

**Income Smoothing Behavior Among US Banks: a Comparison of  
Before and After Policy Change in 1999**

A Thesis Submitted to the College of

Graduate Studies and Research

In Partial Fulfillment of the Requirements

For the Degree of Master of Science in Finance

In the Department of Finance and Management Science

Edwards School of Business University of Saskatchewan

Saskatoon, Saskatchewan, Canada

By

Md Didarul Alam

## **Permission to Use**

In presenting this thesis in partial fulfillment of the requirements for a Postgraduate degree from the University of Saskatchewan, I agree that the Libraries of this University may make it freely available for inspection. I further agree that permission for copying of this thesis in any manner, in whole or in part, for scholarly purposes may be granted by the professor or professors who supervised my thesis work or, in their absence, by the Head of the Department or the Dean of the College in which my thesis work was done. It is understood that any copying, publication, or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of Saskatchewan in any scholarly use which may be made of any material in my thesis.

Requests for permission to copy or to make other uses of materials in this thesis in whole or part should be addressed to:

Head of the Department of Finance and Management Science  
Edwards School of Business  
University of Saskatchewan  
25 Campus Drive  
Saskatoon, Saskatchewan, Canada  
S7N 5A7

## **Abstract**

We investigate income smoothing behaviour for US bank holding companies. Our sample period covers from 1991 to 2013. We investigate whether policy change in late 90s affects income smoothing behaviour. Federal Financial Institutions Examination Council (FFIEC) introduced restrictive regulations to charge off of homogenous loans. We find that income smoothing continues even after the policy change but the association between provisioning and heterogeneous loans is not evident. However we get a significant positive association between provisioning and noninterest income. Moreover policy impacts in income smoothing process. The association between previous year charge off of homogenous loan and current year recovery was strong in 90s US financial institution. But after policy change, this relationship weakened. However, income smoothing avenue through previous year charge off of heterogeneous loan and current year recovery is still obvious. The association between current year recovery and gross loan charge off does not change for homogenous loan after policy change but this relationship for heterogeneous loan is stronger even after policy change.

**JEL Classification: G21**

**Key Words:** Income Smoothing; Policy change; Charge off; Recovery

## **Acknowledgements**

I would like to thank my supervisors Dr. Abdullah Mamun and Dr. George Tannous for their excellent guidance and support. Without their patient hearing of my thoughts and insightful feedback on my draft, this thesis would have been difficult to finish.

I would like to express my sincere gratitude to Dr. Abdullah Mamun and his family to make my life in Saskatoon very easy. I would like to give my heartfelt gratitude to Dr. Marie Racine for her support from the very beginning of this program to make my program smooth.

I would like to thank Dr. Min Maung, my committee member for his useful feedback. I also would like to thank Dr. Nancy Ursel for taking time to give me suggestions to improve my paper. I would like to thank all the faculty members of my department for their comments. These comments aid in improving my paper.

I would like to thank Harun Rashid and his family for their support. I would like to thank Abdullah Shahid to introduce me this resourceful program. Last but not least, I appreciate all the feedbacks and encouragement provided by my friends and classmates.

## Table of Contents

Permission to Use .....	i
Abstract .....	ii
Acknowledgements .....	iii
List of figures .....	vi
1.0 Introduction.....	1
2.0 Literature Review.....	3
2.1 Income Smoothing .....	3
2.2 Related GAAP regulations for loan loss allowance .....	9
2.3 Loan segregation and its association with loan loss provision.....	10
2.4 Charge off.....	10
2.4.1 Charge off and related regulations.....	12
2.5 Economic factors .....	13
2.6 Capital ratio .....	14
2.7 Size .....	14
2.7 Tax rate.....	15
2.8 Noninterest income .....	15
3.0 Hypotheses .....	16
4.0 Data and Variable Definition .....	20
5.0 Methodology .....	22
6.0 Empirical Results .....	26
6.1 Descriptive Statistics .....	26
6.2 Regression Results .....	27
Table 6.1: Descriptive Statistics of Dependent and Independent Variables: Before Policy Change Vs after Policy Change .....	31
Table 6.2: Correlation Matrix among variables-Before policy change (1991-1998).....	33
Table 6.3: Correlation Matrix among variables-after policy change (2001-2013) .....	34
Table 6.4: The effect of net interest income before provision for loan and lease losses on provision for loan and lease losses after policy change .....	35

Table 6.5: The effect of heterogeneous loan charge off and homogenous loan charge off on recovery after policy change .....	36
Table 6.6: The effect of recovery of heterogeneous loan and homogenous loan on gross loan charge off after policy change.....	37
7.0 Conclusion .....	38
References.....	40
Appendix.....	44

**List of figures**

Figure 6.1: NLCO of Homogenous loan and Heterogeneous loan before and after policy change ..... 32

Figure 6.2: Ratio of recovery to gross loan charge off of loan ..... 32

## **1.0 Introduction**

Income smoothing is a long standing empirical finding in different literatures (Greenwalt and Sinkey, 1988, Wahlen, 1994, Collins et al. 1995, Agarwal et al. 2007, and Ashraf et al. 2014). Banks smooth income to manage taxes and to stabilize the firm's performance. Smoothed earning is preferable to management and stakeholders of the firm than fluctuated earnings (Hepworth, 1953 and Beidleman, 1973). Firms utilize different income smoothing items (or techniques) to smooth earning (Hepworth, 1953; Barnea et al., 1976; Healy, 1985; Chaney and Lewis, 1995). Firms generally generate the accounting information by following Generally Accepted Accounting Principles. As financial institution is highly regulated industry, regulatory bodies always try to make regulations so that information from financial statement of banking industry carries credible information for analysts, investors and other concerned parties. These regulations impact the behaviour of the smoothing income. In 1990, the FDIC revised the capital requirement regulation. It initiated risk based capital requirement. This change impacts in earnings management (Ahmed et al. 1999). Loan loss reserve was a part of Tier I or primary capital before policy change for capital requirement in 1991. However, loan loss reserve after policy change became a part of Tier II capital and loan loss reserve can contribute maximum of 1.25% of risk-weighted assets in Tier II capital. As provision for loan loss was the primary part of the capital ratio before the policy change for capital requirement, this change in regulations reduces the earning management. The reason behind is that increase in loan loss reserve does not increase the primary capital under new capital requirement. On the other hand, in 1993, FDIC came up with new regulations under which banks, holding total asset more than 500 million, need to make an additional management report. In this report, banks are required to state management's responsibilities with the financial statements and to state that banks maintain adequate internal control and develop procedures for financial reporting. It is also required to give an assessment of the effectiveness of the internal control and to state that banks produce information that complies with all laws and regulations. This report needs to be signed by the CEO and the chief accounting or financial officer. Altamuro and Beatty (2010) find that these additional internal control regulations reduced earning management behaviour to banks, holding total assets more than \$500 million.



Liu and Ryan (2006) find that banks holding more homogenous loan, smooth income more in booming period of 90s. Banks charge off homogenous loan and they recover this charged off of homogenous loan in next year. One of the main arguments of Liu and Ryan's (2006) paper was that the inadequate rules for charge off of homogenous loan made it easy for banks to smooth income through charge off and recovery of homogenous loan. In 1999, FFIEC<sup>1</sup> addressed this issue by imposing more restrictions on charge off of homogenous loans. This study is an extension of Liu and Ryan's paper. We investigate how restrictions imposed by FFIEC in 1999 have affected the charge off of homogenous loan. We test the same mechanisms of income smoothing as Liu and Ryan's (2006), used over a much longer study period with a specific interest to the effect of policy change on income smoothing by banks. There are other studies in recent period such as Ahmed et al. (1999) and Altamuro and Beatty (2010) who have also investigated effect of accounting regulation change in US banking industry, however, none of the study to our knowledge has investigated the FFIECs policy change. Similar to these studies we use dummy variable methodology to capture the effect of policy change. We expect that income smoothing will continue even after the policy change. However, the mechanism, which was applied in the 90s to smooth income, might be weakened. With restrictive regulations for charge off of homogenous loan, we expect that association between heterogeneous loan and provision for loan and lease losses might be increased. We find that income smoothing continues even after policy change. We find that association between charge off of homogenous loan and subsequent year recovery is less after policy change. Our findings will contribute to existing income smoothing literature. It will give an idea to policy makers whether an intended effect was achieved after policy change.

The remainder of the thesis is organized as follows. Chapter 2 reviews literature regarding income smoothing, accounting regulations and relevant regulatory changes for charge off of loans. Chapter 3 discusses hypothesis development. Chapter 4 discusses data and variable definition and Chapter 5 discusses methodology. Chapter 6 analyses the results. Finally in Chapter 7, we give conclusion.

---

<sup>1</sup>FFIEC noticed the abnormal charge off and subsequent recovery by investigating Sun Trust Banks. In 90s booming period, Sun Trust Banks recovered almost 40% of previous year charge off. Sun Trust Banks recovered high percentage of charge off from 1993 to 1997 (Ryan, 2007).

## **2.0 Literature Review**

### **2.1 Income Smoothing**

Literature of income smoothing is evolved around few ideas. Earlier literature tries to focus on reasons of income smoothing and try to indicate the accounting choice or accounting items which are related with income smoothing. Hepworth (1953) posits that few major reasons contribute to income smoothening. At firm level, he argues that tax advantage is an important factor. Moreover, the owners and creditors would like to invest in a firm that shows stable performance. He also posits an explanation for income smoothing in aggregate economic level. When firms show bad figures i.e. low income in current year, it will create an expectation that the economy will be in stagnant position in future. From this point of view, he argues that income smoothing contributes to stabilize economy. He also mentions some accounting items which might be used to smooth income. Those are gross revenue manipulation, deferred charge (or charge off) and intangible asset accounting, inventory accounting, property accounting, and reserve accounting. He argues that these could be potential tools for smoothing income in line with regulatory requirements. However, some literature addresses this issue from the perspective of long standing tension between principles and agents. Gordon (1964) discusses different pros and cons about postulates and principles of accounting in this paper. He argues that corporation's performance is an important tool for stockholders satisfaction/dissatisfaction. Stockholders' satisfaction ensures growth of the income and job security of the management. He also argues that in the presence of a different owner and management, management will accept the accounting principles which will smooth income over the years. Lambert (1984) explores the income smoothing in line with principle-agent relationship. Here, he assumes that stockholder knows that management is going to smooth income. In this context, stockholder makes the contract in such a way which will motivate management to take stockholder's desired strategy. This is definitely not the best option. But this is optimal equilibrium behaviour in context of agency settings. He focuses on real smoothing rather than accounting smoothing in his study. He argues that management has an incentive to choose between production and investment decision in such a way that these decisions will help management to have expected utility i.e. bonuses and other benefits. Watts and Zimmerman (1990) advances that managers utilize accounting method either to increase the wealth of all related parties or to increase his wealth at the expense of other parties. Though they don't argue incomes smoothing explicitly, managers have the capability of selecting the accounting methods which will give favourable accounting numbers. Influence of

ownership structure of firm is documented in Kamin and Ronen (1978). They argue that separation of ownership and management has an influence in smoothing behaviour of the firm. They find that management controlled firms smooth income more than owner controlled firms do when entry barrier to the industry is high. On the other hand, in cases where is a low entry barrier to industry, owner controlled firm do the smoothing more than management controlled firm do.

This literature also discusses the ideal characteristics of smoothing variables. Copeland (1968) argues that all financial items are not qualified as smoothing items. He advances characteristics which are obvious in smoothing devices. Those are “A. Once used, it must not commit the firm to any particular future action. B. It must be based upon the exercise of professional judgement and be considered within the domain of “Generally Accepted Accounting Principles”. C. It must lead to material shifts relative to year-to-year differences in income. D. It must not require a “real” transaction with second parties, but only a reclassification of internal account balances. E. It must be used, singularly or in conjunction with other practices, over consecutive periods of time”. He also argues that smoothing device should not be obvious as auditors might qualify the annual report. In his paper, he finds that dividend from subsidiary company is used as a manipulative tool. He focus on different other instruments tools which are used to manipulate the income in long horizon. He contends that six year horizon is more valid to observe a firm smoother than two year horizons or four year horizons.

A very often cited definition of smoothing is given by Beidleman (1973) which mentions “Smoothing of reported earnings may be defined as the intentional dampening of fluctuations about some level of earnings that is currently considered to be normal for a firm”. He advances argument of income smoothing from the internal and external view of the firm. Management smooth earnings so that they can make plans and budgets, which will not fluctuate too much in the long run. It would be difficult to achieve fluctuating targets rather than to achieve smoothed targets. He also argues that the support for smoothing is deeply rooted in capital asset values. As investors observe the expected cash flow of a firm, the fluctuating cash flow will affect the firm’s value. Investors prefer steady expectation rather than fluctuating expectation. He also argues that smoothing helps security analysts as well. Security analysts can use earnings figure easily as they don’t need to normalize the earning figures if it is done by management. Analysts think that management normalization of the earning figures gives a better idea about the future of

the firm. He mentions different items of financial statements which could be arbitrarily used by management to smooth the income and his empirical evidence support it. He considers pension and retirement expense, incentive compensation, research and development expense, remitted earning from unconsolidated subsidiaries, sales and advertising expense, and plant retirements smoothing tool in his study. Beidleman's (1973) definition of income smoothing is borrowed by Barnea, Ronen and Sadan (1976) with a significant modification. They argue that the word "intentional" should not be in definition. They argue that this is not possible to judge the intentions of management with non-behavioural empirical design. They study four industries- paper, chemicals, rubber, and airlines. They argue that income smoothing can be done in different ways. Smoothing can be done recognizing events carefully, recognizing events' allocation in different time period or classifying intra items so that specific item could be smoothed. In this paper, they use extraordinary item as a tool to smooth (1) ordinary income before extraordinary items per share and (2) operating income before period charges and extraordinary items per share. They argue that investors pay attention to ordinary income and make forecast based on ordinary income. On the other hand, analyst and investors judge managerial performance based on operating income. They find that extraordinary item is used to smooth the ordinary and operating income series.

