_{it} + \beta_6 EBTP_{it} + \beta_7 AUDMEET_{it} + \beta_8 SIZE_{it} + \beta_9 T_t + \varepsilon_{it}$$

	Model 1	Model 2	Model 3
Underidentification Test			
Kleibergen-Paap rk LM statistic:	69.46***	69.46***	69.46***
Weak Identification Test			
Cragg-Donald Wald F statistic:	26.05	26.05	26.05
Kleibergen-Paap rk Wald F statistic:	23.97	23.97	23.97
Stock-Yogo weak ID test critical values:			
5% maximal IV relative bias	11.04	11.04	11.04
10% maximal IV relative bias	7.56	7.56	7.56
5% maximal IV size	16.87	16.87	16.87
10% maximal IV size	9.93	9.93	9.93
Instrument Validity Test			
Hansen J statistic:	1.591	1.533	2.016
Chi-square P-value	0.4514	0.4647	0.3649
Endogeneity Test of Endogenous Regressors	6.274**	5.341*	6.500**

***, **, * represent 1%, 5% and 10% significance, respectively.

$DLLPTL_{it}$ = discretionary loan loss provisions are residuals of regression model (4.1); $DLLPLA_{it}$ = discretionary loan loss provisions as a percent of total assets; $DLLPTA_{it}$ = discretionary loan loss provisions are residuals of regression model (4.5); $OPTIONS_{it}$ = CEO option-based compensation is measured as: value of annual option awards/(value of annual option awards + annual salary + annual bonus + annual other income); $INSTOWN_{it}$ = aggregate holdings of the five institutional investors with the largest number of shares divided by the total holdings of all institutional shareholders; $BINDEP_{it}$ = board independence = independent directors/ board size; $CEODUAL_{it}$ = a dummy variable equal to 1 if the CEO is also the chairman of the board and 0 otherwise; $BMEET_{it}$ = the number of board meetings per year; $AUDMEET_{it}$ = the number of the audit committee meetings per year; $EBTP_{it}$ = earnings before extraordinary items, taxes and provisions to total assets; $SIZE_{it}$ = the natural logarithm of total assets; T_t= year dummies; i = bank holding company identifier; t = year (2006 to 2016).

Weak Instrumental Variables

Instrumental variables (IV) which are weakly correlated with the endogenous variables will lead to inconsistent and biased IV estimates (Bound *et al.*, 1995). Therefore, the post-estimation test for evaluating whether the instruments have strong correlations with the endogenous regressors is the Kleibergen-Paap Wald rk F statistic. This test is robust to heteroskedasticity and the null hypothesis tested is that the estimator is weakly identified as it would be subject to an unacceptably high bias. However, when using this statistic to test for the strength of the instrumental variables, Baum *et al.* (2007) suggest that the critical values compiled by Stock and Yogo (2005) should be applied with caution. Alternatively, the "rule of thumb" of Staiger and Stock (1997), which states that the F statistic should be at least 10 for weak identification not to be considered a problem, is more appropriate. Thus, as reported in Table 4.3, the Kleibergen-Paap Wald rk F statistic for each model is 23.97 and the Stock-Yogo critical value at 5% maximal IV relative bias is 11.04 and at 5% maximal IV size is 16.87, hence the null of weak instruments can be rejected. Clearly, following Staiger and Stock (1997), as the Kleibergen–Paap Wald rk F statistic is greater than 10, the null of weak instruments is also rejected, and the equations are not weakly identified. The final tests pertain to the exogeneity of the instrumental variables to the error term and these are discussed next.

Validity of Instrumental Variables

The test for assessing the independence of the instrumental variables from the unobservable error term is the Hansen J statistic which is provided when the equation is identified. In other words, the number of instrumental variables is equal to or greater than the number of endogenous variables (Baum *et al.*, 2007). The Hansen J statistic is a joint hypothesis test which tests for correct model specification and the exogeneity of the instrumental variables. Therefore, a rejection of the null hypothesis implies that either the instrumental variables are not truly exogenous or they are incorrectly excluded from the regression (Baum *et al.*, 2007). Based on the results presented in Table 4.3, the null hypotheses cannot be rejected as the p-value for the Hansen J statistic is greater than 0.25 as proposed by Roodman (2009a; 2009b) for Models 1-3. Therefore, this test result suggests that the empirical models satisfy the orthogonality conditions and are correctly specified. As the Hansen J statistic is a joint hypotheses test, to ensure that the endogenous variables should not be treated as exogenous the following test is carried.

Testing for Endogeneity

According to prior research option-based compensation and bank profitability should be treated as endogenous variables. Nevertheless, rather than relying on past findings the *endogtest* option to the *ivreg2* command is applied in order to conduct endogeneity tests of the suspected endogenous variables. The null hypothesis is that the specified endogenous variables can actually be treated as exogenous. When testing for the endogeneity of option-based compensation and bank profitability the resulting test statistic is strongly significant in all three models, as shown in Table 4.3, meaning the null hypotheses can be rejected and these variables are indeed endogenous. The variable representing institutional ownership, $INSTOWN_{it}$, is not treated as endogenous, despite having rejected the null hypothesis for the strict exogeneity test at 10% significance level. This is because any attempt to treat it as endogenous failed the endogeneity post-estimation test even in the presence of valid and relevant instrumental variables. Overall, the two-stage least squares (2SLS) estimates presented in Table 4.4 are robust as all post-estimation tests have been successfully passed. The OLS estimates are also provided to observe any differences in the results before controlling for endogeneity.

4.5.5 Summary

In this section, the empirical analysis conducted is built on the research study of Cornett *et al*. (2009) who also investigate the impact of corporate governance mechanisms on earnings management. A sample of 72 U.S. bank holding companies and a more recent time period, 2006-2016, that than that employed by Cornett *et al*. (2009), and one that captures the 2007-2009 financial crisis period is employed. First, the loan loss provisions variable was split to its discretionary and non-discretionary components. Then, using three variations of the discretionary component as dependent variables, a two-stage least squares estimation method was chosen to estimate the empirical models. The rationale for this choice is that the option-based executive compensation and bank profitability variables were found to be endogenous and, in this instance, OLS estimates would be biased and inconsistent. Having conducted the appropriate post-estimation tests, the empirical findings are analysed in the following section.

Table 4.4: *OLS and two-stage least squares second-stage regressions estimation results.*

Model 1:

$$DLLPTL_{it} = \beta_0 + \beta_1 OPTIONS_{it} + \beta_2 INSTOWN_{it} + \beta_3 BINDEP_{it} + \beta_4 CEODUAL_{it} + \beta_5 BMEET_{it} + \beta_6 AUDMEET_{it} + \beta_7 EBTP_{it} + \beta_8 SIZE_{it} + \beta_9 T_t + \varepsilon_{it}$$

Model 2:

$$DLLPLA_{it} = \beta_0 + \beta_1 OPTIONS_{it} + \beta_2 INSTOWN_{it} + \beta_3 BINDEP_{it} + \beta_4 CEODUAL_{it} + \beta_5 BMEET_{it} + \beta_6 AUDMEET_{it} + \beta_7 EBTP_{it} + \beta_8 SIZE_{it} + \beta_9 T_t + \varepsilon_{it}$$

Model 3:

$$DLLPTA_{it} = \beta_0 + \beta_1 OPTIONS_{it} + \beta_2 INSTOWN_{it} + \beta_3 BINDEP_{it} + \beta_4 CEODUAL_{it} + \beta_5 BMEET_{it} + \beta_6 AUDMEET_{it} + \beta_7 EBTP_{it} + \beta_8 SIZE_{it} + \beta_9 T_t + \varepsilon_{it}$$

