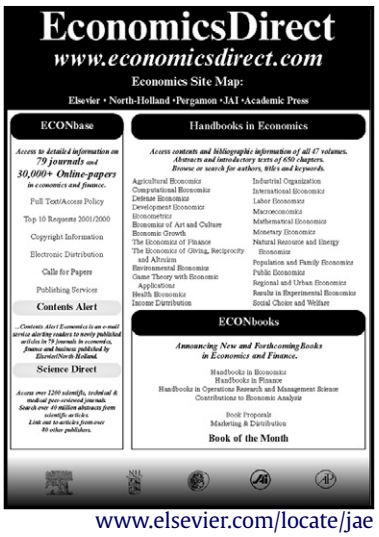

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Financial Accounting in the Banking Industry: A review of the empirical literature[☆]

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Abstract

We survey research on banks' financial accounting. After providing a brief background of the theoretical models and accounting and regulatory institutions underlying the bank accounting literature, we review three streams of empirical research. Specifically we review studies associating bank financial reporting with the valuation and risk assessments, associating bank financial reporting discretion with regulatory capital and earnings management, and examining banks' economic decisions under differing accounting regimes. We discuss what we have already learned and about what else we would like to know. We also discuss methodological challenges associated with predicting the effects of alternative accounting and regulatory capital regimes.

Keywords

Financial accounting; bank regulatory capital; information asymmetry

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1. Introduction

We review the empirical accounting literature that focuses on banking, which is a relatively large industry specific literature. Potential explanations for the prominence of banks in accounting research include the prevalence of financial assets and liabilities in banks, the use of recognized accounting numbers in the prudential regulation of banks, and easier isolation and modeling of banks' dominant accrual (i.e., the loan loss provision). In addition, the link between accounting changes and banking crisis, such as the reintroduction of fair value accounting after the savings and loan crisis in the late 1980s (see Figure 1 that shows changes in accounting standards around banking crises), combined with the economic importance of banks' liquidity and capital provision roles further supports an important economic role for bank accounting. Each of these explanations for researching bank accounting is reflected in the existing literature to varying degrees. Existing bank accounting research primarily focuses on asymmetric information between banks and equity investors and between banks and regulators. Surprisingly, information asymmetry between borrowers and depositors (i.e., creditors) has not played a central role in the empirical bank accounting literature, despite the potentially fertile ground for studying the effects of financial reporting on information asymmetry provided by banks' special role in addressing information problems between borrowers and depositors. In particular, the greater information asymmetry associated with bank assets provides an advantageous setting to examine the importance of accounting information in addressing information problems.[3]

We classify bank accounting research into three streams based on the questions and the underlying economic issues being studied. Specifically, we focus on research examining 1)

[3] Our review focuses on banks rather than borrowers. Although there is a very large literature on bank debt contracting, that literature is surveyed by Armstrong et al. (2010).

valuation and risk relevance of bank accounting information, 2) the use of accounting discretion to manage earnings and reported regulatory capital, and 3) the effect of accounting on banks' economic behaviors before, during and after the financial crisis. To examine these issues, bank accounting research has primarily focused on loan loss provisions and fair value accounting. The focus on the loan loss provision in the literature can be explained, at least in part, by the predominance of this accrual for banks, the importance of estimated losses in assessing opaque assets, i.e., bank loans, and the effect of the provision on regulatory capital ratio calculations. In contrast, the assets banks recognize at fair value tend to be less opaque and tend not to affect regulatory capital ratios, although the debate over the role of fair value accounting in the recent financial crisis often assumes an important relation between fair values and capital regulation. The focus on bank fair values arises primarily due to the greater extent of fair value accounting requirements for banks relative to nonfinancial firms and due to the evolution of fair value accounting around banking crises.

The valuation and risk relevance literature, which we review first, examines how the equity and debt markets price bank accounting information. These studies focus on banks' use of the loan loss provision to mitigate information asymmetry, and on the value and risk relevance of accounting methods such as fair value accounting and securitizations. When surveying the fair value accounting literature, we focus on value and risk relevance research published after the thorough reviews by Barth et al. (2001) and Holthausen and Watts (2001). In general, this literature has ignored both the bank specific and non-bank specific agency problems that accompany information asymmetry (e.g., between regulators and banks, and between managers and outside investors) and therefore fails to distinguish between the signaling and moral hazard hypotheses. In addition, most of the provision studies in this literature are concentrated in the

early to mid-90s and most fair value studies are narrowly focused on individual accounting rules and clustered around adoptions of new accounting rules (e.g. FAS 107, 115, and 119). Further, even though depositors' information problems are at the heart of the microeconomic theory of banks, most pre-crisis research focuses on the perspectives of outside equity investors rather than creditors. While more recent studies have begun to investigate public debt market implications, we still understand very little about how bank accounting information addresses bank creditors' information problems. Finally, while some studies attempt to understand the value or risk relevance in alternative proposed regulatory regimes, the insights are limited by a failure to consider potential bank behavior changes around shifts in regimes.

The earnings and capital management literature, which we survey next, focuses on agency problems arising from the information asymmetry between banks and equity investors and regulators and the implications for financial reporting discretion. This research largely emphasizes earnings management around regulatory capital requirements through discretion in the loan loss provision and in recognition of securities gains and losses. Similar to the first research stream, studies in this literature ignore the agency problems in the credit market despite the importance of depositors' information problems. This literature faces several challenges. First, there is an ongoing debate over the determinants of banks' capital levels, whether capital regulations are a binding constraint and the extent to which capital levels are chosen based on market considerations. Second, identification of earnings versus capital management is a challenge for studies in this area because loan loss provisions decrease both earnings and capital in the current regulatory regime.[4] Further, several alternative models of expected loan loss provisions have been used in this literature but no consensus about the best model has emerged.

[4] Although a previous regulatory regime where loan provisions increased regulatory capital (i.e., pre-BASEL/FDICIA) allowed researchers to separate these effects, findings on earnings smoothing are mixed.

To facilitate research on this issue we use factor analysis to identify three factors underlying these alternative models of expected loan loss provisions and develop four models built on these factors to better understand the differences and commonalities across the models.

The third literature that we discuss examines the effect of accounting methods on banks' economic behaviors such as lending choices and investment maturity. For example, this research studies how loan loss provision timeliness affects the pro-cyclicality of bank lending and risk taking and how fair value accounting affects fire sales and other investing and operating behaviors. Interest in how accounting affects banks' operating activities was heightened during the financial crisis when some argued that the existing accounting rules decreased banks' willingness to lend and led to fire sales.[5] This literature uses the loan loss provision and fair values to study the economic consequences of bank accounting before, during and after the financial crisis. The focus on operating activities distinguishes this literature from the first two that we survey, which focus on capital market reactions and the use of discretion to circumvent regulatory capital requirements. Although some studies in this literature argue that regulatory capital provides the channel through which fair value accounting methods would lead to changes in operating activities, e.g., fire sales or pro-cyclicality, the possibility of other channels that could also allow accounting methods to affect operating activities has been suggested by Plantin et al. (2008). While the literature that associates fair value accounting with pro-cyclicality is growing rapidly, the weak and mixed evidence does not support a definitive conclusion. In addition, the empirical literature has not fully explored whether market mispricing during crises for reasons other than illiquidity alters the effect of fair value accounting on firm real activities.

Similar to the changes in bank regulation, which are often designed to "fight the previous crisis" rather than to avoid the next one, most banking studies focus on the effects of existing

[5] For example, see Stulz et al. (2013).

regulation rather than the possible effects of alternative regulatory regimes. Understanding banks' responses to new regulation is likely to be important in avoiding future crises. In addition, much of the banking research faces methodological concerns related to the evaluation of regulatory changes. Specifically, these concerns arise in research that evaluates newly enacted regulation by comparing firms before and after the change. Observed changes typically cannot cleanly be attributed to the new regulation because of difficulties identifying legitimate control groups. There are even greater methodological challenges in studies attempting to predict the effect of a proposed regulation that rely on the highly unlikely assumption that banks will not change their economic behavior in response to the policy change or to circumvent the new requirement or policy. Gaining insights about avoiding future crises will likely require an understanding of how banks will react to alternative proposed regulations.

The most recent financial crisis has led to several regulatory changes, including BASEL III, the Dodd-Frank Act, and several accounting rule changes (e.g. elimination of the Qualified Special Purpose Entity concept) and exposure drafts (e.g. financial instrument measurement and impairment). The crisis also led to rethinking the economic models of bank opacity and the likely effects of requiring greater transparency and of the cost of bank equity and the potential implications of increasing capital requirements. These regulatory and theoretical innovations create abundant opportunities for future accounting research that addresses these issues.

In Section 2, we provide a brief background of the micro-economic theory important for conducting bank accounting research, which examines why banks exist, why they are regulated, and how the accounting regime affects banks' economic decisions. We provide background institutional information about regulatory capital requirements and banks' financial statements in the third section. In Section 4, we review empirical research examining the relation between

bank financial reporting and outside equity and debt focusing on what we can learn from that research about how properties of accounting information affect information asymmetries between managers and investors. We discuss research on financial reporting discretion and regulatory capital and earnings management in Section 5. We review empirical work that examines how differing accounting regimes, which may or may not have an effect on regulatory capital calculations, affect banks' economic decisions in Section 6. We discuss directions for future research including methodological issues that will need to be addressed for accounting research to provide insights into the likely effects of alternative regulatory and accounting regimes in Section 7. We provide a brief summary and conclusion in Section 8.

2. Theory of banks

Freixas and Rochet (2008) state that there was no microeconomic theory of banking prior to 1980 because the economic role of banks cannot be explained under the complete markets assumption of the Arrow-Debreu general equilibrium model. In a simple model extended to include a banking sector, they show that "if firms and households have unrestricted access to perfect financial markets, then in a competitive equilibrium: banks make a zero profit; the size and composition of bank's balance sheets have no effect on other economic agents." In this model households are completely indifferent between deposits and securities and firms are completely indifferent between bank loans and securities. In other words, investors and borrowers can achieve efficient risk allocation on their own (Santos, 2001). They refer to this model as the banking analog of the Modigliani-Miller theorem for firm financial policy. Similarly, Holthausen and Watts (2001) discuss the absence of a role for accounting in models of perfect and complete markets because these models assume costless information.

We provide a more extensive discussion of the role of banks and accounting information in addressing information problems in the economy in Section 2.1. In particular, we discuss how banks' delegated monitoring role mitigates information asymmetry between borrowers and depositors (Section 2.1.1) but creates agency problems by increasing information asymmetry between depositors and bank managers (Section 2.1.2). One potential solution to these agency problems is to require bank equity holding, where accounting information and information asymmetry between bank managers and investors may play an important role in affecting the cost of raising equity capital (Section 2.1.3). In Section 2.2, we extend the discussion of why bank capital should be regulated based on the information asymmetry perspective (Section 2.2.1). We further discus the different views in the current debate about how bank capital should be regulated (Section 2.2.2) and how bank regulation differs from regular private debt contracting that accountants tend to focus on (Section 2.2.3).

2.1 The role of information asymmetry

The emergence of the asymmetric information paradigm has provided an explanation for both the usefulness of accounting and the role of banks in the economy. For example, Holthausen and Watts (2001) discuss the importance of asymmetric information to understanding the function of accounting in equity valuation. Freixas and Rochet (2008) argue that asymmetric information between borrowers and depositors is important in understanding both banks' delegated monitoring and deposit-taking roles. In addition, information asymmetry is fundamental to agency problems between managers and shareholders that can increase the costs of issuing outside equity and raising regulatory capital. Financial reporting potentially provides a mechanism for addressing agency problems that arise from asymmetric information.

Specifically, accounting information can be used to evaluate banks' monitoring of borrowers, to mitigate agency problems between managers and shareholders, and as a basis for regulation of capital. The fact that asymmetric information is at the heart of both accounting and banking is consistent with the focus of accounting research on the banking industry.

Although information asymmetry between bank managers and depositors has typically been assumed undesirable, an alternative view is provided by Dang et al. (2013) who argue that banks are optimally opaque. In their model, banks are unique in privately producing debt that is a money-like security that trades at par and does not vary in value over time. To produce this money-like debt the banks choose portfolios of assets to minimize information leakage because the debt needs to be information-insensitive to serve as an efficient transaction medium. They state that banks "produce debt for use as a transaction medium (i.e., bank money), which requires that information about the backing assets not be revealed, so that bank money does not fluctuate in value, reducing its efficiency in trade."[6] Consistent with increased transparency being costly, Holmstrom (2009) uses the way de Beers sells wholesale diamonds to demonstrate that transparency may not lead to more market liquidity. He argues that placing diamonds in packets that buyers are forbidden to explore eliminates adverse selection problems among buyers, where allowing inspection slows down trade and might even prevent trade entirely. This view that banks are optimally opaque is consistent with the history of bank equity trading illustrated in Figure 2 where banks had not been required to fully disclose financial reports until 1974.[7]

[6] Moreno and Takalo (2012) argue that when banks' illiquid asset portfolio is funded by short-term debt, increased bank transparency decreases the equilibrium fraction of creditors' who mistakenly roll over, and thereby has a large negative impact on banks' payoff when returns on assets are sufficiently low. They further argue that if bank failures have negative social externalities, the optimal level of transparency would be even lower.

[7] Similarly, Monnet and Quintin (2013) argue that there is a trade-off between information and liquidity. In their model more information leads to better decisions but increases the risk that stakeholders may lose value if they must liquidate their positions. Their model is consistent with Hirshleifer (1974) who shows that interim information "can lower the market value of long-term projects unless the project 'can be converted into money at a price representing

In contrast to the positive effect of higher accounting quality and improved transparency in resolving agency problems, Dang et al. (2013) and Holmstrom (2009) argue that policies designed to enhance bank transparency have a negative effect because these policies reduce the ability of banks to produce bank money. These recent theories, which have not been considered in the empirical accounting literature, provide potentially interesting alternative hypotheses about desirable accounting properties in the banking industry.

2.1.1 Delegated monitoring

An important potential explanation for banks' economic role in reducing information asymmetry between households (depositors) and firms (borrowers) is banks' superior monitoring of borrowers, which includes screening projects, preventing opportunistic behavior and verifying that borrowers meet contractual obligations.[8] Because Armstrong et al. (2010) provide a through discussion of the accounting literature that examines the advantages of bank financing in addressing information problems between borrowers and lenders, we do not focus on this literature.

Although delegated monitoring addresses the information problems between depositors and borrowers, it gives rise to information asymmetry between depositors and bank managers about the bank's monitoring quality and performance. This suggests that opacity is a side effect of banks' lending activities, thereby leading to a potential role for accounting information in addressing bank-depositor information asymmetry. Differing aspects of how banks' monitoring

only the time-discount of the value at maturity.'" In their model bank depositors would not monitor banks even in the absence of deposit insurance because they would lose the "liquidity services that the bank provides."

[8] Diamond's (1984) delegated monitoring theory of financial intermediation suggests that banks have a comparative advantage relative to other monitors such as rating agencies, security analysts, or auditors. The Diamond (1984) model relies on banks' scale economies and investors' small capacity in monitoring borrowers and suggests that this delegated monitoring avoids the duplication of investors' monitoring costs.

quality and performance is captured in their financial reports are considered in each of the three research streams that we review. Specifically, we examine how the loan loss provision is perceived by investors, is used to manage capital and earnings, and affects economic behaviors with an emphasis on the financial crisis.

2.1.2 Agency problems associated with delegated monitoring

Banks' role as a delegated monitor potentially explains why banks hold loans even though their comparative advantage is in originating loans and monitoring borrowers rather than holding loans, which increases their on-balance sheet assets and exposes them to runs (Diamond and Dybvig, 1983). Specifically, Diamond (1984) and Boyd and Prescott (1986) argue that by holding loans banks will have incentives to monitor borrowers and produce information about credit risks, while Calomiris and Gorton (1991) argue that the liquidity mismatch that holding loans creates between banks' assets and liabilities gives rise to the possibility of depositor panics.

The information asymmetry between banks and their depositors that arises from banks' delegated monitoring role gives rise to possible agency problems because banks fail to fully internalize either the cost of their risk taking or the benefit of their monitoring efforts. For example, because bank managers' incentive to take risk is not aligned with depositors' asymmetric payoff function, banks may engage in suboptimal risk taking from depositors' perspectives. In addition, there are important accounting and regulatory implications of banks holding loans versus selling or securitizing them. For example, recording loans on the balance sheet reduces regulatory capital ratios by increasing risk-weighted assets, which furthers banks' incentives to incur risk to increase income and increase the regulatory capital.

Tirole (2006) argues that either demandable debt or equity can be used as plausible alternative mechanisms to control bank agency problems. His model requires debt holders to demand early repayment in the case of a bad signal, but not when there is a good signal, thereby ruling out depositor panics. Allen et al. (2011) show that banks' delegated monitoring role may provide market incentives for banks to hold more than the socially optimal level of equity capital as a way to internalize the moral hazard costs associated with their monitoring effort. Tirole (2006) argues that these two incentive mechanisms produce different liquidity effects: "demandable debt monitoring drains the firm's liquidity while stock market monitoring does not."

2.1.2.1 Demandable deposits, information asymmetry, and bank runs

While demandable debt may provide one mechanism for monitoring banks, depositors may induce a system wide panic if they believe that some banks are under-performing but cannot detect which ones may become insolvent. Specifically, when there is asymmetric information about bank performance between banks and depositors, depositors may have a difficult time monitoring banks. Calomiris and Gorton (1991) summarize the asymmetric information theory of bank panics, which suggests that when depositors are uninformed about bank asset portfolio values and receive adverse news about the macro economy they may panic. That is, depositors, who do not know the actual incidence of failure, withdraw from all banks when they have reasons to believe that there is an increased likelihood of bank failure. Although bank runs are generally considered costly and can be disastrous to social welfare, Calomiris and Kahn (1991) model bank runs as a way to prevent opportunistic behavior and Calomiris and Gorton (1991) argue that a panic can be viewed as a form of bank performance monitoring.

Accounting information plays an important role in informing depositors about banks' portfolio values. Holod and Peek (2007) consider the effect of information asymmetry on banks'

ability to raise uninsured deposits during periods of monetary tightening. They find that public banks with lower information asymmetry are better able to issue uninsured large time deposits during the monetary tightening periods and therefore are less financially constrained than private banks with great information asymmetry. Their findings suggest that differences in the financial reporting requirements for publicly traded versus privately held banks are important in attracting depositors even in the presence of regulatory filings for private banks. They also note that deposit insurance alters the importance of accounting for insured depositors.

2.1.3 Equity capital

The need for government bailouts of banks during the recent financial crisis highlighted concerns that insured demand deposits do not provide proper monitoring or risk taking incentives and led to calls for banks to be required to hold additional equity capital. The relative costs of this policy recommendation are currently being debated in the theoretical literature and have been examined to a limited extent in the empirical finance literature. Given the importance of retained earnings in determining the recorded value of equity, this debate has potentially important implications for accounting research, especially the research that considers the use of accounting discretion to manage reported regulatory capital. Specifically, banks' incentives for using accounting discretion to manage regulatory capital may depend on how costly it is to hold additional equity capital. This debate on whether the cost of outside equity depends on information asymmetry also has an important implication for accounting research that associates information asymmetry with the cost of equity capital. In particular, this stream of accounting research relies on the role of accounting information in reducing these costs of equity capital and depends on the extent to which they are driven by information asymmetry.

2.1.3.1 Violation of Modigliani and Miller theory versus implicit government subsidies

In the ongoing debate about banks' costs of raising equity, Admati et al. (2010) argue that banks' revealed-preference for high leverage need not suggest a Modigliani and Miller (M&M) theory (1958) violation, but may merely be a response to government subsidizing high leverage via taxes and implicit guarantees of uninsured debt. Pages (2011) and Bolton (2011) argue that the M&M theory provides a weak foundation for Admati et al.'s (2010) conclusions about bank capital regulation. Similarly, DeAngelo and Stulz (2013) argue that in an M&M world, there is no reason for banks to exist. They argue that banks' high deposit financing arises when liquid-claim production is a profitable bank activity. Miller (1995) states that "all-equity banks might well exist in principle, no such banks exist in practice, which suggests that the M&M propositions really *don't* apply to banking," but, he also notes that "taken literally, they would not apply anywhere else either."

Admati et al.'s (2012) alternative explanations for banks' relatively high revealed preference for equity are also questionable. Obviously, debt tax shields apply to all industries so they cannot explain the differential in leverage between banks and non-financial firms. While the arguments about implicit guarantees of uninsured debt are subtler, the empirical evidence does not support this explanation. Implicit debt guarantees are typically assumed to arise primarily from an extension of FDIC insurance coverage to uninsured depositors.[9] However, historical data do not provide evidence that implicit guarantees associated with FDIC insurance or with access to Federal Reserve loans are responsible for banks' high leverage. Berger et al. (1995)

[9] Walter and Weinberg (2002) discuss the coverage of uninsured depositors during the 1980s banking failures and the Federal Reserve's willingness to allow short-term liability holders to withdraw their funds before the regulators take over failed banks, suggesting possible implicit guarantees since the advent of FDIC insurance and the Federal Reserve.

document that the average ratio of bank equity as a percent of assets declined steadily from more than 40% prior to the National Banking Act of 1863, to approximately 15%, when the Federal Reserve and the FDIC were created in 1914 and 1933, respectively, and reached current levels by the mid-1940s. This history suggests declining bank equity prior to implicit guarantees associated with the advent of FDIC insurance or the Fed discount window. In addition, Gropp and Heider (2008) examine cross-sectional differences in the relation between deposit insurance coverage and banks' leverage and are unable to find any evidence to support this claim.

Further evidence that is inconsistent with the implicit guarantee argument is provided in Berger et al. (2008) who state that "some authors have asserted that explicit and implicit government guarantees lead banking institutions to operate with as little capital as the supervisor will permit. Clearly, though, the evidence … shows that this assertion is not always true." They document that U.S. banks hold capital in excess of the most stringent regulatory requirements and consider whether this is consistent with a pecking order view of capital structure or an optimal capital structure based on market conditions. They conclude that banks actively manage their capital ratios, which is inconsistent with the pecking order view. Consistent with the notion that banks target a specific capital ratio that typically exceeds the regulatory capital requirements, they provide the example of Citigroup who disclosed in their SEC filings a target Tier 1 capital ratio of 7.5% which is substantially above the 6% required to be considered "well capitalized."[10]

[10] Several studies attempt to explain why targeted capital ratios are significantly higher than regulatory minimums. For example, Peura and Keppo (2006) find that return volatility explains a fraction of the variation in bank capital ratios. Kashyap et al. (2010) and Allen et al. (2011) argue that the reason why banks are determined to operate with high leverage is because of the competitiveness nature in financial services. On the other hand, Gropp and Heider (2009) argue that unobserved time-invariant bank fixed effects are ultimately the most important determinant of banks' capital structures and that banks' leverage converges to bank specific time invariant targets.

2.1.3.2 Information asymmetry and outside equity

An alternative explanation for banks' reliance on debt capital is that the cost of equity is higher than the cost of debt due to higher information asymmetry with equity providers. Specifically, Becht et al. (2011) argue that "Banks are in the business of taking risks; they can take on risk quickly and easily; they can mask, to some extent, how much risk they take. Their portfolios are often illiquid and hard-to-value, their positions shift rapidly, and their assets and liabilities can be extremely complex. This compromises the availability of long-term funding, be it debt or equity." Consistent with this argument, Kashyap et al. (2008) state "the tendency for banks to finance themselves largely with short term debt may reflect a privately optimal response to governance problems." Bolton and Freixas (2006) provide a model where asymmetric information about banks' net worth adds a cost to outside equity capital.[11] They show that in equilibrium, banks' capital adequacy constraints are always binding. Using data from the 1920s and 1930s, Calomiris and Wilson (2004) provide empirical evidence that bank capital crunches can be an "equilibrium outcome chosen by banks in response to asymmetric-information problems" rather than an artifact of capital regulation and deposit insurance.