Firms employ the different income smoothing tools jointly to achieve firms' overall objectives (Hagerman and Zmijewski, 1981). According to this study firms do not take accounting policy choices individually. Firms employ different policies jointly to achieve overall firm's income target. Managers always face different conflicting objectives. To achieve those objectives, different types of variables are employed jointly in different combination. For example, firms have smoothing tools such as depreciation and inventory. Now firms can choose accounting policy to increase the income by choosing depreciation and to decrease income by choosing inventory.

Compensation of management is also considered in income smoothing literature. Healy (1985) argues that managers use total accruals to manage the income when their bonuses depend on the accounting numbers. However, Gaver, and Gaver (1995) argue that managers rely on discretionary accruals to smooth income rather than to achieve the bonus. They consider the accruals net of exogenous factors which determine the nondiscretionary part of accruals. Not only compensation plan but also other firm specific factors are taken into consideration (Moses,

1987). Moses argues that certain firm characteristics affect the smoothing. For example, he discusses the political cost. Firms with upward earnings could be the subject to regulatory scrutiny. This incurs cost for the firm. If any firm is powerful in market, this could lead the firm to face antitrust law. So to avoid this kind of unexpected situation, firms might smooth income. In this case, he argues that different accounting changes such as to switch to LIFO method, change in pension method, change in depreciation method, are associated with smoothing. He adds that smoothing is associated with size, bonus plan and expected earning of the firm.

Literature also addresses the consequences of income smoothing. Broadly, how market perceives income smoothing is addressed in this type of literature. Titman and Trueman (1988) posits that management smooths income to change the perception of the investors about the firm. So, investors perceive the firm less risky. Chaney and Lewis (1995) suggest that the earnings give a signal to the investors. Investors place a greater value in smoothed earnings rather than fluctuating earnings. Income smoothing, be it good or bad, carries information for the reader. They argue that management employ different accounting choices such as LIFO or FIFO method, depreciation method, investment tax credit etc. to smooth their income. High value firms use more income increasing accounting choices to make a stable look of the future earnings. Subramanyam (1996) finds that discretionary accrual carries information for the investors. Investors take it as private information. These discretionary accruals are priced by the market. This study is based on non-financial institutions. He argues that income smoothing conveys message for future earnings. So does discretionary accruals that convey future profitability. Michelson et al. (1995) find that firms that have tendency to smooth income incur less annualized return than firms that do not smooth income. Firms that smooth income have a lower beta and show a higher market value.

Above discussion addresses the issue of income smoothing in non-financial sector broadly. But income smoothing is evident in all sectors of economy. Belkaoui and Picur (1984) decompose the whole US economy into periphery and core industrial sectors. They find that core sector employs lesser degree of income smoothing than periphery sector does. Same stratification of economy is used in the study of Albrecht and Richardson (1990). They find that in every sector there are some firms which are smoothing income. They find that very large firms in periphery sector, based on sales, smooth income more than core sector does. However, overall analysis of

this study suggests that every sector of the economy smoothes income in even fashion. Financial institution falls into the core sector of their stratification.

Empirical investigation in financial sector gives an evidence of income smoothening. Greenwalt and Sinkey (1988) find income smoothing behaviour in US economy from 1976 to 1984. In this time period, they find significant relationship between earning and provision for loan losses. They also conclude that regional Bank Holding Companies (BHC) smooth income more than money-centre BHC do. Wahlen (1994) finds that provision for loan losses has two parts. One part is nondiscretionary part that is stemmed from the non-performing loans and to some extent from charge off of loans. Another part is the discretionary part of the provision. He advances the idea of provisioning from two perspectives. One is information based explanation and another one is capital based explanation. According to the information based explanation, unexpected part of the provisioning basically conveys the private information of the managers. He shows that unexpected provisioning (discretionary part) is positively associated with future cash flow. On the other hand, capital based explanation depends on the capital requirement of the regulatory authority. Collins et al. (1995) find support for smoothing earnings. This study uses security gain & loss, provision for loan losses to judge the earning management. Moreover, it explains that banks manage tax, capital and earning simultaneously. It finds that earnings have positive significant relationship with loan loss provisions. It concludes that smoothing behaviour depends on the ability and willingness of the banks. Ahmed et al. (1999) study income smoothing among banks after the changes regulations for the capital adequacy ratio in 1991 in US economy. Though this paper finds no relationship between the provision and earnings in their methodology, it shows significant relationship between loan loss provision and earning by following the Collins et al. (1995) methodology. Though Collins et al. (1995) uses the beginning year non-performing loan to estimate model for loan loss provision, Ahmed et al. (1999) does not use beginning year non-performing loan. Ahmed et al. (1995) obtains significant relationship between earning and provision for loan loss after incorporating the beginning year non-performing loan. Relationship between the market value and loan loss allowance is documented in Beaver and Engel (1996). This study tries to disentangle the discretionary and nondiscretionary part of the allowance for loan loss account. Nonperforming assets contribute to nondiscretionary part of the allowance account. On the other hand, profitability contributes to discretionary part of the allowance account. This study finds a significant positive relationship between earning and discretionary part of provisioning. On the other hand, Beatty et al. (1995)

explains that managers in banks make complicated decision about the tax planning, earnings management and capital requirement. In this study, they argue that managers need to make a trade off among tax planning, earning management and capital requirement. This paper considers the interdependence of these issues. It provides evidence that provisions are not used to smooth income.

Evidence of income smoothing is prevalent outside of US as well. Chen and Daley (1996) investigate the discretionary behaviour of management to manage capital adequacy, taxable income and earnings. They investigate this issue before significant changes in Canadian banking industry in 1987. Sample period for this study is from 1977-1987. They find that loan loss experience (LLE) and reserves are utilized to manage capital and that LLE is utilized to manage the tax though reserve does not influence in making tax decision. However, they do not find any income smoothing behaviour among the Canadian bank<sup>2</sup>. Agarwal et al. (2007) investigate the income smoothing behaviour in Japanese banks. This study segregates the economy in three different phases. Those are high growth (1985-1990), stagnant growth (1991-1996) and severe recession (1997-1999). The aim of this paper is to investigate Japanese banks' earning management behaviour in above mentioned three economic situations. This study uses 78 Japanese banks' balance sheet information. It argues that Japanese bank manage earnings by employing lending, securities gain, provisioning and dividend. It uses simultaneous equation methodology to address this endogeneity issue. It finds that management use securities gain to manage earning for all economic situations but management uses provision for loan loss to manage earnings in high growth and stagnant period. On the other hand, lending and dividend

---

<sup>2</sup> Hasan and Wall (2003) compare income smoothing between US banks and non-US banks. Their sample covers from 1993-2000. They regress the loan loss allowance on discretionary part (earnings & capital) and non-discretionary part (non-performing loan, net charge off, loans). They find presence of income smoothing in US banks. But they did not find any relationship between earning and loan loss allowance for Canadian banks. Fonseca and Gonzalez (2008) investigate income smoothing behaviour around the world. They observe this phenomenon for 40 countries. Their sample covers from 1995-2002. They try to incorporate the cross country determinants of income smoothing. They consider investor protection, disclosure, regulation and supervision, financial structure and financial development of different countries. At the very beginning of their study, they run a regression for earning on loan loss provisioning with other control variables for each country. They found no income smoothing in Canadian banks. On the other hand, they observe the difference between publicly and non-publicly traded banks. They create dummy variable PT which takes 1 if publicly traded and 0 otherwise. Then they interact the earning with PT to observe the difference between this two types of banks. For the limited number of publicly traded banks, they cannot observe this phenomenon for Canadian banks.

differed significantly on how they smooth income in different phases of economy. Anandarajan et al. (2007) observe Australian banks for the first time whether loan loss provision is used for capital management, earning management, and signalling theory. They observe this phenomenon before and after the implementation of Basel Accord of 1988. Sample period covers from 1991 to 2001 for 50 commercial banks. They find that bank management uses loan loss provision to manage capital and that this behaviour does not change after the policy change. Again, provision for loan losses is used to manage earning and this behaviour significantly increased after the policy change. However, provision for loan losses does not give any signal for higher earnings in Australian commercial banks. In a recent study, Ashraf et al (2014) find the income smoothing in global context. They try to observe whether income smoothing, capital management and earning signalling are different for pro-cyclical or dynamic provisioning. When economy is booming, banks make less provision and banks provision more in recessionary period. This phenomenon is known as pro-cyclical behaviour. On the other hand, when economy is in recession, banks make less provision but in booming period, banks make more provision. This phenomenon is known as dynamic provisioning. Moreover, they also observe whether income smoothing, capital management and earning signalling are different for rules based accounting and principles based accounting. Data covers from 1999 to 2010 for 118 countries. They utilize capital ratio, earning and lagged provision as explanatory variable. Moreover, they control country specific macroeconomic variables and legal framework of the country. They find that principles-based accounting generally shows lower level of earning management compared to rules-based accounting. On the other hand, dynamic provision makes bank to set aside more provision than pro-cyclical provisioning.

## **2.2 Related GAAP regulations for loan loss allowance**

Allowance for loan losses is guided by FAS No. 5 (FASB 1975) that is known as Accounting for Contingencies. This standard allows bank to accrue loan losses are probable and these losses can be reasonably estimated. An expense for incurred loss or estimated loss is recorded as provision for loan losses and an allowance for loan losses account is created for this. When any specific loan needs to be charged off, allowance for loan losses account and loan outstanding account are reduced for the same amount. If any charged off amount is collected from the consumers, this collection is known as recovery. Another regulation is FAS no. 114 (FASB 1993) that is known as Accounting by Creditors for Impairment of a loan. This provides more specific guidance regarding loan impairment and provides guideline for the related disclosure.



### **2.3 Loan segregation and its association with loan loss provision**

Loan loss provision and its relationship with loan composition are documented in Liu & Ryan (1995, 2006). They decomposed the loan composition of the banks into two categories. One is homogenous loan and another one is heterogeneous loan. The basis of their loan segregation is loan size and frequency of loan renegotiation. Homogenous loan implies that the clauses are the same for different types of customers such as consumer loans. For consumer loans, terms and conditions do not vary for different customers. Unlike consumer loans, industrial loans are approved on a loan by loan basis. Terms of loan are decided based on the negotiation between financial institution and borrowers. These kind of heterogeneous loans are renegotiated frequently based on how a loan performs. Provisions are determined differently for these two types of loan. For homogenous loan, statistical basis is used to determine how much provision will be made. Contrary, judgement is used to determine provision for the heterogeneous loan. Liu & Ryan (1995) argue that loan losses are more timely provisioned for the small and infrequently renegotiated loans than for the large and frequently renegotiated loans. They try to investigate the market reaction for the loan loss provision. They find that market reaction has positive association with the increased loan loss provision for the large and frequently renegotiated loan. They argue that market perceives it as good news if any increased provision is made for the heterogeneous loan. It works as a buffer for the unexpected loss of the company. However, Liu & Ryan (2006) observe a direct relationship between loan loss provision and loan composition. They argue that more profitable bank set aside provision more for the future unexpected loss in 1990's booming period of US economy. They find that loan loss provision has a strong association with homogenous loan.

### **2.4 Charge off**

Charge off is one of the several elements to determine the allowance for provision. If net charge off is high for any particular period, the bank management needs to make more provision to have a stable allowance for loan and lease losses account. In different income smoothing literatures, charge off is regarded as the control variable for the smoothing purpose. Wahlen (1994) argues that when any particular loans are deemed to be uncollectible, they are charged off. Different factors such as actions by Federal Reserve, bankruptcy proceedings determine how much will be charged off from the loan portfolio. He mentions that consumer loan are charged off based on a certain amount of days delinquent and that commercial loans involve to some extent judgement of the management. He considers the charge off as non-discretionary part. Again Beatty et al.

(1995) considers the charge off as partly non-discretionary part. The study argues that loan loss reserve will be driven by loan charge off. Kim and Kross (1998) argue that charge off is related with provision by construction of allowance account. Liu & Ryan (2006) study in the 90s economic boom, covers the period 1991-2000. The study uses US bank holding companies' data from Y-9C report. They investigate how banks keep stable their loan loss account with coordinated approach in 90s unique situation. They regress earnings and homogenous loan on provision to see the presence of income smoothing and association with homogenous loan. Then they regress lagged charge off on recovery to observe whether previous year charge off has any association with current year recovery. Next, they regress charge off on recovery and finally they regress earning on charge off of homogenous loan to observe the persistent income for next three years. They find that income smoothing is evident in more profitable banks and that more profitable banks holding more homogenous loan has greater association between provision and earning. They find that more profitable banks charges off of homogenous loan and this charge off is recovered at a higher rate in next year. They find that more profitable banks charge off more from current year recovery and that charging off more homogenous loan has an association between provision and next three years earning. In this study, Liu & Ryan (2006) consider charge off as a strategic tool that is used by management to smooth the income. No previous study before Liu & Ryan (2006) considers charge off as smoothing tool. Previous literatures always consider charge off as control variable. So charge off as a smoothing tool is a unique contribution of Liu and Ryan (2006). Liu and Ryan (2006) argue that charge off is used to smooth income in the booming period. They find that bank management smoothens the income during the 90s booming period. They conceal the smoothing using charge off. US banking industry during 90s charges off of loan in a year and recovers charged off loan in subsequent year, a mechanism which helps US bank management to make a stable allowance account. Liu and Ryan (2006) find that bank management charges off more from the homogenous loan. In 90s, consumer loan can be charged off from 180 days to 240 days window of delinquent in payment and bank management can change the charge off policy for default loan frequently as they need to do so. By using this flexibility, they choose a different charge off window to accelerate the charge off in different years. They find a significant association between provisioning and homogenous loan. Bank that charges off more homogenous loan this year recover more loans next year. Again Beck and Narayanamoorthy (2013) investigates the impact of SEC's (SAB 102) guidance on association between charge off and allowance for provision.