	OLS Estimates			2SLS Estimates		
Variable	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
$Intercept$	0.143***	0.0935***	0.0982***	0.154***	0.101***	0.106***
	(22.19)	(21.44)	(22.08)	(18.68)	(16.87)	(18.52)
$OPTIONS_{it}$	0.00358**	0.00280***	0.00233***	0.00885**	0.00683***	0.00632***
	(2.325)	(2.936)	(2.596)	(2.447)	(2.753)	(2.647)
$INSTOWN_{it}$	-0.0231***	-0.0136***	-0.0124***	-0.0300***	-0.0180***	-0.0163**
	(-3.177)	(-2.895)	(-2.602)	(-2.907)	(-2.870)	(-2.541)
$BINDEP_{it}$	-0.000910	0.000166	0.00122	-0.00258	-0.00112	0.000662
	(-0.471)	(0.138)	(0.936)	(-1.054)	(-0.739)	(0.396)
$CEODUAL_{it}$	-0.000932	-0.000848**	0.000100	-0.00227***	-0.00178***	-0.000531
	(-1.491)	(-2.132)	(0.244)	(-2.991)	(-3.542)	(-1.020)

(continued)

$BMEET_{it}$	-0.000199**	-0.000098	-0.000198***	-0.000268**	-0.000172***	-0.000241***
	(-2.313)	(-1.619)	(-3.246)	(-2.574)	(-2.601)	(-3.352)
$AUDMEET_{it}$	-0.000307***	-0.000246***	-0.000208***	-0.000524***	-0.000406***	-0.000374***
	(-3.867)	(-4.836)	(-3.832)	(-4.634)	(-6.085)	(-4.832)
$EBTP_{it}$	-0.198***	-0.127***	-0.114***	-0.0372	-0.0548	-0.0153
	(-3.124)	(-3.148)	(-2.776)	(-0.427)	(-0.947)	(-0.278)
$SIZE_{it}$	-0.00805***	-0.00533***	-0.00570***	-0.00834***	-0.00551***	-0.00595***
	(-26.44)	(-26.03)	(-27.17)	(-22.44)	(-19.89)	(-22.19)
Year Effects	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	747	747	747	477	477	477
R^2	0.655	0.682	0.687	0.656	0.697	0.696

***, **, * represent 1%, 5% and 10% significance, respectively.

t-statistics are reported in parentheses. All t-statistics are based on robust standard errors.

$DLLPTL_{it}$ = discretionary loan loss provisions are residuals of regression model (4.1); $DLLPLA_{it}$ = discretionary loan loss provisions as a percent of total assets; $DLLPTA_{it}$ = discretionary loan loss provisions are residuals of regression model (4.5); $OPTIONS_{it}$ = CEO option-based compensation is measured as: value of annual option awards/(value of annual option awards + annual salary + annual bonus + annual other income); $INSTOWN_{it}$ = aggregate holdings of the five institutional investors with the largest number of shares divided by the total holdings of all institutional shareholders; $BINDEP_{it}$ = board independence = independent directors/ board size; $CEODUAL_{it}$ = a dummy variable equal to 1 if the CEO is also the chairman of the board and 0 otherwise; $BMEET_{it}$ = the number of board meetings per year; $AUDMEET_{it}$ = the number of the audit committee meetings per year; $EBTP_{it}$ = earnings before extraordinary items, taxes and provisions to total assets; $SIZE_{it}$ = the natural logarithm of total assets; T_t= year dummies; i = bank holding company identifier; t = year (2006 to 2016).

4.6 Discussion of Empirical Results

4.6.1 Introduction

With respect to the empirical findings of this research, the two-stage least squares (2SLS) estimates, presented in Table 4.4, are discussed as these are not biased and inconsistent due to the presence of endogeneity. Nonetheless, the differences between OLS and 2SLS estimates in terms of statistical significance concern only two variables: CEO duality ($CEODUAL_{it}$) and bank profitability ($EBTP_{it}$) as shown in Table 4.4. Pertaining to the 2SLS estimates, the findings suggest that institutional ownership, CEO duality, the number of board and audit committee meetings and size are strongly and negatively associated with discretionary loan loss provisions. CEO option-based compensation, however, is positively associated with discretionary loan loss provisions. Interestingly, these findings, with the exception of CEO Duality, are contradictory to those of Cornett *et al.* (2009) who investigated the impact of these variables- except institutional ownership concentration- on earnings management over the time period 1994 to 2002 as discussed in section 4.3. Most likely, the enactment of the Sarbanes-Oxley Act in 2002 and the 2007-2009 recessionary period have played a critical role in exposing the (in)effectiveness of corporate governance mechanisms in constraining earnings management behaviour and in aligning the interests of bank managers with the interests of shareholders. Therefore, taking these factors into consideration, the relationship between each explanatory variable and discretionary loan loss provisions are examined next.

4.6.2 Option-Based Compensation

With regards to option-based compensation, the coefficient estimate for the variable $OPTIONS_{it}$ is positive and statistically significant for Models 1, 2 and 3 as shown in Table 4.4. This finding suggests that the larger the value of options awards relative to total compensation the higher the discretionary loan loss provisions recorded leading to lower earnings as a result. Hence, the proposed hypothesis can be rejected.

H1. The value of option-based compensation relative to total compensation is associated with higher levels of earnings management and the under-reporting of discretionary loan loss provisions in the period 2006-2016.

This finding is in line with the view of Baker *et al.* (2003) that CEOs with higher option-based compensation may 'report lower operating performance hoping to temporarily supress stock prices' (p.559). Subsequently, by the time stock options reach the expiration date, stock prices are expected to have risen which in turn would increase the value of the stock options held by the CEO. This finding can be of value to policymakers as the implementation of the Sarbanes-Oxley Act in 2002, aiming at discouraging option backdating and requiring timelier reporting of option awards, may have unintentionally led to increased pressure to manage earnings as part of an option-related strategy (Baker *et al.*, 2009).[49] In addition, Cohen *et al.* (2004) offer an alternative explanation which is that earnings management is expected to decline after the introduction of the Sarbanes-Oxley Act of 2002. This Act was initiated as a result of corporate scandals such as Enron and WorldCom who were accused of fraudulent financial reporting. Thus, the authors attribute this to the sanctions imposed on managers by the Act or due to the adverse publicity and legal costs imposed on executives and banks accused of fraudulent reporting practices.

Table 4.5: Two-stage least squares second-stage regressions estimation results.

Model 1:

$$DLLPTL_{it} = \beta_0 + \beta_1 OPTIONS_{it} + \beta_2 OPTIONS_{it}{}^2 + \beta_3 INSTOWN_{it} + \beta_4 BINDEP_{it} + \beta_5 CEODUAL_{it} + \beta_6 BMEET_{it} + \beta_7 AUDMEET_{it} + \beta_8 EBTP_{it} + \beta_9 SIZE_{it} + \beta_{10} T_t + \varepsilon_{it}$$

Model 2:

$$DLLPLA_{it} = \beta_0 + \beta_1 OPTIONS_{it} + \beta_2 OPTIONS_{it}{}^2 + \beta_3 INSTOWN_{it} + \beta_4 BINDEP_{it} + \beta_5 CEODUAL_{it} + \beta_6 BMEET_{it} + \beta_7 AUDMEET_{it} + \beta_8 EBTP_{it} + \beta_9 SIZE_{it} + \beta_{10} T_t + \varepsilon_{it}$$

Model 3:

$$DLLPTA_{it} = \beta_0 + \beta_1 OPTIONS_{it} + \beta_2 OPTIONS_{it}{}^2 + \beta_3 INSTOWN_{it} + \beta_4 BINDEP_{it} + \beta_5 CEODUAL_{it} + \beta_6 BMEET_{it} + \beta_7 AUDMEET_{it} + \beta_8 EBTP_{it} + \beta_9 SIZE_{it} + \beta_{10} T_t + \varepsilon_{it}$$