The concept of costly outside equity due to asymmetric information also motivates recent accounting research. These accounting studies may also shed light on why banks have high leverage by linking loan loss provisions and equity financing. For example, Beatty and Liao (2011) argue that banks with larger delays in loan loss provisioning reduces lending in the crisis period more than banks with smaller delays because it is harder for banks to replenish equity

[11] Although the Berger et al. (2008) evidence is inconsistent with Admati et al. (2008), it need not be inconsistent with Bolton and Freixas (2006). In particular information asymmetry can explain banks' capital ratio targets even if the pecking order does not. Bolton and Dewatripont (2006) show that information asymmetry can lead either to a preference for debt, consistent with the Myers and Majluf's (1984) pecking order theory, or for a preference for equity depending on the assumptions made about the relationship between market mispricing and the state of nature.

capital during the crisis.[12] They also find that banks with smaller delays build up more equity capital during expansionary periods that serve as the buffer for losses in the crisis. In addition, consistent with Beatty and Liao (2011), Bushman and Williams (2013) find that delayed loan loss provisioning is associated with stock market illiquidity risks that increase financing frictions associated with raising new equity.

Finally, this debate on whether outside equity is more costly than debt capital also has an important implication on regulation debates in response to the current financial crisis. Those who believe that the M&M propositions hold for banks argue that outside equity is no more costly than other forms of financing and advocate for a substantially higher required capital ratio to prevent future crises. In contrast, those who think that information asymmetry makes outside equity more costly have proposed contingent capital, such as debt that converts into equity when there is a crisis or when other triggers are met, as a less expensive mechanism for addressing capital adequacy during economic crises. This would allow additional capital to be raised in a period when the information problems are not exacerbated by poor economic conditions.

2.2 Why is bank capital regulated?

The information asymmetry between banks and depositors may either directly or indirectly explain the need for bank capital regulation. Flannery et al. (2004) and Bolton (2011) argue that outsiders' inability to value banks due to a lack of timely and accurate information can directly explain the failure of the usual market mechanisms to control bank managers and

[12] These results are consistent with Van den Heuvel's (2009) model that shows that costly outside equity can lead banks to reduce recessionary lending due to decreases in bank capital. Specifically, he argues that banks with sufficiently low equity will reduce lending due to meet capital requirements given the costs of raising new equity. His model explicitly shows that reduced lending can occur even when capital requirements are not currently binding because banks may optimally forgo current profitable lending to lower the risk of future capital inadequacy.

shareholders and thus the need for a regulatory solution. Others argue for an indirect link between information asymmetry and the need for capital regulation because of banks' transformation function of funding long-term illiquid assets with potentially short-term liabilities. For example, Diamond and Dybvig (1983) argue that banks' provision of liquidity service exposes them to depositor runs because banks' asset liquidation values are less than the value of their liquid deposits. By reducing the liquidation value of banks' assets, information asymmetry increases the likelihood of bank runs while capital regulation has the potential to reduce the likelihood of bank runs.[13]

Alternatively, using an incomplete contracting approach, Dewatripont and Tirole (1994) argue that the need for regulation arises when high-risk claims are held by dispersed and potentially unsophisticated investors. Under these circumstances, the government may be required to become the delegated monitor if no private representation mechanism for monitoring, writing and enforcing covenants or intervening can be established. Finally, another view of why banks should be regulated is based on the notion that the externality cannot be addressed by market mechanisms. For example, Acharya (2000) argues that a bank failure results in two offsetting externalities. A negative externality results from a reduction in aggregate supply of deposits reducing the aggregate investment in the economy and a positive externality results from migration of deposits from failed banks to good banks.

Regardless of the origin, capital regulation distinguishes banks from other industries and motivates a large literature studying the effect of banking regulation on accounting discretion and on bank economic behaviors. Bank capital regulation based (largely) on GAAP financial

[13] However, these arguments are not unique to banks. Dewatripont and Tirole (1994) point out there is not a one to one mapping between the transformation function and regulation. First, they note that unregulated nonfinancial firms also finance long-term investments with shorter term debt. Second, they argue that some other financial firms, such as insurance companies and pension funds, do not participate in the payment system but are still regulated. Finally, they argue that not all highly leveraged financial firms are regulated.

reports has important implications for accounting research because reported accounting numbers can affect banks' regulatory capital adequacy. The claim made during the recent financial crisis that fair value accounting caused or exacerbated the crisis is just another indicator of the potential importance of accounting methods in capital regulation, although fair value accounting in reality does not significantly affect regulatory capital calculations (Badertscher et al., 2012).

2.2.1 Capital Regulation and information asymmetry

Further discussion of the information asymmetry explanation for capital regulation is provided by Flannery et al. (2004) who argue that the unusual difficulty for outside investors in valuing bank assets provides one justification for bank regulation. They argue that bank loans are opaque because no one knows the true value of nonmarketable loans, although others such as Benston and Kaufman (1998) argue that banks' greater use of fair values make them less opaque.[14] Flannery et al. (2004) use an empirical comparison on banks' and nonbanks' information opacities to evaluate the need for government regulation of banks and find no support for a difference in opacity for financial versus non-financials. Specifically, they do not find higher equity bid-ask spreads for banks, although they do find that balance sheet composition affects the bid-ask spreads. In contrast, Morgan (2002) finds that Moody's and S&P rating split more often for banks than other firms and that the disagreement is greater for banks that hold more of their assets in loans and trading assets and is smaller for banks with more physical assets and higher regulatory capital.

Flannery et al. (2013) attempt to reconcile these differences, which relate to the differences in financial conditions examined in these two papers. In particular, they note that

[14] Morgan and Stiroh (2001) further suggest increasing business complexity adds to banks' opaqueness.

Morgan's (2002) sample "includes the turbulent 1980s" while Flannery et al. (2004) "examine banking firms during a relatively tranquil time period." Flannery et al.'s (2012) sample period covers 1993 through 2009, which includes non-crisis periods and periods of stress related to Long-term Capital Management (i.e., from August to December of 1998) and the recent financial crisis. They find that, relative to nonfinancials, banks have higher bid-ask spreads and a higher price impact of trades during crisis periods, although they find no significant difference during non-crisis periods. These findings altogether seem to suggest that banks are more opaque compared to nonfinancials in economic downturns or turmoil where bank regulation can have the most benefits.

2.2.2 Micro-prudential versus macro-prudential regulation

Consistent with the ongoing debate on why bank capital should be regulated, bank capital regulation has evolved through time. Bank regulation has long taken a micro-prudential approach, which Borio (2003) argues is designed to limit distress of individual banks with the ultimate objective of protecting depositors and investors from the costs of distress. Hanson et al. (2011) also argue that this approach is designed to "force banks to internalize losses, thereby protecting the deposit insurance fund and mitigating moral hazards." Accounting research that examines average effects assuming each bank is an independent observation is consistent with this micro-prudential approach for bank regulation where systemic risks are assumed to be exogenous to the individual banks, and correlations between individual banks are ignored.

The recent financial crisis has shifted regulators' emphasis to a macro-prudential perspective, which Borio (2003) argues is designed to limit financial system-wide distress with the ultimate objective to avoid reductions in GDP. Systemic risks are assumed to be, at least in

part, endogenous and correlations and common exposures across institutions are considered to be important in macro-prudential regulation. Similarly, Hanson et al. (2011) argue that macro-prudential approach can be characterized as "an effort to control the social costs associated with excessive balance sheet shrinkage of multiple financial institutions hit with a common shock." Typically, accounting research in banking has not had a macro focus, although Bushman and Williams (2013) consider macro effects of loan loss provisioning timeliness in their covariance analyses.

2.2.3 How does bank capital regulation differ from private debt contracting?

In this subsection, we discuss the difference between capital regulation as a mechanism in addressing agency problems and private debt contracting mechanisms that prior accounting research has examined extensively. The difference between the two mechanisms further explains the importance of accounting research on banks.

Tirole (2001) states that "to make a case for regulation, you first have to ask, where is the market failure?" This statement suggests that regulation is aimed at addressing market failures. The representation hypothesis put forth by Dewatripont and Tirole (1994) argues that a need to protect small depositors from moral hazard and adverse selection problems motivates bank regulation. If banks are monitored by disperse depositors, the monitoring functions including screening, auditing, covenant writing, and intervention are excessively costly and duplication of these activities is also wasteful. In addition, the potential free rider problem associated with these activities leads to a need for a representative monitor. This role is very similar to the one that banks play as a delegated monitor of debt financing as discussed in Beatty et al. (2012). Birchler and Butler (2007) further argue that bank monitoring is assumed to be a public good and bank

regulation is solving a failure of corporate control that arises if depositors can observe each other's monitoring efforts.

While Dewatripont and Tirole (1994) argue that "the control of banks by their regulators is not all that different from the control of nonfinancial companies by banks," they point out several differences. An important difference between the two is in the limited discretion that is provided to bank regulators compared to the much greater flexibility in tailoring loan agreements. For example, the definition of regulatory capital is uniform across banks while the definition of net worth in loan agreements varies by company. Other differences that they discuss are regulators' concern with the systemic risk caused by a bank failure and regulators' lack of control of the amount of deposits that they are protecting. Similarly, Miller (1995) states that "standard government blunderbuss, one-size-fits-all regulations cannot, and should not be expected to match the kind of delicate balancing of interests achievable through private contracting." He further argues that bank regulation can be expected to continue as a source of inefficiency and of friction between banks and regulators. Accounting research examining capital management for a broad cross-section of banks takes advantage of this uniformity in regulatory capital requirements. Specifically, regulators' inability to undo accounting discretion either ex ante or ex post makes banking a good setting to examine the use of accounting discretion in a setting with uniform contracts.

3. Background on capital regulation and basic bank balance sheet

3.1 Capital regulation

Although the economic underpinnings of bank capital regulation are not yet completely understood based on the theoretical literature, capital adequacy is, and has been for the past three decades, an important component of regulators' evaluation of a bank's safety and soundness, reflected in the C in the CAMELS regulatory ratings.[15] However, regulators' methods of evaluating capital adequacy have changed over time often in response to a recent financial crisis.

3.1.1 History of U.S. regulatory discretion and explicit capital ratio requirements

Burhouse et al. (2003) provide a history of bank capital regulation. They argue that while there has been a longstanding emphasis by bank regulators on "capital adequacy as a key element of bank safety and soundness," regulators did not impose numerical capital requirements historically. They note that during the period prior to numerical capital adequacy regulation (i.e., before 1981) the average capital ratios for the banking industry ranged between 5 and 8 percent and there were very few bank failures.

While bank regulators' discretion in evaluating and responding to capital inadequacy is currently limited, this has not historically been true. In a review of the evolution of regulatory capital standards the FDIC (2003) notes that:

> *Prior to the 1980s, bank supervisors in the United States did not impose specific numerical capital adequacy standards. Instead, supervisors applied informal and subjective measures tailored to the circumstances of individual institutions. In assessing capital adequacy,*

[15]To evaluate banks, the OCC and other federal bank and thrift regulatory agencies use the uniform interagency rating systems adopted by the Federal Financial Institutions Examination Council (FFIEC) to assign ratings to banks. A bank's composite rating under Uniform Financial Institutions Rating System (UFIRS) or "CAMELS" integrates ratings from six component areas: Capital adequacy, Asset quality, Management, Earnings, Liquidity, and Sensitivity to market risk. CAMELS is an acronym of these six components.

regulators stressed factors such as managerial capability and loan portfolio quality, and largely downplayed capital ratios… Indeed, it was widely held that rigid adherence to fixed capital ratios would preclude the more comprehensive analysis thought necessary to weigh the myriad of factors affecting a bank's ability to sustain losses….These statements exemplify a judgment-based, subjective, bank-by-bank approach to assessing capital adequacy…. The convergence of macroeconomic weakness, more bank failures and diminishing bank capital triggered a regulatory response in 1981 when, for the first time, the federal banking agencies introduced explicit numerical regulatory capital requirements.

Figure 3 exhibits the evolution of bank capital regulation. The explicit numerical capital requirements in 1981 and 1985 as a response to bank failures in the 70s and early 80s were largely determined using the primary capital to average total assets ratio. As shown in Figure 4, the primary capital components were: common equity, perpetual preferred stock, minority interests, mandatory convertible instruments, and the loan loss allowance. While the loan loss provision consistently lowers reported earnings under accrual accounting, the add-back of the pre-tax loan loss allowance during this period resulted in the provision increasing regulatory capital by the amount of the deferred taxes associated with the provision expense. This counter intuitive regulatory capital calculation allows accounting research to identify earnings versus capital management using loan loss provision in this regime. Details are provided in Section 5.

The introduction of numerical capital requirements limited regulators' ability to modify the measure of capital adequacy on a bank-by-bank basis, but still allowed regulatory discretion in the actions taken in response to these measures. This discretion was the focus of concerns about regulatory forbearance during the 1988-1991 savings and loan (S&L) crisis. For example, Kane (1989) argues that agency problems between regulators and tax payers lead regulators to conceal weaknesses to shift blame if weakness surfaced at some later point. "In particular, if regulators have long-run career concerns, they have an interest in delaying the disclosure of difficulties encountered by the institutions under their supervisions." In contrast, a recent study

by Morrison and White (2010) suggests that regulator forbearance can stabilize the economy and have the potential to prevent bank runs due to reputation contagion.

3.1.1.1 FDICIA prompt corrective action requirement

Criticisms over the regulatory forbearance during the savings and loan crisis of 1988-1991 resulted in the passage of Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA). In a report to Congress on bank regulation the GAO (2011) noted that:

> *After the savings and loan crisis, federal regulators were criticized for failing to take timely and forceful action to address the causes of bank failures and prevent losses to taxpayers and the deposit insurance fund…. In response, Congress passed the Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991… to improve the ability of regulators to identify and promptly address deficiencies at depository institutions.*

Undercapitalized institutions are subject to restrictions on borrowing from the Federal Reserve System. In addition, they are subject to growth limitations and are required to submit capital restoration plans. If the institutions are significantly undercapitalized, they may be required to sell sufficient voting stock to become adequately capitalized, to divest assets, or to cease receipt of deposits from correspondent banks.[16] Finally, critically undercapitalized institutions that fail to maintain a level of tangible equity to total assets at 2% are subject to appointment of a receiver or conservator.

3.1.1.2 Importance of accounting methods given limited regulatory discretion

Uniform capital requirements combined with FDICIA prompt corrective actions, which resulted in the limits on regulatory discretion that we currently observe, give rise to an important

[16] Requiring the issuance of voting stock prevents banks from using non-voting equity such as preferred stocks to meet the regulatory capital requirements.

role for accounting methods and accounting choices.[17] Specifically, the introduction of explicit numerical capital requirements creates incentives for banks to use financial reporting discretion to circumvent the minimum capital requirement to avoid the need to raise costly outside equity or to reduce lending. This circumvention is reinforced by the limitation on regulatory discretion because regulators will not be able to undo banks' capital management. In addition, Bushman and Landsman (2010) argue that accounting discretion can affect regulatory forbearance directly by affecting capital adequacy calculations or indirectly by affecting transparency and market discipline. Both effects suggest that banks will consider the ex post effects of accounting discretion on regulatory forbearance when selecting their ex ante capital levels.

3.1.1.3 Importance of asset riskiness given limited regulatory discretion

Although numerical capital adequacy standards were designed to help alleviate some of the problems associated with regulatory forbearance as mentioned in previous sections, the reduction in regulatory discretion may create a new problem by eliminating regulators' ability to adjust the required capital for management actions designed to evade the regulatory requirements. In addition to using accounting discretion to enhance the reported capital, managers could increase the riskiness of their net assets to circumvent the intent of the capital requirement. Specifically, in the calculation of the explicit numerical capital ratios that were adopted in the U.S. in the 1980s, the denominator is average total assets regardless of the risk associated with different assets. Therefore, banks could defeat the purpose of capital requirements, which is to hold equity against expected losses given default on their assets, by holding riskier assets either on- or off-balance sheet. This would allow them to earn higher returns on riskier assets without

[17] In their review of empirical research and accounting choice, Fields et al. (2001) question why regulators do not undo accounting manipulations. The limitations on regulatory discretion designed to mitigate regulatory agency problems or regulators' career concerns may be the answer to their question.

the commensurate costs associated with holding greater equity.[18]

3.1.2 International supervisory standards and guidelines (BASEL and BASEL II)

Prior to the U.S. S&L crisis, problems with international banking markets and currencies led the Group of Ten central-bank Governors to establish the Basel Committee in 1974 in Basel, Switzerland.[19] The Committee was designed to enhance member country cooperation and to remove competitive inequalities arising from differing national capital requirements.[20] While the recommendations made by the committee do not have legal force, they are designed to promulgate best practices and to encourage convergence toward common approaches and standards.

Consistent with the concerns of U.S. bank regulators, in the early 1980s the committee became concerned that capital ratios were deteriorating at a time when risks were growing. The culmination of the Basel Committee on Bank Supervision's efforts resulted in a 1988 accord entitled "International Convergence of Capital Measurement and Capital Standards." This agreement, which has been known as the Basel Capital Accord (BASEL), provides a new capital adequacy framework, which was fully implemented in the U.S. by 1992.[21]

BASEL is a risk-based capital framework that changed both the numerator and denominator of the capital adequacy ratio and incorporates both on- and off-balance-sheet risk exposures. The definition of bank capital (the numerator) is broken down into two components

[18] These arguments are not necessarily based on the assumption that the capital requirement is binding. As in Section 2.1.3, banks tend to have a targeted leverage ratio which may be higher than the capital minimum requirement.
[19] The failure of Herstatt Bank in Germany in 1974 that caused significant losses for its American counterparties gave rise to the Basel Committee on Bank Supervision and exposed the need for coherent international cooperation between nations to minimize future risks associated with international banking.
[20] The Committee's members come from Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Spain, Sweden, Switzerland, United Kingdom and United States.
[21] Originally adopted by G10 countries, BASEL was later adopted by most countries (>100) with banks active in international markets.

based on their reliability to cushion losses in the bank's assets. Herring (2007) describes the political forces that lead to the BASEL regulatory capital definitions. Specifically he discusses the differences in countries in how regulatory capital was defined and the extremes in the definitions used by the German, who only included shareholders' equity, and the French, who also included long-term debt. He notes that, consistent with the German view, Tier 1 capital consists of core equity capital items that have lower priority in repayments and therefore have a better ability to absorb losses. He further argues that compromise was achieved with the French, U.S. and Japanese using Tier 2 capital, which includes long-term debt, loan loss reserves to a limited extent and unrealized capital gains on equity investments.

As in Figure 4, the Tier 1 capital ratio numerator still includes common equity, perpetual preferred stock and minority interests, but deducts goodwill and other intangibles and no longer adds back the loan loss allowance. Intangible assets are excluded from Tier 1 capital because they may become worthless when banks are terminated or bankrupt. Loan loss allowances are excluded from the core (Tier 1) capital because they have been created against identified losses and therefore are not freely available to meet unidentified losses that may subsequently arise elsewhere in the portfolio. In addition, they do not possess the essential characteristic of equity capital arising from shareholder ownership, although loan loss allowances are allowed to be added to Tier 2 capital up to 1.25% of total risk-weighted assets. The denominator is risk-weighted assets, instead of total assets as in the pre-BASEL period, calculated after assigning assets to one of four categories with weights of 0%, 20%, 50% or 100%, depending on the assets' risk. Assets that are considered risk-free (e.g. U.S. Treasury Securities) are assigned a zero weight. Assets assumed not to be risk-free but considered to be relatively safe (e.g. U.S. Agency securities) are assigned a 20% weight. Assets that are risky where the loss of default is limited by

collateral (e.g. mortgages) are assigned a 50% weight. Remaining assets are assigned a 100% weight.

The effectiveness of BASEL depends on each country's regulation and enforcement. In the U.S., FDICIA requires the federal banking regulators to take "prompt corrective actions" on FDIC-insured depository institutions that do not meet minimum capital requirements.[22] If an insured depository institution's Tier 1 capital ratio is less than 6%, total capital ratio less than 10% or leverage ratio less than 5%, then the institution is considered undercapitalized. That is, all three capital minimums need to be satisfied to be considered adequately capitalized. Note that in the U.S., banks are not only required to maintain two risk-based capital requirements which are higher than the BASEL requirement, they are also required to maintain a leverage ratio as defined in Figure 4. In addition, to be considered well capitalized based on the Basel Accord, a bank's total ratio of capital to weighted risk assets should be 8% of which the core (Tier 1) capital should be at least 4%, which are lower than the U.S. regulation.

After BASEL implementation, regulators became concerned with the divergence between the BASEL risk weights and the actual economic risks such as securitizations and credit derivatives that increase risk exposure but lower BASEL risk weights. The Basel Committee on Bank Supervision published BASEL II in 2004 to address potential regulatory capital arbitrage by adjusting regulatory risk weights so that they accurately reflect actual economic risks using the Standard Approach, the Foundation Internal Ratings-Based Approach, or the Advanced Internal Ratings-Based Approach. Concerns about the implementation of these approaches led

[22] FDICIA establishes five capital tiers: "well capitalized," "adequately capitalized," "undercapitalized," "significantly undercapitalized" and "critically undercapitalized." A FDIC-insured depository institution is well capitalized if it maintains a Leverage Ratio of at least 5%, a Tiered 1 Capital Ratio of at least 6% and a Total Capital Ratio of at least 10% and is not subject to a directive, order or written agreement to meet and maintain capital levels. An insured depository is adequately capitated if it meets all of the minimum capital requirements. In addition, an insured depository institution will be considered undercapitalized if it fails to meet any minimum requirement, significantly undercapitalized if it is significantly below these measures and critically undercapitalized if it fails to maintain a level of tangible equity equal to not less than 2% of total assets.

the U.S. to only require BASEL II for large, internationally active banks with more than $250 billion in total assets or with foreign exposures greater than $10 billion.

3.1.3 The role of fair value versus historical cost accounting in capital regulation

Dewatripont et al. (2010) note that regulation is too frequently designed to "fight the previous crisis" rather than to avoid the next one. They argue that those drafting regulations should explicitly incorporate the innovations that banks will make to minimize the effects of the regulations. They further note that the accounting regulators, i.e. the FASB and the IASB, argue that it is not part of their mission to incorporate these changes in behavior when setting accounting standards. The following quote from former FASB vice-chair and IASB Board chair Leisenring (1990) is consistent with this view:

> *Unfortunately, it is once again fashionable to suggest that the FASB should abandon the notion that decision-useful information must be neutral and should consider the 'economic consequences' of its decisions. Some would even assert that the FASB should try to determine in advance who will be relatively helped or hurt by the result of applying a particular accounting standard, and consider 'public policy implications' when it establishes accounting standards. In a word, bias the information reported to influence the capital allocation or other economic decisions toward some predetermined objective, thereby undermining the proper functioning of the capital markets and impairing investors' and creditors' capital allocation decisions.*

This accounting neutrality view may also affect how regulators address important issues such as pro-cyclicality of capital regulation. The current capital regulation is claimed to exacerbate pro-cyclicality of bank lending, and Dewatripont et al. (2010) suggest that this pro-cyclicality issue should be addressed in a different way than accounting. Relatedly, in a May 7, 2009 speech entitled ''Lessons of the Financial Crisis for Banking Supervision,'' Ben Bernanke, Federal Reserve Bank (FED) chairman, also emphasized the importance of mitigating pro-cyclical features of capital regulation and other rules and standards to enhance the stability of the

financial system as a whole.