SAB 102 emphasizes on systematic methodology for loan loss allowance and on consistent application of this methodology and on documentation of the results of this methodology. This study covers sample period 1992 to 2008. It regresses charge off on allowance for provision. It finds that the association between past charge off and allowance has increased after the SEC's (SAB 102) guidance. This association is stronger for large banks and strong banks rather than for small banks and weak banks. The study segregates large and small bank based on median asset size. It differentiates the strong and weak bank based on median capital ratio (total equity scaled by total assets). It also finds that allowance carries more information for future loss after SAB's 102 guidance. Beck and Narayanmoorthy (2013) attribute their result to SEC's guidance (SAB 102). Keely and Ryan (2013) disagrees with Beck and Narayanamoorthy (2013). But utilizing the same data and same methodology, Keely and Ryan (2013) shows that primary driver for the association between allowance and charge off is consumer loan. They emphasize on the loan composition for this kind of association. Altamuro and Beatty (2010) investigates the impact of Federal Deposit Insurance Corporation Improvement Act of 1992 (FDICIA) on banks' reporting quality. This study covers sample period from 1986 to 2001. In this sample, 1986-1992 was the pre-regulation period and 1995 to 2001 was post-regulation period. It excludes 1993-1994 as this was the implementation period. FDICIA imposes extra internal control regulations for the banks, holding assets more than \$500 million. A difference –in-difference research design is applied in this analysis. It is found that the association between provision and next period charge off is stronger after the FDICIA-mandated internal control requirements for the banks, holding assets more than \$500 million. These studies suggest that charge off becomes a determinant factor of estimating allowance for loan and lease losses.

#### **2.4.1 Charge off and related regulations**

Change in charge-off regulation is very important for this paper as we test the implication of this on bank's income management. Charge off are done complying to regulations and following accounting standards of GAAP. Homogenous loan are charged off following the rules of Uniform Policy for Classification of Open-end and Closed-end Credit, which was enforced since 1980. FFIEC revised this regulation in 1999. After taking opinion from different regulatory bodies and banks holding companies regarding different sections of 1980 policy, FFIEC announces the final notice on February 10, 1999. FFIEC revised the policy for various reasons. Firstly, risk profiles of the open-end credit have changed substantially since 1980's policy.

However, 1980's policy was not comprehensive enough to incorporate these changes. For example, there was no specific classification for residential and home equity loan in the 1980 policy, while this residential and home equity loans consist of substantial amount of consumer loan. Secondly, banks could charge off these loans as needed between 120 days to 240 days once deemed as bad loans. Bank uses this option to charge off to smooth its income (Liu and Ryan, 2006). Thirdly, differing interpretations of the existing policy made the situation worse. Opinion differs among the financial institutions to charge off open end accounts by "the seventh zero billing cycle". All these concerns are addressed in the new regulations.

Sun Trust bank case is probably a good example of the irregularity in bank reporting of loan loss provision, its charge off and subsequent recovery. Sun Trust banks made large provision for loan losses. Liu & Ryan (2006) documented "In November 1998, the SEC required SunTrust Banks-which reported a high level of gross charge offs that it recovered at a rate close to 40 percent from 1993-1997 to reduce its allowance for loan losses by \$100 million". According to Keeley & Ryan (2013), Sun Trust bank was not an outlier for that time period in context of over-reserving. Moreover, SEC promulgated Staff Accounting Bulletin (SAB 102) in July 2001. On the same day, FFIEC came up with similar guidance for financial institution. SAB 102 emphasized on systematic methodology for loan loss allowance and on consistent application of this methodology and on documentation of the results of this methodology.

## **2.5 Economic factors**

Economic factors are responsible for the fluctuation of the quality of loan portfolio. When the economy is doing good; the expectation of the credit loss is very low. So there should be a negative relationship between the loan loss provisions and GDP growth. This is known as pro-cyclical behaviour. For example, Bikker & Hu (2002) utilizes sample period form 1979-1999 over 26 countries to investigate lending behaviour and provisioning across the countries. They find that in bad times of the economy, banks make more provision and good time they find banks to reverse the situation. But this pro-cyclical behaviour is mitigated by the discretionary behaviour of bank management. As in good times, bank make more profit, they set aside a portion of profit for the bad times. Bikker & Metzmakers (2005) investigates cyclical behaviour on provisioning. They consider 29 OECD countries over the period from 1991 to 2001. They find that when GDP rises, provisioning reduces. They also argue that pro-cyclicity is reduced by the "earning" effect. They attributed this earning effect to either income smoothing or dynamic provisioning. Literature shows that banks profit pro-cyclicity comes from economic

situation of the country. Albertazzi and Gambacorta (2009) investigates the relationship between bank profitability and business cycle by analysing the data for 10 countries over the period 1981-2003. They argue that banks profitability pro-cyclicality derives from net interest income, provisioning and that economic cycle exerts influence on profit by net interest income and provisioning primarily. They find that profit pro-cyclicality of economy is channelled through net interest income and loan loss provisioning.

## **2.6 Capital ratio**

Literature regarding the capital ratio should be analysed in the light of significant regulatory change in 1989. Before 1989, the capital ratio was calculated, broadly, shareholder's equity plus loan loss allowance divided the total assets. After 1989, capital is segregated into tier I capital and tier II capital; loan loss allowance is no more considered for primary capital which is the tier I capital after regulatory change. Loan loss allowance is now part of the tier II capital. Before regulatory change, bank can increase the capital ratio by increasing the loan loss allowance. But the consequence was that bank's profit reduced on increasing the loan loss provision. Regulatory change, however, makes the situation opposite. Now if the bank increases the loan loss allowance, profit and capital ratio both will be reduced. As loan loss allowance reduces the profit, the process implies the reduction of the retained earning that is a part of shareholders' equity. Moyer (1990) studies capital adequacy ratio before the regulatory change. He found a significant negative relation between loan loss provision and capital ratio among the bank with less than minimum regulatory requirement. Kim & Kross (1998) documented the change of the regulatory effect on capital management. They considered bank with low capital ratio and bank with high capital ratio. They found that the low capital ratio banks are reducing their loan loss provision after regulatory change. Same type of result is documented in Ahmed et al. (1999) about the regulatory impact on capital management.

## **2.7 Size**

Moyer (1994) argues that larger bank might face greater scrutiny from the regulatory body for larger profit. These banks bear political cost for not complying the rules and regulations. So these banks have incentive to reduce the earnings. She predicted a positive relationship between size and loan loss provision; but found a negative relationship between these two variables. Bishop (1996) offers "too big to fail" hypothesis which advocates that regulators are not inclined to intervene to activities of large bank, implying an insignificant coefficient for the relationship between size and provisioning. Kim and Kross (1998) conclude positive relationship between

size and provision. So empirical finding for the relationship between provisioning and size is ambiguous.

## **2.7 Tax rate**

Merz and Overesch (2014) investigate the tax sensitivity of multinational banks. They collect data from Bankscope Database over the period of 2001 to 2012. Their sample size consists of 2136 multinational banks groups located in 131 countries. They find that higher tax rate of host country will reduce the profit of the subsidiary banks. They also find that trading gains are more tax sensitive than other interest bearing activities. They find that host country's higher tax rate contribute to more provisioning for the banks.

## **2.8 Noninterest income**

DeYoung and Roland (2001) investigates whether fee based income increases the volatility in banks earnings. They observe this phenomenon among US commercial banks for a period from 1988 to 1995. They find that fee based income increases the earning variability for banks. Overall, the earnings of banks have increased when they engage in fee based income. DeYoung and Rice (2004) investigates the conditions that are conducive to generate noninterest income. Their sample includes urban US commercial banks over a period of 1989 to 2001. They find that large banks normally generate noninterest income. They also mention that noninterest income is associated with increased profit and more variability in profit. Mamun, Meier and Wilson (2012) observed the relationship between noninterest income and banking performance over a period from 2003 to 2012. They find that noninterest income increases bank performance. They also argue that noninterest activity does not worsen bank performance during the crisis. From the analysis, it can be shown that noninterest income is very important earning tool for the banking industry.

### 3.0 Hypotheses

Banks prefer to maintain a consistent level of loan loss allowance to avoid investigation from different regulators. Below is the general equation for loan loss allowance.

$$All_t = All_{t-1} + Pll_t + Rec_t - Glco_t \quad (3.1)$$

In equation 3.1,

All= Allowance for loan and lease losses

Pll= Provision for loan and lease losses

Rec= Recovery of charged off loans

Glco= Gross loan charge off

Here, if one year recovery or provision is higher, charge off should be higher as well to make the allowance stable. Banks smooth income prolonged horizon by utilizing the charge off (Liu and Ryan, 2006). Moreover, banks need to make continuous adjustment in charge off and recovery to avoid an unintended attention from regulatory authorities.

As discussed earlier, untimely provision for loan and lease losses reserve for above-median heterogeneous loan carries information for market (Liu and Ryan, 1995). This untimely recognition was a good news for the investors as it implies that bank management are making more provision using discretionary power to absorb the unexpected hit from economy. Liu and Ryan (1995) find this behaviour over a period of 1983 to 1991. However this behaviour have been changed in 90s economic boom as documented in Liu and Ryan (2006). It is found that homogenous loans are associated with loan loss provision for more profitable bank than heterogeneous loan are. During 90s booming period, US banking industry was utilizing a unique mechanism to smooth income, a mechanism which allows them to charge off more in current year and subsequently recover in next year (Liu and Ryan, 2006). After the Sun Trust Banks' case, new regulatory measures were imposed to provide more transparency in loan loss accounting. FFIFC comes up with the strict regulations in 1999, which addresses few concerns of the policy applied since 1980. These stricter regulations give bank management less incentive to charge off of homogenous loan. As a result, we expect that discretionary behaviour in provisioning might change after policy change in 1999. As provision for heterogeneous loan is made based on judgement, banks may focus on heterogeneous loan rather than on homogenous loan to continue their income smoothing process. As such, we hypothesize that:

*Hypothesis 1a:* Profitable BHC will continue to smooth income even after policy change.

*Hypothesis 1b:* After policy change in 1999, the association between provisioning and heterogeneous loans will be stronger for profitable BHC.

Another mention worthy issue is the banks' income source. Apart from traditional interest income, banks generate noninterest income. After Gramm-Leach-Bliley Act of 1999 (GLBA), banks are open for broad noninterest activities. DeYoung and Rice(2004) mention that over 40% of the operating income of the U.S. Commercial banking industry is generated from noninterest income in U.S. commercial banking industry. Moreover, DeYoung and Roland (2001) find that diversification of income in noninterest activities increases the earning volatility for the banks. So these kinds of noninterest income increase the riskiness of the bank. Therefore, the bank might build a safety buffer through provisioning. Based on this, we hypothesize that:

*Hypothesis 1c:* Provisioning will be associated with noninterest income for profitable BHC.

There were two important regulatory changes in very short period of time for US banking industry in late 90s and beginning of 2001, which might have an effect in charge off of different kind of loans. In 1999, FFIEC's policy regarding the charge off homogenous loan was not new. This policy made charge off of different types of homogenous loan stricter and this policy was comprehensive to capture changes in the riskiness of the consumer loans. The policy regarding charge off homogenous loan before the revised policy by FFIEC in 1999 was flexible. Before this change banks could charge off homogenous loans between the periods between 120 to 240 days. However, in revised policy, bank need to charge off open end credit at 180 days past due and closed-end credit at 120 days past due. After SunTrust Bank's case, FFIEC makes this proposal to restrict charge off of homogenous loan. It would be exaggeration to claim that this policy will stop the discretionary part of charge off of homogenous loan. But it could be expected that regulatory oversight will increase over charge off of homogenous loan after this policy change. We propose that:

*Hypothesis 2a:* Following the policy change in 1999 by FFIEC the lead lag relationship between charge off of homogenous loans in the past year and recovery in the current year is expected to be weakened.

In 2001, Securities and Exchange Commission (SEC) issues guideline for loan loss allowance methodology that is known as Staff Accounting Bulletin (SAB 102). FFIEC also comes up with similar kind of guideline in same time period. This regulation requires that loan loss allowance



be made systematic way, applied consistently and methodology have to be documented. Though this regulation is for all kinds of loan, heterogeneous loan might be affected more. In background information of SAB 102, it is mentioned that “Some registrants assured the staff that they had assessed significant loans individually for impairment, but could not produce documentation demonstrating how the loans were evaluated or how any loan impairment was measured. In other cases, registrants' internal documentation indicating that a particular loan was impaired could not be reconciled with management's ultimate decision not to provide for any loss on that loan. Several registrants that recorded loan loss allowances for pools of loans did not maintain documentation indicating how the amounts of the loan loss allowances were determined or how the amounts related to the composition of the loan pool at any particular balance sheet date.” So when regulatory authority is concerned with individual loans, it necessarily indicates that these guidelines will impose some restriction on making discretionary provisioning from heterogeneous loan. Moreover, Beck and Narayanamoorthy (2013) find that the association between allowance and future charge off is stronger after the guidance of SAB 102. So provisioning carries information for the future loss. Then future charge off carries less discretionary element than before the guidance of SAB 102. Based on this fact, we propose that:

*Hypothesis 2b:* Following the policy change in 2001 by SEC/FFIEC the lead lag relationship between charge off of heterogeneous loans in the past year and recovery in the current year is expected to be weakened.