$DLLPTL_{it}$ = discretionary loan loss provisions are residuals of regression model (4.1); $DLLPLA_{it}$ = discretionary loan loss provisions as a percent of total assets; $DLLPTA_{it}$ = discretionary loan loss provisions are residuals of regression model (4.5); $OPTIONS_{it}$ = CEO option-based compensation is measured as: value of annual option awards/(value of annual option awards + annual salary + annual bonus + annual other income); $INSTOWN_{it}$ = aggregate holdings of the five institutional investors with the largest number of shares divided by the total holdings of all institutional shareholders; $BINDEP_{it}$ = board independence = independent directors/ board size; $CEODUAL_{it}$ = a dummy variable equal to 1 if the CEO is also the chairman of the board and 0 otherwise; $BMEET_{it}$ = the number of board meetings per year; $AUDMEET_{it}$ = the number of the audit committee meetings per year; $SIZE_{it}$ = the natural logarithm of total assets; $EBTP$ = earnings before extraordinary items, taxes and provisions to total assets; T_t= year dummies; i = bank holding company identifier; t = year (2006 to 2016). t-statistics are reported in parentheses. All t-statistics are based on robust standard errors. ***, **, * represent 1%, 5% and 10% significance, respectively.

[49] Option backdating is the practice in which 'grant dates are retroactively assigned to historically low share prices' (Baker et al., 2009, p. 651).

Variable	Model 1	Model 2	Model 3
$Intercept$	0.150***	0.0987***	0.104***
	(18.03)	(16.68)	(18.20)
$OPTIONS_{it}$	0.0359**	0.0233**	0.0260***
	(2.246)	(2.326)	(2.631)
${OPTIONS_{it}}^2$	-0.0643**	-0.0395**	-0.0463**
	(-2.084)	(-2.119)	(-2.510)
$INSTOWN_{it}$	-0.0298***	-0.0180***	-0.0165**
	(-2.894)	(-2.865)	(-2.567)
$BINDEP_{it}$	-0.00252	-0.00105	0.000651
	(-1.029)	(-0.694)	(0.380)
$CEODUAL_{it}$	-0.00208***	-0.00170***	-0.000404
	(-2.642)	(-3.266)	(-0.765)
$BMEET_{it}$	-0.000284***	-0.000182***	-0.000251***
	(-2.765)	(-2.763)	(-3.576)
$AUDMEET_{it}$	-0.000437***	-0.000356***	-0.000312***
	(-3.820)	(-5.304)	(-3.981)
$EBTP_{it}$	-0.0324	-0.0504	-0.0132
	(-0.370)	(-0.870)	(-0.235)
$SIZE_{it}$	-0.00815***	-0.00538***	-0.00583***
	(-21.83)	(-19.66)	(-22.06)
Year Effects	Yes	Yes	Yes
No. of Observations	477	477	477
R^2	0.655	0.693	0.696

Nevertheless, the incentive to decrease earnings as a result of higher option-based compensation is counterintuitive alluding to a possibly non-linear relationship with discretionary loan loss provisions. Thus, the quadratic relationship between these two variables is investigated and the results are presented in Table 4.5. The quadratic specification appears to be an improvement as all previously statistically significant variables remain significant and the quadratic term, ${OPTIONS_{it}}^2$, is negatively related to discretionary loan loss provisions.[50] According to Wooldridge (2016), the "turning point" (or maximum of the function) of the

[50] The same endogenous variables and instruments have been adopted to estimate Models 1, 2 and 3 presented in Table 4.5. All post-estimation tests indicate that the instrumental variables are relevant and valid and that each model is well specified.

relation between option-based executive compensation and discretionary loan loss provisions is achieved at the coefficient on $OPTIONS_{it}$ over twice the absolute value of the coefficient on $OPTIONS_{it}{}^{2}$:

$$Maximisation\ point\ =\ -\beta_1/2\beta_2$$

The maximisation point is 28% for Models 1 and 3 and 29% for Model 2 based on the coefficient estimates provided in Table 4.5. Thus, the non-linear relationship suggests an inverted U-shaped curve whereby income increasing earnings management may be observed when option-based compensation surpasses a critical point, 28%-29%. However, the estimated "turning point" should not be over interpreted, as there is no theoretical prediction in relation to the specific compensation level at which this will occur (Koh, 2003). Nonetheless, the positive association between option-based compensation and discretionary loan loss provisions may potentially explain the lack of empirical evidence supporting an improved performance in banks where CEOs are compensated mainly in the form of stock-options when accounting-based performance measures are used (Fahlenbrach and Stulz, 2011). Therefore, the existence of this turning point provides evidence contrary to the simple linear relation between option-based compensation and earnings management and warrants further academic research.

Overall, as Mehran and Rosenberg (2008) propose, given depositors are the key stakeholders of banks, executive officers should be given incentives to act on behalf of debtholders. Consequently, providing executive officers with compensation contracts which are not considerably reliant on a bank's performance may be optimal. The subsequent findings on board structure and function, namely, CEO duality and the number of board and audit committee meetings will provide further clarity on the effectiveness, or lack thereof, of corporate governance mechanisms in banks.

4.6.3 Board Structure & Function

The negative association between discretionary loan loss provisions and CEO duality, $CEODUAL_{it}$, as shown in the results for Models 1 and 2 in Table 4.4, supports the proposed hypothesis.

H4. CEO duality is associated with higher levels of earnings management and the under-reporting of discretionary loan loss provisions in the period 2006-2016.

This finding challenges the effectiveness of the Sarbanes-Oxley Act of 2002 and the subsequent requirements of the Security and Exchange Commission that financial statements must be certified by the bank's CEOs and CFOs (Cohen *et al.*, 2004; Lobo and Zhou, 2005). In other words, this finding suggests that despite shifting some of the risk of earnings manipulation to the CEO and CFO, this has not deterred bank managers from engaging in earnings management. Nevertheless, it must be emphasised that the underreporting of loan loss provisions is not necessarily classified as fraud and can be practised without violating the Generally Accepted Accounting Principles per se (Erickson *et al*., 2006). Therefore, CEOs may capitalise on their capacity as Chairmen and the additional power this offers in order to approve of and/or engage in earnings management, albeit legally, as a means of achieving their personal objectives. Nonetheless, the implications of underreporting loan loss provisions to increase earnings must be acknowledged. Specifically, this may prevent a bank's ability to absorb future loan losses as well as portray a false representation of the bank's financial health to its stakeholders (Anandarajan *et al.*, 2007).

This finding can be related to the negative relationship between board activity, $BMEET_{it}$, and discretionary loan loss provisions, shown in Table 4.4. The negative sign for board activity suggests that frequent board meetings are associated with income-increasing earnings management and contradicts the respective hypothesis.

H3. Frequent board meetings are associated with lower levels of earnings management and over-reporting of discretionary loan loss provisions in the period 2006-2016.

As discussed in section 4.2.2.2, board activity is expected to be related to the information content of earnings and specifically, active boards are thought to be indicative of more credible earnings numbers, all else equal (Anderson *et al.*, 2003). However, the function of the Chairman is to run board meetings and oversee the process of hiring, firing, evaluating and compensating the CEO (Brickley *et al*., 1997). Pertinent to board activity, without the direction of an independent Chairman, it may be more difficult for the board to perform its critical function and subsequently not effective enough in constraining earnings management. Therefore, this contradicts the argument of Adams (2003) which is that the number of board meetings is a good proxy for the ability of corporate governance structures to control manager behaviour and ensure managers act in the interests of the shareholders.