In addition to the debate over whether accounting standards should remain neutral to potentially pro-cyclical effects on current capital regulation, it is also widely debated whether capital adequacy calculations should be based on fair value accounting. Dewatripont and Tirole (1994) argue that although fair values introduce noise that may unduly allocate decision rights,[23] historical costs provide a distorted risk-shifting incentive similar to the flexible capital requirement. Specifically, they argue that banks have incentives to take on excessive risk in the historical cost regime when asset fair values decline (e.g., such that fair value capital ratios drop below minimum capital requirements) even though they have not violated their capital requirements. This risk-taking may not be socially optimal compared to regulatory intervention associated with fair value capital requirements.

There is also a debate in the bank theory literature over the use of fair value to calculate regulatory capital. For example, Allen and Carletti (2008), argue that using market prices to assess banks' solvency in low liquidity markets is not desirable because the price shocks may be caused by other sectors such as the insurance sector. In addition, Plantin et al. (2008) argue that the information asymmetries inherent in bank loans are important in understanding the real effects of historical cost versus mark-to-market accounting regimes. Their model assumes that bank managers attempt to maximize expected earnings for several reasons, including, but not limited to, compensation contracts or prudential ratios. They argue that the insensitivity of historical costs to price signals induces inefficient asset sales of assets with appreciated values because the accounting system does not reflect these increases. While marking to market overcomes this problem, it distorts information for illiquid assets such as loans. In contrast to the

[23] This argument is consistent with Barth et al. (1995) who find that banks violate regulatory capital requirements more frequently under fair value than historical accounting.

incentive under historical cost accounting to sell appreciated assets, there is an incentive under mark-to-market accounting to sell assets expected to depreciate in anticipation of other firms' sales of similar assets, which will depress the price that is used to value the assets if they are held. They argue that in general marking to market tends to amplify asset price movements relative to the fundamental in bad states of the world. They state that these "strategic concerns create pro-cyclical trades that destabilize prices in the mark-to-market regime while strategic concerns result in counter-cyclical trades that reduce fundamental volatility in the historical cost regime."[24]

3.2 Basic bank financial statements

In this section, we discuss basic bank financial statements and provide discussions on important accounts in banks and varying accounting approaches that have potential economic implications in capital regulations and bank behaviors. For our discussions, Figure 5 provides bank holding company average balance sheet composition by the total asset-based peer groups used by bank regulators. Figure 6 shows the relative importance of income statement accounts from 2006 to 2012.

3.2.1 Balance sheet

In Figure 5, as of the end of 2012, net loans and leases averaged approximately 60% of total assets across all four peer groups. Total debt securities made up about 20%, and interest bearing bank balances made up around 5% of total assets for all peer groups. In sum, all four peer groups appear to have similar asset compositions. On the liability and equity side, Group 1

[24] They further argue that the destabilizing mark-to-market effect would not arise in a historical cost with impairment regime as long as impairments relate to borrower rather than market specific discount rates.

with total assets greater than $10 billion has a significantly lower core deposits (55.65% of total assets) compared to other groups (63%-68%). All four groups have a noncore funding close to 20%, with Group 1 having a slightly higher ratio. Finally, while the equity capital made up around 10% of total assets (9%-11%) across the four peer groups, their Tier 1 risk-based capital ratios are between 12%-14%, with the largest group having the lowest ratio (12.86%).

3.2.1.1 Fair values

The use of fair values in bank balance sheets has evolved over the last two decades as described in Figure 7. Initially, FAS 107 required only footnote disclosure of fair values of financial instruments with no balance sheet recognition. This standard resulted in the disclosure of fair values for nearly 90% of banks assets on average. Although accounting standards have required the fair values of financial assets to be disclosed for the past two decades fair values are recognized in the balance sheet for only a fraction of those assets. For example, as of December of 2012, loan fair values, which make up roughly 60% of banks assets on average, are only disclosed in the footnotes. On average, only 20% of assets are recognized at fair value in bank balance sheets. (The use of fair values in the income statement is even lower since changes in fair values are often reported in other comprehensive income rather than being reported in the traditional income statement.) Fair value accounting was controversial in both the savings and loan crisis and the recent financial crisis and has been the subject of a great deal of accounting research.

3.2.1.2 Securitizations

Securitized assets that qualify for sales treatment will not be reflected on the balance sheet although these assets may still expose banks to risk. Although a relatively small number of

banks securitize assets, among those that do, Barth et al. (2012) report that securitized assets make up on average 20% of the banks' total assets. In addition, banks that securitize assets are typically among the largest banks. Barth et al. (2012) report that the size of the median securitizing bank is more than $40 billion in assets. This suggests that the accounting for securitizations has the potential to be important for the banks that engage in these transactions and that the banks that securitize are potentially important in the economy. Securitization accounting became controversial during the recent financial crisis and is the focus of an increasing body of accounting research.

3.2.2 Income statement

A typical bank income statement is broken down into four components: net interest income, the provision for loan losses, net non-interest income and securities gains and losses as in Figure 6. Although the loan loss provision can be very small compared to net interest income and net non-interest income when economic conditions are good (e.g., 2006-2007), the relative magnitude of this item can balloon during poor economic conditions such as those observed during the recent financial crisis (e.g., 2008-2009). Despite its small magnitude compared to other income statement components, loan loss provision is the largest component among accruals (see the following section). In addition, the volatility of the provision combined with the discretion in estimating this accrual and the high correlation between the provision and net income make the provision a very important component of the income statement. Specifically, banks' net income has the highest correlation with loan loss provisions at -61%, compared to correlations with net interest income, non-interest income and securities gains and losses at 16%, 21% and 15%, respectively.

3.2.2.1 Loan loss provision

The loan loss provision plays a prominent role in much of the bank accounting literature. The examination of a single accrual to the exclusion of most other accruals in the banking literature contrasts with the literature examining non-financial firms, which tends to study overall earnings, total accruals or total current accruals. Loan loss provisions are accruals of fundamental importance to bank performance, and because they are estimates of loan losses, they also reflect information asymmetry, which is the heart of the banking literature.

Relative to other accruals, the loan loss provision is large and explains much of the variability in total accruals. Specifically, for years ended 2005-2012 the ratio of the mean of the absolute values of the provision to that of total accruals (measured as the difference between net income before extraordinary items and cash from operations) is 56%, which is nearly twice the value of the next largest accrual. Consistent with the relative magnitudes, the percentage of the variance of total accruals explained by the provision of 34% is more than double the value of the accrual with the second highest explanatory power.[25]

Consistent with the arguments made in McNichols and Wilson (1988), the focus on loan loss provisions may also reflect an attempt to develop an account specific discretionary accrual model that is less subject to measurement issues than measures that combine many accounts are combined in an aggregate accrual measure. Data availability is a third possible explanation for the focus on the loan loss provision. Historically, determining total operating accruals for banks has been more challenging than for companies in other industries because of a lack of data availability for the statement of cash flows in either regulatory or COMPUSTAT databases.

[25] Other accruals generating a difference between net income and cash from operations include impairments, depreciation, deferred taxes, reclassifications of securities gains and losses, changes in loans held for sale, changes in other assets and liability, including net trading assets, and changes in interest receivables and payables.

While banks' regulatory filings require extensive disclosure of information related to the provision, they do not require the banks to file a statement of cash flows. This suggests that regulators may not consider this statement useful in monitoring banks' performance. Furthermore, COMPUSTAT only began including values from the statement of cash flows for banks in 2004. Again this may suggest that COMPUSTAT did not view this statement as being useful to its subscribers, although the recent addition of this information suggests that this assessment may have changed. Consistent with a potential shift in the perceived importance of cash flow information for financial firms, Givoly et al. (2009) show that in 1995 analysts forecast cash flows for only 2.8% of financial firms with earnings forecast compared to 14.3% for all industries. By 2005 the percentage for financial firms increased to 34.5% while the percentage for all industries increased to 57.1%. The relative rate for financials versus all industries increased from 20% in 1995 to 60% in 2005, suggesting both an absolute and relative increase in the demand for cash flow information for financial firms over this period.

It is also useful to consider the background of loan loss provision accounting under GAAP. Prior to the May 1993 adoption of FAS 114, FAS 5 provided impairment guidance for all receivables including loans. FAS 114 provides more specific guidance for loans individually deemed to be impaired when it is probable that not all interest and principal payments will be made as scheduled. FAS 114 also amends FAS 5 to clarify that a creditor should evaluate the collectability of both contractual interest and contractual principal of all receivables when assessing the need for a loss accrual. FAS 114 is applicable to all creditors, not just banks, and to all loans, regardless of collateralization, except for: 1) large groups of smaller-balance homogeneous loans that are collectively evaluated for impairment, 2) loans that are measured at fair value or at the lower of cost or fair value, 3) leases, and 4) FAS 115 debt securities. FAS 114

requires 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. FAS 114 requires that impaired loans be measured based on the present value of expected future cash flows discounted at the loan's effective interest rate or, as a practical expedient, at the loan's observable market price or the fair value of the collateral if the loan is collateral dependent.

3.2.2.2 Relation between loan loss provision and regulatory capital

As seen in Figure 4, in the pre-BASEL period because primary capital included loan loss allowances, a one dollar increase in the loan loss provision increased regulatory capital by the tax rate times one dollar (Moyer, 1990). Specifically, while a one dollar loan loss provision decreases earnings and regulatory capital by one dollar times (1-tax rate), one dollar provision is added back to regulatory capital. As a net, a one dollar provision increased regulatory capital by the tax rate times one dollar. The most important change in the BASEL capital regulations affecting the relation between provision and regulatory capital is the elimination of loan loss allowances from Tier 1 capital. This change means that a one dollar increase in loan loss provisions decreases Tier 1 capital by the after-tax amount of the provision.[26]

4. Research examining the valuation and risk relevance of bank accounting information

With the backdrop of the theoretical economic models underlying bank accounting research summarized in Section 2 and the institutional background information provided in Section 3, we

[26] Because loan loss reserves still count as Tier 2 capital up to 1.25% of risk-weighted assets, a one dollar increase in loan loss provision increases total capital by the tax rate times one dollar if loan loss allowances do not exceed this threshold.

now discuss research on how bank financial reporting affects outside equity and debt valuation and risk assessment.

Consistent with concerns raised by Holthausen and Watts (2001), most of the pre-crisis empirical accounting research examining associations between bank financial reporting and bank external financing focuses on outside equity rather than credit markets even though financing by depositors is at the heart of the microeconomic theory of banks. This focus likely reflects the FASB's focus on providing "decision-useful information to investors." While there has been an increase in research examining the effects of banks' financial reporting on debt in the post-crisis period, we believe more research on credit markets would broaden our understanding of how accounting information addresses information asymmetry with creditors.

Despite the importance of information asymmetry between bank managers and outside equity and debt holders in understanding the limits on banks' ability to relax their capital constraints, the role of information asymmetry in the empirical research examining the association between financial reporting and capital markets is not always evident. Although the research examining the stock market's reaction to loan loss provisions mainly addresses information issues, the focus on information issues is very limited in the research examining the value and risk relevance of fair values and securitizations. In addition, although some recent studies have begun to shift the focus to debt markets when studying the effect of banks' information environment, the importance of this shift in focus is inconclusive. In particular, the agency conflicts between equity and debt holders and differences in access to information and risk preferences have not been considered in this very limited literature.

4.1 Equity valuation of loan losses

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. For example, Nichols et al. (2009) find that public banks face higher information asymmetry compared to private banks, and therefore provide timelier loan loss provision to mitigate information asymmetry. Alternatively, managers may exploit their information advantage to engage in earnings, capital or tax management that is either opportunistic or aligned with shareholders' interests. To assess the information content of loan loss provisions or reserves, several papers examine the association between stock returns/values and the level of provisions/reserves. Beaver et al. (1989) embark on this literature by documenting a positive association between market value and loan loss reserves.

Beaver et al. (1989) argue that this positive association between market value and loan loss reserves suggests that managers convey to the market that the bank's earnings power can withstand an increased loan loss provisions hit to earnings. Elliot et al. (1991) also find a positive market reaction to large banks' announcements of increased loan loss provisions for their problem loans made to lesser-developed countries. In contrast, these large banks experience negative market returns surrounding Bank of Boston's announcement of large charge-offs, when the loans are written-off as uncollectible. Elliot et al. (1991) posit that the market interprets loan loss provisions favourably as a signal of banks' willingness to deal with the problem loans and that the market reacts negatively to charge-offs because charge-offs reduce a bank's capital adequacy ratio, while loan loss provisions actually increase the capital adequacy ratio during this period. Griffin et al. (1991), examining a similar context, also interpret the positive market

reaction for large banks' additions to loan loss provisions as credible signals about banks' intentions and abilities to resolve the bad debt situations.

While the two signalling interpretations put forth by these studies are similar, they are not entirely the same. Beaver et al.'s (1989) argument is that managers recognize provisions when earnings are high as a signal to the market that they are "good" banks with smooth earnings. Based on Ryan et al. (2006), this "earnings smoothness" behavior arguably makes earnings more informative and reveals the bank's type. Although Elliot et al.'s (1991) argument that banks use provisions to signal their capability of addressing the loan problems also suggests they are the "good" type, it has little earnings smoothness connotation.

These two signalling arguments motivate studies that conduct more direct tests of a signalling argument for loan loss provisions, although they typically do not attempt to distinguish between the two interpretations. For example, Wahlen (1994) argues that both market returns and future cash flow increase with unexpected or discretionary provisions only when conditioning on unexpected non-performing loans and unexpected charge-offs. His findings emphasize the importance of controlling for other information. Further, Liu and Ryan (1995) test whether the positive coefficient on provisions depends on the loan type. They argue that loan provisioning timeliness decreases with provisioning discretion, thereby affecting the information content of provisions. Specifically, banks are less timely in recognizing provisions for large and frequently renegotiated heterogeneous loans, thereby pre-empting the negative news of provisions and leading to a positive correlation between provisions and returns. Supporting this signalling hypothesis, Beaver and Engel (1996) also partition discretionary versus non-discretionary loan loss reserves/provisions and find that the market value is only positively associated with discretionary reserves/provisions.

Liu et al.'s (1997) findings, on the other hand, are supportive of the notion that provisions are used to signal that banks have the intention and ability to deal with bad loans, where the positive valuation implication of discretionary loan loss provisions only exists when banks have low regulatory capital ratios in the fourth quarter. In addition to these two alternative but related arguments, there are at least two more interpretations of the positive association between stock returns and loan loss provisions that this literature has not explored. First, in the pre-BASEL regime, loan loss provisions actually increase regulatory capital. Therefore, a positive market reaction may reflect an increase in the capital adequacy ratio. For example, Liu et al.'s (1997) finding of positive valuations of provisions for low capital ratio banks is potentially consistent with this argument because low capital banks benefit more from increased provisions. Next, a higher provision level in good times may indicate that banks are more timely in recognizing provisions. Based on the studies that argue that more timely banks are less pro-cyclical and less affected by recessions (e.g., Beatty and Liao, 2011; Bushman and Williams, 2012), markets may react positively to the timely banks.

Evidence consistent with the alternative regulatory capital explanation is provided by Ahmed et al. (1999) who find that discretionary loan loss provisions are negatively correlated with stock returns in the post-BASEL regime where loan loss provisions decrease Tier 1 capital. Based on this finding, it appears that regulatory capital can explain both the positive pre-BASEL and negative post-BASEL stock returns-provisions correlations. Ahmed et al. (1999) also find that discretionary provisions are negatively associated with next period earnings before provisions, which provides additional evidence that is inconsistent with the signalling hypotheses. While Ahmed et al. (1999) shed some light on this regulatory explanation they do not directly test this alternative regulatory capital hypothesis.

While studies in this literature attempt to provide some explanations for this positive association, the alternatives they consider are limited in scope and ignore the implications of provisions/reserves on earnings, capital or tax management. In addition, mixed findings in this literature also cast doubt on the interpretations and sustainability of the positive association between market value/returns and provisions/reserves. Few studies examine the valuation of loan loss provisions after the mid-90s. One reason contributing to this short literature is that researchers were only focused on the signalling hypothesis of loan loss provisions without considering the valuation of other properties of provisions. For example, we have limited understanding of how the market views the use of the provision for earnings, capital or tax management. Market valuation of this discretion may help us understand whether managers' use of discretion is self-interested or instead serves shareholders' interests. In addition, most studies in this literature are done before the BASEL regulation shift. Therefore, the effect of the regulation change on valuation is not well understood. Furthermore, how the market values banks' earnings quality, e.g., timeliness in loan loss recognition is also underexplored. Finally, how banks use provisions to mitigate information asymmetry with creditors is also lacking in the literature.

4.2 Valuation and risk relevance of fair values

The debate over fair value versus historical cost accounting has been ongoing for decades. Fair value accounting, previously known as mark-to-market accounting, was suspended in 1938 because it was believed to be responsible for many bank failures during the Great Depression. After the Savings and Loan (S&L) crises in the 1980s, fair value accounting was reintroduced based on the argument that historical cost accounting allowed S&Ls to hide problems by

opportunistically choosing to sell investments to recognize realized gains while increasing unrealized losses.

Recently the fair value debate has again attracted wide-spread interest due to the potential effect of fair value accounting on the financial crisis. For example, Forbes (2009) argues that "the debate over fair-value accounting has jumped from the pages of accounting journals and into the business sections of newspapers nationwide, bringing unprecedented national attention to an issue to which very few outside the accounting profession had ever paid much attention." The relevance, reliability and unintended consequences of fair value versus historical cost accounting have been the focus of the debate.

Proponents of fair value argue that fair value is a more relevant measure for financial instruments providing investors with more transparent, timely and accurate information. Opponents of fair value, on the other hand, argue that fair value can be unreliable when markets are illiquid or distressed and can cause unintended consequences such as the feedback effect in the recent financial crisis. Nissim and Penman (2008) provide an information conservation principle that adds to the fair value versus historical cost debate. Specifically, they argue that "when accounting informs about price, price cannot inform the accounting." They discuss both the cases of efficient prices, when price equals the fair value to shareholders, and inefficient prices, when price does not equal the fair value to shareholders. In the first case, they argue that if the market fair values historical cost earnings to obtain the market price, then replacing historical cost income with fair value income will eliminate the information required by the market to establish price equal to fair value. In the second case, they argue that when there is market mispricing, such as in the late 1990s NASDAQ bubble, then fair value accounting not only eliminates the historical cost income needed to set prices it further perpetuates the bubble

by bringing inflated price onto the financial statements. This issue is distinct from the concerns about the effect of liquidity on market prices, which was addressed by FAS 157-4.

Peek (2011) echoes these arguments noting that "capital markets collect and weigh investors' dispersed opinions" thereby consuming rather than producing information. He further states that "a second limitation of public capital markets is that investors in these markets may not trade only on fundamental information." In addition, he argues that investors averse to states of ambiguity "become pessimistically biased during times of ambiguity in capital markets, such as during the recent credit crisis." Also consistent with speculation that there were inefficiencies in market prices during the financial crisis, Stanton and Wallace (2013) find that "prices for the AAA ABX.HE index CDS during the crisis were inconsistent with any reasonable assumption for mortgage default rates."

The notion that important incremental pricing information would be lost if historical cost accounting was replaced by fair value accounting is provided by Dong et al. (2012). They examine the incremental explanatory power of the reclassification of unrealized securities gains and losses to net income when available-for-sale securities are sold. They find that the reclassified gains and losses are incrementally associated with market values and market-adjusted returns and that the coefficients are similar to the relatively permanent component of net income, in contrast to the coefficients on unrealized gains and losses, which are valued as being more transitory. They conclude that these findings suggest that information on amortized cost is useful for investors and that "the FASB should continue to require information about realized gains and losses, an amortized cost accounting construct, to be prominently presented in financial statements."

There are several reasons why the banking industry has been a primary focus of the fair value literature. First, banks use financial instruments, which are subject to fair value accounting, much more than industrial companies. Second, the use of fair value accounting can have implications for bank regulatory capital. U.S. banking regulators were actually early critics of fair value measurement applied in the absence of active markets. Regulatory capital rules use prudential filters to reduce the impact of fair value accounting. For example, Tier 1 capital excludes unrealized gains and losses included in debt and equity securities' fair values. Third, the use of fair value accounting has evolved around banking crises including the great depression, the S&L crisis, and the most recent financial crisis.

The variety of fair value accounting treatments provides important variation that facilitates research on a variety of issues such as the importance of recognition versus disclosure and the effect of accounting rules on capital regulation. For example, some fair value standards require only disclosure rather than recognition (e.g., SFAS 107 for fair value of loans), some switch from disclosure to recognition (e.g., SFAS 133, derivative accounting), and some recognized fair values affect net income (e.g., for trading securities) while others do not (e.g., for available for sale securities.) We discuss the equity and debt market implications of fair value in this section and discuss economic behavioural consequences of fair value accounting in Section 6.

4.2.1 Equity valuation of fair values

Many papers in the fair value literature examine the value relevance of banks' fair value disclosures beyond those of historical costs.[27] The results of these papers, which have been

[27] e.g., Barth (1994), Barth et al. (1996), Eccher et al. (1996), Nelson (1996), Venkatachalam (1996) and Wong (2000).

reviewed by Barth et al. (2001) and Holthausen and Watts (2001), are somewhat mixed. There are a variety of potential explanations for the discrepancies in the findings across these studies, many of which have been discussed in the previous reviews. In our context, a concern with these papers is that they focus on banks only because of the predominance of financial assets and liabilities, and therefore largely ignore bank specific characteristics, such as regulatory capital requirements. In addition, these papers have not thoroughly considered the effects of information asymmetry between managers and equity investors or distinguished between adverse selection and agency problems.

These papers typically implicitly assume that the effect of information asymmetry between managers and equity investors would have the same effect on fair value measurements as random measurement errors in the fair values. Beaver and Venkatachalm (2003) is an exception that directly focuses on this issue by examining how the equity market values discretion in banks' estimates of loan fair value to test the signalling versus opportunism hypotheses. They decompose loan fair values into three components: nondiscretionary, discretionary, and noise. They find that the nondiscretionary component is priced dollar for dollar. They also find a more positive pricing multiple on the discretionary portion of the fair value estimates, more suggestive of the signalling hypothesis, and a more negative association on the noise component than on the nondiscretionary component.

Further evidence supporting the importance of information asymmetry in the equity valuation of fair values is provided by studies examining differences in the valuation based on differing measurement approaches taken in the fair value estimates. Based on the classification of three levels of fair value assets under SFAS 157, Song et al. (2010) extend the value relevance literature by considering how fair value measurement affects the value relevance of recognized

fair values. They conclude that greater information asymmetry in fair values based on unobservable, firm-generated inputs decreases the value relevance of the level 3 fair value measurements relative to the level 1 and 2 fair values that rely on market values or market inputs.

Although Song et al. (2010) demonstrate the importance of the potential for discretion and noise in fair value estimates, similar to much of this literature, they do not attempt to distinguish between the two. The results of studies that have attempted to isolate discretion in level 3 fair values have found inconsistent results. For example, Altamuro and Zhang (2013) examine managerial discretion in recognized fair values for MSRs (Mortgage Servicing Rights). They find that level 3 MSR fair values better reflect the persistence of future cash flows, measured using servicing fees, compared with the level 2 MSR fair values. They also find that level 3 fair values have stronger associations with proxies for default risk and prepayment risk. They argue that managers use their discretion in computing level 3 fair values to provide information that is useful in predicting future performance and risk. These results are consistent with managers exercising discretion over fair values to convey information. Inconsistent with Altamuro and Zhang (2013), Cheng (2012), in his examination of the association between the fair value of mortgage backed securities under FSP 157-3 and economic factors and firm-specific characteristics, finds that the association between fair value of mortgaged-backed-securities and economic factors declined under the new regime after FSP157-3. Cheng (2012) argues that these results are more suggestive of opportunism rather than signaling.

