Discretions over Security Investments in U.S. Banking Industry

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Abstract of Dissertation Presented to the Graduate School
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Abstract:

This study examines U.S. banks' investment behaviors as well as their financial reporting decisions on debt security investments. Particularly, I focus on two separate but related issues. The first issue examined is whether and how managerial incentives, influenced by the compensation contracts, affect managers' investment decisions on debt securities in the U.S. banking industry. Using a sample composed of top 1,000 bank holding companies from 2001 to 2009, I find that managers, when their wealth is more sensitive to stock return volatility, tend to structure the firms' debt investments with a higher proportion of credit risky securities. Provided that price of credit risky debt securities slumped during the recent financial crisis, that empirical evidence is consistent with the view that managerial compensation may induce excess risk-taking in the U.S. banking industry. The finding is relevant to both researchers and practitioners when they consider restructuring bankers' compensation.

Given the investment decisions made by the managers, the second issue studied in this thesis is the financial reporting decisions made by banks. To elaborate, banks have discretions to classify the debt securities into available-for-sale (AFS) category vs. trading category depending on the purpose of the holding, while the classification decisions have very different impacts on firms' income statement. Therefore, I study how accounting treatments of AFS and trading category and their different impacts on firms' income statements affect reporting decisions. I find banks inclined to classify credit-riskier securities into AFS rather than into trading category, when banks have weak interest revenues, have high level of income-increasing discretional accruals, have concentrated assets, or have high level of risky assets. But I do not find classification decision is related to bank's capital adequacy ratio.

As long as one security is classified into AFS category, I document that banks strategically time the recognitions of gains and losses on AFS securities to smooth earnings, to meet earnings targets, to reduce regulatory costs, or to facilitate seasonal equity offering. These evidences collaborate with my previous results that banks prefer classifying credit risky securities into AFS rather than into trading category.

Finally, I investigate market reactions to fair value changes on AFS securities and to trading revenues from trading assets. I show that trading revenues are more persistent, with greater value relevance, and drive more significant stock returns. This evidence indicates that artificially classifying securities which are held for trading purpose into AFS category may have negative impacts on firm values.

Keywords: Bank holding companies; debt security investments; managerial compensation; trading assets; available-for-sale; SFAS 115; gains trading

摘要

本文研究了美國銀行對債券資产组合的投資決策和財務報告行為。第一個研究問題是，經理人報酬是否影響了銀行對債券資產的投資決策。通過對美國在 2001 到 2009 年間最大的 1000 家銀行控股公司的實證研究，我發現，當經理人由於股票期權而有較高動機提高公司整體經營活動風險時，他們會購買違約風險較高的債券。我們知道，在 2008 年金融危機期間，這類債券的市價出現大幅下跌。本文的發現和銀行家的薪酬機制導致銀行參與了過高風險業務的普遍看法相一致。這個發現對考慮改革銀行的薪酬體制有借鑒作用。

本文的第二個研究對象是經理人購入債券之後所作的一個重要會計決策：是將其歸入“交易性金融資產”還是“可供出售的金融資產”。這個會計決策會對會計結果有重大影響。如果劃分為“可供出售的金融資產”，則公允價值變動不會影響當期利潤和資本充足率。反之，如果劃分為“交易性金融資產”，公允價值變動會直接影響當期利潤和資本充足率。我發現，當銀行的利息收入較低，在以前會計期間計提的貸款減值準備不足，資產風險較高，資產集中時，銀行傾向於將高風險的債券歸入可供出售的金融資產類別。我沒有發現銀行的資本充足率會影響分類決策。

在債券被歸入“可供出售的金融資產”類別后，公允價值變化會累積在一個特殊權益項目中。銀行會根據需要選擇性的出售債券，將那些累積的公允價值變化計入當期利潤。我發現當銀行有動機去平滑利潤，達到某個目標，降低監管風險，或者幫助近期的資本性融資時，實現的以前會計期間的累積公允價值變動會按照銀行的意願變動。這個結果進一步說明為何銀行在有動機控制利潤時將債券歸類到“可供出售的金融資產”中去。

最後，我研究了市場對來自“交易性金融資產”和“可供出售的金融資產”的公允价值变动的反应。我发现“交易性金融资产”产生的收益有更高的持久性，更强的价值相关性，而且导致更高的股价波动。可能的原因是兩者反應了不同的業務特性。同時這也說明，將本來用作交易用途的債券劃分成“可供出售的金融資產”可能會降低市場對公司的估值。

關鍵詞：銀行控股公司；債券投資；經理人報酬；“交易性金融資產”；“可供出售的金融資產”；財務會計準則 115 號；尋利性交易

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Chapter 1. Introduction

After the savings and loan crisis in late 1980s and early 1990s, the U.S. banks have quite a long period of golden time, until 2007. During years from 1994 to 2006, banks on average maintain a 2 to 3% quarterly ROE, but it starts to go south in year 2007 (Figure A.1 in Appendix A). From 1994 to 2006, the percentage of loss banks never exceeds 5%. However, by the end of 2009, this figure rises to a stunning 40% (Figure A.2). In year 2008, 25 banks go bankrupt, a number close to the sum of bankruptcies incurred in the previous seven years. In 2009, this number becomes extremely high as 140 (Figure A.3).