Table 4.6: *Number of board meetings for sample banks for the period 2006-2016.*

Year	Average Number of Board Meetings	Std. Dev.
2006	9.043	4.564
2007	9.400	4.178
2008	10.828	4.745
2009	11.685	5.414
2010	11.057	5.514
2011	10.357	4.928
2012	9.916	3.811
2013	10.138	4.361
2014	10.055	4.144
2015	9.267	3.504
2016	9.619	3.390

However, it is worth considering that directors' behaviour is also subject to an agency problem, which may undermine their ability to address effectively the agency problems in the relationship between managers and shareholders. More specifically, Bebchuck and Fried (2003) argue that directors generally want to be re-appointed to the board as, besides an attractive salary, a directorship is also likely to provide prestige and valuable business and social connections. Most importantly, CEOs play an important role in re-nominating directors to the board, hence, directors may have an incentive to favour the CEO. In this case, directors may know that there are some questionable and/or illegal activities, such as earnings management, that the bank has engaged in (or about to engage in) and this requires a lot of debate, which results in more meetings.[51] Chen *et al.* (2006) claim that this is a plausible explanation as the frequency of board meetings may increase in times of financial distress or in times of controversial decisions that may involve illegal or questionable activities. This is supported by the summary statistics on board activity for the sample banks provided in Table 4.6, whereby the average number of board meetings gradually increased around the years of the 2007-2009 financial crisis.[52]

In line with this finding, the number of audit committee meetings, $AUDMEET_{it}$, is found to be negatively associated with discretionary loan loss provisions implying income-increasing earnings management and this shown in Table 4.4. This is an important variable to control for as in 2003 the Securities and Exchange Commission adopted rules which require banks to have at least one "audit committee financial expert" serving on their audit committee, and if so, state

[51] The agendas and minutes of directors' meetings are not available and there is no way of knowing what discussions took place.
[52] Using U.S. data, Vafeas (1999) found that more frequent board meetings followed poor performance.

the name of the expert and whether he or she is independent of management (SEC, 2003b). Therefore, these requirements suggest the financial expertise of the audit committee members is expected to ensure the quality of financial reporting and constrain the ability of managers to exercise their discretion in determining loan loss provisions (Xie *et al*., 2003). Thus, it is counterintuitive to suggest that more frequent audit committee meetings may lead to income increasing-earnings management. Nonetheless, it can be argued, that given the current accounting standards entail an "incurred loss" methodology in computing loan loss provisions, the audit committee may be right in approving the underreporting of loan loss provisions, when this is well-justified, on the basis that expected economic impacts are not permitted to be accounted for. A bank manager cannot, for example, consider the increases in default risk due to future increases in unemployment (Balla and Rose, 2015). Indeed, the statistically insignificant estimate for the earnings variable, $EBTP_{it}$, shown in Table 4.4 validates this. In other words, the negative association between earnings and loan loss provisions found in Chapter 3 (shown in Table 3.6 and discussed in section 3.4.2) is more likely to be due to the application of a backward-looking provisioning method that facilitates the underreporting of loan loss provisions than due to earnings management.

Nonetheless, based on the Bank Holding Company Supervision Manual (2017) the amounts reported each period for the loan loss provisions and loan loss reserves must be reviewed and approved by the board of directors. Further, the report states that the audit committee should oversee and monitor the internal controls over the reserves' determination process. Therefore, this hints at the possibility that the authority granted to the board of directors may be misused and that the directors' behaviour may be subject to an agency problem. This undermines their ability to address effectively the agency problems in the relationship between managers and shareholders as in the care where the shareholders are passive and/ or short-term oriented as the following finding suggests.

4.6.4 Institutional Ownership

With regards to the extent to which institutional shareholders affect the incentives of management to manage reported earnings through loan loss provisions, the following hypothesis has been established:

H5. Greater institutional ownership concentration is high, institutional ownership is associated with higher levels of earnings management and the underreporting of discretionary loan loss provisions for the period 2006-2016.

The negative relationship between institutional ownership concentration, $INSTOWN_{it}$, and discretionary loan loss provisions, shown in Table 4.4, supports the hypothesis. That is, institutional shareholders are characterised as myopic, short-term oriented investors who focus excessively on current earnings rather than long-term earnings in determining stock prices (Porter, 1992). Hence, it is possible for managers to feel more compelled to meet the earnings goals of these investors and be incentivised to engage in income-increasing earnings management as a result. Indeed, according to Hirschman (1970), when the bank performs poorly, they can place pressure on the managers of the bank and even withdraw their investment. This view can be reinforced with the negative and statistically significant coefficient estimate for the bank size variable, $SIZE_{it}$ shown in Table 4.4. This suggests that larger banks are associated with the underreporting loan loss provisions to increase reported earnings. As the sample banks are indeed classified as *large* or *giant* this may mean that managers of large banks are likely to have more opportunities to manage reported earnings, especially when they have complex operations that make it difficult for investors such as institutional shareholders to detect earnings management (Lobo and Zhou 2006).

Alternatively, Roth and Saporoschenko (2001) posit that institutional shareholders are generally passive investors who do not even play an active governance role. This rationale is based on the corporate governance implications resulting from the highly leveraged and regulated nature of banks discussed in section 2.5.1.2. In detail, as Flannery (1998) argues, the regulatory monitoring of banks, decreases the incentives of outside investors to monitor and discipline bank managers; the relationship between regulation and market discipline is one of substitution, rather than complementarity (Booth *et al.*, 2002; Elyasiani and Jia, 2008). Therefore, given the tightly regulated nature of the banking industry there may be less monitoring by institutional investors hence, institutional ownership concentration is associated with income-increasing earnings management. Elyasiani *et al*., (2017), who employ a sample of U.S. banks (see section 4.3), find that only monitoring institutions (those with long investment horizons, high ownership concentrations, and independence from the investee firms) stand out in terms of strength and efficacy of monitoring and disciplining investee banks. Therefore, linking this with the finding of the thesis, it may be the case that the proportion of institutional shareholders studied does not possess these attributes and are indeed myopic,

short-term oriented investors. Further, the extent and/or effectiveness of monitoring may be weaker in banking than in non-financial industries since banks are highly leveraged institutions. According to White (2012), the highly geared capital structure of banks is potentially encouraging institutional shareholders- who are protected by the "limited liability" that is a part of the legal structure that pertains to corporations- to undertake more risky strategies than they would in the absence of the debt. As a result, with risk-based profits going to institutional shareholders, institutional shareholders may have strong incentives to put in place monetary risk-taking incentives that lead to higher payoffs for them at the expense of debtholders (Hagendorff, 2015). Consequently, such incentives may be associated with increasing earnings which managers can achieve by underreporting loan loss provisions.

4.6.5 Summary

Overall, the findings of this research provide evidence supporting that certain corporate governance mechanisms in banks may be facilitating rather than constraining the use of loan loss provisions to manage reported earnings. Specifically, board activity, CEO duality and institutional ownership concentration are found to be associated with the underreporting of loan loss provisions and thus, income-increasing earnings management. Option-based executive compensation was found to be associated with the overreporting of loan loss provisions and income-decreasing earnings management which was indicative of a non-linear relationship with discretionary loan loss provisions. These findings highlight the need for governance reforms to take the unique features of banks into account, such as their highly leveraged and tightly regulated nature, as opposed to adopting a "one-size-fits-all" approach. Indeed, these features entail the implication of increased risk-taking which may manifest in the form of earnings management in an attempt of bank managers to either achieve their own personal objectives or to act in the best interest of shareholders such as institutional shareholders. Thus, in the context of the banking industry, "good governance" does not necessarily have to be in the best interest of shareholders as agency theory advocates. Instead, taking the interests of other stakeholders such as depositors and governments into account may be optimal.

5 CONCLUSIONS

5.1 Introduction

This concluding chapter aims to bring together the analysis of bank holdings companies in Chapter 2 and integrate the empirical findings of Chapters 3 and 4 into a cohesive narrative from which their respective contribution and the most important implications for bank stakeholders and academic research can be drawn.