In addition to information issues, inconsistency in the findings may arise from a focus of these studies on a variety of new accounting rules, as specified in Figure 7, requiring disclosure only, balance sheet recognition but no income statement recognition, and recognition in both the balance sheet and income statement. There is an important debate in this literature about whether

investors' valuation of fair values depends on disclosure versus recognition.[28] While the distinction might lead to differences in information properties, in the banking context, this distinction is particularly important because of potentially differing effects on regulatory capital calculations. Exploiting the expanded disclosures of derivatives prior to SFAS 133 and the mandatory recognition of derivative fair values after SFAS 133, Ahmed et al. (2006) find that while the valuation coefficients on disclosed derivatives are not significant, the valuation coefficients on recognized derivatives are significant. Taking a different approach, Beatty et al. (1996) and Cornett et al. (1996) find negative market reactions to the adoption of SFAS 115, which requires banks to recognize fair values of investment securities previously only disclosed in footnotes, indicating that the difference between disclosure and recognition affects investors' use and perception of the fair value information. One methodological challenge associated with research on disclosure versus recognition is that bank behaviors may change due to the rule changes that affect, for instance, regulatory capital calculations. Therefore, attributing the change in valuation to the positioning of information on financial statements may be inaccurate. To address this issue, researchers should investigate and control for the incentives for behavioral changes.

Finally, the papers in this area appear to lack a comprehensive investigation of how a fair value system, as opposed to individual fair value accounting rules, addresses information issues between bank managers and equity holders, how these information issues are affected by differences in fair value measurement, and how information issues are affected by the use of fair values by regulators and other claimants. A comprehensive investigation may have the potential to address these issues and the inconsistency or mixed findings in the literature.

[28] Most papers studying this question are experimental e.g., Hirst et al. (2004).

4.2.2 Equity risk assessment of fair values

A smaller group of studies, motivated in part by the debate on recording changes in fair values in other comprehensive income versus in the income statement, investigates the association between fair value accounting and equity market risk. For example, Hodder et al. (2006) argue that given the importance of fair valued financial instruments for assessing bank performance and risk, it is important to study the relation between bank risk and fair value accounting. These fair value risk relevance studies share many of the same issues with the value relevance studies. Specifically, questions arise about how information asymmetry affects the interpretation of the associations, how equity risk measurement affects information asymmetry, and about whether recognition versus disclosure gives rise to differences in banks' behaviors, especially involving regulatory capital calculations. In contrast to the value relevance papers, which Barth et al. (2001) argue "are designed to assess whether particular accounting amounts reflect information that is used by investors in valuing firms' equity, not to estimate firm value," the risk relevance studies typically interpret equity market risk measures as estimates of firm risk. Given this assumption, one important issue is that noise in reported values associated with market volatility will be interpreted as representing higher firm risk, which may or may not be appropriate.

Hodder et al. (2006) examine the associations between three income volatility measures, based on different fair value assumptions (i.e., GAAP net income, net income plus comprehensive income and fully fair value), and four stock market-based risk factors (i.e., market-model beta, short-term and long-term interest-rate betas, and stock return volatility). They conclude that full-fair-value income volatility reflects elements of risk that are not captured

by volatility in net income or comprehensive income. In contrast, focusing on investment securities, Barth et al. (1995) find that while the fair value earnings volatility is higher than historical cost earnings volatility, the incremental volatility is not associated with bank share prices. They argue that the finding suggests that fair value accounting does not capture more underlying economic risk than historical cost accounting.

Riedl and Serafeim (2011) also examine the association between bank equity betas and fair values. They specifically focus on the measurement characteristics of recognized fair values. They find evidence that firms with greater exposure to level 3 financial assets exhibit higher betas relative to those designated as level 1 or level 2. They also find that this difference in implied betas across fair value designations is more pronounced for firms with ex ante lower quality information environments measured using analyst following, market capitalization, analyst forecast errors, and analyst forecast dispersion. They conclude that differences in firms' information environments can mitigate information risk across the fair value designations.

While each of these papers examines the association of fair values with market betas, the interpretation of the findings is not consistent. Hodder et al. (2006) interpret a positive association with market betas as an indication that the fair value measure better captures the risk of the firm, while Riedl and Serafeim (2011) interpret a positive association as an indication that the information risk associated with the accounting numbers is greater. These two interpretations have very different implications for the properties of the accounting numbers being studied. As mentioned earlier, the noise component in fair value measurement may affect these interpretations. Because noise in fair value measurement can be positively or negatively associated with volatility measures, interpreting income measurement that is most associated with volatility as in Hodder et al. (2006) may not be appropriate. On the other hand, whether the

interpretation in Riedl and Serafeim (2011) of a higher association between level 3 assets and market betas as higher information risk is appropriate also depends on whether the noise component in level 3 asset measurement is driven by information asymmetry.

In contrast to much of the banking research, which examines the consequences of current banking regulation or accounting rules rather than the possible effects of alternative counter-factual regulatory regimes, Hodder et al. (2006) compare alternative recognition regimes. While this is an important first step in understanding the potential effects of future regulatory regimes, their study implicitly assumes that bank behavior will remain unchanged under alternative regulatory regimes. If bank's reporting incentives differ based on how fair values are reported, which is of interest to economists and accountants, then conclusions based on currently reporting regimes may not extend to alternative regimes. For example, Ball et al. (2013) find that banks with higher exposure to trading securities face higher bid-ask spreads, which they use as an information risk proxy, while those with higher available for sale and held to maturity securities do not. They argue that because managers can manipulate mark-to-market gains and losses for trading securities in less than perfect liquid markets and because mark-to-market accounting reduces the ability of bank managers to convey private information, fair value accounting is associated with higher opacity and information risk.[29]

While it is plausible that managers can manipulate fair value accounting as suggested by Ball et al. (2013) and Song et al. (2010), there is only a limited literature examining managers' incentives for manipulating fair values. One exception is, Livne et al. (2011) who find that CEOs' cash bonuses are positively correlated with fair values of both trading securities and available for sale assets. This finding suggests the possibility of opportunistic fair value management.

[29] Using Danish data, Bernard et al. (1995) argue that there is no evidence that mark-to-market accounting is managed to avoid regulatory intervention. They also find that Danish fair value accounting generates more reliable values than then historical-cost numbers reported in the U.S.

4.2.3 Debt valuation of fair values

Research on the debt markets' valuation of banks' fair value accounting is sparse perhaps because debt data was less available. Blankespoor et al. (2013) extend the approach taken by Hodder et al. (2006) from the equity market to the debt market by examining the extent to which various leverage ratios based on different measurements including fair value, GAAP, and Tier 1 capital, explain variation in banks' bond yield spreads and bank failures. They find that the unrecognized fair value of loans, disclosed by the banks, appears to be the primary source of incremental fair value explanatory power for yield spreads. The results using the bank failure model are less consistent with no significant difference in explanatory power between the fair value and Tier 1 capital ratios in any of the three years leading up to the bank failure. The paper concludes "banks' financial statements with financial instruments measured at fair values … are more descriptive of the credit risk inherent in the business model of banks than the current GAAP financial statements."

By examining both bond yields and bank failures, Blankespoor et al. (2013) attempt to clarify the interpretation of associations between accounting information and market based measures as evidence of the underlying bank risk rather than the market's perception of risk. However, the inconsistency in the findings for the bond yield spread versus the bank failures leaves the interpretation ambiguous. Bond yields are likely affected by information risk in fair values in a way similar to what Riedl and Serafeim (2011) demonstrated for equity betas. In addition, the conclusion in Blankespoor et al. (2013) that fair value leverage better captures bank's credit risk than GAAP leverage also makes the implicit assumption that the measurement of the fair values is invariant to whether they are disclosed versus recognized or to whether they

are incorporated in the calculation of regulatory capital ratios. That is, these conclusions do not consider how banks behave differently in alternative regimes of fair value measurement.

Supportive of the information risk interpretation, Arora et al. (2013) find that level 2 and especially level 3 assets are associated with higher short-term credit spreads measured as a ratio of CDS one-year spreads over five- or ten-year spreads compared to level 1 assets. They argue that their results suggest that level 2 and 3 asset measurements are less reliable than level 1 assets, thereby demanding higher spreads due to information risk.

Ahmed et al. (2011) find that both interest rate derivatives classified as hedging and interest and foreign exchange rate trading derivatives are more negatively associated with fixed-rate bond spreads after SFAS 133. They conclude that SFAS 133 has increased the risk relevance of accounting measures of derivative exposures to bond investors. Similar to other studies in this literature, Ahmed et al. (2011) do not attempt to distinguish between the effect of derivative classification on bond spreads and the real economic effect or behavior changes due to SFAS 133. The lack of a valid control group also prevents the authors from controlling for potential time confounding effects.

4.2.4 Methodology concern over policy interpretations

Several studies (e.g., Hodder et al., 2006; Blankespoor et al., 2013) in the fair value literature compare how various accounting regimes capture market-based variables, such as return volatility or interest spread. The methodological challenges are non-trivial in these studies trying to predict the effect of a proposed regulation. Counterfactual simulations could be used for ex ante evaluation of proposed regulations, but creating a counterfactual sample requires a model to describe how banks will change their behaviour in response to the proposed policy. In the

absence of an economic model of these changes in economic behaviour, the accounting research has typically drawn conclusions about these proposed policies assuming that there will be no change in banks economic behaviour. This is not likely to be a valid assumption for most policy changes. For example, the effect of the current BASEL III proposal to include unrealized securities gains and losses in regulatory capital calculations cannot be inferred by merely including the current values for these amounts in regulatory capital ratios since banks are likely to change their investment activities once this regulation goes into effect as shown by Beatty (1995). Our suggestion for future research on this issue is that authors should at least take banks' possible behavior changes into account by providing a prediction model when considering the effects of potential regulation change.

4.3 Securitization accounting

Controversy over the accounting for special purpose entities (SPE) arose after the Enron scandal. The SEC and the FASB responded to these concerns by replacing the notion of SPEs with variable interest entities (VIE). Despite this change, the concept of a qualified special purpose entity (QSPE) that was exempt from these updated requirements remained. Concerns about implicit risk associated with loan securitizations became apparent during the financial crises. These concerns led to the FASB eliminating QSPE status beginning in 2010. Finally, similar to fair value accounting research, research on securitization has focused on banking because of the reliance on securitization being much more prominent than in other industries.

4.3.1 Equity market assessment of securitization

The interpretive issues associated with the role of information asymmetry in value and risk relevance of fair value accounting further extends to the literature examining the equity market's assessment of securitizations. Landsman et al. (2008) find that the equity market values special purpose entity assets and liabilities similarly to those of the sponsor-originator, thereby arguing the risk and rewards of ownership of the transferred assets reside with the sponsor-originator. Using a sample of originators applying sale accounting guidance in SFAS 125/140, Niu and Richardson (2006) find that off-balance-sheet debt related to securitizations has similar CAPM betas to on-balance-sheet debt. They argue that their results "challenge the extant measurement standards in SFAS 140" that allows securitization to be classified as sales. In addition, using volatility of realized stock returns, option-implied volatility and credit spreads, Dou et al. (2013) find an increase in the risk-relevance for subprime securitization as early as 2006. They interpret this as evidence that investors understood the risk involved with subprime securitization well before the crisis.

Chen et al. (2008) recognize the importance of information asymmetry in their examination of the association between equity risk and securitized assets and retained interest for three loan types: mortgage loans, consumer loans, and commercial loans. They predict that equity risk will be more highly associated with securitized assets when they have higher and less externally verifiable credit risk. While this hypothesis implicitly acknowledges that both economic risk and information risk can affect equity risk, it does not attempt to distinguish between the two. In addition, this hypothesis is predicated on the assumption that banks provide implicit recourse on the securitized loans, since the risk and verifiability of assets that are sold

would not otherwise matter. They find that equity risk is associated with securitized assets for mortgages and consumer loans but not for commercial loans. These results are not consistent with their prediction that commercial loans should have the highest association with equity risk. Retained interests are significantly associated with equity risk only for commercial loans. They argue that the lack of significance on retained interests in consumer loans arises from implicit recourse on this loan type, but are unable to explain the lack of significance on the retained interest for mortgages.

Cheng et al. (2011), directly examine the equity market assessment of the information uncertainty associated with securitized assets. They find that when market participants have a greater difficulty in estimating risk transfer (proxied by banks' securitization volume and income), banks face greater information uncertainty (proxied by bid-ask spreads and analyst forecast dispersion). Their results suggest that there is information risk associated with assessing implicit recourse. Corresponding to Cheng et al.'s (2011) findings, Barth and Landsman (2010) argue that transparency of information associated with securitizations and derivatives likely were insufficient for investors to properly assess values and riskiness.

These findings and interpretations are interesting because different conclusions may be drawn. Niu and Richardson (2006) and Landsman et al. (2008) interpret investors' lack of reliance on the sales accounting treatment for securitizations as an indication that the accounting treatment is not appropriate. However, Cheng et al. (2011) conclude from their findings that investors have difficulty understanding securitization disclosures suggesting that investors may not rely on the sale accounting treatment because they do not understand it. Further research in this area may help reconcile the potential inconsistency.[30] Amiram et al. (2011) suggest that the

[30] Chen et al. (2008) provide evidence that characteristics of loan securitizations accounted for as sales determine the extent to which banks retain the risks of securitized loans.

market valuation of securitizations may have changed after the financial crises altered the market's expectation of the probability that banks would honor implicit guarantees. Their interpretation of risk-relevance of securitization in the pre-crisis period is different from Niu and Richardson (2006). In addition, their findings also suggest that rather than abandoning the sales accounting treatment for securitizations, better information about implicit guarantees should be incorporated.

4.3.2 Credit market assessment of securitization

Barth et al. (2012) extend the examination of equity market assessment of the risk associated with asset securitizations to consider how the debt market assesses this risk, arguing that the differences payouts across these two markets might lead to differing risk assessments. Specifically, they examine how credit rating agencies and the bond market assess risk associated with asset securitizations. In the period prior to the financial crisis, they find that banks' own bond yield spreads are positively associated with both retained and non-retained interests of securitization. This result is consistent with the equity valuation results in Landsman et al. (2008) and the equity risk results for all loans in Chen et al. (2008). However, Barth et al. (2012) find that S&P credit ratings reflect only the explicit recourse associated with the contractual retained interests. They argue that if the bond market makes the correct risk assumption then the use of an alternative assumption by a credit rating agency can be driven by the credit rating agency's incentives. They do not use actual outcomes to test whether the bond market or S&P were more accurate. The conclusion about the appropriateness of S&P's pre-crisis ratings might differ if there is a change in the debt market assessment of these implicit risks after the crisis, similar to what Amiram et al. (2011) argue occurred in the equity market.

5. Research examining financial reporting discretion and capital and earnings management

A large literature examines whether banks use financial reporting discretion to circumvent capital adequacy requirements or to smooth earnings. In contrast to the general criticism made by Fields et al. (2001) that most studies on accounting choice examine a single reporting choice and a single motive for that choice, the accounting literature in banking has often considered more than one reporting choice and has typically examined both capital and earnings motives in a single model.[31] Given that the loan loss provision is the most important bank accrual, the primary focus of this research has been on discretion in the loan loss provision. Other reporting choices, such as gains and losses on asset sales, which were the subject of controversy during the savings and loan crisis, have also frequently been considered.

Often these reporting choices are modeled as being independent, although Beatty et al. (1995) considered the possibility that they are jointly determined.[32] These studies have typically relied on the assumption that the motives for financial reporting discretion depend on the amount of capital or earnings before the effect of the discretion, and have interpreted the correlation between provisions and capital as an indication of capital management and the correlation between provisions and pre-provision earnings as a measure of earnings management. Identification of either the capital or earnings motive is challenging in the absence of a true control group that is unaffected by these motives. Separating the capital and earnings motives is made even more challenging by the inclusion of earnings in regulatory capital.

[31] Some studies also investigate tax management along with capital and earnings management, e.g., Beatty et al. (1995) and Collins et al. (1995).

[32] Chen and Daley (1996) also model tax, earnings and capital management simultaneously using a Canadian sample. They find results consistent banks manipulate earnings for capital management but do not find evidence consistence with earnings management and only weak results supporting tax management.

A variety of strategies have been employed in the literature to at least partially address these identification challenges. Specifically, changes in the effects of reporting choices in the calculation of regulatory capital have been used to validate the capital management results and differences in equity trading status have been used to isolate earnings management incentives.

5.1 Loan loss provisioning discretion and capital and earnings management

The change in the effect of the loan loss provision on regulatory capital calculations during the pre-BASEL versus BASEL periods affects how accounting research identifies capital management behavior and how we interpret the correlation between the provision and regulatory capital. We separate our discussion of this research, in the following two subsections, based on these two regulatory regimes.

5.1.1 Pre-BASEL period

Identification of a separate earnings and regulatory capital motive was facilitated in the late 1980s (pre-BASEL) by the opposite effects of the provision on earnings versus regulatory capital calculations. This provided low-capital banks incentives to *increase* their provisions to meet the capital requirements even though a higher provision would reduce earnings. Consistent with an increase in the provision increasing regulatory capital and with the assumption that firms with lower capital have greater capital management incentives, Moyer (1990), Collins et al. (1995) and Beatty et al. (1995) find a negative correlation between regulatory capital ratios and provisions in the pre-BASEL regime. The consistent conclusion drawn in these papers is that banks used discretion in their loan loss provisions during the pre-BASEL period to manage their reported regulatory capital. In contrast, the earnings management results are less consistent.

While Collins et al. (1995) find a positive correlation between the earnings and the provision, which is consistent with their earnings smoothing hypothesis, Beatty et al. (1995) do not find a significant association between earnings and the provision. (Moyer, 1990, does not incorporate earnings in her research design.)

Although the lack of consistency in the earnings management results during this period is somewhat disappointing given that the effective regulation during this period provided a potentially powerful setting to disentangle the capital from earnings motives, these studies examine very small samples due to a lack of data availability. [33]

5.1.2 Pre versus post- BASEL period

The adoption of the BASEL capital adequacy requirements, which were phased in starting in 1990, provided an experiment that could be used to validate the pre-BASEL capital management results. In contrast to the pre-BASEL period when capital ratios increased with provisions because loan loss allowances were included in regulatory capital, the BASEL capital requirements eliminate loan loss allowances from the calculation of Tier 1 capital, so the Tier 1 capital ratio decreases with provisions in the new regime.[34] Therefore, low-capital banks have incentives to *decrease* their provisions to avoid violations of regulatory capital minimums in the new regime. Employing this regulation shift, Kim and Kross (1998) and Ahmed et al. (1999) find evidence consistent with the capital management interpretation in the pre-BASEL studies. Specifically, Kim and Kross (1998) find a decrease in the magnitude of the discretionary loan

[33] The Federal Reserve did not require the reporting of bank holding company data (Y9C) until June 1986, and prior to this time BANK COMPUSTAT only covered approximately 146 of the "largest and most important U.S. banks." While COMPUSTAT back filling features may now be used to expand the pre-BASEL period sample to take advantage of this unique identification opportunity using a larger sample, some important information such as non-performing loans is not provided by COMPUSTAT until 1993.

[34] In the new regime, loan loss allowance is added back to Tier 2 capital up to 1.25% of risk-weighted assets.

loss provision in the period after the change in regulation and Ahmed et al. (1999) find that the negative correlation between regulatory capital and discretionary provisions is significantly more positive in the post-BASEL period. The combined results of these studies are consistent with capital regulation dampening opportunistic discretionary loan loss provisioning. However, using BASEL implementation in Australia, Anadarajan et al. (2007) find that earnings management using loan loss provisions becomes more aggressive after BASEL while they find no change in capital management. In addition, Shrieves and Dahl (2003) find that Japanese international banks manage provisions and gains on securities sales to comply with BASEL capital regulation.

Beatty et al. (2002) examine banks' earnings management incentives by comparing the use of discretionary provisions to avoid earnings decreases for publicly traded versus privately held banks. For their sample drawn from the periods both before and after the implementation of BASEL, they find that public banks use more discretion in the loan loss provision to achieve earnings targets than private banks. This finding, although somewhat different from earnings smoothing, suggests that discretion in the loan loss provision is related to earnings management incentives that are distinct from the effect of earnings on capital management.

5.1.2.1 Methodology concerns with research on regulation change

Similar to Ahmed et al. (1991) and Kim and Kross (1998), much of the bank financial accounting research is designed to understand the impact of a newly enacted or proposed change in either financial reporting or regulatory capital regulation. The main challenge in evaluating newly enacted regulations is in determining what the outcomes would have been in the absence of the regulation. The typical approach that has been taken in the literature is to examine the same firm before and after the regulatory change and to attribute any difference in outcome to the regulation. The problem with this approach is that the changes cannot be clearly attributed to

the new regulation since they may have occurred without the intervention. This approach, which is typically taken because of difficulties in finding control groups for new regulations that apply to all banks, relies on the inclusion of control variables to address other potential confounding effects.

Occasionally, regulatory changes apply to only a subset of all banks or the adoption of regulation is staggered so that not all banks are affected at the same time. Under these circumstances a difference-in-difference approach has been used. For example, Altamuro and Beatty (2010) examine the effect of FDICIA's internal control requirements on financial reporting by using ADR banks and banks with total assets less than $500 million as control firms. This method addresses any trends that are common to both the affected and unaffected banks, but if those differences are not consistent through time then direct inferences about the effect of the regulation could still be difficult and once again control variables must be relied upon to address other potential sources of change. In addition, if the composition of the samples varies depending on the newly enacted regulation, the selection issue needs to be addressed. Similarly, for some accounting changes banks are allowed to early adopt the change, thereby allowing for a comparison between the early and late adopters. In these cases, because banks choose the implementation period, selection bias again must be addressed.[35] The challenges associated with dealing with selection bias in banking research are similar to those discussed in the literature for firms in other industries.

An additional related challenge associated with research on the effect of regulation on bank behaviours is that regulation may not be completely exogenous. For example, the saving and loans crisis in 1980s gives arise to BASEL and FDICIA, which significantly change bank behaviours and accounting practices. However, the same crisis may prompt banks to adjust their

[35] For example, see Beatty (1995).

operations and accounting. To address this issue, researchers may need to find a control group that is subject to the new regulation but does not experience the underlying cause of the regulation, which may not always exist.

5.2 Analysis of loan loss provisioning discretion models

One of our observations about the capital and earnings management literature is that unlike the research on accruals for non-banks where there are a limited number of commonly used discretionary accruals models, there does not appear to be a consensus in the banking studies on how to best model discretionary provisions. For example, we summarize in Table 1 nine models from the literature that attempt to measure discretionary provisions each with a different specification. Among these models, most models are pooled time-series and cross-sectional models except for Collins et al. (1995) who employ a time-series model. Although we are not arguing that it is necessarily better for future research to start using a commonly accepted model, there is a lack of understanding of what these models capture and whether these models measure the same underlying construct. One methodological challenge associated with having multiple loan loss provision models is that different models have different assumptions on what variables are exogenous. It is hard to reconcile differing assumptions in previous research. For example, some studies treat charge-offs and loan loss allowance as discretionary while others treat them as exogenous. In contrast, models of discretion in realized securities gains and losses have been more consistent. Nonetheless, we are not aware of any study testing the validity of these models.