As described earlier, banks have less incentive to make charge off of loan this year, which eventually recovers next year. It implies that regulation creates obstacles to smooth income by charge off. In this situation, banks might be in trouble if they recover more, making huge allowance account. Banks can make more charge off of in current year if banks recover unexpectedly to make the allowance account stable. Though it is counterintuitive with the previous hypothesis, it would be sheer exaggeration to claim that new policy will stop discretionary charge off completely. Bank management always has an option to charge off though new policy should weaken the abnormal charge off that was observed in 90s economic boom. Based on this situation, we expect that:

*Hypothesis 3a:* The policy change in 1999 by FFIEC strengthens the association between current year recovery from homogenous loan and current year gross loan charge off for profitable BHC.

*Hypothesis 3b:* The policy change in 2001 by SEC/FFIEC strengthens the association between current year recovery from heterogeneous loan and current year gross loan charge off for profitable BHC.

#### **4.0 Data and Variable Definition**

Though FFIEC gave final notice related with charge off on 10th February, 1999, the full implementation of this policy went into effect from 2000 due to flexibility given to changes in computer programming related to policy changes. It is possible that banks adopted this regulation in different years. Some banks might have implemented in year 1999 and others in year 2000. To avoid this noise, we have not considered the data for the year 1999 and 2000. So we consider before policy change regime is 1991-1998 and after policy change regime is 2001-2013. We consider only bank holding companies which hold asset more than 500 million. There are two reasons to choose BHCs who hold consolidated asset 500 million or more. FDICIA's internal control regulations are applicable for the banks which holds asset more than 500 million. Altamuro and Beatty (2010) find that this internal control regulation has improved the reporting quality of the financial statements. Greater association between provisions for loan losses and loan charge offs, persistence earning, reduced earning management, improvement in cash predictability are documented in Altamuro and Beatty (2010) for banks which are under internal control regulation of FDICIA. Moreover, we collect data from Fed Form FR Y-9C Regulatory filing database. Reporting obligations for BHC has changed various times. Before 2006, BHCs which hold total consolidated assets \$150 million or more need to report using FR Y-9C; after 2006, those which hold total consolidated assets \$500 million or more need to be reported. Based on internal control regulation and reporting requirement, we have considered only those banks which report consolidated assets \$500 million or more.

Another issue is that bank behaviour varies based on strong banks and weak banks. Different literatures define weak and strong based on capital ratios or earnings before provision or return on assets. Banking industry is differentiated based on size, growth or profitability, which is implied in Collins et al. (1995). Increase in loan loss provision is related positively with stock market return for only at risk bank, documented in Liu et al. (1997). Here, they define "at risk" banks which have below median primary capital ratio in sample size. Again Liu and Ryan (2006) find that more profitable banks, holding more homogeneous loan, are associated with income smoothening through loan loss provision during 90s booming period. Here, they define more profitable banks as banks that have above median return on assets. Narayanamoorthy and Beck (2013) find that allowance of strong bank has greater association with past charge-offs than those of weak bank. Here, they define weak and strong based on earnings and capital ratios. Consistent

with this literature we consider banks with above median profitability (measured by return on asset) in any given year we also windsorize data at .05% to address the outlier problem.

We follow Liu and Ryan (2006) in constructing our variables. They used annual frequency in their study. We collect quarterly data; for balance sheet item, we take last quarter's value and for income statement items, we take average of four quarters and multiply it by four to annualize the data. To track the economic boom and bust, we collect business cycle data from the National Bureau of Economic Research (NBER). All the variables used in this study are defined in appendix.

## 5.0 Methodology

As hypothesized, we posit that banks' provision for loan and lease losses is positively associated with income before provision for loan and lease losses. We also expect that this income smoothing behaviour is stronger for more profitable banks that hold more heterogeneous loan after policy change. As discussed, policy changes in 1999 leads us to hypothesize that provision for loan and lease losses should be more associated with heterogeneous loan. This expectation is opposite of what is observed by Liu and Ryan (2006). To test our conjecture we use a model very similar to the specification of Liu and Ryan (2006). We use dummy variable to identify the policy change. We interact the dummy variables and other variables to observe the effect of change after policy. Our sample period is much longer than any other study which captures several business cycles. Previous literatures find that economic condition impact bank profitability through provision for loan and lease losses. In our model, we use NBER's business cycle dummy to control economic condition. Moreover, we add net loan charge off and recovery in our model. As mentioned earlier, allowance for loan and lease losses is the function of provision for current year, charge off and recovery. So provision for loan and lease losses is not independent of loan charge off and recovery. It depends on how much loan charge off and recovery occurs in current year. Kim and Kross (1998) also include loan write off in their model to estimate the provision for loan and lease losses. They also include size in their model to control any kind of political bias. As we work with only the higher return generating banks, we don't do any interactions terms for more profitable banks as Liu and Ryan (2006) have done. As such the model is used to test the presence of income smoothing behaviour:

$$Pll_t = a + x_t + het\_per_t + policy + [x_t * policy] + [het\_per_t * policy] + cap1_t + dnpa_t + nlco_t + rec_t + size_t + rnoninter_t + contract_t(expans_t) + e_t \quad (5.1)$$

This above model is used to measure the effect of policy change. In this equation,  $Pll_t$  is the provision for loan and lease losses,  $x_t$  is the net income before provision for loan and lease losses,  $het\_per_t$  is the percentage of heterogeneous loan,  $policy$  is a dummy variable to capture policy change (it is 0 before the policy change and 1 after the policy change),  $cap1_t$  is the tier 1 capital ratio,  $dnpa_t$  is the changes in non-performing loans,  $nlco_t$  is the gross loan charge off net of recovery,  $rec_t$  is the recovery,  $size_t$  is the log of total assets,  $rnoninter_t$  is the noninterest income,  $contractt(expanst)$  is a dummy following the NBER business cycle to capture contraction (expansion) of the economy. As hypothesized, we expect test three main hypothesis using the above model after policy change. First, we expect positive association between both  $x_t$  and  $pll_t$ ,

indicating the presence of income smoothing behaviour. We also expect a positive association between  $[x_t * policy]$  and  $Plt_t$ , indicating the existence of income smoothing behaviour even after policy change. Second, we expect positive association between  $[het\_per_t * policy]$  and  $pllt_t$ , indicating that banks, holding more heterogeneous loans, have more incentive to smooth income after policy change. Third, we expect positive association between noninterest income ( $rnonintert$ ) and provisioning ( $Pllt$ ).

We expect other control variable will be consistent with previous literatures.  $Cap1$  should be negatively associated with provisioning as documented in Liu and Ryan (2006) and Ahmed et al. (1999). We expect a positive sign between charge off and provision for loan losses as charge off goes up, provisioning should increase to avoid regulators attention of ballooned allowance for loan and lease account. Kim and Kross (1998) uses loan write off in their model to estimate provision for loan and lease losses. As by construction, charge off should have a positive association with provisioning and negative association with recovery to make a stable allowance for loan and lease account. According to previous literature, we expect a positive sign for size of the banks.

The first model is used to judge the presence of income smoothing; the next two models are developed to substantiate the results of equation 1. As charge off policy from FFIEC gives less incentive for bank management to charge off of homogenous loan, we predict that charge off behaviour might shift to heterogeneous loans after policy change. The following model captures the continuous process of income smoothing to give allowance a stable look. Liu and Ryan (2006) use this model in prolonged 90s booming period. We have followed Liu and Ryan's (2006) model with few modifications

$$Rec_t = a + het\_per_{t-1} + policy + glco\_hom_{t-1} + glco\_het_{t-1} + [glco\_hom_{t-1} * policy] + [glco\_het_{t-1} * policy] + cap1_{t-1} + dnpa_t + dnpa_{t-1} + dnpa_{t-2} + dnpa_{t-3} + size_t + rnoninter_t + contract(expans)_t + e_t \quad (5.2)$$

In this equation,  $rec_t$  is the recovery of the charged off of loan,  $het\_per_t$  is the heterogeneous loan of the bank's loan composition,  $policy$  is a dummy variable to capture policy change,  $glco\_hom_{t-1}$  is the gross loan charge off of homogenous loan,  $glco\_het_{t-1}$  is the lagged gross loan charge off of heterogeneous loan,  $cap1_{t-1}$  is the lagged capital ratio,  $dnpa_t$  is the changes in non-performing loan,  $dnpa_{t-1}$  is the lagged changes in non-performing loan,  $dnpa_{t-2}$  is the two year lagged

changes in non-performing loan,  $dnpa_{t-3}$  is the three year lagged changes in non-performing loan,  $size_t$  is the log of total assets,  $rnoninter_t$  is the noninterest income,  $contract(expans)_t$  is a dummy following the NBER business cycle to capture contraction(expansion) of the economy. In this model, we predict that policy might have impact on charge off policy of bank management. Liu and Ryan (2006) find that previous year charged off is substantially recovered in current year. This behaviour was intensive for more profitable bank, holding more homogenous loan in 90s prolonged economic boom. New regulation for charge off policy has few significant changes. Banks could charge off of homogenous loan from 120 days to 240 days before the regulatory change. Under the new policy regime, banks need to charge off of open end credit within 180 days of past due payments and of closed end credit at 120 days of past due payments. Open end credit indicates a pre-approved loan between financial institution and borrower. The pre specified amount of loan must be paid off within specified date to continue the loan agreement. Credit card falls into this category. Closed end credit indicates a loan that is provided at the beginning of the loan agreement. But the principal amount and financing charge must be paid off within specified time. Auto loans fall into this category. This restriction makes it difficult for bank management to charge off homogenous loan arbitrarily, which eventually could be recovered next year. In this context, our conjecture is that bank management might have less incentive to charge off homogenous loan. So in this context, we expect after policy change loan charged off of homogenous loans might be reduced. The coefficient of  $[glco\_hom_{t-1}*policy]$  should be negative after policy change. However, Ryan (2007) also argues that in rapidly fluctuating economic conditions, loan officers might make mistakes to estimate the loan default for heterogeneous loan even though loan officers don't have any discretionary intention. We also expect that past charged off from heterogeneous loan might have negative and significant relationship with recoveries. It might be due to stricter regulations for documentation of the methodology of loan loss allowance account, implemented in 2001. We expect that policy in 2001 will effect more to provisioning of heterogeneous loan rather than that of homogenous loan. The coefficient  $[glco\_het_{t-1}*policy]$  should be negative. Similar to our previous model specification, we also control for economic condition and the size effect.

In next model, we will try to show that banks recovered more loan in current year, charge off more loan in current year to have a stable allowance account. This model captures a single year manipulation unlike dynamic income manipulation that can be captured in equation 2.

$$\begin{aligned}
Glco_t = & a + het\_per_t + policy + rec\_hom_t + rec\_het_t + [rec\_hom_t * policy] + \\
& [rec\_het_t * policy] + cap1_t + pll_t + all_t + dnpa_t + size_t + rnoninter_t + \\
& contract(expans)_{t-1} + e_t \qquad (5.3)
\end{aligned}$$

This model tests the association between recovery of different loan composition and gross loan charge off. We expect that recovery from heterogeneous loan will have an association with gross loan charge off even after policy change. Though policy might impact the lead lag relationship of the charge off and recovery, current year relationship between recovery and charge off should continue. As hypothesized in equation 1, banks will continue their smoothing behaviour. To do so, banks need to charge off if they recover more from different loan composition to keep allowance account stable. So the coefficient of  $[rec\_het_t * policy]$  and  $[rec\_het_t * policy]$  will be positive. We have also controlled the other factors as documented in Liu and Ryan (2006). Ryan (2007) argues that provision for loan losses is the estimation of credit losses. So when economy goes in recession, banks make more provision which might be defaulted in next year. He also mentions that charge off is the realization of the credit losses during the period. So charge off might be associated with the lagged economic conditions. So we used lagged economic indicators, creating dummy variable following business cycle defined by the National Bureau of Economic Research. We have controlled size of the bank to control the strength of the banks.



## 6.0 Empirical Results

### 6.1 Descriptive Statistics

Table 6.1 provides descriptive statistics of the variables used in this study for two sample period i.e. before policy change and after policy change. Average profit has declined from period 1991-1998 to 2001-2013 and the decrease (approximately 16%) of the profit is statistically significant. On average, Size of the banks between these two period reduced by almost 1%, which is statistically significant. Recessionary period after policy change might have contributed to shrink the size of the bank.

It is found that allowance for loan and lease losses has reduced by approximately 22%. Though economy has experienced bust and boom in the period 2001 to 2013, it is counter intuitive to have a reduced loan and lease losses allowance. Provision for loan and lease losses remains almost unchanged between these two periods. Overall, gross loan charge off also significantly declined by approximately 4%. But gross loan charge off of homogenous loan has decreased by approximately 5% while gross loan charge off of heterogeneous loan has not changed. Recovery, however, has reduced by almost 46%. Recovery from both homogenous and heterogeneous loan has decreased by approximately 41% and 54% respectively. Compared to period from 1991 to 1998, banks might have been cautious about gross loan charge off especially for homogenous loan. Gross loan charge off for homogenous loan reduces between these two periods, so does recovery of homogenous loan. This might have been due to strict regulations from bank authorities or strict oversight of existing banking regulations. However, the behaviour of gross loan charge off and recovery of heterogeneous loan is not same. Between these two time periods, the gross loan charge off of heterogeneous loan has not changed but the recovery of same loan has decreased. During 2001-2013, two recessionary periods (2001 and 2008-2009) might have had an impact on gross charge off of heterogeneous loan. Ryan (2007) has argued that in rapidly changing economic situation, banks' judgment for heterogeneous loan could be wrong. The situation of net loan charge off overtime is shown in figure 6.1. It is obvious that the net loan charge off from homogenous loan has been decreased after policy change. Moreover, in figure 6.2, it is found that ratio of recovery to gross loan charge off has reduced over the years.