5.2 Summary of Main Findings & Contribution

5.2.1 Chapter 2: An Analysis of the U.S. Banking Sector

The purpose of Chapter 2 was to provide a thorough analysis of the main capital adequacy and asset quality indicators which would then be utilised to contextualise the hypotheses and empirical findings of Chapters 3 and 4. The approach to this analysis was to first establish the functions and rationale for the existence of financial institutions, and then through an illustration of the banks' financial statements demonstrate the importance and impact of the provision for loan losses. Indeed, following an analysis of the main capital adequacy and asset quality financial ratios using data for 881 publicly traded U.S. bank holding companies for the period 2000-2016, loan loss provisioning proved to be a key accounting choice that directly influences the volatility and cyclicality of bank earnings, as well as information properties of banks' financial reports with respect to reflecting loan portfolios' risk attributes. This hints to the need for U.S. banks to adopt a provisioning model that takes into account the anticipation of future losses during financially viable times. Another important element of provisions is the discretion embedded in its estimation which may incentivise bank managers to use loan loss provisions as a tool for signalling, earnings and capital management thus, exacerbating agency costs; these considerations formed the basis of the empirical analysis conducted in Chapter 3.

Further, as the time period employed for the financial ratio analysis captured the impact 2007-2009 financial crisis, it exposed the implications of a shareholder-centric corporate governance system. The highly leveraged and tightly regulated nature of the banking industry- arising from their role as providers of liquidity- may in fact hinder effective governance by facilitating risk-taking behaviour in an attempt of bank mangers to act in the best interests of shareholders as

opposed to depositors who provide the main source of funding for banks. Accordingly, this provides advice to regulators and policymakers in that governance reforms may be more effective in constraining risk-taking behaviour when the interests of stakeholders such as governments and depositors are prioritised. This provided the impetus of the research conducted in Chapter 4 which evaluates the effectiveness of corporate governance mechanisms on constraining earnings management practices.

5.2.2 Chapter 3: Loan Loss Provisioning Practices of U.S. Bank Holding Companies

Taking into consideration the economic developments and financial ratio analysis discussed in Chapter 2 of the thesis, Chapter 3 sought to empirically investigate whether bank managers use loan loss provisions as a tool for signalling, earnings and capital management using a sample of 675 publicly traded U.S. bank holding companies for the period 2002 to 2016. Also, motivated by the unprecedented impact of the financial crisis of 2007-2009 and scarce empirical research, this chapter examined the association between loan loss provisions and the economic cycle, represented by GDP growth, to assess the limitations inherent in the "incurred loss" methodology of provisioning.

The negative relationship between earnings before taxes and provisions and loan loss provisions rejects the income smoothing hypothesis and suggests either income-increasing and/or income-reducing earnings management or the application of a backward-looking approach to the estimation loan loss provisions as the current accounting standards require. The latter interpretation is supported following the evidence in support of the procyclicality. That is, banks under-provision during economic expansions and then over-provision during economic downturns (Laeven and Majnoni, 2003). In other words, in the years before the financial crisis, banks faced accounting constraints against the early recognition of loan losses that prevented them from increasing provisions during good economic times. However, during the economic downturn, the "incurred loss" methodology for loan loss provisioning required banks to increase provisions potentially exacerbating the downturn. This provides new evidence in the debate over the reason banks entered the financial crisis of 2007-2009 with what in retrospect is seen as insufficient loan loss reserves. More specifically, this finding supports the initiative of the Financial Accounting Standards Board to implement a new set of accounting standards under which expected credit losses are estimated using forward-looking

information (FASB, 2017). As a result, the level of provisioning resulting from this approach would generally be less subject to sharp swings stemming from the cyclical nature of economic activity thus, aiding towards the aim of a more resilient baking system.

Further, the capital management hypothesis is based on the premise that Tier I capital can be built up through an increase in retained earnings (Calem and Rob, 1999). Thus, it was hypothesised that managers of banks with low levels of capital may boost Tier I capital by underreporting loan loss provisions in order to increase retained earnings. Indeed, evidence in support of the Tier I capital management was found. Thus, the pressure of capital reduction coupled with the costs of violating regulatory capital requirements may lead banks to delay the provisioning process to artificially inflate the regulatory capital base without the need to issue capital on a timely basis (El Sood, 2012).

Therefore, the evidence in support of capital management may challenge the implementation of a forward-looking provisioning model. While increased discretion may facilitate incorporation of more information about future expected losses into loan provisioning decisions and mitigate procyclicality, permitting managers to make judgmental decisions about loan losses increases the potential for capital management that may ultimately degrade bank transparency (Bushman and Williams, 2012). However, this may be prevented following the implementation of the more stringent Basel III capital requirements in year 2019. To strengthen the regulatory capital framework, Basel III proposes to raise the quality of the capital base to better absorb future losses by adjusting the composition of regulatory capital and to enhance risk coverage by increasing capital requirements for counterparty credit risk exposures. In addition, Basel III introduces counter-cyclical capital requirements to address the pro-cyclicality of capital regulation (BCBS, 2011). Overall, these new regulation changes provide a fertile area for future research on procyclicality and capital management.

In terms of the methodology adopted for the empirical analysis, two dynamic panel data models were employed as opposed to static models employed in prior related research on U.S. banks. Using a generalised method of moments estimator, the empirical and post-estimation findings make the following contribution to academic research investigating the determinants of loan loss provisions. That is, (i) the dynamic specification to model bank provisioning is recommended given the strongly and statistically significant coefficient estimate of the lagged dependent variable as explanatory variable and (ii) the endogeneity of bank-specific variables

must be accounted for; the ordinary least squares, random and fixed effects estimation techniques- employed in extant literature on U.S. banks- do not provide this feature leading to biased and inconsistent estimates.

5.2.3 Chapter 4: The Impact of Corporate Governance Mechanisms on Loan Loss Provisioning

Chapter 2 of the thesis ascertained that the highly leveraged and tightly regulated nature of banks entails corporate governance implications and subsequently, governance reforms should take these unique features of banks into account. Thus, the research of Chapter 4 is motivated by this observation and the fact that existing studies on corporate governance largely focus on non-financial firms due to the unique features of banks that set them apart (Claessens and Yurtoglu, 2013). More specifically, a sample of 72 publicly traded bank holding companies and the time period 2006-2016 were employed to investigate the impact of corporate governance mechanisms on loan loss provisioning and subsequently, earnings management.

The findings suggest that institutional ownership, CEO duality, bank size and the number of board and audit committee meetings are strongly and negatively associated with discretionary loan loss provisions implying income-increasing earnings management. CEO option-based compensation, however, was found to be positively associated with discretionary loan loss provisions which is indicative of income-decreasing earnings management. Following this finding, a non-linear relationship with discretionary provisions was examined and an invested U-shaped relationship was predicted which is in contrast to the linear predictions of U.S. studies. This means that bank managers are incentivised to increase earnings through decreasing loan loss provisions after the value of option-based compensation (as a proportion of total compensation) has reached a specific threshold. Thus, this non-linear relationship contributes to future research investigating the impact of performance-based executive compensation on earnings management.

Further, the evidence in support of option-based compensation incentivising earnings management proposes that the objective of corporate governance should not be focused on aligning the incentives of executive officers with those of the shareholders per se. According to Mehran and Rosenberg (2008) given regulators, depositors and the government are the key stakeholders of banks, executive officers should be given incentives to act on behalf of these parties. Consequently, providing executive officers with compensation contracts which are not

considerably reliant on a bank's performance may be optimal. In addition, this evidence may be of interest to compensation committees as they can gain important insight in designing compensation provisions that balance the incentive to improve a bank's performance with the incentive for earnings management.