Another observation is that most of the studies examining whether banks use the loan loss provision to manage capital use the pre-BASEL/FDICIA period sample. We find it interesting

that few studies examine earnings and capital management in the new regime using a large sample facilitated by data availability. Although both Kim and Kross (1998) and Ahmed et al. (1999) examine the change in correlations between provisions and regulatory capital, they do not directly examine capital management in the new regime. Specifically, their findings indicate the incentive to increase provisions to meet capital requirements decreases in the new regime; however, whether banks have an incentive to decrease provisions to meet the requirement in the new regime is not clear from their studies.[36]

We use post-BASEL/FDICIA data to examine the differences in the nine models summarized in Table 1. Again, the purpose of this exercise is to further our understanding of the differences and commonalities of the various models used by prior research. We do not advocate for specific variables to be included in loan loss provision models universally; instead, we want to point out the variation of these models that researchers should be aware of in future research. Specifically, we conduct a factor analysis on the residuals from these provision models to understand the important factors underlying these models. Based on the results of our factor analysis and the three factors we identify, we determine that there are four important model variants. To assess the associations of these four models with reporting discretion, we use the residuals from these four provision models as proxies for discretionary provisions to predict banks' restatements and receipt of SEC comment letters. We combine restatements and SEC comment letters to capture a range of subsequent outcomes resulting from the use of discretion.

[36] For example, in Ahmed et al. (1999), the coefficient on regulatory capital in the provision regression is negative in the pre-BASEL regime, and while the offset coefficient for the post-BASEL regime is significantly positive, the sum of these two these coefficients is negative, suggesting that capital management may not exist in the new regime.

5.2.1 Sample

Our sample contains COMPUSTAT banks with necessary data during the period 1993Q4-2012Q2, including 33,025 bank-quarters that represent 1,394 banks. Panel A of Table 2 provides descriptive statistics of variables used in the provisions models. The loan loss provision variable is somewhat skewed: the mean of this variable is significantly larger than the median and is close to the 75th percentile in distribution. In addition, during the sample period, banks' Tier 1 regulatory capital ratios (i.e., *T1CAP*) are well above the 8% threshold to be considered well capitalized, consistent with that banks have a targeted capital ratio well above the requirement minimums. Panel B presents Pearson correlations of these variables. Although loan loss provisions are negatively correlated with both Tier 1 capital ratio and earnings before provisions, the inferences on capital or earnings management should be drawn based on a rigorous multivariate analysis, which is the focus of the literature.

5.2.2 Factor analysis

To gain a better understanding of the underlying commonalities and differences among the nine different provision models identified in Table 1, we run a factor analysis on the residuals of these models. Note that we do not control for loan types in these models because of the data availability.[37] Table 3 provides results of the factor analysis. We are able to identify three factors that have eigenvalues greater than one among the nine models. In the first three columns "Varimax rotated factor pattern", we find that the first four models (1)-(4) (i.e., Beaver and Engel, 1996; Kim and Kross, 1998; Kanagaretnam et al., 2010; Beck and Narayanmoorth, 2013)

[37] Requiring loan type information may further reduce our sample by 40%. As a robustness check, we also control for loan types, and the inferences continue to hold.

have the highest loadings on Factor 1. The next three models (5)-(7) (i.e., Wahlen, 1994; Collins et al., 1995; Beatty et al., 1995) have the highest loadings on Factor 2, and the final two models (8)-(9) (i.e., Liu and Ryan, 2006; Bushman and Williams, 2012) have the highest loadings on Factor 3. This result suggests that Factor 1 may capture the difference between models (1)-(5) and the other models, Factor 2 may capture the difference between models (5)-(7) and the others, and Factor 3 may capture the difference between models (8)-(9) and the other models. The last three columns show the standardized scoring coefficients for each factor. These scoring coefficients also draw a picture of the loadings on factors similar to the rotated factor pattern.

As noted in Table 1, the first four models are distinguished from the rest by the inclusion of net charge off in the model (i.e., the *CO* variable), likely explaining Factor 1. In addition, Models (5)-(7) contain lagged loan loss allowance (*ALW*) but do not include the charge off variable, likely capturing Factor 2. Finally, Models (8) and (9) do not include either allowance or charge off variables, likely reflecting Factor 3. Based on these observations, we construct the following four models (a)-(d) based on the three factors we identify from the factor analysis.[38]

Model (a): $LLP_t = \alpha_0+\alpha_1\Delta NPA_{t+1}+ \alpha_2\Delta NPA_t+ \alpha_3\Delta NPA_{t-1}+ \alpha_4\Delta NPA_{t-2}+\alpha_5 SIZE_{t-1} + \alpha_6\Delta Loan_t +\alpha_7\Delta GDP_t+ \alpha_8 CSRET_t+ \alpha_9\Delta UNEMP_t+ \varepsilon_t$

Model (b): $LLP_t = \alpha_0+\alpha_1\Delta NPA_{t+1}+ \alpha_2\Delta NPA_t+ \alpha_3\Delta NPA_{t-1}+ \alpha_4\Delta NPA_{t-2}+\alpha_5 SIZE_{t-1} + \alpha_6\Delta Loan_t +\alpha_7\Delta GDP_t+ \alpha_8 CSRET_t+ \alpha_9\Delta UNEMP_t+ \boldsymbol{\alpha_{10} ALW_{t-1}} +\varepsilon_t$

Model (c): $LLP_t = \alpha_0+\alpha_1\Delta NPA_{t+1}+ \alpha_2\Delta NPA_t+ \alpha_3\Delta NPA_{t-1}+ \alpha_4\Delta NPA_{t-2}+\alpha_5 SIZE_{t-1} + \alpha_6\Delta Loan_t +\alpha_7\Delta GDP_t+ \alpha_8 CSRET_t+ \alpha_9\Delta UNEMP_t+ \boldsymbol{\alpha_{10} CO_t} +\varepsilon_t$

Model (d): $LLP_t = \alpha_0+\alpha_1\Delta NPA_{t+1}+ \alpha_2\Delta NPA_t+ \alpha_3\Delta NPA_{t-1}+ \alpha_4\Delta NPA_{t-2}+\alpha_5 SIZE_{t-1} + \alpha_6\Delta Loan_t +\alpha_7\Delta GDP_t+ \alpha_8 CSRET_t+ \alpha_9\Delta UNEMP_t+ \boldsymbol{\alpha_{10} ALW_{t-1}} +\boldsymbol{\alpha_{11} CO_t} +\varepsilon_t$

where

[38] Models (8) and (9) also do not include the lagged non-performing assets variable either. However, we feel less comfortable to include both change in non-performing assets and lagged non-performing variables in the same models. Including NPA_{t-1} in Models b-d does not change the inference in the following analyses. For the same reason, we do not include the level of bank loans in the models.

LLP: Loan loss provision (COMPUSTAT "pllq") scaled by lagged total loans (COMPUSTAT "lntalq").
Δ*NPA*: Change in non-performing assets (COMPUSTAT "naptq") divided by lagged total loans (COMPUSTAT "lntalq").
SIZE: The natural log of total assets (COMPUSTAT "atq").
Δ*Loan*: Change in total loans (COMPUSTAT "lntalq") divided by lagged total loans.
Δ*GDP*: Change in GDP over the quarter.
CSRET: The return on the Case-Shiller Real Estate Index over the quarter.
Δ*UNEMP*: Change in unemployment rates over the quarter.
ALW: Loan loss allowance (COMPUSTAT "rclq") divided by total loans (COMPUSTAT "lntalq").
CO: Net charge off (COMPUSTAT "ncoq") divided by lagged total loans (COMPUSTAT "lntalq").

In Model (a), the baseline model, we include all variables from Bushman and Williams (2012) and Liu and Ryan (2006), i.e., all variables in models (8)-(9) in the absence of Co_t and ALW_{t-1} to capture Factor 3, along with all macro-variables that prior studies have used to control for macro-economic conditions (i.e., *CSRET* and Δ*UNEMP*). We include ΔNPA_{t+1} and ΔNPA_t in the model to reflect 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. On the other hand, ΔNPA_{t-1} and ΔNPA_{t-2} are included to capture the fact that some banks use past non-performing loan information to estimate loan loss provisions. We control for bank size because banks of different sizes may be subject to different levels of regulatory scrutiny or monitoring. Finally, we control for loan growth (Δ*Loan)* because loan loss provisions may be higher when the bank extends credit to more clients with lower credit. In Model (b), we include lagged loan loss allowance (ALW_{t-1}) to reflect Factor 2, and Model (c) includes charge off (CO_t) to reflect Factor 1. Finally, we include both loan loss allowance and net charge off in Model (d). The rationale of controlling for past allowance (ALW_{t-1}) is that if banks recognize sufficiently high provision in the past, then the current provision may be lower. However, if past allowance reflects the overall credit quality of the bank's clients, then lagged allowance and

provision may be positively correlated. Finally, some studies control for charge offs (CO_t) in the model because the amount of charge offs affects the level of allowance, which in turn affects provisions. However, due to the very high correlation between the discretion over charge offs and provisions, some studies do not include this variable because it may subsume the variation of provisions.

5.2.3 Relation between discretionary provisions and restatements/comment letters

We examine whether the discretionary provision measures based on Models (a)-(d) capture the propensity of banks financial restatements and SEC comment letter receipt caused by loan loss provisioning related issues. This validation strategy is similar to Dechow et al. (1995): provided that restatements/comment letters capture the most egregious provision manipulations, the residuals of the models that better capture discretion should be more highly correlated with the propensity of restatements/comment letters. Specifically, we average the absolute values of the residuals from the proposed models over the 1993-2012 period for each bank and examine the correlation between this average value and restatement/comment letters incidents. We argue that egregious discretion (proxied by restatements/comment letters) should increase with average absolute values of residuals based on the assumption that these residuals capture earnings/capital management incentives.

We use a Logit model regressing the incident of restatement/comment letters on the residuals from the four models we construct, where the dependent variable is an indicator variable of whether the bank has a restatement or received comment letters regarding loan loss provision during the sample period. As the explanatory variable of interest, we use average absolute values of residuals instead of signed residuals for two related reasons. First, provision

manipulation should manifest in both large positive and large negative residuals. For example, overstated provisions in one period will reverse leading to under recognition in subsequent periods. In 1998, the SEC targeted SunTrust for this behaviour (Beck and Narayanmoorth, 2013). Therefore, both large positive and large negative residuals may capture provision manipulation. Second, because we use average residuals to proxy for firm specific "provision quality", averaging signed residuals may disguise true provision manipulation since large positive residuals may be offset by large negative residuals in other periods.

We identify banks' restatements and SEC comment letters from Audit Analytics and our own search using 10K wizard. We find that 12.7% of banks have restated their financial statements for loan loss provisions reasons, and 35.3% of banks have received SEC comment letters due to inappropriate loan loss provisioning. In sum, 40.9% of sample banks have either restated financial statements or received comment letters regarding loan loss provision.

In Table 4, we show the OLS estimates of determinants of the four provision models. Model (c) and (d) appear to better predict provisions based on the R-squared, which is consistent with a high correlation between discretion in charge offs and discretion in loan loss provisions (Liu and Ryan, 2006). Table 5 shows that, based on Logit estimates, residuals from all four models have a significantly positive correlation with restatement/comment letter incidents. Among the four models, residuals from Model (a) appear to have the highest coefficient, z-statistic, and pseudo R-squared. We also calculate the percentages of the models correctly predicting restatement/comment letter incidents.[39] Model (a) correctly predicts 21.05% of the incident, higher than Model (b)'s 16.31%, Model (c)'s 3.51% and Model (d)'s 3.68%. On the other hand, all four models have a reasonably high percentage (around 90%) in predicting the

[39] When the predicted probability of the comment letter/restatement incident based on the Logit model is above 50%, then the predicted value of the incident is 1; 0 otherwise.

absence of the incident. Again Model (a) appears to have the highest predictive percentage. While these results may provide insights into how to capture certain types of accounting discretion, the comparative results across these models might differ for different discretionary purposes.

5.3. Other accounting choices and capital and earnings management

Although the loan loss provision is the most prevalent and typically largest bank accrual, bank managers may use other reporting discretion to manage their reported capital and earnings. Recognition of securities gains and losses provides an important ongoing alternative accounting choice. In addition, on a one time basis the change in accounting for post-retirement benefits also provided a setting to identify managerial accounting discretion.

5.3.1 Gains and losses on asset sales

While banks are also likely to use securities gain and loss recognition to manage capital or earnings, no evidence of a significant association between regulatory capital and gains and losses on securities sales is reported by Moyer (1990), Beatty et al. (1995), or Collins et al. (1995)[40]. Although Moyer (1990) does not consider an earnings management incentive, both Beatty et al. (1995) and Collins et al. (1995) find a negative association between pre-discretion earnings and discretion in securities gain and loss recognition (SGL). These findings are interpreted as evidence consistent with earnings smoothing. Prior literature also takes this incentive to manage earnings via SGL into consideration when valuing SGL. For example,

[40] While Collins et al. (1995) do not find evidence that banks use SGL to manage capital, they find results consistent with that banks issue common and preferred shares to avoid violating capital regulations.

consistent with Barth et al. (1990), Ahmed and Takeda (1995) find that the positive correlation between stock returns and realized SGL is lower for low capital and earnings banks.

Beatty and Harris (1998) extend these findings by comparing the association between pre-discretion earnings and SGL for publicly traded versus privately held banks. While the negative association is found for both groups, the association is stronger for the publicly traded banks. They argue the findings are consistent with earnings management occurring due to greater information asymmetry in public firms, suggesting that earnings management may convey management's private information to external stakeholders and may not necessarily reduce the quality of earnings. Beatty et al. (2002) further compare SGL in publicly traded versus privately hold banks and find that public banks use more discretion in gain and loss recognition to achieve earnings targets than private banks. This finding, although somewhat different from earnings smoothing, suggests that discretion in SGL is related to earnings management incentives.[41]

5.3.2 Other evidence of earnings management

In addition to using provisions and SGL to manage earnings, Ramesh and Revsine (2000) find that banks also time the adoption of SFAS 106 and 109 to reduce regulatory costs and to accrue earnings management benefits. Similarly, Schrand and Wong (2003) find that for sufficiently well capitalized banks, the amount of valuation allowance for deferred tax assets increases with a bank's capital. They also find that in later years, these banks then adjust the valuation allowance "hidden reserves" to smooth earnings. Finally, Kilic et al. (2013) find the use of loan loss provision to smooth earnings increases around the adoption of SFAS 133, which

[41] SGL can also be managed to reduce taxes. Beatty and Harris (2001) find that subsidiary banks manage their gain realizations not only to reduce their own state taxes, but also strategically to reduce their consolidated groups' tax expense. Warfield and Linsmeier (1992) find that investors price SGL in a manner consistent with this tax planning.

reduce banks' ability to smooth earnings through derivatives. This result suggests management uses loan loss provisions and derivatives as substitutes for earnings management.

Earnings management may also be related to banks' external equity financing activities. Bishop and Lys (2001) find that banks' financing choices reflect their private information regarding the levels of regulatory capital, earnings and charge offs. They find a negative market reaction to capital-increasing issuances and a positive reaction to capital-decreasing issuances. Arguing that public banks face greater agency costs due to separation of ownership and control, Nichols et al. (2009) find that the demand for timely loss recognition is higher for public than for private banks.

It is worth noting that in contrast to the signalling literature, most studies in the capital or earnings management literature have assumed opportunistic behaviour even though the purpose of capital or earnings management may be to convey private information and mitigate information asymmetry as suggested by Beatty and Harris (1998). While the literature on signalling via the provision does not directly address agency problems, this literature typically does not consider the signalling possibility.[42] Furthermore, this literature also ignores the possibility that earnings or capital management aligns with shareholders' interests and therefore is not necessarily opportunistic. We argue that future research should consider these explanations to draw a complete picture.

5.4 Corporate governance and financial reporting and disclosure quality

Compared to non-banking industries, we know relatively little about how banks' corporate governance interacts with regulation in shaping financial reporting and disclosure

[42] Another exception that considers the possibility of signaling in earnings management literature is Kanagaretnam et al. (2004) who however find that the signaling argument is more plausible than agency interpretations.

quality. Becht et al. (2011) argue that more opacity and information problems in banks lead to different bank governance, and therefore this omission is important. Consistent with Dewatripont and Tirole's (1994) argument that banking regulation is similar to debt covenants to some extent, Black et al. (2004) find a decrease in the number of debt covenants used in debt issued by banks when regulatory monitoring increases. They argue that this indicates that regulatory monitoring substitutes for monitoring via debt covenants. The recent financial crisis also prompts a new wake of discussion about the role of corporate governance in business cycles and crises (e.g., Fahlenbrach and Stulz, 2011; Huizanga and Laeven, 2012). We argue that more future research is called for to further our understanding of how corporate governance interacts with regulation in influencing the macro economy.

5.4.1 Executive compensation

In addition to this debt contracting perspective, how bank managers are compensated is important in understanding the underlying incentives for bank managers to manipulate earnings. Clinch and Magliolo (1993) find that CEO compensation is only positively associated with discretionary earnings accompanied with cash flows. This finding suggests that earnings management not related to cash flows may not be motivated by CEO compensation. On the other hand, Livne et al. (2011) find a positive link between CEO cash bonus and fair value valuations, suggesting a possibility that fair value manipulation may affect CEO compensation. In addition, Blackwell et al. (1994) find that turnover of subsidiary bank managers is negatively related to subsidiary financial performance, potentially giving incentives for managers to manage earnings for career concerns. What is not clear from this literature is whether earnings management driven by executive compensation is also aligned with shareholders' interests.

As mentioned above, the role of corporate governance in banks in the recent financial crisis is widely debated. For example, Fahlenbrach and Stulz (2011) find that banks whose CEO compensation incentives are aligned with shareholders perform worse, and that banks with higher option compensation for their CEOs did not perform worse during the crisis. Luo and Song (2012) however find that option awards received by bank CEO and CEO option holdings lead to higher bank risk which is not rewarded by better performance during the crisis. More research is encouraged to broaden our understanding of how bank managerial compensation interacts with financial crisis and perhaps resolves this inconsistency in findings.

5.4.2 Internal Controls and Auditors

Previous studies also directly examine the relation between corporate governance mechanisms and accounting quality for banks. Altamuro and Beatty (2010) find FDICIA's internal control provisions improve financial reporting quality captured by loan loss provisions predicting future charge offs, earnings persistence and cash flow predictability. They take advantage of the exemptions from the provisions for banks with assets under $500 million and for non-US banks to identify the effect of internal control on reporting quality. In the same line, Vyas (2011) argues that the extent to which banks' delayed write-offs compared to the devaluation implied by exposure-specific credit indices such as ABX depends on banks' corporate governance quality and regulatory investigations.[43] Cornett et al. (2009) find that board independence constrains earnings management. Finally, Kangaretnam et al. (2010) find that for small banks, audit efforts proxied by audit fees increase with earnings management. In addition, Beck and Narayanamoorthy (2013) find that stronger capital banks improve the informativeness

[43] Using international data, Beltratti et al. (2013), in contrast to Vyas (2011), find that both fair value and aggregate write-downs are associated dollar-for-dollar with contemporaneous security returns. This suggests that write-downs on average are timely throughout the financial crisis.

of charge offs after SAB 102 and the FFIEC (2001) Policy Statement that provide guidance for the loan loss estimation. SAB 102 guidance requires banks to use a consistent loan loss estimation methodology and also implement controls over the loan loss estimation process.

One general critique of the banking corporate governance and compensation literature is that the role of regulation is typically not well identified, which prevents researchers from understanding whether any effect is driven by bank regulation or applies to all industries. While it is interesting to study governance in the banking sector because of the importance of banks in the capital market, more insights might be acquired through clear identification of how regulation interacts with corporate governance either through taking advantage of regulation change or by cross-sectional comparisons between banking and other industries.

5.4.3 Corporate governance and macro-economic conditions

Whether the effectiveness of bank corporate governance depends on macro-economic conditions has received increased attention after the financial crisis. Most studies in this literature treat macro-economic conditions as an exogenous shock. However, whether corporate governance is endogenously related to macro-economic conditions is also interesting and has not been well explored.

5.4.3.1 Risk management policies

Examining the business cycle through the 1990s, Liu and Ryan (2006) find that while financially weak banks delay loss recognition on heterogeneous loans during the pre-1990 bust, profitable banks managed income downward by accelerating charge-offs of homogeneous loans in the 1990s boom period. Related to the importance of the mix of loans in the loan portfolio, Liu and Ryan (1995) also find that information content of provisions depend on loan types.

Specifically, banks have discretion and tend to delay provisions for heterogeneous loans, thereby pre-empting negative information content of provisions. In addition, Bhat et al. (2013) find that banks that rely more on statistical analysis of loan performance are more timely in recognizing losses in the pre-crisis boom period and late in the financial crisis but less timely early in the financial crisis compared to those that use stress tests. They conclude that statistical modeling is associated with less pro-cyclical loan originations, particularly for homogeneous loans, and that stress test on the other hand is associated with less pro-cyclical originations of heterogeneous loans. One interesting observation made in these studies is that not only does loss recognition timeliness depend on loan portfolio mix, it also depends on macro-economic conditions as an exogenous variable. However, the possibility of a dynamic relation between loan loss timeliness and the macro economy has not been considered.

5.4.3.2 Governance and the business cycles

In addition to CEO compensation, other research also examines whether other corporate governance attributes affect bank performance in the financial crisis. For example, Erkens et al. (2012) find that financial firms with more independent boards and higher institutional ownership experienced worst performance during the financial crisis because these firms raised more equity and take on more risk prior to the crisis. Also using international data, Beltratti and Stulz (2012) find similar results that more shareholder-friendly boards or better governance banks perform worse in the crisis.

Further, related to the argument that regulatory monitoring shapes financial reporting, Bertomeu and Magee (2011) argue that because political power varies through business cycles, regulators may demand less financial transparency when economic conditions initially decline but demand high reporting quality during the recession. In contrast with this prediction,

Huizanga and Laeven (2012) argue that banks overstate the value of distressed assets and their regulatory capital during the financial crisis. While they interpret their findings as suggestive of regulatory forbearance and noncompliance with accounting rules, there are many other potential explanations for their results and they conduct no direct tests that would allow them to draw conclusions about regulatory forbearance or noncompliance with accounting rules. More research in this area is required to reconcile the difference between the theoretical predictions and the empirical findings and to rule out alternative explanations for the empirical results. Finally, investigating the consequences of accounting quality in the financial crisis, Cohen et al. (2012) argue that more opaque banks that engage in more earnings management are more likely to crash during the crisis. We argue that we still know very little about how corporate governance affects provision quality in the banking industry that may have an important implication on macro-economy. Of course, this comment is not limited to banking research. For example, direct evidence on how capital market pressure gives rise to earnings management is still not generally well understood.

6. Research examining the effect of accounting on banks' economic behaviors

Whether and how a proposed change in accounting standard will affect firms' economic behaviours is often debated by those attempting to influence the final accounting standards. Changes in firm behaviour after changes in accounting standards have been studied in a variety of settings.[44] Beatty (2007) provides reasons why we observe that only a small proportion of the studies on accounting standards conducted in the last three decades directly examine firms'

[44] Beatty (2007) reviews empirical research on changes in economic behavior resulting from accounting changes in both financial and non-financial firms including changes in R&D expenditures, change in leasing, and in other post-retirement benefits resulting from related changes in accounting rules. Work subsequent to her review has considered changes in pension and derivative accounting.

economic behaviours (i.e., less than 10%). One of the major limitations of these studies is that, although they often discuss the incentives for the changes in behaviour, few actually conduct tests of the economic incentives that give rise to the documented changes. She argues that while contracting incentives may exist, they are not ubiquitous, so identifying incentives is not trivial. For example, while debt covenants are explicitly stipulated, most previous studies use crude measures such as leverage to proxy for covenants due to the daunting data collection requirements. In addition, compared to debt covenants, compensation contracts tend to be loosely linked to specific accounting numbers, thereby giving rise to identification difficulties. Banking regulation provides an interesting setting to study this question because bank regulators often rely on GAAP numbers explicitly. Studies on banking regulatory incentives may therefore broaden our understandings on how accounting standards affect real activities. Concerns that accounting standards may have led to or exacerbated the recent financial crisis have also increased the interest in the effect of accounting on economic behaviour.