Homogenous loan and heterogeneous loans show exact opposite trend before and after policy change. While homogenous loan decreases by approximately 37% between these two periods, heterogeneous loan increases by 23%. On the other hand, changes in non-performing loan have

increased by 220% between these two periods. Ryan (2007) argues that non-performing loan is better benchmark for future loan default of large, heterogeneous loan. So we can infer that increase in heterogeneous loan is contributing more in changes in non-performing loans. Two recessionary periods i.e. 2001 and 2008-2009 might have contributed to the non-performing loan. This non-performing loan might have impacted the provision for the period, which eventually causes to reduce the profit.

Correlation matrixes among variables are shown in table 6.2 and table 6.3 before policy change and after policy change respectively. There is no significant change in relationship among the variables before and after policy change.

## 6.2 Regression Results

Table 6.4 documents the fixed firm effect estimation of equation 5.1. As hypothesized, the coefficient of  $X_t$  is positive and significant in all different specifications, consistent with previous results documented in Wahlen (1994), Collins (1995), and Liu and Ryan (2006). But the interaction term between the  $X_t$  and *policy* ( $X\_policy$ ) is not significant. Which suggests the presence of income smoothing continues even after policy change. We expect that due to stricter policy on provisioning of homogenous loan, banks might have shifted to more provisioning through heterogeneous loans. Contrary to our expectation we find no change in association between percentage of heterogeneous loan and provision after policy change.

As hypothesized, we also find a significant association between noninterest income and provisioning<sup>3</sup>. This result is consistent with the idea of DeYoung and Roland (2001) and DeYoung and Rice (2004). As fee based income increases the variability of the earning, bank management may try to make cushion for this risk through provisioning.

We find,  $contract_t$  has a positive relationship with provision for loan and lease losses in column (1) and column (2).  $Expans_t$  has a negative relationship with provision for loan and lease losses in column (3) and column (4). This conforms the pro cyclical behaviour of provisioning, consistent to results of Bikker and Hu (2002) and Albertazzi and Gambacorta (2009). Other control variables are consistent with previous literature. Capital ratio has a significant negative association with provision for loan and lease losses, consistent with results of Moyer (1994) and Ahmed et al. (1999). Change in non-performing loan is significantly associated with provision for loan and lease losses, consistent with results of Ahmed et al (1999). Consistent with results of

---

<sup>3</sup> We observe this relationship between provisioning and noninterest income over the period of 2001 to 2013. This result holds for this subsample also.

Kim and Kross (1998),  $nlco_t$  has a significant positive association with provisioning. As expected, recovery ( $Rec_t$ ) has an opposite sign of net loan charge off.  $Size_t$  is negatively related with provision though statistically insignificant, consistent with results of Moyer (1994). Ryan (2007) argues that non-performing loan is better benchmark of credit losses for large and heterogeneous loan that might be charged off using judgement. So as economy goes through cycle non-performing asset should increase and decrease. One should expect higher nonperforming asset when the economy is in a contraction and opposite in expansion. As opposed to this expectation, we find insignificant results in column (2) and column (4) of table 6.4 for the interaction term  $dnpacontra$  (interaction between  $dnpa$  and  $contraction$ ) and  $dnpaexpan$  (interaction between  $dnpa$  and  $expansion$ ) respectively.

Though the literature shows a relationship between the tax rate and provisioning, we do not control for tax rate for few reasons. First, we use a year dummy in our study. So the variability of tax rate could be captured by the year dummy. Second, we control for the firm fixed effect. This control might capture the variation in tax rates among the firms. Third, Dyreng et al. (2014) observe that the effective tax rates have decreased over the last twenty five year periods from 1988-2012 U.S. They observe this phenomenon for a sample of 54,005 U. S firm-years. Therefore, the tax rate might have not impacted smoothing income as the effective tax rate has declined over a long time period.

From the first model (table 6.4), it is evident that income smoothing behaviour does not change even after policy change. But to substantiate this result we need to observe the other components of allowance for loan and lease losses. Those two models are discussed as follows.

Table 6.5 estimates firm fixed effects model of equation 5.2. We find that previous year charged off of homogenous loan is significantly associated with recovery, consistent with results of Liu and Ryan (2006). However, after policy change that association between previous year charged off homogenous loan ( $lglco\_hompolicy$ ) and recovery ( $rec$ ) has been reduced significantly. This is consistent with our expectation. After regulation changes by FDICIA in 1993 for banks holding total assets more than 500 million, Altamuro and Beatty (2010) find that current year provision for loan and lease losses have greater association with charged off of next year. This implies that provision is made for that part of loans which is more than likely to default. So the next year charged off of loans is not discretionary part. This charged off has little chance to recover in the following year. That is reflected in our findings. Weakening in association

between previous year charge off of homogenous loan and current year recovery after policy change is due to policy change, as discussed, for charge off of homogenous loan.

On the other hand, we find that previous year charge off of heterogeneous loan has a significant association with current year recovery, which is consistent with the Liu and Ryan (2006). But as opposed to our expectation, this association does not change after the policy change. This implies that FFIEC policy in 1999 has had an impact in charge off of homogenous loan which is essentially recovered in the next year. It also suggests that SEC/FFIEC policy in 2001 does not impact in the behaviour of charge off of heterogeneous loan. Though in 2001, SEC/FFIEC implements new documentation policy, banks still can use judgement to make provision and charge off of heterogeneous loan. All other variables used in table 6 have similar signs of Liu and Ryan (2006). We find a negative sign with economic contraction dummy (contract) though not significant. These results are consistent with descriptive statistics<sup>4</sup> in table 6.1.

Table 6.6 shows the firm fixed effects estimation of equation 5.3. We find that recovery from homogenous loan has a significant association with gross loan charge off, which is consistent with the results of Liu and Ryan (2006). But as opposed to expectation, this relationship does not change after policy change. Similarly, recovery from heterogeneous loan has a significant association with gross loan charge off. However, the interaction term between policy and recovery from heterogeneous loan is positive and significant. This result is consistent with our hypothesis that after policy change recovery from heterogeneous loan is associated with gross loan charge off. This result is different from what is observed by Liu and Ryan (2006) in terms of recovery of heterogeneous loan. They find no significant association with recovery of heterogeneous loan and gross loan charge off. It suggests that bank management has shifted its behaviour in income smoothing process after policy change. We find no significant change in

---

<sup>4</sup> We find that net loan charge off of homogenous loan has significantly declined after policy change. We can infer from analysis that the intended effect of policy change has been achieved. Policy has reduced the arbitrary rule of fast charge off policy among banks in 90s booming period. On the other hand, we find that net loan charge off of heterogeneous loan has increased after policy change. But this increment of charged off of heterogeneous loan does not show any association with recovery. It necessarily suggests that charged off of heterogeneous loan is not the discretionary behaviour of bank management but the reflection of economic conditions that force bank management to charge off of heterogeneous loan.

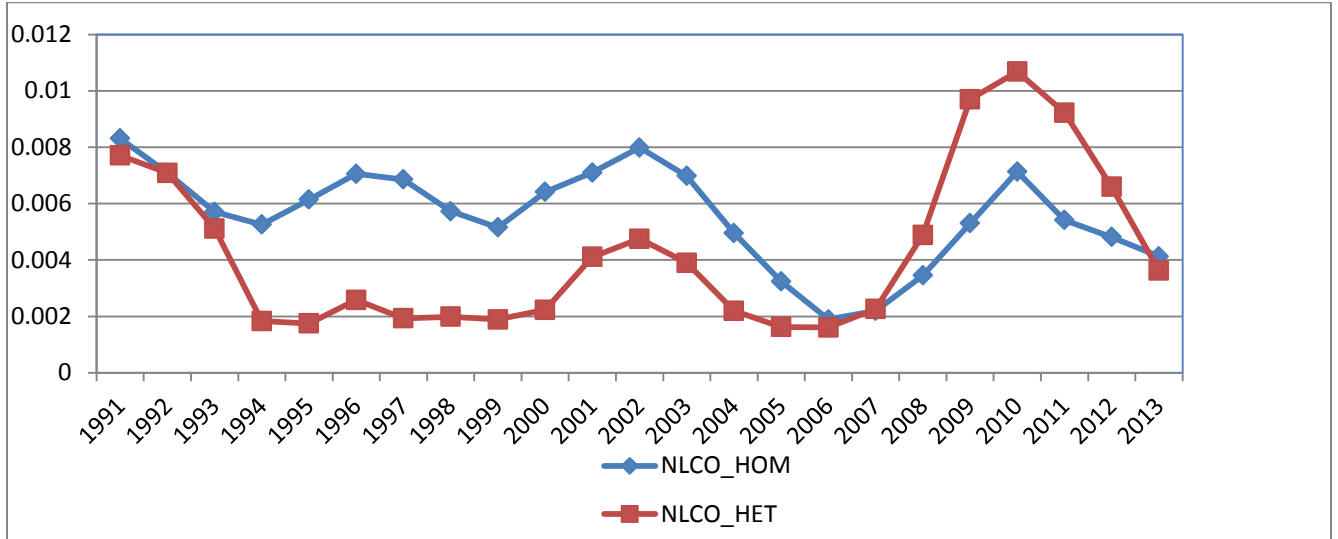
association between recovery of homogenous loan and gross loan charge off after policy change. Restrictive nature of the policy makes charge off of homogenous loan difficult. It implies that bank charges off that part of a loan that is essentially not recoverable. All other variables show consistent results with Liu and Ryan (2006) except capital (*cap1*).

**Table 6.1: Descriptive Statistics of Dependent and Independent Variables: Before Policy Change Vs after Policy Change**

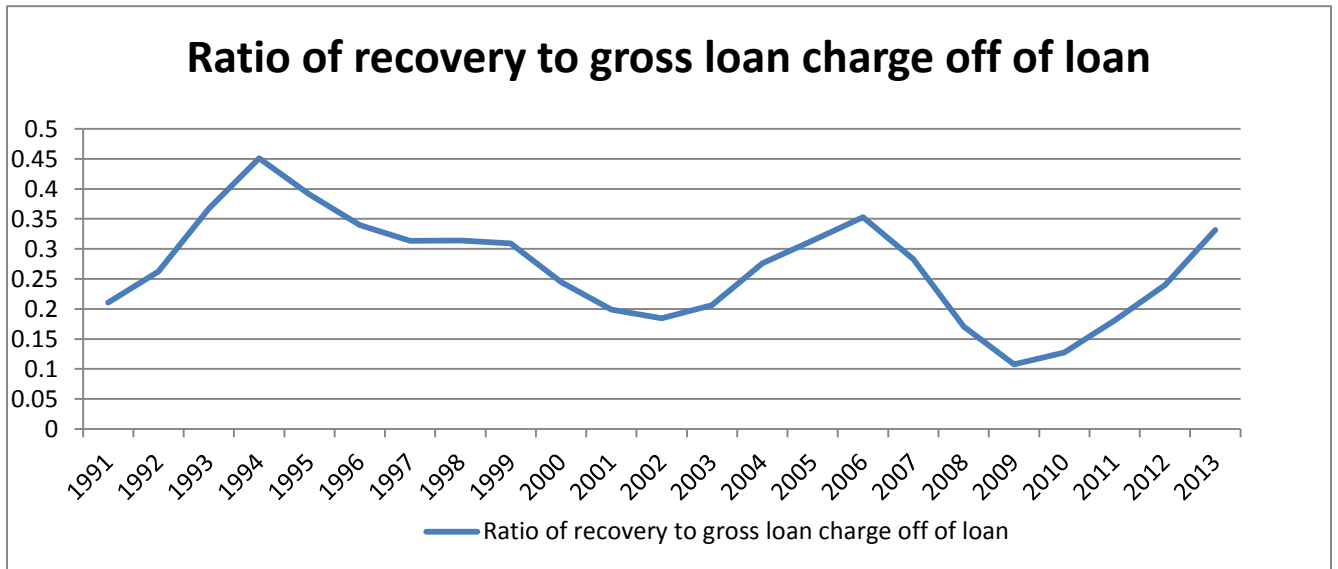
This table reports mean, median, minimum and maximum value of different variables that are used in different analysis of this study. In last column, t-statistics is given for the significance difference in the means for the two periods. “\*\*\*” indicates significance level at 0.01. X represents for provision for loan and lease losses. PLL represents for provision for loan and lease losses. GLCO stands for gross loan charge off. GLCO\_HOM stands for gross loan charge off homogenous loan. GLCO\_HET stands for gross loan charge off of heterogeneous loan. NLCO represents gross loan charge off net of recovery of charged off loan. NLCO\_HOM represents gross loan charge off of homogenous loan net of recovery of charged off homogenous loan. NLCO\_HET represents gross loan charge off of heterogeneous loan net of recovery of charged off heterogeneous loan. REC stands for recovery of charged off loan. REC\_HOM represents for recovery of charged off homogeneous loan. REC\_HET represents for recovery of charged off heterogeneous loan. ALL stands for allowance for loan and lease losses. DNPA represents changes in non-performing loan. HOM\_PER and HET\_PER defined in details sample and variable definition section. SIZE is the log of total assets. RNONINTER stands for noninterest income.