The negative association between discretionary loan loss provisions and CEO/Chair duality challenges the effectiveness of the Sarbanes-Oxley Act of 2002 and the subsequent requirements of the Security and Exchange Commission that financial statements must be certified by the bank's CEOs and CFOs (Cohen *et al.,* 2004; Lobo and Zhou, 2005). This finding suggests that despite shifting some of the risk of earnings management to the CEO and CFO this has not deterred bank managers from using discretionary loan loss provisions to manage earnings upwards. Thus, it is advisable for policymakers and regulatory bodies to consider reforms regarding the independence of CEO with the role of the Chairman as this dual role, in the context of banking, may exacerbate as opposed to mitigate agency costs.[53]

This finding can be related to the negative relationship between board activity, measured as the number of board meetings, and discretionary loan loss provisions. The function of the Chairman is to run board meetings and oversee the process of hiring, firing, evaluating and compensating the CEO (Brickley *et al*., 1997). Pertinent to board activity, without the direction of an independent Chairman, it may be more difficult for the board to perform its critical function and subsequently not effective enough in constraining earnings management.

Similarly, audit committee meetings were found to be negatively associated with discretionary loan loss provisions implying income-increasing earnings management. Nonetheless, it can be argued, that when considering the existing "incurred loss" methodology in computing loan loss provisions, the board and audit committee may be right in approving the underreporting of discretionary loan loss provisions. This methodology facilitates prudent accounting and is line with accounting priorities; these are objectivity and comparability of financial statements to facilitate bank monitoring (Balla and Rose, 2015). Therefore, this provides additional evidence in support of the initiative of the Financial Accounting Standards Board to implement a forward-looking model for loan loss provisioning.

Finally, the negative relationship between institutional ownership concentration and discretionary loan loss provisions supports the perspective that institutional shareholders are

[53] Earnings management obscures real performance and lessens the ability of shareholders to make informed decisions hence, it is perceived as an agency cost (Xie et al., 2003).

characterised as myopic, short-term oriented investors who focus excessively on current earnings rather than long-term earnings in determining stock prices (Porter, 1992). Hence, it is possible for managers to feel more compelled to meet the earnings goals of these investors and be incentivised to engage in income-increasing earnings management as a result. Also, the regulatory monitoring of banks may decrease the incentives of outside investors to monitor and discipline bank managers hence, managers pursue their own objectives unchecked (Flannery, 1998).

This finding has strong implications for regulatory decisions in allowing institutional ownership and for investors in the choice of banking stocks. In particular, the finding on earnings management by larger banks[54] is more important in the context of banking than in non-financial firms due to banks' high leverage, their pivotal role in the economy, and the possibility of interbank contagion (Elyasiani *et al.*,2017).

Lastly, this research significantly adds to the narrow, yet growing literature regarding the interaction among executive compensation, board structure, and earnings management. Cornett *et al.* (2009) is the only study found that examines the joint effect of board structure and executive compensation on earnings management and Elyasiani *et al.* (2017) being the only study on institutional ownership and earnings management. Therefore, this study will be of interest to academic research as it provides a better understanding of earnings management and the effectiveness, or lack thereof, of corporate governance mechanisms in the context of banking.

5.3 Summary

This concluding chapter has attempted to capture how the study has contributed to academic research, bank stakeholders and policymakers. The overarching aim of this thesis has been to examine the determinants of the provision for loan losses, investigate its procyclicality and assess the effectiveness of corporate governance mechanisms in constraining the use of loan loss provisions to manage reported earnings.

The findings provide overwhelming evidence in support of the procyclicality of loan loss provisions and that audit committees are likely to ensure that the current backward-looking

[54] The sample employed consists of banks classified as *large* or *giant* based on average total assets (see section 4.5.2).

model of provisioning, which facilitates prudent accounting for loan losses, is adhered to. Nonetheless, taking into consideration the shortcomings of the procyclical pattern of loan loss provisions, the initiative of the Financial Accounting Standards Board to implement a forward-looking model for loan loss provisioning is strongly supported. In terms of the impact of corporate governance mechanisms, the findings of a negative association of CEO/Chair Duality and institutional ownership concentration with discretionary loan loss provisions, in particular, alludes to the possibility of increased pressure on managers to manage earnings upward in an attempt to meet the interests of shareholders. Subsequently, if bank managers are representing and responding to the interests of the shareholders, then they ought to be undertaking activities that might otherwise appear to be excessively risky (Hagendorff, 2015). Consistent with this, Anginer *et al*. (2018) and Beltratti and Stulz (2012) demonstrate the pitfalls of overly shareholder-oriented corporate governance in banking; it can bring about an outcome that at the time appears to be in the interests of shareholders but may turn out to be suboptimal for other key stakeholders including depositors and governments. Therefore, in the context of the banking industry, "good governance" does not necessarily have to be in the best interest of shareholders and the interests of stakeholders such as governments and depositors ought to be considered if not prioritised by policymakers and regulators.

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APPENDIX 1: REGRESSION RESULTS FOR DISCRETIONARY LOAN LOSS PROVISIONS

The following table provides variable definitions, descriptive statistics, and regression results for the Beatty *et al.* (2002) and Cornett *et al.* (2009) fixed effects regression models explaining loan loss provisions and realised security gains and losses for a sample of 72 bank holding companies over the period 2006 to 2016. The following regression models are estimated:

$$NDLLP_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_2 NPL_{it} + \beta_3 LLR_{it} + \beta_4 LOANR_{it} + \beta_5 LOANC_{it} + \beta_6 LOAND_{it} + \beta_7 LOANA_{it} + \beta_8 LOANI_{it} + \beta_9 LOANF_{it} + \varepsilon_{it}$$

and

$$RSGL_{it} = \beta_0 + \beta_1 SIZE_{it} + \beta_1 URSGL_{it} + \varepsilon_{it}$$

Panel A: *Definitions of Variables used in Regressions.*

i =	bank holding company identifier;
t =	year (2006 to 2016);
$NDLLP$ =	non-discretionary loan loss provisions as a percentage of (I) total loans or (II) total assets;
$SIZE$ =	the natural logarithm of total assets;
NPL =	non-performing loans (includes loans past due 90 days or more and still accruing interest and loans in nonaccrual status) as a percentage of (I) total loans or (II) total assets;
LLR =	loan loss allowance as a percentage of (I) total loans or (II) total assets;
$LOANC$ =	consumer loans as a percentage of (I) total loans or (II) total assets;
$LOANI$ =	commercial and industrial loans as a percentage of (I) total loans or (II) total assets;
$LOAND$ =	loans to depository institutions as a percentage of (I) total loans or (II) total assets;
$LOANF$ =	loans to foreign governments as a percentage of (I) total loans or (II) total assets;
$LOANA$ =	agriculture loans as a percentage of (I) total loans or (II) total assets;
$LOANR$ =	real estate loans as a percentage of (I) total loans or (II) total assets;
$RSGL$ =	realised security gains and losses as a percentage of total assets (includes realised gains and losses from available-for-sale securities and held-to-maturity securities);
$URSGL$ =	unrealised security gains and losses (includes only unrealised gains and losses from available-for-sale securities) as a percentage of total assets.