6.1 Accounting changes, regulatory capital and changes in economic behaviour

To the extent that regulatory capital ratios are computed using GAAP numbers, changes in accounting standards create an incentive for affected banks to change their economic behavior. However, ambiguity can exist about the effect of accounting changes on the calculation of regulatory capital ratios. FDICIA requires regulatory accounting standards to be no less stringent than GAAP. Compliance with this regulation typically results in changes in GAAP inducing changes in regulatory accounting standards. However the Board of Governors of the Federal Reserve System (2005) has stated that

> *"Although GAAP informs the definition of regulatory capital, the Federal Reserve is not bound by GAAP accounting in its definition of tier 1 or tier 2 capital because these are*

> *regulatory constructs designed to ensure the safety and soundness of banking organizations, not accounting designations designed to ensure the transparency of financial statements. The current definition of tier 1 capital differs from GAAP equity in a number of ways that the Federal Reserve has determined are consistent with its responsibility for ensuring the soundness of the capital bases of banking organizations under its supervision. These differences do not constitute differences between regulatory reporting and GAAP accounting requirements, but rather are differences only between GAAP equity and the concept of tier 1 capital as used in the Board's regulatory capital requirements for banking organizations."*

This statement suggests that any given accounting change may or may not affect the calculation of regulatory capital ratios and therefore may or may not provide an incentive for a change in economic behavior.

6.1.1 Partial fair value accounting

For financial institutions the move to fair value accounting for investment securities with the adoption of SFAS 115 was an important accounting change with the potential to affect their operating decisions. Opponents of this change argued that the use of fair value accounting for only a single type of asset while ignoring concurrent changes in the values of other assets and liabilities could lead to unrealistic volatility in reported equity and therefore provide banks with an incentive to change investment behavior.

Beatty (1995) compares changes in the investment behavior of bank holding companies that early adopted SFAS 115 versus those that did not in the SFAS 115 early adoption quarter. This is an interesting setting because bank regulators had not yet determined that they would exclude the SFAS 115 gains and losses recorded in other comprehensive income from regulatory capital ratios as of the initial adoption date of this standard, although banks had expected that SFAS 115 gains and losses would likely be included in capital ratio calculations. Including a self-selection correction for the early adoption decision, she finds a decrease in both the proportion of assets held in investment securities and the maturity of the investment securities

held for those that adopt early. These changes suggest that the volatility in recognized fair values may have led banks to change investment behavior due to the potential regulatory capital costs that could have arisen from the accounting change. She concludes that shortening the maturity of the investment portfolio may reduce interest income earned or increase their interest rate risk. As a result, increased exposure to interest rate changes could make the banking industry more volatile, which was one of the arguments raised by Greenspan when opposing this standard.[45]

After the regulators decided to exclude these amounts from regulatory capital the FASB allowed banks an amnesty period to reclassify their securities holdings. Hodder et al. (2002) use this amnesty period to validate the importance of regulatory capital considerations in the initial SFAS 115 classifications. Their results confirm the findings in Beatty (1995) that regulatory capital was an important determinent in the initial portfolio allocation decision and that banks used the amnesty to undo their initial over or under classification of available for sale securities.

Using international data and IASB's amendment of IAS39 to grant companies the option to abandon fair value recognition for selected financial assets, Bischof et al. (2011) find that banks use the reclassification option to avoid recognizing fair value losses on trading securities. They also find that this reclassification option most benefits the troubled banks. However, this reclassification option may come at a cost. They document that two-thirds of reclassifying banks that do not comply with the accompanying disclsoure requirments experience a long-term significant increase in bid-ask spreads. Paananen et al. (2012) also find consitent evidence that banks are more likely to reclassfy financial assets when their capital ratios are close to the minimum requirement and when they have a larger exposure to fair value measurement. They further find that investors rely less on earnings and book value of equity after the reclassification.

[45] See Duke and Salwen (1990).

These studies indicate that banks altered their investment behavior to minimize the effect of fair value accounting on regulatory capital, but do not examine the efficiency losses associated with these changes in behavior or tell us how the behavior changes affected the usefulness of the regulatory capital ratio in capturing potential solvency problems.

6.1.2 Off-balance sheet financing

Bens and Monahan (2006) discuss how the FASB Interpretation No. 46 (FIN 46) requirement that sponsors consolidate their highly leveraged asset-backed commercial paper (ABCP) conduits affected regulatory capital ratio calculations. These assets were assigned a zero risk weight by the regulator and therefore this accounting change did not affect the calculation of the risk-based capital ratios. However, this accounting change did affect the calculation of the leverage ratio, which for U.S. banks is required in addition to the risk-based capital requirements, because GAAP assets are used in the denominator of the leverage ratio.

Bens and Monahan (2006) examine how sponsors of ABCP conduits responded to this accounting change. They find that the volume of ABCP began to decline upon the introduction of FIN 46 and that this decline is primarily attributable to a reduction in U.S. banks' sponsorship of ABCP. Also, they find that U.S. banks entered into costly restructuring arrangements to avoid having to consolidate their conduits per FIN 46. They conclude that in certain settings, accounting standards appear to have real effects on investment activity via capital regulation.

6.2 Incurred loss model and pro-cyclicality

Dramatic reductions in bank lending during financial crises raise concerns that current bank provisioning practices and capital regulation might exacerbate pro-cyclicality. For example,

pro-cyclicality of loan loss provisions is one interpretation that is consistent with Bikker and Metzemakers' (2005) findings, using data on OECD countries, that bank loss provisions are substantially higher when GDP growth is lower. [46] In addition, Bouvatier and Lepetit (2012) use a partial equilibrium model to show that forward-looking provisioning system where statistical provisions can be used to smooth total provisions and thereby mitigate the pro-cyclicality of loan provisions. These papers suggest that the currently used incurred loss model, which is criticized as backward-looking, might exacerbate pro-cyclicality. Beatty and Liao (2011), using a time-series model to capture provision timeliness, examine this possibility and find that banks that tend to delay recognition of loan losses are more likely to cut lending in the recessionary periods, leading to higher lending pro-cyclicality. While this finding does not directly address the debate on whether expected loss models address pro-cyclicality, it does shed some light on this issue by taking advantage of the variation within incurred loss models. That is, assuming that the expected loss model is more forward looking or less delayed in recognizing loss, the expected loss model may have the potential to be less pro-cyclical. This approach, however, is also subject to the criticism that bank behavior may change in response to the accounting rule change.[47]

To provide evidence on how more forward-looking provisions can mitigate lending pro-cyclicality, Fillat and Montoriol-Garriga (2010) use the parameters of the Spanish dynamic provision to simulate what might have happened if the US banking system had used this provisioning method. They show that if US banks had funded provisions in expansionary periods using dynamic provisioning models, they would have been in a better position to absorb

[46] Harndorf and Zhu (2006) on the other hand find that average US banks' loan loss provisions are positively correlated with changes in GDP, although giant and small banks' loan loss provisions are negatively correlated with GDP. We caution that this finding should be interpreted carefully because their loan provision model includes charge offs as a control variable which may dampen the variation in loan loss provisions explained by GDP.

[47] While the incurred loss model may be associated with less timely loan loss recognition, Gebhardt and Novotny-Farkas (2011) find that after IFRS adoption, the incurred loss model under IAS39 significantly reduces European banks' income smoothing.

loan losses during the economic downturns. However, the authors acknowledge that this approach ignores the endogenous response of bank behaviour to regulatory changes. That is, in their calculations, they make the unrealistic assumption that banks would not restrain credit in the presence of higher provisions.

Using international data, Bushman and Williams (2012) find that while forward-looking provisions designed to smooth earnings dampens discipline over risk taking, captured by the sensitivity of leverage to asset risk, forward-looking provisions designed to reflect timely recognition of future losses is associated with enhanced discipline. Consistent with the international setting, Bushman and Williams (2013) find that using U.S. data that banks that tend to delay loss provisions are associated with more severe balance sheet contractions and contribute more to systemic risk during economic downturns. These studies have important implications suggesting that financial reporting affects banks' risk taking and should be taken into account in future policy debates.

There may be a link between the possibility that it is economically beneficial for banks to exercise more discretion to make loss recognition more timely and the use of the loan loss provision to signal information to the capital markets or the use of the loan loss provision to manage capital or earnings. Future research exploring these links may help us better understand the economic effects of loan loss provisioning.

6.2.1 Loan loss provisions and quality of regulatory capital

It has been debated whether the add-backs of loan loss reserve to Tier 2 capital deteriorate the function of total regulatory capital as loss cushion. Ng and Roychowdhury (2013) find that the reserve add-backs incentivize banks to increase risky lending that leads to bank

failures during the recent economic crisis. They further find that the positive association of add-backs with bank failure risk is concentrated among cases in which the add-backs are likely to increase total regulatory capital. Their study however does not consider the possibility of reverse causality that failing banks that recognize additional provisions may undertake excessive risk hoping to resurrect the financial health.

6.3 Fair value accounting and pro-cyclicality

Another heated debate surrounds the effect of fair value accounting on pro-cyclicality, and existing research has provided mixed evidence regarding the contribution of fair value accounting to the recent financial crisis. Badertscher et al. (2012) focus solely on the regulatory capital effect of fair value accounting and examine whether other than temporary impairments (OTTI) or asset sales during the crisis years depleted regulatory capital thereby leading to a reduction in lending. They argue that compared to bad debt expense, OTTI represents only a small reduction in regulatory capital, therefore fair value accounting should not be blamed for accelerating the financial crisis. This argument is consistent with Barth and Landsman (2010) and Laux and Leuz (2009, 2010). However, their conclusion that fair value accounting did not exacerbate the recent financial crisis because it did not deplete bank's regulatory capital does not allow for the possibility that fair value accounting was important for reasons that do not depend on regulatory capital ratios. For example, Plantin et al. (2008) argue that as long as managers care about the fair value of assets (e.g., executive compensation tied to fair value as suggested by Livne et al., 2001), they have incentives to sell financial assets in fire-sales leading to the feedback effect. In addition, the benchmark that should be used to assess whether OTTI only represents a small reduction in regulatory capital is not completely obvious. Given the proportion

of loans versus investment securities on banks' balance sheet, OTTI could be large in proportion to investments and appear small when compared to loan losses.

Plantin et al.'s (2008) view that fair value accounting accentuates fire sales of bank assets is also currently under debate. Bleck and Gao (2011) argue that market-to-market accounting is endogenous to firms' behaviour by showing that mark-to-market information affects banks' incentives to both retain and originate loans. However, Davila (2011) argues that "feedback loops, cycles or spirals between prices and the amount of assets sold are neither necessary nor sufficient to generate fire sales externalities; in other words, normative and positive implications of fire sales must be decoupled," suggesting that even if fair value accounting can be criticized for its feedback effect, it should not necessarily be blamed for fire sale externalities. In addition, Herring (2011) argues that fire sales can be caused by a downward spiral in prices because of increases in margin or haircut requirements independent of the accounting regime, be it fair value or historical cost accounting. Consistent with these arguments, Ryan (2008) argues that subprime crisis was caused by bad operating, investing, and financing decisions, managing risks poorly, and in some instances committing fraud, but not by fair value accounting.[48] While he argues that fair value actually has the potential to stem the credit crunch and damage caused by these actions, empirical evidence consistent with this possibility seems to be lacking.

Plantin et al.'s (2008) argument is partially supported by Adrian and Shin (2010), Bhat et al. (2011) and Khan (2010). Adrian and Shin (2010) find that marked-to-market leverage is strongly pro-cyclical (i.e., positively related to assets growth), affecting the aggregate liquidity among financial intermediaries. Bhat et al. (2011) conduct a more literal test of the Plantin et al.

[48] This is also supported by Amel-Zadeh and Meeks' (2011) finding that bank failures may occur due to sudden shocks to liquidity positions despite capital adequacy and balance sheet solvency.

(2008) model, by examining whether FAS 157-4 reduced the association between securities prices and changes in banks' mortgage-backed securities holdings. They conclude that the reduced association they find indicates reduced feedback from fair values to securities holdings and therefore indicates a lessening of the pro-cyclicality effect. In addition, Khan (2010) adopts a different approach by examining whether the probability that a bank experiences a low stock market return in the same month that an index of money center banks experiences a low return varies with the overall extent of fair value reporting in the banking industry. His measure of fair value reporting includes both recognized and disclosed fair values that are reported in the bank holding company regulatory filings. Despite the FAS 107 requirement that the fair value of all financial instruments be disclosed in the footnotes to the financial statements beginning in 1993, his measure does not include fair value of all financial instruments under FAS 107 because the regulatory reports used to construct his measure do not include the FAS 107 disclosures. For example, his measure excludes the fair value of loans, which, given the importance of loans on a bank's balance sheet, is an important omission that could contribute to his findings. The increasing pattern of fair value recognition and disclosure documented in his paper would not likely be found if an alternative data source, such as 10-k filings, were used. He finds that the association between extreme returns for banks and the money center index increases with the overall use of his fair value measure. He argues that his findings suggest that fair value accounting is likely to amplify the subprime crisis.

While it is important to document the limited impact of fair value accounting for investment securities on regulatory capital calculations, it is not terribly surprising that the impact may be considered small given the exclusion from regulatory capital of unrealized gains and losses on available for sale securities. Interestingly, because unrealized gains and losses on

available for sale securities are excluded from Tier 1 capital, Chu (2013) documents that banks with low capital levels are less likely to realize losses in fire sales of REOs (bank-owned commercial real estate) to avoid violating regulatory capital requirements. Perhaps a more interesting question would be what would the impact have been had they been included in capital calculations. This question is of course difficult to answer if banks' economic behaviour changes with changes in the regulatory capital rules.

Considering the effects of fair value accounting on pro-cyclicality and contagion in the absence of a regulatory capital effect is also important, but the current limited and sparse evidence suggesting that fair value accounting contributes to these problems ignores the incentives through which the feedback occurs other than through regulatory capital. Understanding the link between pro-cyclicality and contagion and the effects of fair value accounting more broadly might provide a more convincing case for the importance of accounting in the recent financial crisis because most of SFAS 115 gains/losses are not included in the capital ratio calculations. An additional issue, as argued by Laux and Leuz (2009, 2010), is that these studies do not examine whether historical cost accounting would avoid these feedback effects as theorized by Plantain et al. (2010), or consider the cost-benefit trade-offs, which would further contribute to the fair value versus historical cost debate.

6.3.1 Mispricing for reasons other than liquidity

As discussed earlier, Nissim and Penman (2008) provide an information conservation principle that argues that when there is market mispricing, such as in the late 1990s NASDAQ bubble, then fair value accounting not only eliminates the historical cost income needed to set prices it further perpetuates the bubble by bringing inflated price onto the financial statements.

This issue is distinct from the previously discussed concerns about the effect of liquidity on market prices. Stanton and Wallace's (2013) findings of mispriced AAA ABX.HE index CDS during the crisis is an empirical example where liquidity is not the driver of mispricing. Whether the market mispricing during crises for reasons other than illiquidity alters the effect of fair value accounting on firm real activities has been largely unexplored in the empirical literature. One study that relates to this issue is Liang and Wen (2007) who investigate how the accounting measurement basis affects the capital market pricing of a firm's shares, which, in turn, affects the efficiency of the firm's investment decisions. They show that fair value may lead to more mispricing and investment inefficiency because fair values are subject to more managerial discretion and noise. More research in this area would be helpful in understanding broader issues associated with how market mispricing alters the effects of fair value accounting on economic behaviour.

6.4 Methodology concern

When researchers study pro-cyclicality or other macro-economic related activities, they face an identification issue on separating the demand from supply effects or separating bank behaviors from market conditions. The typical approach to address this issue involves partitioning samples based on variables assumed to be related to the supply effect but unrelated to the demand effect predicting differential results across partitions. For example, Beatty and Liao (2011) use bank asset size to capture the loan supplies affected by loan provisioning. Previous studies (e.g., Harndorf and Zhu, 2006) also use loan type and regulatory capital ratios as partitioning variables. Another related identification issue is the separation between accounting quality and management quality when studying bank behaviors. This identification

issue tends to be ignored and poses a larger challenge on the literature. Prior studies use a similar approach by partitioning the samples by variables that are related to management quality but not accounting quality and predicting no difference across partitions. Whether this approach is successful heavily depends on whether the partitioning variables are truly uncorrelated with the confound, which is rarely examined in prior studies.

7. Future banking and accounting regulation

7.1 BASEL III

In response to the latest financial crisis, the Basel Committee 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 witnessed in the recent crisis. To strengthen the global 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. These new regulation changes provide a fertile area for future research.

In the U.S., the Federal Reserve approved the final rule on BASEL III on July 2, 2013. The final rule not only implements many aspects of the BASEL III capital framework agreed upon by the Basel Committee, but also incorporates changes required by the Dodd-Frank Act. While the final rule does not apply to banks with total consolidated assets less than $500 million, advanced approaches banks, which are those with total consolidated assets greater than $250 billion or banks with on-balance sheet foreign exposures greater than $10 billion, are subject to

more rigid rules. Advanced approaches banks also need to comply with the BASEL III final rule on January 1, 2014, one year ahead of non-advanced approaches banks' compliance date of January 1, 2015. Finally, U.S. BASEL III also revises the capital thresholds for the different prompt corrective action categories under FDICIA.[49]

Compared to the Tier 1 and Tier 2 capital under BASEL I, U.S. BASEL III adds several new capital ratio requirements and increases the requirement of some existing ratios. Specifically, BASEL III breaks Tier 1 capital into "Common Equity Tier 1" and "Additional Tier 1" capital. In addition, the Common Equity Tier 1 ratio has a minimum requirement of 4.5% and the total Tier 1 capital ratio is required to be above 6%, which is higher than the 4% requirement under the existing rule, although the total capital ratio requirement is maintained at 8%. In addition, U.S. BASEL III also introduces a capital conservation buffer of Common Equity Tier 1 capital above the minimum capital requirement that needs to be maintained at 2.5% of risk-weighted assets to avoid limitations on capital distributions and discretionary bonus payments to executives. Further, advanced approaches banks are also subject to the countercyclical capital buffer if the regulators determine that credit growth in the economy becomes excessive. The countercyclical capital buffer ranges from 0 to 2.5 % of risk-weighted assets. Finally, in addition to the existing leverage capital requirement, advanced approaches banks are also subject to an additional supplementary leverage ratio that takes into account on-and off-balance sheet exposures that must be at least 3% of risk-weighted assets.

Whether this increase in capital requirements and the introduction of countercyclical capital requirement can achieve the objective of BASEL III is not clear from the theory perspective. It has been debated whether regulators should adopt a time-varying capital. For

[49] For example, for a bank to be considered to be well-capitalized, its total capital ratio needs to be 10% (unchanged) and its Tier 1 total capital ratio, Common Equity Tier 1 ratio and leverage ratio need to be 8%, 6.5% and 5% respectively.

example, information theory (Holmstrom, 1979) suggests that banks should be insulated from macroeconomic factors. Using the incomplete contracting approach, Dewatripont and Tirole (1994) argue that while a fixed capital requirement may allocate the control rights unduly due to the volatility of economy that is not under management's control, a flexible capital requirement may provide distorted incentives of risk-shifting. For example, in a flexible capital requirement regime, during economic downturns, while banks do not violate the downward adjusted capital requirements, banks that would otherwise be subject to regulatory intervention may have incentives to gamble or take on excessive risk to resurrect or recover their capital from the low level. This view is consistent with Hanson et al.'s (2011) argument that in bad times, the market may impose a tougher test on banks than do regulators, refusing to fund bank that are not strongly capitalized. Regulators may want to take this risk-shifting incentive into account when considering time-varying capital requirements.

Based on Dewatripont and Tirole's (1994) review, the theoretical conclusions on whether higher capital requirements can reduce bank risk taking are very mixed. In the current regime, empirical researchers may be able to exploit the different capital requirements around the world to partially investigate the empirical consequences of higher capital requirements. In addition, future empirical research can take advantage of BASEL III's bifurcation approach to investigate whether countercyclical capital requirements result in higher or less risk taking and pro-cyclicality by using smaller banks as the control group because they will not be subject to this countercyclical requirement. One potential issue associated with using smaller banks as control banks is that they are inherently different, thereby undermining the effectiveness of this control group.

In addition to the changes in capital ratio percentage requirements, BASEL III also changes the composition of capital for each tier and changes the calculation of risk-weighted assets to better prevent and absorb future losses. Specifically, Common Equity Tier 1 capital mainly includes common stock and related surplus and retained earnings. Non-cumulative perpetual preferred stock, which is currently included in Tier 1 capital, will be classified in Additional Tier 1 capital. In addition, cumulative perpetual preferred stock and trust preferred securities will no longer be allowed in regulatory capital except for those issued before May 19, 2010. In terms of risk-weighted assets calculation, the new rule imposes higher and more stringent risk weights on both on- and off-balance sheet assets. For example, among others, the new rule requires a 150% risk weight to apply to loans that are 90 days or more past due or on nonaccrual, in contrast to the current rule where no additional risk weight is required for nonaccrual loans. Further, for OTC derivatives, the new rule also removes the original 50% risk weight ceiling to better reflect the underlying risk of derivatives. The differential risk weight applied to nonaccruing loans may alter banks incentives to classify loans as nonaccrual. Given the importance of nonaccrual loans in the discretionary loan loss provisioning research this could have an important implication for the estimates generated from these models. Specifically, this will potentially change the maintained assumption in the prior literature that classification of nonaccruing loans is less discretionary compared to loan loss provisions or charge-offs.

Accounting researchers may be especially interested in the proposal in BASEL III reforms that requires comprehensive income arising from unrealized securities gains/losses to be part of Tier 1 capital. After considering tremendous opposition from banks, the U.S. final rule provides an opt-out option for non-advanced approaches banks to make a one-time, permanent election to continue the treatment of unrealized securities gains/losses under existing capital rules.

For those that do not opt out and advanced approaches banks, unrealized gains and losses on all available for sales securities (except for preferred stock classified as equity security) will flow through Common Equity Tier 1 capital.

While the current accounting literature provides some insights into the consequences of these changes, it is difficult to make predictions based on the existing empirical research about the likely effects of these changes. For example, there was no opt-out provision in an otherwise similar rule change examined by Beatty (1995). Comparing changes in the investment behavior of bank holding companies that early adopted SFAS 115 versus those that did not in the SFAS 115 early adoption quarter, Beatty (1995) finds that the volatility in recognized fair values may have led banks to change investment behavior due to regulatory capital costs that could have arisen from the accounting change. This new U.S. BASEL III rule may provide accounting researchers an interesting setting to study 1) whether banks' regulatory capital concern affects this opt-out choice and 2) the effect of fair value accounting on bank investment behaviors by taking advantage of the fact that some banks are subject to the new rule and others may opt out from the new rule. In addition, the new rule may also facilitate empirical investigations of Plantin et al.'s (2008) model where fair value affects regulatory capital calculations.