Variables	Before Policy Change(1991-1998)					After Policy Change(2001-2013)					t-statistics(Mean Difference)
	N	Mean	Sd	Min	Max	N	Mean	Sd	Min	Max	
X	1830	0.1159	0.0371	0.028	0.449	5248	0.0965	0.0265	0.014	0.501	20.6109***
PlI	1830	0.0129	0.0167	-0.055	0.176	5248	0.0127	0.0223	-0.029	0.556	0.4023
Glco	1830	0.0157	0.0182	0.000	0.170	5248	0.0132	0.0248	0.000	0.555	4.5781***
Glco_hom	1830	0.0087	0.0149	0.000	0.149	5248	0.0062	0.0219	0.000	0.555	5.4206***
Glco_het	1830	0.0064	0.0077	0.000	0.082	5248	0.0063	0.0083	0.000	0.092	0.4687
Nlco	1830	0.0107	0.0155	-0.039	0.155	5248	0.0105	0.0214	-0.013	0.494	0.4278
Nlco_hom	1830	0.0065	0.0128	-0.006	0.133	5248	0.0049	0.0186	-0.002	0.494	4.0581***
Nlco_het	1830	0.0038	0.0068	-0.034	0.057	5248	0.0051	0.0077	-0.012	0.088	-6.7984***
Rec	1830	0.0050	0.0058	0.000	0.073	5248	0.0027	0.0044	0.000	0.064	15.4814***
Rec_hom	1830	0.0022	0.0026	0.000	0.024	5248	0.0013	0.0033	0.000	0.064	11.8492***
Rec_het	1830	0.0026	0.0039	0.000	0.057	5248	0.0012	0.0021	0.000	0.034	14.6344***
All	1830	0.0214	0.0129	0.003	0.191	5248	0.0165	0.0086	0.002	0.200	15.1198***
Dnpa	1830	0.0005	0.0090	-0.040	0.117	5246	0.0016	0.0116	-0.114	0.128	-4.1602***
Hom_per	1830	0.5742	0.2843	0.000	2.993	5248	0.3607	0.2072	0.000	1.904	29.5085***
Het_per	1830	0.5819	0.3113	0.003	5.409	5248	0.7145	0.2486	0.006	2.361	-16.4811***
Size	1830	14.7164	1.3239	13.127	18.713	5248	14.4818	1.4186	13.125	21.024	6.4058***
Rnoninter	1830	0.1607	0.1079	0.020	0.861	5248	0.2036	0.1362	-0.010	0.970	-13.6368***
index	1830	0.1248	0.3643	-0.610	0.620	5248	-0.3540	0.6962	-1.910	0.330	37.2881***

**Figure 6.1: NLCO of Homogenous loan and Heterogeneous loan before and after policy change**



**Figure 6.2: Ratio of recovery to gross loan charge off of loan**



**Table 6.2: Correlation Matrix among variables-Before policy change (1991-1998)**

First table shows correlation matrix among the variables before policy change and second table shows correlation matrix among the variables after policy change. The symbols “\*\*\*”, “\*\*”, “\*” denote the statistical significance at the 1%, 5% and 10% levels, respectively. X represents for provision for loan and lease losses. PLL represents for provision for loan and lease losses. GLCO stands for gross loan charge off. LGLCO stands for lagged gross loan charge off. GLCO\_HOM stands for gross loan charge off homogenous loan. GLCO\_HET stands for gross loan charge off of heterogeneous loan. NLCO represents gross loan charge off net of recovery of charged off loan. NLCO\_HOM represents gross loan charge off of homogenous loan net of recovery of charged off homogenous loan. NLCO\_HET represents gross loan charge off of heterogeneous loan net of recovery of charged off heterogeneous loan. REC stands for recovery of charged off loan. REC\_HOM represents for recovery of charged off homogeneous loan. REC\_HET represents for recovery of charged off heterogeneous loan. ALL stands for allowance for loan and lease losses. DNPA represents changes in non-performing loan. RNONINTER stands for noninterest income.HOM\_PER and HET\_PER defined in details in appendix.

	x	pll	glco	lglco	glco_ho m	glco_het	nlco	nlco_ho m	nlco_het	rec	rec_hom	rec_het	all	dnpa	hom_per	het_per	Size
X	1																
PLL	0.51***	1															
Glco	0.51***	0.84***	1														
Lglco	0.33***	0.62***	0.77***	1													
glco_hom	0.51***	0.83***	0.89***	0.74***	1												
glco_het	0.12***	0.20***	0.41***	0.20***	-0.01	1											
Nlco	0.50***	0.89***	0.96***	0.71***	0.88***	0.37***	1										
nlco_hom	0.51***	0.85***	0.88***	0.72***	0.99***	-0.01	0.89***	1									
nlco_het	0.11***	0.31***	0.38***	0.15***	0.01	0.87***	0.45***	0.01	1								
Rec	0.30***	0.32***	0.61***	0.52***	0.51***	0.29***	0.40***	0.45***	-0.02	1							
rec_hom	0.43***	0.64***	0.77***	0.66***	0.84***	0.01	0.67***	0.78***	-0.02	0.66***	1						
rec_het	0.02	-0.18***	0.10***	0.14***	-0.05*	0.34***	-0.12***	-0.07***	-0.13***	0.65***	0.07***	1					
All	0.34***	0.31***	0.48***	0.35***	0.28***	0.44***	0.37***	0.28***	0.25***	0.63***	0.32***	0.42***	1				
Dnpa	0.27***	0.18***	0.16***	-0.06**	0.12***	0.07***	0.14***	0.13***	0.08***	0.24***	0.09***	-0.01	0.37***	1			
hom_per	0.38***	0.22***	0.26***	0.16***	0.36***	-0.12***	0.27***	0.35***	-0.07***	0.12***	0.35***	-0.12***	0.10***	0.26***	1		
het_per	0.16***	-0.15***	-0.12***	-0.22***	-0.30***	0.32***	-0.18***	-0.30***	0.20***	0.08***	-0.24***	0.26***	0.33***	0.26***	-0.38***	1	
Size	0.04*	0.21***	0.36***	0.35***	0.33***	0.15***	0.33***	0.32***	0.11***	0.25***	0.33***	0.11***	0.23***	0	0.14***	-0.08***	1
Rnoninter	-0.169** *	0.197** *	0.293** *	0.318** *	0.29***	0.02	0.25***	0.28***	-0.01	0.26***	0.32***	0.09***	0.15***	-0.03	0.04*	-0.13***	0.36** *



**Table 6.3: Correlation Matrix among variables-after policy change (2001-2013)**

First table shows correlation matrix among the variables after policy change and second table shows correlation matrix among the variables after policy change. The symbols “\*\*\*”, “\*\*”, “\*” denote the statistical significance at the 1%, 5% and 10% levels, respectively. X represents for provision for loan and lease losses. PLL represents for provision for loan and lease losses. GLCO stands for gross loan charge off. LGLCO stands for lagged gross loan charge off. GLCO\_HOM stands for gross loan charge off homogenous loan. GLCO\_HET stands for gross loan charge off of heterogeneous loan. NLCO represents gross loan charge off net of recovery of charged off loan. NLCO\_HOM represents gross loan charge off of homogenous loan net of recovery of charged off homogenous loan. NLCO\_HET represents gross loan charge off of heterogeneous loan net of recovery of charged off heterogeneous loan. REC stands for recovery of charged off loan. REC\_HOM represents for recovery of charged off homogeneous loan. REC\_HET represents for recovery of charged off heterogeneous loan. ALL stands for allowance for loan and lease losses. DNPA represents changes in non-performing loan. RNONINTER stands for noninterest income. HOM\_PER and HET\_PER defined in details in appendix.

	X	PLL	Glco	lglco	glco_ho m	glco_het	Nlco	nlco_ho m	nlco_het	Rec	rec_ho m	rec_het	All	Dnpa	hom_per	het_per	Size	
X	1																	
PLL	0.47***	1																
Glco	0.46***	0.90***	1															
Lglco	0.48***	0.72***	0.83***	1														
glco_ho m	0.53***	0.83***	0.90***	0.85***	1													
glco_het	-0.01	0.35***	0.42***	0.17***	0.04***	1												
Nlco	0.45***	0.92***	0.99***	0.80***	0.88***	0.44***	1											
nlco_ho m	0.53***	0.84***	0.90***	0.84***	0.99***	0.05***	0.89***	1										
nlco_het	-0.01	0.38***	0.41***	0.15***	0.05***	0.96***	0.45***	0.06***	1									
Rec	0.40***	0.54***	0.73***	0.71***	0.69***	0.22***	0.63***	0.65***	0.08***	1								
rec_hom	0.51***	0.69***	0.79***	0.80***	0.88***	0	0.74***	0.85***	0	0.79***	1							
rec_het	0.02	0	0.16***	0.13***	0	0.39***	0.07***	0	0.16***	0.56***	0.03**	1						
All	0.44***	0.65***	0.65***	0.56***	0.60***	0.28***	0.64***	0.61***	0.23***	0.55***	0.51***	0.25***	1					
Dnpa	0.06***	0.12***	-0.04***	-0.09***	-0.01	-0.04***	-0.02	-0.01	0	0.15***	-0.03**	-0.21***	0	1				
hom_per	0.09***	0.18***	0.22***	0.22***	0.32***	-0.15***	0.21***	0.31***	-0.14***	0.23***	0.36***	-0.09***	0.10***	0.03**	1			
het_per	0.16***	-	-0.25***	-0.24***	-0.30***	0.04***	-0.25***	-0.29***	0.01	0.21***	0.33***	0.09***	0	0.12**	-0.70***	1		
Size	-0.11***	0.13***	0.19***	0.17***	0.17***	0.12***	0.18***	0.17***	0.10***	0.19***	0.17***	0.11***	0.10***	0	0.26***	-0.22***	1	
Rnoninte r	-0.16***	0.21***	0.27***	0.26***	0.23***	0.07***	0.25***	0.23***	0.05***	0.29***	0.25***	0.10***	0.14***	-	0.06**	0.20***	-0.28***	0.36**

**Table 6.4: The effect of net interest income before provision for loan and lease losses on provision for loan and lease losses after policy change**

Dependent Variables	Provision for loan and lease losses			
	(1)	(2)	(3)	(4)
x	0.0526*** (2.76)	0.0525*** (2.78)	0.0526*** (2.76)	0.0525*** (2.78)
het_per	-0.00113 (-0.52)	-0.00114 (-0.52)	-0.00113 (-0.52)	-0.00114 (-0.52)
policy	-0.00376* (-1.80)	-0.00378* (-1.84)	-0.00376* (-1.80)	-0.00378* (-1.84)
x_policy	0.0126 (0.63)	0.0126 (0.63)	0.0126 (0.63)	0.0126 (0.63)
het_policy	0.000896 (0.42)	0.000907 (0.43)	0.000896 (0.42)	0.000907 (0.43)
cap1	-0.0423*** (-3.04)	-0.0422*** (-3.07)	-0.0423*** (-3.04)	-0.0422*** (-3.07)
dnpa	0.166*** (6.64)	0.167*** (5.55)	0.166*** (6.64)	0.164*** (4.35)
nlco	0.929*** (13.66)	0.929*** (13.64)	0.929*** (13.66)	0.929*** (13.64)
rec	-0.280*** (-2.96)	-0.280*** (-2.96)	-0.280*** (-2.96)	-0.280*** (-2.96)
size	0.00000835 (0.02)	0.0000107 (0.02)	0.00000835 (0.02)	0.0000107 (0.02)
rmoninter	0.0118*** (2.86)	0.0118*** (2.82)	0.0118*** (2.86)	0.0118*** (2.82)
contract	0.00311*** (8.87)	0.00312*** (8.62)		
dnpacontr		-0.00261 (-0.06)		
expans			-0.00311*** (-8.87)	-0.00312*** (-8.62)
dnpaexpan				0.00261 (0.06)
Constant	0.00296 (0.41)	0.00294 (0.41)	0.00607 (0.84)	0.00606 (0.84)
Observation	7076	7076	7076	7076
R <sup>2</sup>	0.8427	0.8427	0.8427	0.8427

1. Table 6.4 reports firm fixed effect regression, estimated for equation 5.1.
2. The symbols “\*\*\*”, “\*\*”, “\*” denote the statistical significance at the 1%, 5% and 10% levels, respectively and in parenthesis, white’s heteroscedasticity-adjusted t-statistics are shown.
3. “X” stands for net interest income before loan and lease losses. “Het\_per” stands for heterogeneous loan, explained in Appendix. “Policy” stands for dummy variable that takes 1 for the period from 2001 to 2013. “X\_policy” stands for interaction between “X” and “Policy”. “Het\_policy” stands for interaction between “Het\_per” and “Policy”. “Cap1” stands for tier 1 capital ratio. “Dnpa” stands for changes in non-performing loan. “Nlco” stands for gross loan charge off net of recovery. “Rec” stands for recovery of previous charged off loan. “Size” stands for log of total assets. “rmoninter” stands for noninterest income. “Contract” stands for dummy variable that takes 1 in recessionary period. In my sample, recessionary period is 2001, 2008, & 2009. “Dnpacontr” stands for interaction between “dnpa” and contract. “Expans” stands for dummy variable that takes 1 in expansionary period. Expansionary period is all the years except recessionary period. “Dnpaexpan” stands for interaction between “dnpa” and “Expans”.