Panel B: *Descriptive Statistics of fixed effects regression variables (scaled by total loans) for the sample of 72 U.S. Bank Holding Companies over 2006-2016.*

Variable	Mean	Std. Dev.	Min	Max
$NDLLP$ (%)	0.780	1.230	-2.040	11.940
NPL (%)	2.100	2.260	0	16.410
LLR (%)	1.650	0.920	0.450	9.420
$LOANC$ (%)	7.970	8.910	0.010	53.490
$LOANI$ (%)	20.610	12.160	2.560	75.020
$LOAND$ (%)	0.080	0.370	0	7.230
$LOANF$ (%)	0.000	0.020	0	0.500
$LOANA$ (%)	0.820	1.580	0	12.110
$LOANR$ (%)	66.880	15.980	10.130	123.380

Panel C: *Descriptive Statistics of fixed effects regression variables (scaled by total assets) for the sample of 72 U.S. Bank Holding Companies over 2006-2016.*

Variable	Mean	Std. Dev.	Min	Max
$NDLLP$ (%)	0.516	0.820	-0.985	7.163
NPL (%)	1.387	1.547	0	12.145
LLR (%)	1.063	0.603	0.169	5.024
$LOANC$ (%)	5.101	6.280	0.010	45.019
$LOANI$ (%)	13.296	7.865	0.503	44.667
$LOAND$ (%)	0.053	0.252	0	4.929
$LOANF$ (%)	0.002	0.018	0	0.360
$LOANA$ (%)	0.484	0.912	0	6.706
$LOANR$ (%)	43.722	13.639	4.196	80.723
$RSGL$ (%)	0.02041	0.19575	-1.55353	1.58806
$URSGL$ (%)	0.06067	0.28061	-1.969	1.32539

Panel D: *Regression results.*

Variable	$NDLLP$ (I)	$NDLLP$ (II)	$RSGL$
$Intercept$	-0.139***	-0.0870***	-0.00334
	(-5.532)	(-5.341)	(-0.814)
$SIZE$	0.00793***	0.00526***	0.000208
	(5.203)	(5.407)	(0.812)
NPL	0.247***	0.209***	
	(2.676)	(2.848)	
LLR	0.591***	0.769***	
	(4.278)	(8.511)	
$LOANC$	0.00445	-0.0214**	
	(0.272)	(-2.595)	
$LOANI$	0.00271	-0.00466	
	(0.294)	(-0.602)	
$LOAND$	-0.165*	-0.189**	
	(-1.936)	(-2.012)	
$LOANF$	-0.879***	-0.972***	
	(-5.311)	(-5.811)	
$LOANA$	-0.0208	-0.0781**	
	(-0.520)	(-2.413)	
$LOANR$	0.00891	0.000675	
	(1.020)	(0.166)	
$URSGL$			0.154**
			(2.554)
Year Effects	Yes	Yes	Yes
No. of Observations	755	755	747
R^2	0.7639	0.7981	0.3377

***, **, * represent 1%, 5% and 10% significance, respectively. t-statistics are reported in parentheses. All t-statistics are based on robust standard errors.

APPENDIX 2: TEST FOR STRICT EXOGENEITY

To test for strict exogeneity of the variables, $OPTIONS_{it}$, $INSTOWN_{it}$, $EBTP_{it}$ and $BINDEP_{it}$ a test of *strict exogeneity* proposed by Wooldridge (2002, p.285) and applied by Wintoki *et al.* (2012) is conducted and is estimated by the following fixed effects model.

$$y_{i,t} = \alpha + \beta X_{i,t} + \Omega W_{i,t+1} + \eta_i + \varepsilon_{it} \quad \text{t = 2006, 2007,…, 2016,}$$

where $W_{i,t+1}$ is a subset of future values of the corporate governance and control variables, $X_{i,t}$. Under the null hypothesis of strict exogeneity, $\Omega = 0$, future realisations of these variables are unrelated to current discretionary loan loss provisions.

Table A2.1: *The impact of corporate governance mechanisms on loan loss provisioning. Tests of strict exogeneity.*

y is discretionary loan loss provisions ($DLLPTL_{it}$) which are residuals of regression model (4.1); **X** includes: $OPTIONS_{it}$ = CEO option-based compensation is measured as: value of annual option awards/(value of annual option awards + annual salary + annual bonus + annual other income); $INSTOWN_{it}$ = aggregate holdings of the five institutional investors with the largest number of shares divided by the total holdings of all institutional shareholders; $BINDEP_{it}$ = board independence = independent directors/ board size; $CEODUAL_{it}$ = a dummy variable equal to 1 if the CEO is also the chairman of the board and 0 otherwise; $BMEET_{it}$ = the number of board meetings per year; $EBTP_{it}$ = earnings before extraordinary items, taxes and provisions to total assets; $AUDMEET_{it}$ = the number of the audit committee meetings per year; $SIZE_{it}$ = the natural logarithm of total assets; T_t = year dummies; i = bank holding company identifier; t = year (2006 to 2016). t-statistics are reported in parentheses. All t-statistics are based on robust standard errors. ***, **, * represent 1%, 5% and 10% significance, respectively.

Dependent Variable: $DLLPTL_{it}$	(1)	(2)	(3)	(4)	(5)	(6)
$OPTIONS_{it}$	-0.000127	-0.00142	-0.000967	-0.00122	-0.000066	0.000272
	(-0.0723)	(-0.831)	(-0.567)	(-0.704)	(-0.0384)	(0.157)
$EBTP_{it}$	-0.253***	-0.244***	-0.270***	-0.257***	-0.252***	-0.248***
	(-11.27)	(-10.71)	(-11.99)	(-11.37)	(-11.16)	(-10.83)
$INSTOWN_{it}$	-0.0191***	-0.0175***	-0.00950**	-0.0183***	-0.00923**	-0.00896*
	(-4.527)	(-4.173)	(-2.013)	(-4.324)	(-1.981)	(-1.897)
$BINDEP_{it}$	-0.00196	-0.00230	-0.000982	-0.00111	-0.00272	-0.00268
	(-0.525)	(-0.618)	(-0.265)	(-0.275)	(-0.697)	(-0.685)
$CEODUAL_{it}$	0.000077	0.000068	0.000023	-0.000079	0.000298	0.00120
	(0.0809)	(0.0720)	(0.0244)	(-0.0809)	(0.317)	(1.021)
$BMEET_{it}$	0.000138	0.000149	0.000147	0.000150	0.000131	0.000122
	(1.494)	(1.619)	(1.610)	(1.619)	(1.454)	(1.291)
$SIZE_{it}$	0.000261	-0.000241	-0.000100	0.000272	-0.000695	0.00105
	(0.209)	(-0.192)	(-0.0805)	(0.215)	(-0.562)	(0.457)

(continued)

$AUDMEET_{it}$	0.000070	0.000051	0.000039	0.00003	0.000043	0.000062
	(0.0565)	(0.414)	(0.317)	(0.241)	(0.351)	(0.485)
$OPTIONS_{it+1}$	-0.0056***				-0.0057***	-0.0056***
	(-2.939)				(-3.102)	(-3.000)
$EBTP_{it+1}$		-0.0787***			-0.0835***	-0.0751***
		(-3.494)			(-3.772)	(-3.263)
$INSTOWN_{it+1}$			-0.0185		-0.0191*	-0.0199*
			(-3.991)		(-4.186)	(-4.310)
$BINDEP_{it+1}$				-0.000178	-0.000386	0.000387
				(-0.0447)	(-0.0999)	(0.0971)
$CEODUAL_{it+1}$						-0.00151
						(-1.267)
$BMEET_{it+1}$						0.000063
						(0.652)
$SIZE_{it+1}$						-0.00199
						(-0.855)
$AUDMEET_{it+1}$						-0.000084
						(-0.610)
$Intercept$	0.00639	0.0136	0.0126	0.00423	0.0258	0.0295
	(0.302)	(0.641)	(0.597)	(0.197)	(1.221)	(1.324)
No. of Observations	674	674	674	673	673	672
R^2	0.791	0.792	0.794	0.788	0.802	0.803

Table A2.2: *The impact of corporate governance mechanisms on loan loss provisioning. Tests of strict exogeneity.*

$\boldsymbol{y}$ is discretionary loan loss provisions as a percent of total assets ($DLLPLA_{it}$); **X** includes: $OPTIONS_{it}$ = CEO option-based compensation is measured as: value of annual option awards/(value of annual option awards + annual salary + annual bonus + annual other income); $INSTOWN_{it}$ = aggregate holdings of the five institutional investors with the largest number of shares divided by the total holdings of all institutional shareholders; $BINDEP_{it}$ = board independence = independent directors/ board size; $CEODUAL_{it}$ = a dummy variable equal to 1 if the CEO is also the chairman of the board and 0 otherwise; $BMEET_{it}$ = the number of board meetings per year; $EBTP$ = earnings before extraordinary items, taxes and provisions to total assets; $AUDMEET_{it}$ = the number of the audit committee meetings per year; $SIZE_{it}$ = the natural logarithm of total assets; T_t= year dummies; i = bank holding company identifier; t = year (2006 to 2016). t-statistics are reported in parentheses. All t-statistics are based on robust standard errors. ***, **, * represent 1%, 5% and 10% significance, respectively.