The U.S. BASEL III also changes the eligibility of deferred tax assets (DTA) to be included as regulatory capital. Under the existing rule, DTAs can be part of Tier 1 capital up to 10% of Tier 1 capital. Considering that DTA has a weaker ability to absorb future losses, especially when banks fail, the new rule requires DTAs that arise from operating loss and tax credit carryforwards to be subtracted from Common Equity Tier 1 Capital (besides goodwill and intangibles, and defined beneift pension net assets.) However, DTAs arsing from temporary differences can still be recognized as Common Equity Tier 1 Capital up to 10% of Common

Equity Tier 1 capital.[50] Future research may study how this regulation change affects banks' tax strategies and whether banks become more procyclical in lending as argued by opponents of this rule change.

Finally, BASEL III introduces a global minimum liquidity standard (forthcoming in the U.S. rule) to insulate banks from the liquidity dry-up experienced in the crisis. BASEL III requires two new additional ratios: liquidity coverage ratio (LCR) and net stable funding ratio (NSFR). LCR requires banks to maintain high-quality liquid assets sufficient to meet 100% or more of net cash outflows over a 30-day period under stipulated stress scenarios that include run-off of retail deposits, additional contractual outflows arising from downgrade in banks' credit rating of up to three notches, etc. In defining liquid assets, cash, central bank reserves and securities that have 0% risk weight are considered to have the highest quality. On the other hand, the purpose of NSFR is to establish a minimum acceptable amount of stable funding based on liquidity characteristics of banks' assets and activities over one-year horizon. The requirement is to have available stable funding above the required stable funding, where available stable funding includes both Tier 1 and Tier 2 capital and beyond and the required stable funding equals sum of assets held by banks and off-balance sheet commitments of banks multiplied by relevant required stable funding factors. There is no similar requirement under the existing regulation; therefore researchers may not be able draw inferences of this new requirement from the previous regulation. The interaction between managing the liquidity ratios while also managing capital ratios may provide interesting opportunities to better identify how compliance with these requirements affects banks' financial reporting choices.

[50] Although DTAs arising from temporary differences are allowed to be part of Common Equity Tier 1 capital up to 10%, there is a 15% aggregate threshold for three components: DTAs, mortgage servicing assets and investments in unconsolidated financial institutions in the form of common stock. In addition, for DTAs that are recognized as Tier 1 capital, a 250% risk weight will be applied in the risk-weighted asset calculation.

7.2 FASB and IASB exposure drafts and Dodd Frank Act

One important discussion in the Basel Committee's proposal that is not included in the U.S. BASEL III final rule is the adoption of more forward-looking provisioning. Although not incorporated in the new BASEL rule, FASB and IASB are proposing forward-looking provisioning to replace the incurred loss model. FASB proposes an exposure draft in December 2012 that requires banks to adopt the "current expected credit loss" model.[51] Specifically, banks need to recognize lifetime credit loss to reflect management's current estimate of the contractual cash flows that the bank does not expect to collect. That is, the new model does not have the "probable" threshold requirement used in the incurred loss model. The current accounting research may help us understand the consequence of the emphasis prosed in BASEL III and by the FASB and the IASB on more forward-looking provisioning. For example, Beatty and Liao (2011) find that less delayed provisioning under the current incurred loss model is associated with less lending pro-cyclicality. Bushman and Williams (2012, 2013) find that banks with less delayed provisioning contribute less to systemic risk. However, using the results of these studies to draw inferences about future regulation changes is subject to the critique discussed above that it is difficult to predict the likely effect of this accounting change in the absence of an economic model of the change in behaviour resulting from the changes in loan loss provision accounting. Another issue of using the current findings to argue that the expected loss model or more timely provisioning models can mitigate pro-cyclicality and systemic risk is the potential self-selection problem associated with those choosing more timely loss recognition in the current regime. Future research should take advantage of the actual future accounting rule change that is exempt

[51] IASB in contrast proposes a three-bucket expected loss approach while also getting rid of the "probable" threshold requirement.

from these two criticisms to broaden our understanding of the effect of more forward-looking accounting rules on bank behaviors.

In addition to expected loss models, the FASB and the IASB are also proposing to revamp the classification and valuation of debt instruments. Classification of debt instruments will be based on the cash flow characteristics and business models. Under the proposal, debt instruments that include cash flows that are not solely payments of principal and interest need to be fair valued through net income. In addition, equity investments can no longer be fair valued through comprehensive income; instead, they need to be valued through net income. This proposal will broaden the application of fair values in financial statements and will likely increase the volatility of earnings.

Finally, Dodd-Frank Act requires that securitizers must retain at least 5 percent of the un-hedged credit risk of securitized assets. The Act also directs the SEC to require securitizers to disclose, for each tranche or class of security, information regarding the assets backing that security, the nature and extent of the compensation of the broker or originator of the assets backing the security and the amount of risk retained by the originator and the securitizer of such assets. Each of these new regulations is expected to have both intended and unintended consequences on banks' economic behaviors that should be considered in future research using these regulatory changes to provide insights into the important consequences of bank accounting.

8. Summary and conclusions

Our review of bank financial accounting research highlights several fundamental unresolved theoretical issues with important implications for empirical research, including the current debates over the costs and benefits of increasing capital ratio requirements and of bank

opacity. Both of these theoretical issues have potentially important implications for the effect of changes in accounting rules such as the use of fair values and forward looking provisioning rules. In addition, the optimal transparency debate also has important implications for banks' disclosure requirements. Future research addressing the interaction between this optimal transparency and bank disclosures could provide important insights.

Most studies in the first research stream that we survey, which considers the valuation and risk relevance of bank accounting information, focus predominantly on equity markets and do not attempt to distinguish between agency problems and information signalling hypotheses. The dominant focus on equity markets is somewhat surprising given the importance of debt funding for banks and the role of information asymmetry between bank managers and depositors or other creditors in the microeconomic theory of banking. Beyond what has been considered in this literature, other potentially interesting questions include: 1) is there an information effect of loan loss provisions that is separate from the regulatory capital effect? 2) What is the role of managerial signaling versus opportunism in value and risk relevance studies? 3) If information risk is priced what inferences about economic risk can be drawn from these methods? 4) How do recognition versus disclosure and different regulatory capital treatments affect the interpretation of value and risk relevance studies?

Fairly consistent evidence of the use of discretion to manage capital across two different regulatory regimes is found in the second research stream we review, which examines whether banks use financial reporting discretion to manage their reported capital and earnings. The evidence in support of earnings management is more mixed, perhaps in part due to an ill-defined notion of the earnings management objective. The earnings smoothing objective is not well motivated in the banking literature and ignores how depositor information problems affect

earnings and capital management, despite the importance of this information problem. In addition, the results of this literature seem particularly sensitive to research design choices. Finally, because a consistent loan loss provision model has not arisen in this literature, we conduct a factor analysis to analyze the underlying difference among the various discretionary provision models in the literature. We also propose four variant models attempting to capture the three factors we identify. Beyond what has already been examined in this literature, other potentially interesting questions include: 1) is there any evidence of a relation between the loan loss provision and regulatory capital ratios in the BASEL period? 2) Is financial reporting discretion used opportunistically or to provide managers' private information? 3) How can earnings and capital management best be captured? 4) What is the implication of earnings and capital management in the credit or depositor market?

The third research stream we survey examines whether banks' economic behaviour is affected by the accounting regime and accounting quality. The results from this literature suggest that banks alter their economic behaviour due to accounting methods that affect regulatory capital requirements including fair value recognition, asset securitizations and loan loss provisioning. The results are less clear when there is not a direct link between the accounting methods and regulatory capital, especially when considering the pro-cyclicality of accounting methods. Beyond what we already know from this literature other potentially interesting questions include: 1) how is bank efficiency altered by changes in economic behaviour induced by an accounting regime change that affects regulatory capital? 2) Would an alternative method of loan loss provision accounting lead to more efficient lending and risk taking? 3) What impact would fair value accounting have if unrealized available for sale gains and losses were included

in capital calculations, as proposed in BASEL III? 4) How does fair value accounting affect pro-cyclicality and contagion in the absence of a regulatory capital link?

Overall, we argue that much of the bank accounting research has been backward looking focusing on the effects of existing regulation rather than the possible effects of alternative regulatory regimes. Our methodological concerns with this literature primarily relate to the evaluation of changes in regulation in studies that attempt to evaluate newly enacted regulation by comparing firms before and after the change. Since control firms are hard to find for regulations affecting all banks, observed changes cannot cleanly be attributed to the new regulation. There are even greater methodological challenges in studies designed to predict the effect of a proposed regulation that will likely alter bank behavior. Accounting research has typically drawn conclusions about these proposed policies assuming that there will be no change in banks' economic behavior in response to the new policy. This is not likely to be a valid assumption for most policy changes. To gain insights about how to avoid the next crises will likely require an understanding of how banks may react to alternative counter-factual regulations designed to avoid the future crises.

The most recent financial crisis has led both to a great deal of regulatory change, including BASEL III, the Dodd-Frank Act, and several accounting changes and exposure drafts. The crisis also led to a rethinking of the economic models that explain bank opacity and the likely effects of requiring greater transparency and models that consider the possible implications of increasing capital requirements. These regulatory changes and theoretical innovations create a great opportunity for future accounting research addressing these issues.

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Figure 1: U.S. Banking Crises

Period	Crisis	Accounting Implication
1930-1933	Great Depression	Market value accounting for investment portfolios was eliminated to encourage long-term value investments and discourage short-term speculative focus.
1982-1984	Latin American Debt Crisis	U.S. Banks were slow to record loan loss provisions related to LDC debt. Banks continued to accrue interest on loans even though payments were largely being made using additional borrowings.
1988-1991	Savings and Loan Crisis	Market value accounting for investment portfolios was reintroduced to eliminate gains trading where securities with gains were sold and securities with losses were retained.
2007-2009	Financial Crisis	Market value accounting was accused of magnifying liquidity spirals leading to fire sales. Incurred loss model of loan loss provisioning was argued to result in delayed loss recognition and reduced lending during recession when losses were recorded and reduced regulatory capital

Figure 2: History of Bank Equity Trading

Year	Event
1792	Bank of New York is the first company listed on the NYSE
1928	Several banks, including Chase, voluntarily delist from the NYSE
1933	Banks (but not bank holding companies) were exempted from the disclosure requirements of the Securities Act of 1933
1934	As a "temporary measure" the SEC exempted banks from the Securities Act of 1934 reporting and other requirements for securities listed on national exchanges
1964	Securities Amendments Act of 1964 extended reporting, proxy and insider-trading rules to certain unlisted securities including banks (assets > $1 million and 500 shareholders), although the regulatory authority over FDIC insured banks was given to the bank supervisors
1974	Securities Amendments Act of 1974 requires the "banking agencies to issue substantially similar regulations' with respect to periodic reporting, proxy regulation, and insider trading as those adopted by the SEC"

Figure 3: Bank Regulatory Capital Changes

Date	Requirement	Accounting Implication
1981	Inconsistent explicit numerical capital requirements introduced by three U.S. bank regulators	The effects of accounting on capital requirements differed across banks by regulator
1985	Uniform capital requirement with common definition of regulatory capital adopted by three U.S. bank regulators.	Add back of the loan loss allowance to primary capital made loan loss provision increase regulatory capital ratio
1990	Basel risk based capital adopted with additional leverage ratio requirement in the U.S.	Loan loss provision decreased Tier 1 capital but increased Tier 2 capital
1991	FIDICIA enacted	Required evaluation of internal controls, prompt corrective action and regulatory accounting that is at least as strict as GAAP
1993	Bank regulators opted to include unrealized FAS 115 AFS gains in regulatory capital	Holding gains and losses affect regulatory capital calculations
1994	Bank regulators reversed decision and excluded unrealized FAS 115 gains from regulatory capital	AFS FAS 115 fair values do not affect regulatory capital calculations

Figure 4: Regulatory Capital Calculation

	Numerator	Denominator	Effect of Loan Loss Provision on Capital Ratio
Pre-BASEL	1. Common equity, 2. perpetual preferred stock, 3. minority interests, 4. mandatory convertible instruments, 5. loan loss allowance	Average total assets	A one dollar increase in the loan loss provision increases regulatory capital by the tax rate times one dollar. Specifically, while one dollar loan loss provision decreases earnings and regulatory capital by one dollar times (1-tax rate), one dollar provision is added back to regulatory capital. As a net, once dollar provision increased regulatory capital by the tax rate times one dollar.
Post-BASEL			
Tier 1 Risk-Based Capital Ratio	1. Common equity, 2. perpetual preferred stock, 3. minority interests, 4. mandatory convertible instruments, Deduct: goodwill and intangibles, unrealized gain and loss on available for sale securities (exception: unrealized loss on available for sale equity securities is included in Tier 1 capital)	Risk weighted assets: 0%: cash, gold and claims unconditionally guaranteed by the US or OECD central governments, 20%: shorter-term claims guaranteed by US and foreign banks, and claims conditionally guaranteed by the US or OECD central governments, 50%: loans fully secured by first liens on 1-4 family residential properties and loans to state and local government, 100%: all other assets not assigned to the lower weight categories.	A one dollar increase in loan loss provisions decreases Tier 1 capital by one dollar times (1-tax rate), because loan loss allowance is not added back to Tier 1 Capital.
Leverage Ratio	1. Common equity, 2. perpetual preferred stock, 3. minority interests, 4. mandatory convertible instruments, Deduct: goodwill and intangibles	Average total assets Deduct: goodwill and intangibles	A one dollar increase in loan loss provisions decreases Tier 1 capital by one dollar times (1-tax rate), because loan loss allowance is not added back to Tier 1 Capital.

	unrealized gain and loss on available for sale securities (exception: unrealized loss on available for sale equity securities is included in Tier 1 capital)		
Total Risk-Based Capital Ratio	Tier 1 Capital plus the followings: 1. qualifying subordinated debt, 2. redeemable preferred stock, 3. loan loss allowance up to 1.25% of risk weighted assets, 4. unrealized gains on available for sale securities up to 45% of the pretax net unrealized holding gain on available-for-sale equity securities	Risk weighted assets: 0%: cash, gold and claims unconditionally guaranteed by the US or OECD central governments, 20%: shorter-term claims guaranteed by US and foreign banks, and claims conditionally guaranteed by the US or OECD central governments, 50%: loans fully secured by first liens on 1-4 family residential properties and loans to state and local government, 100%: all other assets not assigned to the lower weight categories.	There are two possible scenarios: 1. When loan loss allowance is less than 1.25% of risk-weighted assets, a one dollar increase in the loan loss provision increases regulatory capital by the tax rate times one dollar. 2. When loan loss allowance is higher than 1.25% of risk-weighted assets, a one dollar increase in loan loss provisions decreases total capital by one dollar times (1-tax rate).

Figure 5: Balance Sheet Breakdown of Banks as of 2012, by Bank Size (data source: http://www.ffiec.gov/nicpubweb/content/BHCPRRPT/BHCPR_Peer.htm#2012)

Panel A: Assets

	Group 1 $10 B and above	Group 2 $3-$10 B	Group 3 $1-$3 B	Group 4 $500M-$1B
Assets				
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 and Equities

	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%	2.6%	2.29%

Panel C: Capital Ratios

	Group 1	Group 2	Group 3	Group 4
Tier 1 Leverage Ratio	9.37%	10.19%	9.76%	9.68%
Tier 1 Risk-Based Capital Ratio	12.86%	14.73%	13.93%	14.30%
Total Risk-Based Capital Ratio	14.85%	16.10%	15.41%	15.79%
N	90	119	351	485

*Noncore funding The sum of time deposits of $100,000 or more, deposits in foreign offices and subsidiaries, federal funds purchased and securities sold under agreements to repurchase in domestic offices including those of subsidiaries, commercial paper, other borrowings (including mortgage indebtedness and obligations under capitalized leases), and brokered deposits less than $100,000.

Figure 6: 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%

Figure 7: Important GAAP Changes for Banks

No.	Issued	Name	Effective Date
107	Dec-91	Disclosures about Fair Value of Financial Instruments	Effective for financial statements issued for fiscal years ending after December 15, 1992. (12/15/95 for entities with less than $150 million in total assets.)
114	May-93	Accounting by Creditors for Impairment of a Loan--an amendment of FASB Statements No. 5 and 15	Applies to financial statements for fiscal years beginning after December 15, 1994. Earlier application is encouraged.
115	May-93	Accounting for Certain Investments in Debt and Equity Securities	Effective for fiscal years beginning after December 15, 1993. It is to be initially applied as of the beginning of an enterprise's fiscal year and cannot be applied retroactively to prior years' financial statements.
119	Oct-94	Disclosure about Derivative Financial Instruments and Fair Value of Financial Instruments	Effective for financial statements issued for fiscal years ending after December 15, 1994, (12/31/95 for entities with less than $150 million in total assets.)
125	Jun-96	Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities	Effective for transfers and servicing of financial assets and extinguishments of liabilities occurring after December 31, 1996, and is to be applied prospectively. Earlier or retroactive application is not permitted.
133	Jun-98	Accounting for Derivative Instruments and Hedging Activities	Effective for all fiscal quarters of fiscal years beginning after June 15, 1999. Initial application of this Statement should be as of the beginning of an entity's fiscal quarter; on that date, hedging relationships must be designated anew and documented pursuant to the provisions of this Statement.
140	Sep-00	Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities-a replacement of FASB Statement No. 125	Effective for transfers and servicing of financial assets and extinguishments of liabilities occurring after March 31, 2001. This Statement is effective for recognition and reclassification of collateral and for disclosures relating to securitization transactions and collateral for fiscal years ending after December 15, 2000. Disclosures about securitization and collateral accepted need not be reported for periods ending on or before December 15, 2000, for which financial statements are presented for comparative purposes.
157	Sep-06	Fair Value	Effective for financial statements issued for fiscal

		Measurements	years beginning after November 15, 2007, and interim periods within those fiscal years. Earlier application is encouraged, provided that the reporting entity has not yet issued financial statements for that fiscal year, including financial statements for an interim period within that fiscal year.
159	Feb-07	The Fair Value Option for Financial Assets and Financial Liabilities—Including an amendment of FASB Statement No. 115	Effective as of the beginning of an entity's first fiscal year that begins after November 15, 2007. Early adoption is permitted as of the beginning of a fiscal year that begins on or before November 15, 2007, provided the entity also elects to apply the provisions of FASB Statement No. 157, Fair Value Measurements.
157-4	Apr-09	Determining fair value when the volume and level of activity for the asset or liability have significantly decreased and identifying transactions that are not orderly	This FSP shall be effective for interim and annual reporting periods ending after June 15, 2009, and shall be applied prospectively. Early adoption is permitted for periods ending after March 15, 2009. Earlier adoption for periods ending before March 15, 2009, is not permitted.

Table 1: Specification of Provision Models

		Models Excluding Earnings and Regulatory Capital Variables	Includes CO? (Y/N)	Includes ALW? (Y/N)
1.	Beaver and Engel, 1996	$LLP_t = \alpha_0(1/GBV)_t + \alpha_1 CO_t + \alpha_2 \Delta Loan_t + \alpha_3 \Delta NPA_t + \alpha_4 \Delta NPA_{t+1} + \varepsilon_t$	*Y*	*N*
2.	Kim and Kross, 1998	$LLP_t = \alpha_0 + \alpha_1 Loan_{t-1} + \alpha_2 \Delta Loan_t + \alpha_3 \Delta NPA_t + \alpha_4 NPA_{t-1} + \alpha_4 CO_t + \alpha_5 SIZE_{t-1} + \varepsilon_t$	*Y*	*N*
3.	Kanagaretnam et al., 2010	$LLP_t = \alpha_0 + \alpha_1 ALW_{t-1} + \alpha_2 NPA_{t-1} + \alpha_3 CO_t + \alpha_4 \Delta Loan_t + \alpha_5 Loan_t + \varepsilon_t$	*Y*	*Y*
4.	Beck and Narayanmoorth, 2013	$LLP_t = \alpha_0 + \alpha_1 CO_t + \alpha_2 \Delta NPA_t + \alpha_3 SIZE_{t-1} + \alpha_4 CSRET_t + \alpha_5 \Delta UNEMP_t + \alpha_6 ALW_{t-1} + \varepsilon_t$	*Y*	*Y*
5.	Wahlen, 1994	$LLP_t = \alpha_0 + \alpha_1 E\Delta NPA_t + \alpha_2 NPA_{t-1} + \alpha_3 ALW_{t-1} + \varepsilon_t$, where $E\Delta NPA_t$ is the predicted value of from: $\Delta NPA_t = \beta_0 + \beta_1 \Delta NPA_{t-1} + \eta_t$	*N*	*Y*
6.	Collins et al., 1995	$LLP_t = \alpha_0 + \alpha_1 ALW_{t-1} + \alpha_2 NPA_{t-1} + \alpha_3 \Delta NPA_t + \varepsilon_t$	*N*	*Y*
7.	Beatty et al., 1995	$LLP_t = \alpha_0 + \alpha_1 NPA_{t-1} + \alpha_2 ALW_{t-1} + \varepsilon_t$	*N*	*Y*
8.	Liu and Ryan, 2006	$LLP_t = \alpha_0 + \alpha_1 \Delta NPA_t + \varepsilon_t$	*N*	*N*
9.	Bushman and Williams, 2012	$LLP_t = \alpha_0 + \alpha_1 \Delta NPA_{t+1} + \alpha_2 \Delta NPA_t + \alpha_3 \Delta NPA_{t-1} + \alpha_4 \Delta NPA_{t-2} + \alpha_5 SIZE_{t-1} + \alpha_6 \Delta GDP_t + \varepsilon_t$	*N*	*N*

Note: Controls for loan types in various models are not included due to data availability.

Variable Definitions:

ALW: Loan loss allowance (COMPUSTAT "rclq") divided by total loans (COMPUSTAT "lntalq").
CO: Net charge off (COMPUSTAT "ncoq") divided by lagged total loans (COMPUSTAT "lntalq").
CSRET: The return on the Case-Shiller Real Estate Index over the quarter.
GBV: Common shareholders' equity (COMPUSTAT item "ceqq") plus loan loss allowance (COMPUSTAT "rclq").
LLP: Loan loss provision (COMPUSTAT "pllq") scaled by lagged total loans (COMPUSTAT "lntalq").
Loan: Total loans (COMPUSTAT "lntalq") divided by total assets (COMPUSTAT "atq").

NPA: Non-performing assets (COMPUSTAT “naptq”) divided by lagged total loans (COMPUSTAT “lntalq”).
SIZE: The natural log of total assets (COMPUSTAT “atq”).
Δ*GDP*: Change in GDP over the quarter.
Δ*Loan*: Change in total loans (COMPUSTAT “lntalq”) divided by lagged total loans.
Δ*NPA*: Change in non-performing assets (COMPUSTAT “naptq”) divided by lagged total loans (COMPUSTAT “lntalq”).
Δ*UNEMP*: Change in unemployment rates over the quarter.