**Table 6.5: The effect of heterogeneous loan charge off and homogenous loan charge off on recovery after policy change**

Dependent Variables	Recovery			
	(1)	(2)	(3)	(4)
lhet_per	0.00133 (0.96)	0.00161 (1.08)	0.00133 (0.96)	0.000449 (0.34)
policy	-0.000773* (-1.77)	-0.000830* (-1.85)	-0.000773* (-1.77)	-0.000830* (-1.85)
lglco_hom	0.0683*** (2.90)	0.0697*** (2.89)	0.0683*** (2.90)	0.0697*** (2.89)
lglco_het	0.166* (1.70)	0.162* (1.65)	0.166* (1.70)	0.162* (1.65)
lglco_hompolicy	-0.0574** (-1.97)	-0.0582** (-1.99)	-0.0574** (-1.97)	-0.0582** (-1.99)
lglco_hetpolicy	-0.0945 (-0.91)	-0.0898 (-0.86)	-0.0945 (-0.91)	-0.0898 (-0.86)
lcap1	0.00918 (1.01)	0.00911 (1.01)	0.00918 (1.01)	0.00911 (1.01)
dnpa	-0.0175 (-0.82)	-0.0169 (-0.79)	-0.0175 (-0.82)	-0.0169 (-0.79)
ldnpa	-0.00273 (-0.29)	-0.00264 (-0.28)	-0.00273 (-0.29)	-0.00264 (-0.28)
l2dnpa	-0.00763 (-0.42)	-0.00763 (-0.42)	-0.00763 (-0.42)	-0.00763 (-0.42)
l3dnpa	-0.00280 (-0.24)	-0.00266 (-0.23)	-0.00280 (-0.24)	-0.00266 (-0.23)
size	0.0000618 (0.14)	0.0000673 (0.16)	0.0000618 (0.14)	0.0000673 (0.16)
rnoninter	0.00397 (1.34)	0.00401 (1.34)	0.00397 (1.34)	0.00401 (1.34)
contract	-0.0000110 (-0.06)	0.000789 (1.06)		
lhet_contr		-0.00116 (-1.10)		
expans			0.0000110 (0.06)	-0.000789 (-1.06)
lhet_expan				0.00116 (1.10)
Constant	-0.000670 (-0.12)	-0.000890 (-0.16)	-0.000681 (-0.12)	-0.000101 (-0.02)
Observations	3606	3606	3606	3606
R <sup>2</sup>	0.2236	0.2255	0.2236	0.2255

1. Table 6.5 reports firm fixed effect regression, estimated for equation 5.2.
2. The symbols “\*\*\*”, “\*\*”, “\*” denote the statistical significance at the 1%, 5% and 10% levels, respectively and in parenthesis, white’s heteroscedasticity-adjusted t-statistics are shown.
3. “lhet\_per” stands for lagged variable of heterogeneous loan. “Policy” stands for dummy variable that takes 1 for the period from 2001 to 2013. “lglco\_hom” stands for lagged variable of gross loan charged off of homogenous loan. “lglco\_het” stands for lagged variable of gross loan charged off of heterogeneous loan. “lglco\_hompolicy” is the interaction between “lglco\_hom” and “policy”. “lglco\_hetpolicy” is the interaction between “lglco\_het” and “policy”. “lcap1” is the lagged variable of tier 1 capital ratio. “dnpa” stands for changes in non-performing loan. “ldnpa” stands for lagged variable of changes in non-performing loan. “l2dnpa” stands for two year lagged period variable of changes in non-performing loan. “l3dnpa” stands for three year lagged period variable of changes in non-performing loan. “Size” stands for log of total assets. “rnoninter” stands for noninterest income. “Contract” stands for dummy variable that takes 1 in recessionary period. In my sample, recessionary period is 2001, 2008, & 2009. “lhet\_contr” is the interaction between “lhet\_per” and “Contract”. “Expans” stands for dummy variable that takes 1 in expansionary period. Expansionary period is all the years except recessionary period. “lhet\_expan” is the interaction between “lhet\_per” and “Expans”.

**Table 6.6: The effect of recovery of heterogeneous loan and homogenous loan on gross loan charge off after policy change.**

Dependent Variables	Gross Loan Charge Off			
	(1)	(2)	(3)	(4)
het_per	-0.00373 (-1.18)	-0.00375 (-1.18)	-0.00373 (-1.18)	-0.00375 (-1.18)
policy	-0.000728 (-0.83)	-0.000678 (-0.77)	-0.000728 (-0.83)	-0.000678 (-0.77)
rec_hom	1.297*** (4.66)	1.297*** (4.66)	1.297*** (4.66)	1.297*** (4.66)
rec_het	1.039*** (5.40)	1.035*** (5.34)	1.039*** (5.40)	1.035*** (5.34)
rec_hompolicy	0.424 (1.18)	0.425 (1.19)	0.424 (1.18)	0.425 (1.19)
rec_hetpolicy	0.618* (1.87)	0.614* (1.85)	0.618* (1.87)	0.614* (1.85)
cap1	0.0372*** (4.25)	0.0370*** (4.18)	0.0372*** (4.25)	0.0370*** (4.18)
pll	0.712*** (19.70)	0.712*** (19.61)	0.712*** (19.70)	0.712*** (19.61)
lall	0.157*** (3.07)	0.158*** (3.11)	0.157*** (3.07)	0.158*** (3.11)
ldnpa	0.0267 (1.19)	0.0171 (0.71)	0.0267 (1.19)	0.0505 (1.21)
size	0.00146*** (2.62)	0.00142*** (2.58)	0.00146*** (2.62)	0.00142*** (2.58)
rnoninter	0.00239 (0.66)	0.00229 (0.63)	0.00239 (0.66)	0.00229 (0.63)
lcontr	0.000176 (0.53)	0.0000152 (0.05)		
ldnpa_lcon		0.0334 (0.76)		
lexpan			-0.000176 (-0.53)	-0.0000152 (-0.05)
ldnpa_lexp				-0.0334 (-0.76)
Constant	-0.0263*** (-4.25)	-0.0258*** (-4.20)	-0.0261*** (-4.27)	-0.0258*** (-4.23)
Observations	5622	5622	5622	5622
R <sup>2</sup>	0.8948	0.8951	0.8948	0.8951

1. Table 6.6 reports firm fixed effect regression, estimated for equation 5.3.
2. The symbols “\*\*\*”, “\*\*”, “\*” denote the statistical significance at the 1%, 5% and 10% levels, respectively and in parenthesis, white’s heteroscedasticity-adjusted t-statistics are shown.
3. “Het\_per” stands for heterogeneous loan, defined in appendix. “Policy” stands for dummy variable that takes 1 for the period from 2001 to 2013. “Rec\_hom” stands for recovery of charged off of homogenous loan. “Rec\_het” stands for recovery of charged off of heterogeneous loan. “Rec\_hompolicy” is the interaction between “Rec\_hom” and “policy”. “Rec\_hetpolicy” is the interaction between “Rec\_het” and “policy”. “Cap1” stands for tier 1 capital ratio. “Pll” stands for provision for loan and lease losses. “lall” is the lagged variable of allowance for loan and lease losses. “ldnpa” is the lagged variable of changes in non-performing loan. “Size” stands for log of total assets. “rnoninter” stands for noninterest income. “lcontr” is the lagged variable of “Contract” dummy variable. “ldnpa\_lcon” is the interaction between “ldnpa” and “lcontr”. “lexpan” is the lagged variable of “Expans” dummy variable. “ldnpa\_lexp” is the interaction between “ldnpa” and “lexpan”.

## **7.0 Conclusion**

Our objective is to observe the changes in US banking industry in terms of income smoothing and mechanism of income smoothing after the policy change. FFIEC implements a stricter policy in 1999. This policy makes it difficult to discretionary charge off of homogenous loan that was observed in 90s. This study finds out the impact of the policy in income smoothing mechanism that is observed in 90s and tries to find out whether this mechanism has shifted to other avenue. No previous study addresses the impact of FFIEC policy change in 1999. Bank regulators are always concerned about the allowance for loan and lease losses. Banks need to make a coordinated approach among the previous allowance, current year provision, charge off and recovery to have a stable ending allowance. In this paper we have used the equations developed by Liu and Ryan's (2006) with few changes. This study covers a period of 1991 to 2013 to observe the impact of the policy change.

We find that income smoothing continues after the policy change. Though we do not find any association between heterogeneous loans and provisioning, we find association between provisioning and noninterest income.

Restrictive regulations have influenced the income smoothing mechanism. The association between previous year charge off of homogenous loan and current year recovery has been weakened after policy change. Policy has addressed the concern of the changing phenomenon in late 90s regarding the charge off of homogenous loan. To some extent, policy achieves its intended objectives. Charge off from homogenous loan carries more reliable information now than before policy change as policy impacts the discretionary relationship between previous year charge off of homogenous loan and current year recovery. It necessarily implies that recovery from homogeneous loan is independent of previous year charge off of homogenous loan. Bank recovers from charge off of homogenous loan that is not advertently charged off in previous year. Banks' behaviour regarding the association between previous year charge off and current year recovery of heterogeneous loan does not change after policy change. Banks still charge off of heterogeneous loan to smooth income. It can be said that guideline for application of methodology and documentation of the methodology does not impact the behaviour regarding heterogeneous loan. It implies that regulations are not comprehensive enough to restrict the judgement that is used to provision the heterogeneous loan. Moreover, current year recovery of homogenous loan and gross loan charge off has not changed after policy change. However,

current year recovery of heterogeneous loan and gross loan charge off has increased after policy change.

Income smoothing process through loan loss allowance account is a coordinated approach. Lead lag relationship between charge off and recovery for homogenous loan has been weakened after policy change. On the other hand, that relationship for heterogeneous loan does not change after policy change. Moreover, association between current year recovery from heterogeneous loan and gross loan charge off has been stronger even after policy change. As FFIEC policy in 1999 restricts the smoothing mechanism through charge off and recovery of homogenous loan, it would be no exaggeration to posit that income smoothing mechanism has been shifting after policy change.

This study sheds light on policy change. So policymakers will get an idea on whether policy achieves its intended effect. They also get idea how the income smoothing mechanism might continue in future and what issues policymakers need to address to this changing phenomenon. Investors and analyst are always worried about the information they use for analysis. They might get more credible information about allowance, charge off, recovery, and provision now than before policy change. This study definitely contributes to income smoothing literatures of US banking industry.

This study is not without limitations. As mentioned earlier, we do not find any association between provisioning and heterogeneous loans though we expected so after policy change. So it necessarily means there are other forces which drive the income smoothing behaviour. Though we find an association between provisioning and noninterest income, it is not clear which component of noninterest income is basically contributing to the provisioning. Mamun, Meier and Wilson (2012) segregate the noninterest income in three broad categories. Those are stakeholder activity (SA), fee for service activity (FFS) and traditional fee income (TFI). If any future study sheds light on which component of noninterest income is basically the driving force for provisioning, interesting finding might be added to the income smoothing literature.

## References

- Albrecht, W., & Richardson, F. (1990, Winter). Income Smoothing by Economy Sector. *Journal of Business Finance and Accounting*, 17(5), 713-730.
- Michelson, S. E., Jordan-Wagner, J., & Wootton, C. W. (1995, December). A Market Based Analysis of Income Smoothing. *Journal of Business Finance & Accounting*, 22(8), 1179-1193.
- Agarwal, S., Chomsisengphet, S., Liu, C., & Rhee, S. (2007). Earnings management behaviors under different economic environments: Evidence from Japanese banks. *International Review of Economics and Finance*, 16, 429-443.
- Ahmed, A., Takeda, C., & Thomas, S. (1999). Bank loan loss provisions: a reexamination of capital management, earnings management and signaling effects. *Journal of Accounting and Economics*, 28, 1-25.
- Albertazzi, U., & Gambacorta, L. (2009). Bank Profitability And The Business Cycle. *Journal of Financial Stability*, 5, 393–409.
- Altamuro, J., & Beatty, A. (2010). How does internal control regulation affect financial reporting? *Journal of Accounting and Economics*, 49, 58–74.
- Anandarajan, A., Hasan, I., & McCarthy, C. (2007). Use of loan loss provisions for capital, earnings management and signalling by Australian banks. *Accounting and Finance*, 47, 357– 379.
- Ashraf, A., Hassan, M., & Putnam, K. (2014, September). The Effects of Prudential Regulatory Regimes and Accounting Standards on Earnings Management of Loan Loss Provisions in the Banking Industry.
- Barnea, A., Ronen, J., & Sadan, S. (1976, January). Classificatory Smoothing of Income with Extraordinary Items. *The Accounting Review*, 51(1), 110-122.
- Beatty, A., Chamberlain, S., & Magliolo, J. (1995, Autumn). Managing Financial Reports of Commercial Banks: The Influence of Taxes, Regulatory Capital, and Earnings. *Journal of Accounting Research*, 33(2), 231-261.
- Beaver, W., & Engel, E. (1996). Discretionary Behavior with Respect to Allowances for Loan Losses and the Behavior of Security Prices. *Journal of Accounting and Economics*, 22, 177-206.
- Beck, P., & Narayanamoorthy, G. (2013). Did the SEC Impact Banks' Loan Loss Reserve Policies and their Informativeness? *Journal of Accounting and Economics*, 56, 42-65.
- Beidleman, C. (1973). Income Smoothing: The Role of Management. *The Accounting Review*, 48(4), 653-667.

- Belkaoui, A., & Picur, R. D. (1984, Winter). The smoothing of Income Numbers: Some Empirical Evidence on Systematic Differences between Core and Periphery Industrial Sectors. *Jouranal of Business Finance & Accounting*, 11(4), 527-545.
- Bhat , G., Ryan, S., & Vyas , D. (2013, December). The Implications of Credit Risk Modelling for Banks' Loan Loss Provision Timeliness and Loan Origination Procyclicity.
- Bikker, J., & Hu, H. (2002, June). Cyclical Patterns in Profits, Provisioning And Lending of Banks And Procyclicity of The New Basel Capital Requirements. *BNL Quarterly Review*, 221, 143-175.
- Bikker, J., & Metzemakers, P. (2005). Bank Provisioning Behaviour And Procyclicity. *Int. Fin. Markets, Inst. and Money*, 15, 141-157.
- Bishop, M. (1996, June). Managing Bank regualtions through accruals. Working Paper. New York University, New York.
- Chen, P., & Daley, L. (1996, Spring). Regulatory Capital, Tax, and Earnings Management Effects on Loan Loss Accruals in the Canadian Industry. *Contemporary Accounting Research*, 13(1), 91-128.
- Collins, J. H., Shackelford, D., & Wahlen, J. (1995, Autumn). Bank Differences in the Coordination of Regulatory Capital, Earnings, and Taxes. *Journal of Accounting Research*, 33(2), 263-291.
- Copeland, R. (1968). Income Smoothing. *Journal of Accounting Research*, 6, 101-116.
- DeYoung, R., & Rice, T. (2004). Noninterest income and Financial Performance at U.S. Commercial Banks. *The Financial Review*, 39, 101-127.
- DeYoung, R., & Roland, K. (2001). Product Mix and Earning Volatility at Commercial Banks: Evidence from a Degree of Total Leverage Model. *Journal of Financial Intermediation*, 10, 54-84.
- Dyreng, S., Hanlon, M., Maydew, E., & Thornock, J. (2014, October). Changes in Corporate Effective Tax Rates Over the Past Twenty-Five Years. USA.
- Federal Financial Institutions Examination Council. (n.d.). Uniform Retail Credit Classification and Account Management Policy. Federal Register 64:6655-6659.
- Financial Accounting Standards Board(FASB). (1975, March). Accounting for Contingencies. Statement of Financial Accounting Standards No.5.
- Financial Accounting Standards Board(FASB). (1993, May). Accounting by Creditors for Impairment of a Loan. Statement of Financial Accounting Standards no. 114.