Dependent Variable: $DLLPLA_{it}$	(1)	(2)	(3)	(4)	(5)	(6)
$OPTIONS_{it}$	0.000139	-0.000582	-0.000293	-0.000460	0.000197	0.000354
	(0.127)	(-0.546)	(-0.276)	(-0.427)	(0.184)	(0.328)
$EBTP_{it}$	-0.160***	-0.154***	-0.171***	-0.162***	-0.160***	-0.157***
	(-11.39)	(-10.85)	(-12.19)	(-11.48)	(-11.37)	(-11.02)
$INSTOWN_{it}$	-0.0118*	-0.0109*	-0.00550	-0.0114*	-0.00529	-0.00489
	(-4.503)	(-4.183)	(-1.877)	(-4.335)	(-1.823)	(-1.660)
$BINDEP_{it}$	-0.000590	-0.000828	-0.000024	-0.000578	-0.00150	-0.00142
	(-0.253)	(-0.357)	(-0.0106)	(-0.231)	(-0.618)	(-0.582)
$CEODUAL_{it}$	-0.000026	-0.000024	-0.000044	-0.000076	0.000150	0.000603
	(-0.0431)	(-0.0409)	(-0.0754)	(-0.126)	(0.256)	(0.826)
$BMEET_{it}$	0.00010	0.000106	0.000105	0.000106	0.000095	0.00008
	(1.733)	(1.844)	(1.838)	(1.830)	(1.685)	(1.357)
$SIZE_{it}$	0.000031	-0.000269	-0.000214	0.000041	-0.000562	-0.000249
	(0.0400)	(-0.343)	(-0.276)	(0.0522)	(-0.729)	(-0.173)
$AUDMEET_{it}$	-0.000012	0.000014	0.000072	-0.000087	0.000083	0.000015
	(-0.151)	(0.177)	(0.0938)	(-0.0112)	(0.109)	(0.184)
$OPTIONS_{it+1}$	-0.00305***				-0.00316***	-0.00316***
	(-2.587)				(-2.746)	(-2.705)
$EBTP_{it+1}$		-0.0468***			-0.0494***	-0.0445***
		(-3.335)			(-3.578)	(-3.101)
$INSTOWN_{it+1}$			-0.0124*		-0.0128*	-0.0132*
			(-4.312)		(-4.521)	(-4.575)
$BINDEP_{it+1}$				0.00120	0.00114	0.00160
				(0.487)	(0.473)	(0.643)
$CEODUAL_{it+1}$						-0.000796
						(-1.068)
$BMEET_{it+1}$						0.000064
						(1.048)
$SIZE_{it+1}$						-0.000327
						(-0.225)
$AUDMEET_{it+1}$						-0.000040
						(-0.458)
$Intercept$	0.00543	0.00984	0.00989	0.00351	0.0168	0.0165
	(0.412)	(0.743)	(0.754)	(0.263)	(1.280)	(1.191)
No. of Observations	674	674	674	673	673	672
R^2	0.811	0.813	0.815	0.809	0.821	0.822

Table A2.3: *The impact of corporate governance mechanisms on loan loss provisioning. Tests of strict exogeneity.*

y is discretionary loan loss provisions ($DLLPTA_{it}$) which are residuals of regression model (4.5); **X** includes: $OPTIONS_{it}$ = CEO option-based compensation is measured as: value of annual option awards/(value of annual option awards + annual salary + annual bonus + annual other income); $INSTOWN_{it}$ = aggregate holdings of the five institutional investors with the largest number of shares divided by the total holdings of all institutional shareholders; $BINDEP_{it}$ = board independence = independent directors/ board size; $CEODUAL_{it}$ = a dummy variable equal to 1 if the CEO is also the chairman of the board and 0 otherwise; $BMEET_{it}$ = the number of board meetings per year; $EBTP$ = earnings before extraordinary items, taxes and provisions to total assets; $AUDMEET_{it}$ = the number of the audit committee meetings per year; $SIZE_{it}$ = the natural logarithm of total assets; T_t = year dummies; i = bank holding company identifier; t = year (2006 to 2016). t-statistics are reported in parentheses. All t-statistics are based on robust standard errors. ***, **, * represent 1%, 5% and 10% significance, respectively.

Dependent Variable: $DLLPTA_{it}$	(1)	(2)	(3)	(4)	(5)	(6)
$OPTIONS_{it}$	-0.000067	-0.000728	-0.000432	-0.000587	0.000027	0.000181
	(-0.00613)	(-0.685)	(-0.406)	(-0.545)	(0.0251)	(0.168)
$EBTP_{it}$	-0.158***	-0.151***	-0.169***	-0.160***	-0.157***	-0.154***
	(-11.28)	(-10.69)	(-12.01)	(-11.38)	(-11.15)	(-10.79)
$INSTOWN_{it}$	-0.0093***	-0.0084***	-0.00337	-0.0089***	-0.00306	-0.00266
	(-3.539)	(-3.205)	(-1.146)	(-3.373)	(-1.053)	(-0.903)
$BINDEP_{it}$	-0.00102	-0.00137	-0.000480	-0.000862	-0.00184	-0.00177
	(-0.440)	(-0.590)	(-0.208)	(-0.345)	(-0.756)	(-0.726)
$CEODUAL_{it}$	0.000517	0.000533	0.000497	0.000459	0.000687	0.00100
	(0.870)	(0.902)	(0.844)	(0.762)	(1.174)	(1.369)
$BMEET_{it}$	0.000048	0.000054	0.000053	0.000055	0.000044	0.00003
	(0.835)	(0.938)	(0.927)	(0.941)	(0.775)	(0.492)
$SIZE_{it}$	0.000414	0.00007	0.000185	0.000425	-0.000207	0.000256
	(0.530)	(0.0894)	(0.238)	(0.540)	(-0.268)	(0.178)
$AUDMEET_{it}$	0.000077	0.000035	0.000026	0.000019	0.00003	0.000034
	(0.100)	(0.451)	(0.337)	(0.238)	(0.392)	(0.423)
$OPTIONS_{it+1}$	-0.0030**				-0.0031**	-0.0031**
	(-2.510)				(-2.681)	(-2.633)
$EBTP_{it+1}$		-0.0535**			-0.0561**	-0.0513**
		(-3.823)			(-4.067)	(-3.577)
$INSTOWN_{it+1}$			-0.0116*		-0.0120*	-0.0124*
			(-4.027)		(-4.245)	(-4.305)
$BINDEP_{it+1}$				0.000704	0.000527	0.000793
				(0.285)	(0.219)	(0.319)
$CEODUAL_{it+1}$						-0.000564
						(-0.757)
$BMEET_{it+1}$						0.000064
						(1.062)
$SIZE_{it+1}$						-0.000525
						(-0.361)
$AUDMEET_{it+1}$						-0.000031
						(-0.361)
$Intercept$	-0.000941	0.00432	0.00319	-0.00258	0.0112	0.0118
	(0.0190)	(0.0199)	(0.0206)	(0.0199)	(0.0214)	(0.846)
No. of Observations	674	674	674	673	673	672
R^2	0.821	0.824	0.824	0.819	0.831	0.831