Table 2: Descriptive Statistics

Panel A: Means, Medians, Quartiles and Standard Deviations of Variables

Variables	Mean	25%	Median	75%	Standard Deviation
LLP_t	0.0017	0.0004	0.0008	0.0017	0.0027
$T1CAP_{t-1}$	0.1138	0.0901	0.1087	0.1302	0.0393
EBP_t	0.0064	0.0042	0.0063	0.0085	0.0045
ΔNPA_{t+1}	0.0006	-0.0001	0.0000	0.0016	0.0059
ΔNPA_t	0.0006	-0.0001	0.0000	0.0016	0.0058
ΔNPA_{t-1}	0.0006	-0.0001	0.0000	0.0016	0.0105
ΔNPA_{t-2}	0.0006	-0.0001	0.0000	0.0016	0.0055
$SIZE_{t-1}$	7.3617	6.2432	7.0018	8.1424	1.6433
$\Delta Loan_t$	0.0241	-0.0045	0.0163	0.0402	0.0559
ΔGDP_t	0.0231	0.0130	0.0260	0.0360	0.0274
$CSRET_t$	1.4394	0.9636	1.5259	1.7562	0.4775
$\Delta UNEMP_t$	0.0363	-0.1667	-0.0333	0.1333	0.3265
ALW_{t-1}	0.0155	0.0107	0.0136	0.0178	0.0083
CO_t	0.0014	0.0001	0.0005	0.0014	0.0025

Variable Definitions:

LLP: Loan loss provision (COMPUSTAT "pllq") scaled by lagged total loans (COMPUSTAT "lntalq").
T1CAP: Tier 1 capital ratio (COMPUSTAT "capr1q") divided by 100.
EBP: Earnings before provisions (COMPUSTAT "piq" + "pllq") divided by total loans (COMPUSTAT "lntalq").
Δ*NPA*: Change in non-performing assets (COMPUSTAT "naptq") divided by lagged total loans (COMPUSTAT "lntalq").
SIZE: The natural log of total assets (COMPUSTAT "atq").
Δ*Loan*: Change in total loans (COMPUSTAT "lntalq") divided by lagged total loans.
Δ*GDP*: Change in GDP over the quarter.
CSRET: The return on the Case-Shiller Real Estate Index over the quarter.
Δ*UNEMP*: Change in unemployment rates over the quarter.
ALW: Loan loss allowance (COMPUSTAT "rclq") divided by total loans (COMPUSTAT "lntalq").
CO: Net charge off (COMPUSTAT "ncoq") divided by lagged total loans (COMPUSTAT "lntalq").

Panel B: Pearson Correlations (and P-values)

Variables	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) LLP_t	–0.047	–0.182	0.137	0.229	0.163	0.249	0.110	–0.163	–0.187	0.040	0.237	0.381	0.767
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
(2) $T1CAP_{t-1}$		0.143	–0.005	–0.008	–0.013	–0.023	–0.189	0.094	0.002	0.067	–0.050	0.033	–0.062
		(0.001)	(0.320)	(0.150)	(0.017)	(0.001)	(0.001)	(0.001)	(0.843)	(0.001)	(0.001)	(0.001)	(0.001)
(3) EBP_t			–0.064	–0.091	–0.072	–0.108	0.289	0.149	0.201	–0.179	–0.154	–0.003	–0.173
			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.478)	(0.001)
(4) ΔNPA_{t+1}				0.148	0.119	0.123	0.005	0.011	–0.191	0.116	0.250	–0.127	0.014
				(0.001)	(0.001)	(0.001)	(0.365)	(0.052)	(0.001)	(0.001)	(0.001)	(0.001)	(0.011)
(5) ΔNPA_t					0.082	0.164	0.003	0.053	–0.191	0.106	0.242	–0.092	0.026
					(0.001)	(0.001)	(0.478)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
(6) ΔNPA_{t-1}						0.077	0.008	–0.038	–0.104	0.065	0.148	–0.008	0.112
						(0.001)	(0.129)	(0.001)	(0.001)	(0.001)	(0.001)	(0.122)	(0.001)
(7) ΔNPA_{t-2}							0.008	–0.076	–0.138	0.094	0.198	0.009	0.176
							(0.170)	(0.001)	(0.001)	(0.001)	(0.001)	(0.097)	(0.001)
(8) $SIZE_{t-1}$								–0.034	–0.024	0.061	0.013	0.137	0.125
								(0.0	(0.0	(0.0	(0.0	(0.0	(0.0

								01)	01)	01)	21)	01)	01)
(9) $\Delta Loan_t$									0.118	–0.051	–0.088	–0.179	–0.212
									(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
(10) ΔGDP_t										–0.286	–0.598	0.016	–0.108
										(0.001)	(0.001)	(0.003)	(0.001)
(11) $CSRET_t$											0.098	–0.121	0.005
											(0.001)	(0.001)	(0.378)
(12) $\Delta UNEMP_t$												–0.073	0.123
												(0.001)	(0.001)
(13) ALW_{t-1}													0.529
													(0.001)
(14) CO_t													

Table 3: Factor Analysis of Discretionary Provisions Measures

	Varimax Rotated Factor Pattern			Standardized Scoring Coefficients		
	Factor1	Factor2	Factor3	Factor1	Factor2	Factor3
Beaver and Engel, 1996	0.92*	0.21	0.30	0.365	-0.311	0.115
Kim and Kross, 1998	0.91*	0.32	0.24	0.327	-0.097	-0.076
Kanagaretnam et al., 2010	0.91*	0.31	0.25	0.333	-0.115	-0.063
Beck and Narayanmoorth, 2013	0.87*	0.36	0.19	0.305	0.030	-0.200
Wahlen, 1994	0.37	0.83*	0.40	-0.139	0.636	-0.285
Collins et al., 1995	0.39	0.76*	0.47	-0.110	0.459	-0.117
Beatty et al., 1995	0.37	0.83*	0.40	-0.136	0.645	-0.299
Liu and Ryan, 2006	0.29	0.46	0.83*	-0.106	-0.292	0.734
Bushman and Williams, 2012	0.29	0.40	0.86*	-0.092	-0.402	0.837
Eigenvalue	3.865	2.711	2.199			

Note: *represents values greater than 0.57. All models are described in Table 1.

Table 4: OLS Estimation of Determinants of Provision Models

	Model (a)	Model (b)	Model (c)	Model (d)
Variables	Coefficients (t-statistics)	Coefficients (t-statistics)	Coefficients (t-statistics)	Coefficients (t-statistics)
Intercept	0.0009 (5.02)***	-0.0012 (-7.64)***	0.0004 (5.44)***	0.0002 (3.09)***
ΔNPA_{t+1}	0.0241 (5.11)***	0.0428 (10.08)***	0.0337 (10.16)***	0.0348 (10.38)***
ΔNPA_t	0.0784 (14.65)***	0.0885 (17.65)***	0.0810 (20.12)***	0.0817 (20.25)***
ΔNPA_{t-1}	0.0281 (4.78)***	0.0269 (4.99)***	0.0114 (3.96)***	0.0116 (4.01)***
ΔNPA_{t-2}	0.0872 (17.74)***	0.0801 (17.95)***	0.0333 (10.30)***	0.0339 (10.38)***
$SIZE_{t-1}$	0.0002 (7.28)***	0.0001 (4.58)***	0.0000 (3.30)***	0.0000 (2.88)***
$\Delta Loan_t$	-0.0069 (-11.99)***	-0.0035 (-7.90)***	-0.0002 (-0.67)	-0.0001 (-0.32)
ΔGDP_t	-0.0045 (-6.70)***	-0.0013 (-1.96)*	-0.0013 (-2.65)***	-0.0011 (-2.31)**
$CSRET_t$	-0.0002 (-5.82)***	0.0001 (2.05)**	-0.0001 (-2.49)**	-0.0000 (-1.65)*
$\Delta UNEMP_t$	0.0008 (9.69)***	0.0012 (14.15)***	0.0005 (10.26)***	0.0005 (10.69)***
ALW_{t-1}		0.1346 (23.36)***		0.0093 (2.92)***
CO_t			0.8039 (65.40)***	0.7878 (58.18)***
R-Squared	0.1694	0.3166	0.6532	0.6537
N	33,205	33,205	33,205	33,205

Note: ***, **, and * represent 1%, 5% and 10% significance, respectively. Standard errors are clustered at the bank level.

Model (a): $LLP_t = \alpha_0 + \alpha_1 \Delta NPA_{t+1} + \alpha_2 \Delta NPA_t + \alpha_3 \Delta NPA_{t-1} + \alpha_4 \Delta NPA_{t-2} + \alpha_5 SIZE_{t-1} + \alpha_6 \Delta Loan_t + \alpha_7 \Delta GDP_t + \alpha_8 CSRET_t + \alpha_9 \Delta UNEMP_t + \varepsilon_t$

Model (b): $LLP_t = \alpha_0 + \alpha_1 \Delta NPA_{t+1} + \alpha_2 \Delta NPA_t + \alpha_3 \Delta NPA_{t-1} + \alpha_4 \Delta NPA_{t-2} + \alpha_5 SIZE_{t-1} + \alpha_6 \Delta Loan_t + \alpha_7 \Delta GDP_t + \alpha_8 CSRET_t + \alpha_9 \Delta UNEMP_t + \boldsymbol{\alpha_{10} ALW_{t-1}} + \varepsilon_t$

Model (c): $LLP_t = \alpha_0 + \alpha_1 \Delta NPA_{t+1} + \alpha_2 \Delta NPA_t + \alpha_3 \Delta NPA_{t-1} + \alpha_4 \Delta NPA_{t-2} + \alpha_5 SIZE_{t-1} + \alpha_6 \Delta Loan_t + \alpha_7 \Delta GDP_t + \alpha_8 CSRET_t + \alpha_9 \Delta UNEMP_t + \boldsymbol{\alpha_{10} CO_t} + \varepsilon_t$

Model (d): $LLP_t = \alpha_0 + \alpha_1 \Delta NPA_{t+1} + \alpha_2 \Delta NPA_t + \alpha_3 \Delta NPA_{t-1} + \alpha_4 \Delta NPA_{t-2} + \alpha_5 SIZE_{t-1} + \alpha_6 \Delta Loan_t + \alpha_7 \Delta GDP_t + \alpha_8 CSRET_t + \alpha_9 \Delta UNEMP_t + \boldsymbol{\alpha_{10} ALW_{t-1}} + \boldsymbol{\alpha_{11} CO_t} + \varepsilon_t$

Variable Definitions:

ALW: Loan loss allowance (COMPUSTAT "rclq") divided by total loans (COMPUSTAT "lntalq").
CO: Net charge off (COMPUSTAT "ncoq") divided by lagged total loans (COMPUSTAT "lntalq").
CSRET: The return on the Case-Shiller Real Estate Index over the quarter.
GBV: Common shareholders' equity (COMPUSTAT item "ceqq") plus loan loss allowance (COMPUSTAT "rclq").
LLP: Loan loss provision (COMPUSTAT "pllq") scaled by lagged total loans (COMPUSTAT "lntalq").
Loan: Total loans (COMPUSTAT "lntalq") divided by total assets (COMPUSTAT "atq").
NPA: Non-performing assets (COMPUSTAT "naptq") divided by lagged total loans (COMPUSTAT "lntalq").
SIZE: The natural log of total assets (COMPUSTAT "atq").
Δ*GDP*: Change in GDP over the quarter.
Δ*Loan*: Change in total loans (COMPUSTAT "lntalq") divided by lagged total loans.
Δ*NPA*: Change in non-performing assets (COMPUSTAT "naptq") divided by lagged total loans (COMPUSTAT "lntalq").
Δ*UNEMP*: Change in unemployment rates over the quarter.

Table 5: Logit Estimation of Restatements or SEC Comment Letters on Provision Residuals

Restatement or Comment Letter = $\alpha_0+\alpha_1 ARES +\varepsilon_t$

	Model (a)	Model (b)	Model (c)	Model (d)
	Coefficients (z-statistics)	Coefficients (z-statistics)	Coefficients (z-statistics)	Coefficients (z-statistics)
Intercept	-1.0540 (-9.74)***	-0.863 (-9.29)***	-0.550 (-7.12)***	-0.554 (-7.19)***
ARES	468.673 (7.23)***	374.73 (6.56)***	190.517 (3.30)***	196.253 (3.39)***
Number of Banks	1,394	1,394	1,394	1,394
Pseudo-R squared	0.0344	0.0256	0.0063	0.0067
Correct Prediction when *Restatement or Comment Letter* =1	120/570 =21.05%	93/570 =16.31%	20/570 =3.51%	21/570 =3.68%
Correct Prediction when *Restatement or Comment Letter* = 0	752/824 =91.26%	741/824 =89.92%	791/824 =95.99%	788/824 =95.63%

Note: ***, **, and * represent 1%, 5% and 10% significance, respectively. Dependent variable is an indicator variable for banks that have restated financial statements or received SEC comment letters from 1993 to 2012. *ARES* is defined as the average of absolute values of residuals from the following four models.

Model (a): $LLP_t= \alpha_0+\alpha_1\Delta NPA_{t+1}+ \alpha_2\Delta NPA_t+ \alpha_3\Delta NPA_{t-1}+ \alpha_4\Delta NPA_{t-2}+\alpha_5 SIZE_{t-1} + \alpha_6\Delta Loan_t +\alpha_7\Delta GDP_t+ \alpha_8 CSRET_t+ \alpha_9\Delta UNEMP_t+ \varepsilon_t$

Model (b): $LLP_t= \alpha_0+\alpha_1\Delta NPA_{t+1}+ \alpha_2\Delta NPA_t+ \alpha_3\Delta NPA_{t-1}+ \alpha_4\Delta NPA_{t-2}+\alpha_5 SIZE_{t-1} + \alpha_6\Delta Loan_t +\alpha_7\Delta GDP_t+ \alpha_8 CSRET_t+ \alpha_9\Delta UNEMP_t+ \boldsymbol{\alpha_{10} ALW_{t-1}} +\varepsilon_t$

Model (c): $LLP_t= \alpha_0+\alpha_1\Delta NPA_{t+1}+ \alpha_2\Delta NPA_t+ \alpha_3\Delta NPA_{t-1}+ \alpha_4\Delta NPA_{t-2}+\alpha_5 SIZE_{t-1} + \alpha_6\Delta Loan_t +\alpha_7\Delta GDP_t+ \alpha_8 CSRET_t+ \alpha_9\Delta UNEMP_t+ \boldsymbol{\alpha_{10} CO_t} +\varepsilon_t$

Model (d): $LLP_t= \alpha_0+\alpha_1\Delta NPA_{t+1}+ \alpha_2\Delta NPA_t+ \alpha_3\Delta NPA_{t-1}+ \alpha_4\Delta NPA_{t-2}+\alpha_5 SIZE_{t-1} + \alpha_6\Delta Loan_t +\alpha_7\Delta GDP_t+ \alpha_8 CSRET_t+ \alpha_9\Delta UNEMP_t+ \boldsymbol{\alpha_{10} ALW_{t-1}} +\boldsymbol{\alpha_{11} CO_t} +\varepsilon_t$

Variable Definitions:

ALW: Loan loss allowance (COMPUSTAT "rclq") divided by total loans (COMPUSTAT "lntalq").

CO: Net charge off (COMPUSTAT "ncoq") divided by lagged total loans (COMPUSTAT "lntalq").

CSRET: The return on the Case-Shiller Real Estate Index over the quarter.

GBV: Common shareholders' equity (COMPUSTAT item "ceqq") plus loan loss allowance (COMPUSTAT "rclq").
LLP: Loan loss provision (COMPUSTAT "pllq") scaled by lagged total loans (COMPUSTAT "lntalq").
Loan: Total loans (COMPUSTAT "lntalq") divided by total assets (COMPUSTAT "atq").
NPA: Non-performing assets (COMPUSTAT "naptq") divided by lagged total loans (COMPUSTAT "lntalq").
SIZE: The natural log of total assets (COMPUSTAT "atq").
Δ*GDP*: Change in GDP over the quarter.
Δ*Loan*: Change in total loans (COMPUSTAT "lntalq") divided by lagged total loans.
Δ*NPA*: Change in non-performing assets (COMPUSTAT "naptq") divided by lagged total loans (COMPUSTAT "lntalq").
Δ*UNEMP*: Change in unemployment rates over the quarter.

Glossary

Asset-Backed Commercial Paper– Asset-backed commercial paper (ABCP) is a short-term investment vehicle with a maturity that is typically between 90 and 180 days. The security itself is typically issued by a bank or other financial institution. These commercial papers are backed by physical assets such as trade receivables, and are generally used for short-term financing needs.

Bank for International Settlements (BIS) – the BIS, which was established May 17, 1930 making it the world's oldest international financial organization, is a bank for central banks. Its mission is to serve central banks in the pursuit of monetary and financial stability and to foster international cooperation. The head office of the BIS is in Basel, Switzerland.

Basel Committee on Bank Supervision (BCBS)-The BCBS was established by G-10 countries under the auspices of the Bank for International Settlements (BIS) in 1974 in Basel, Switzerland. The BCBS serves as a forum for its members to discuss issues and problems relating to bank regulation. The culmination of the BCBS' efforts resulted in the promulgation of an accord entitled "International Convergence of Capital Measurement and Capital Standards," which has since been known as the Basel Capital Accord.

Basel Capital Accord (BASEL) – a set of minimum capital requirements for banks which was passed in 1988 by the Group of Ten (G-10) countries. The focus of this first international capital agreement is on credit risk. It classifies bank assets into five categories and assigns risk weights to the asset classes ranging from zero to 100%. The act requires banks to hold a percentage of risk weighted assets in regulatory capital.

BASEL II – the second Basel Accord, which was published in June 2004. This accord updated the original Basel Accord to include alternative methods for calculating risk weighted assets and to introduce the concepts of supervisory review and market discipline. BASEL II was only required for the very largest U.S. banks that are internationally active. In December of 2007 when the final U.S. rules were adopted there were 9 core banks required to implement BASEL II.

BASEL III – the third Basel Accord was developed in response to financial regulation deficiencies that became apparent during the financial crisis. Basel III added a leverage ratio requirement, which was already required in the U.S. in conjunction with the original Basel Accord, and liquidity requirements. In addition, BASEL III increased the capital requirement as a percentage of risk weighted and added time-varying capital requirements.

Dodd-Frank Act – Dodd-Frank Act was signed into federal law by President Barack Obama on July 21, 2010, which was passed as a response to the late-2000s recession. It is legislation that increased government oversight of trading in complex financial instruments such as derivatives. It restricts the types of proprietary trading activities that financial institutions will be allowed to practice. This act arguably brought the most significant changes to financial regulation in the United States since the regulatory reform that followed the Great Depression and it made changes in the American financial regulatory environment that affect all federal financial regulatory agencies and almost every part of the nation's financial services industry.

Expected Loss Model – FASB issued an Exposure Draft on "Financial Instruments—Credit Losses" in December 2012 to remove the existing "probable" threshold in FAS 114 for recognizing credit losses and broaden the range of information that must be considered in measuring the allowance for expected credit losses. More specifically, the estimate of expected credit losses would be based on relevant information about past events, including historical loss experience with similar assets, current conditions, and reasonable and supportable forecasts that affect the expected collectability of the assets' remaining contractual cash flows.

Federal Deposit Insurance Corporation (FDIC) –The FDIC was created in 1933 as an independent agency created by the Banking Act of 1933 to maintain public confidence and encourage stability in the financial system through the promotion of sound banking practices.

Federal Reserve System (Federal Reserve or FED) – Federal Reserve System is the central banking system of the United States. It was created by the Congress to provide the nation with a safer, more flexible, and more stable monetary and financial system. The Federal Reserve was created on December 23, 1913. Today, the Federal Reserve's responsibilities includes 1) conducting the nation's monetary policy by influencing money and credit conditions in the economy, 2) supervising and regulating banks and other important financial institutions, 3) maintaining the stability of the financial system and containing systemic risk and 4) providing certain financial services to the U.S. government, U.S. financial institutions, and foreign official institutions. Its unique structure includes a federal government agency, the Board of Governors, in Washington, D.C., and 12 regional Reserve Banks.

FDIC deposit insurance – FDIC insurance covers all deposit accounts, including checking and savings accounts, money market deposit accounts and certificates of deposit. The standard insurance amount is $250,000 per depositor, per insured bank, for each account ownership category. On July 21, 2010, President Barack Obama signed the Dodd-Frank Wall Street Reform and Consumer Protection Act, which, in part, permanently raises the current standard maximum deposit insurance amount to $250,000 from previous $100,000.

FDICIA – the Federal Deposit Insurance Corporation Improvement Act of 1991 was designed to reduce taxpayers' exposure to losses when depositor institutions fail by improving the regulatory process. Specifically, FDICIA restricted regulatory discretion requiring prompt corrective actions designed to reduce regulatory forbearance.

Federal Reserve Discount Window –The Discount Window functions as a safety valve in relieving pressures in reserve markets; extensions of credit can help relieve liquidity strains in a depository institution and in the banking system as a whole. The Window also helps ensure the basic stability of the payment system more generally by supplying liquidity during times of systemic stress.

Implicit Guarantees (in securitizations) –An implicit guarantee is a non-contractual, guarantee (put option) to the special purpose entity capital providers that the sponsor-originator of an asset backed securitization will make good on some portion of the losses they might suffer not covered by other mechanisms.

Incurred Loss Model – Guided by FAS 114 that requires impairment and loan loss recognition when a loss is probable based on past events and conditions at the financial statement date. During the financial crisis the incurred loss model was criticized for delaying the recognition of losses and for not reflecting accurately credit losses that were expected to occur.

Mortgaged Backed Securities – Mortgage-backed securities (MBS) are debt obligations that represent claims to the cash flows from pools of mortgage loans, most commonly on residential property. Mortgage loans are purchased from banks, mortgage companies, and other originators and then assembled into pools by a governmental, quasi-governmental, or private entity. The entity then issues securities that represent claims on the principal and interest payments made by borrowers on the loans in the pool, a process known as securitization.

Mortgage Servicing Rights – A contractual agreement where the right, or rights, to service an existing mortgage are sold by the original lender to another party who specializes in the various functions of servicing mortgages. Common rights included are the right to collect mortgage payments monthly, set aside taxes and insurance premiums in escrow, and forward interest and principal to the mortgage lender.

National Banking Act – The National Bank Act of 1863 was designed to create a national banking system, float federal war loans, and establish a national currency. Congress passed the act to help resolve the financial crisis that emerged during the early days of the American Civil War (1861–1865).

Pro-cyclicality – A condition of positive correlation between the value of a good, a service or an economic indicator and the overall state of the economy or a pattern of positive reinforcement that intensifies fluctuations in a system.

Prompt Corrective Action – a supervisory framework linking enforcement actions closely to the level of capital held by a bank. This framework establishes a set of mandatory actions that regulator must take whenever a bank fails to maintain adequate capital. For adequately

capitalized banks these restriction include cash distributions that would result in undercapitalization. For undercapitalized banks these actions also include increased monitoring, restrictions as asset growth and submission of a capital restoration plan. Critically undercapitalized banks must be placed in receivership unless specific statutory requirements are met.

Retained Interest– In a typical asset backed securitization (ABS), a special purpose entity (SPE) is established by a sponsor, and the sponsor transfers assets to that entity. Regardless of whether the assets are mortgages, credit card debt, or any other type of holding, the SPE would typically issue debt securities with different layers of seniority. The most junior security debts issued are the retained interest. These are assets purchased or retained by the sponsor-originator that set up the SPE in the first place.

Securitizations – A process through which an issuer creates a financial instrument by combining other financial assets and then marketing different tiers of the repackaged instruments to investors. The process can encompass any type of financial asset. The process in theory can create liquidity by enabling smaller investors to purchase shares in a larger asset pool.

Tier 1 Capital – Tier 1 capital refers to the core capital that regulators use to measure financial health of a bank first defined by BASEL. Tier 1 capital includes common equity, perpetual preferred stock, minority interests and mandatory convertible instruments. Tier 1 capital ratio is defined as Tier 1 capital divided by risk-weighted assets detailed in Figure 4.

Tier 2 Capital – Tier 2 capital represents supplementary capital of a bank's capital base that regulators use as a bank financial health indicator. Tier 2 capital includes qualifying subordinated debt, redeemable preferred stock, and qualifying loan loss allowance and unrealized gains on available for sale securities. Total risk-based capital ratio is measured as the sum of capital of all tiers over risk weighted assets, as detailed in Figure 4.