- Gaver, J. J., Gaver, K. M., & Austin, J. R. (1995). Additional evidence on bonus plans and income management. *Journal of Accounting and Economics*, 19, 3-28.
- Gordon, M. (1964, April). Postulates, Principles and Research in Accounting. *The Accounting Review*, 39(2), 251-263.
- Greenawalt, M. B., & Sinkey, J. J. (1988). Bank Loan-Loss Provisions and the Income-Smoothing Hypothesis: An Empirical Analysis, 1976-1984. *Journal of Financial Services Research*, 301-318.
- Hagerman, R., & Zmijewski, M. (1981). An income strategy approach to the positive theory of accounting standard setting/Choice. *Journal of Accounting and Economics*, 3, 129-149.
- Healy, P. M. (1985). The Effect of Bonus Schemes on Accounting Decisions. *Journal of Accounting and Economics*, 7, 85-107.
- Hepworth, S. R. (1953, January). Smoothing Periodic Income. *The Accounting Review*, 28(1), 32-39.
- Kamin, J., & Ronen, J. (1978). The Smoothing of Income Numbers: Some Empirical Evidence on Systematic Differences among Management-Controlled and Owner-Controlled Firms. *Accounting, Organizations and Society*, 3(2), 141-157.
- Keely, J., & Ryan, S. (2013). Discussion of "Did the SEC Impact Banks' Loan Loss Reserve Policies and Their Informativeness?". *Journal of Accounting and Economics*, 56, 66-78.
- Kim, M.-S., & Kross, W. (1998). The Impact of the 1989 Change in Bank Capital Standards on Loan Loss Provisions and Loan Write-Offs. *Journal of Accounting and Economics*, 25, 69-99.
- Lambert, R. (1984, October). Income Smoothing as Rational Equilibrium Behavior. *The Accounting Review*, 59(4), 604-618.
- Liu, C.-C., & Ryan, S. (1995, Spring). The Effect of Bank Loan Portfolio Composition on the Market Reaction to and Anticipation of Loan Loss Provisions. *Journal of Accounting Research*, 33(1), 77-94.
- Liu, C.-C., & Ryan, S. (2006). Income Smoothing over the Business Cycle: Changes in Banks' Coordinated Management of Provisions for Loan Losses and Loan Charge-Off's from the pre-1990 Bust to the 1990s Boom. *The Accounting Review*, 81(2), 421-441.
- Liu, C.-C., Ryan, S., & Wahlen, J. (1997). Differential Valuation Implication of Loan Loss Provisions across Banks and Fiscal Quarters. *The Accounting Review*, 72(1), 133-146.
- Mamun, A., Meier, G., & Wilson, C. (2012). How do Noninterest Income Activities Affect Bank Holding Company Performance? Saskatoon, Saskatchewan, Canada.

- Merz, J., & Overesch, M. (2014). Profit Shifting and Tax Response of Multinational Banks. Germany.
- Moses, O. D. (1987, April). Income Smoothing and Incentives: Empirical Tests Using Accounting Changes. *The Accounting Review*, 62(2).
- Moyer, S. (1990). Capital Adequacy Ratio Regulations and Accounting Choices in Commercial Banks. *Journal of Accounting and Economics*, 13, 123-154.
- Ryan, S. (2007). *Financial Instruments and Institutions*. New Jersey: Jhon Wiley & Sons, Inc.
- Subramanyam , K. R. (1996). The pricing of discretionary accruals. *Journal of Accounting and Economics*, 22, 249-281.
- Trueman, B., & Titman, S. (1988). An Explanation for Accounting Income Smoothing. *Journal of Accounting Research*, 26, 127-139.
- United States Securities and Exchange Commission. (2001). Staff Accounting Bulletin 102, Selected loan loss allowance methodology and documentation issues, Federal Register 66, 36457-36465.
- Watts, R. L., & Zimmerman, J. L. (1990, January). Positive Accounting Theory: A Ten Year Perspective. *The Accounting Review*, 65(1), 131-156.

## Appendix

### Variable construction

This appendix contains the definition of variables and related item code taken from FR Y-9C.

Variable Definition Table

Variable Name	Variable Definition	Item Code
ROA	Measured by net income over lagged total assets	(bhck4340/lbhck2170)
X	Measured by net interest income before provision for loan and lease losses over lagged total assets.	(bhck4074/lbhck2170)
PLL	Measured by provision for loan and lease losses over lagged total loan and lease financing receivables	(bhck4230/lbhck2122)
ALL	Measured by allowance for loan and lease losses over lagged total loan and lease financing receivables	(bhck3123/lbhck2122)
Hom_per	Homogenous loan consists of secured by 1-4 family residential properties , loans to depository institutions and acceptances of other banks, loans to individuals for household, family, and other personal expenditures. This homogenous loan is scaled by lagged total loan and lease financing receivables.	
	1991-1995	(bhdm1797+bhdm5367+bhdm5368+bhck2008+bhck2011)/lbhck2122

1996-2000	(bhdm1797+bhdm5367+bhdm5368+ bhck1292+bhck1755+bhck1296+ bhck2008+bhck2011)/lbhck2122
2001-2010	(bhdm1797+bhdm5367+bhdm5368+ bhck1292+bhck1296+ bhckb538+bhckb539+bhck2011)/lbhck212 2
2011-2013	(bhdm1797+bhdm5367+bhdm5368+ bhck1292+bhck1296+ bhckB538+bhckB539+bhckK137+bhckK2 07)/lbhck2122

Het\_per Heterogeneous loan consists of real estate loan (construction, land development, and other land loans, secured by farmland, secured by multifamily (5 or more) residential properties, secured by nonfarm nonresidential properties), loans to finance agricultural production and other loans to farmers, commercial and industrial loans, and lease financing receivables. These heterogeneous loans are scaled by lagged total loan and lease financing receivables.

1991-2006	(bhdm1415+bhdm1420+ bhdm1460+bhdm1480+ bhck1590+ bhck1763+bhck1764+ bhck2081+ bhck2182+bhck2183)/lbhck2122
-----------	---

	2007	(bhdm1415+bhdm1420+ bhdm1460+bhdm1480+ bhck1590+ bhck1763+bhck1764+ bhck2081+ bhckf162+bhckf163)/lbhck2122
	2008-2013	(bhckf158+bhckf159+bhdm1420+ bhdm1460+bhckf160+bhckf161+ bhck1590+ bhck1763+bhck1764+ bhck2081+ bhckf162+bhckf163)/lbhck2122
GLCO	Measured by Charge offs on loans and leases over lagged total loan and lease financing receivables	bhck4635/lbhck2122
GLCO_hom	Measured by charge off of respective homogenous loan defined before in Hom_per over lagged total loans and lease financing receivables.	
	1991-2000	(bhck5411+bhck5413+ bhck4653+bhck4654+ bhck4656+bhck4657)/lbhck2122
	2001	(bhck5411+bhck5413+ bhck4653+bhck4654+ bhckb514+bhckb516)/lbhck2122
	2002-2010	(bhck5411+bhckc234+bhckc235+ bhck4653+bhck4654+ bhckb514+bhckb516)/lbhck2122
	2011-2013	(bhck5411+bhckc234+bhckc235+ bhck4653+bhck4654+ bhckb514+bhckk129+bhckk205)/lbhck212

GLCO_het	<p>Measured by charge off of  respective heterogeneous loan  defined before in Het_per  (heterogeneous loan) over  lagged total loans and lease  financing receivables.</p>	
	1991-2000	(bhck3582+bhck3584+bhck3588+bhck3590+ bhck4655+ bhck4645+bhck4646+ bhck4643+ bhck4658+bhck4659)/lbhck2122
	2001-2006	(Bhck3582+bhck3584+bhck3588+bhck3590+bhckb513+ Bhck4655+ Bhck4645+bhck4646+ Bhck4643+ Bhck4658+bhck4659)/lbhck2122
	2007	(Bhck3582+bhck3584+bhck3588+bhck3590+bhckb513+ Bhck4655+ Bhck4645+bhck4646+ Bhck4643+ Bhckf185+bhckc880)/lbhck2122
	2008-2013	(bhckc891+bhckc893+bhck3584+bhck3588+bhckc895+bhckc897+bhckb512+ bhck4655+ bhck4645+bhck4646+ bhck4643+ bhckf185+bhckc880)/lbhck2122
Rec	<p>Measured by total recovery over  lagged total loans and lease  financing receivables</p>	bhck4605/lbhck2122
Rec_hom	<p>Measured by Recovery of  respective homogenous loan  defined before in Hom_per over  lagged total loans and lease  financing receivables</p>	
	1991-2000	(bhck5412+bhck5414+

	$\frac{\text{bhck4663}+\text{bhck4664}+\text{bhck4666}+\text{bhck4667}}{\text{lbhck2122}}$
2001	$\frac{(\text{bhck5412}+\text{bhck5414}+\text{bhck4663}+\text{bhck4664}+\text{bhckb515}+\text{bhckb517})}{\text{lbhck2122}}$
2002-2010	$\frac{(\text{bhck5412}+\text{bhckc217}+\text{bhckc218}+\text{bhck4663}+\text{bhck4664}+\text{bhckb515}+\text{bhckb517})}{\text{lbhck2122}}$
2011-2013	$\frac{(\text{bhck5412}+\text{bhckc217}+\text{bhckc218}+\text{bhck4663}+\text{bhck4664}+\text{bhckb515}+\text{bhckk133}+\text{bhckk206})}{\text{lbchck212}}$
	2

Rec\_het Measured by Recovery of respective heterogenous loan defined before in Het\_per (heterogeneous loan) over lagged total loans and lease financing receivables

1991-2000	$\frac{(\text{bhck3583}+\text{bhck3585}+\text{bhck3589}+\text{bhck3591}+\text{bhck4665}+\text{bhck4617}+\text{bhck4618}+\text{bhck4627}+\text{Bhck4668}+\text{bhck4669})}{\text{lbhck2122}}$
2001-2006	$\frac{(\text{Bhck3583}+\text{bhck3585}+\text{bhck3589}+\text{bhck3591}+\text{bhckb513}+\text{Bhck4665}+\text{Bhck4617}+\text{bhck4618}+\text{Bhck4627}+\text{Bhck4668}+\text{bhck4669})}{\text{lbhck2122}}$
2007	$\frac{(\text{bhck3583}+\text{bhck3585}+\text{bhck3589}+\text{bhck3591}+\text{bhckb513}+\text{bhck4665}+\text{bhck4617}+\text{bhck4618}+\text{bhck4627}+\text{bhckf187}+\text{bhckf188})}{\text{lbhck2122}}$
2008-2013	$\frac{(\text{bhckc892}+\text{bhckc894}+\text{bhck3585}+\text{bhck3589}+\text{bhckc896}+\text{bhckc898}+\text{bhckb513}+\text{bhckc892}+\text{bhckc894}+\text{bhck3585}+\text{bhck3589}+\text{bhckc896}+\text{bhckc898}+\text{bhckb513}+\text{bhckc892}+\text{bhckc894}+\text{bhck3585}+\text{bhck3589}+\text{bhckc896}+\text{bhckc898}+\text{bhckb513})}{\text{lbhck2122}}$

		bhck4665+ bhck4617+bhck4618+ bhck4627+ bhckf187+bhckf188)/lbhck2122
NLCO	Measured by gross loan charge off net of recovery, scaled by lagged total loans and lease financing receivables	(GLCO-REC)
NLCO_hom	Measured by gross loan charge off of homogenous loan net of recovery from homogenous loan, scaled by lagged total loan and lease financing receivables.	(GLCO_hom-REC_hom)
NLCO_het	Measured by gross loan charge off of heterogeneous loan net of recovery from heterogeneous loan, scaled by lagged total loan and lease financing receivables.	(GLCO_het-REC_het)
Dnpa	Non-performing asset consists of past due 90 days or more and still accruing and nonaccrual assets. Change in non-performing asset is measured by last year non-performing loans subtracted from this year non-performing loans, scaled by lagged total loan and lease financing receivables.	(bhck5525+bhck5526-lbhck5525-lbhck5526)/lbhck2122
Cap1	Measured by tier 1 capital over total risk weighted assets from 1996 to 2013. Proxy for this	



variable is measured by total equity over lagged total asset for the period from 1991 to 1995.

1991-1995 (bhck3210/lbhck2170)

1996-2013 (bhck8274/bhcka223)

Size	Measured by log of total assets.	Log(bhck2170)
Rnoninter	Measured by total noninterest income over total income	(bhck4079/bhck4107+bhck4079)
Contract	Measured based on business cycle defined by the National Bureau of Research. Contractionary (Contract) period is 2001, 2008 and 2009.	
Expans	Measured based on business cycle defined by the National Bureau of Research. Expansionary (Expans) period is all period except the periods defined in Contract variable.	

---