The financial crisis in year 2008 is triggered by the burst of the U.S. housing bubble. Before 2006, housing price has kept increasing for about ten years in U.S.. The story that housing price won't decrease is popular. People bought houses with high leverage. Banks financed them, even to people who cannot afford the house if housing price decreases. Furthermore, over-lending problem of a few banks is introduced into the banking system through securitization of loans (e.g. the securitization of mortgage loans), which could spread the credit risks to banks who do not pursue an over-lending strategy. Indeed, banks that heavily invest in the credit-risky debt securities (e.g. non-agency mortgage backed securities) suffer most during the crisis period.

Although the banking industry as whole has suffered, we do observe some cross-sectional variations on banks' balance sheets, indicating different investment decisions made by banks. Why are some banks involved deeper in risky investments while others are less so? A usual suspect is the managerial compensation contracting sometimes distorts the investment incentives of the CEOs in banks.

As it is often seen in the newspapers, bankers' compensation has raised many

eyebrows in the U.S. As a result, the Obama administration starts to reform the compensation practices across the financial-service industries after the 2008 crisis. In Europe, The Financial Services Authority has put out a new remuneration code that enforces restrictions on the managerial compensations in banks.

Nonetheless, however strong the public sentiment to change banks' compensation structure, empirical evidences in the literature do not lend direct support to the view that certain compensation schemes create noxious incentives for banks' managers to invest inappropriately. As such, the first research question of this study is whether the compensation structures, specifically, the options granted to the top managers, could explain U.S. banks' risk-taking in debt investments. Option grants are designed to promote risk-averse agents' risk taking behaviors but overdosing it could result in excessive risk taking behaviors.

My second research question regards the financial reporting decisions for banks' debt security investments. Specifically, I study how and why managers classify debt securities into AFS or into trading category. SFAS 115, "*Accounting for Certain Investments in Debt and Equity Securities*", allows discretion for firms to classify securities into Available-for-Sale (AFS) or into trading category, depending on the investment purpose. Under SAFS 115, fair value changes of securities in trading category will be recognized into net income, which in turn affects banks' regulatory capital immediately. However, fair value changes of AFS securities stay out of the income statements as long as the AFS securities are not sold. In essence, classification decision here is about to choose accounting method: fair value accounting for trading securities; a hybrid of fair value accounting and historical accounting for AFS securities. If one security is classified into AFS category, banks will have more discretionary power on fair value changes on it. In the financial crisis period, the asymmetric accounting treatments of the AFS and the trading securities under the SFAS 115 are more desired by banks to classify securities as AFS rather than as trading, in order to avoid losses and to keep the statutory capital adequacy satisfied.

This projection is partially confirmed by IASB's (International Accounting Standard Board) amendment of the IAS 39. The old IAS 39 does not allow reclassification of securities once they have been recognized as AFS or trading securities. In October 2008, when the financial crisis hits the U.S. and the Europe, IASB amends the IAS 39 to allow reclassifications of securities to alleviate the political pressures exerted by the European countries: the European banks were complaining about losing advantage to the U.S. banks who are allowed to reclassify the risky security investments between the AFS and the trading under the U.S. GAAP (i.e., the SFAS 115). Following the amendment of the IAS 39, European banks reclassify a great amount of securities from trading category into AFS, either to avoid the deterioration of earnings or to remain adequate capital (Bischof, Bruggemann and Daske (2010); Unger and Fiechter (2009))

This study attempts to provide direct empirical evidence on how SFAS 115 affects U.S. banks' financial reporting of AFS vs. trading securities. Using a sample of banks from year 2001 to year 2009, I show that banks are inclined to classify a greater amount of the risky securities into AFS rather than into trading category when their overall risk of the debt investments is high. This finding is consistent with the common view that banks utilize the asymmetric accounting treatments between the trading category and AFS category to conceal their true economic performances.

The rest of this study is organized as the following to address two research questions. Chapter 2 draws a descriptive picture on debt security investments of the U.S. banking industry. In this chapter, I present summary statistics in various dimensions. First, I discuss the sample selection process of this study. Then I present the relative significance of three types of securities on banks' balance sheet, namely, trading securities, AFS securities, and the held-to-maturity (HTM) securities, as well as the relative significance of the subcategories of securities (e.g., Treasury securities, government one, MBS, ABS, etc.). To evaluate the riskiness of each subcategory of securities, I estimate the historical return and return volatility of these assets. The descriptive statistics show that certain types are more risky than the rest of the

securities.

Chapter 3 investigates whether banks' risk appetite on security investments is related to top managers' compensation. In traditional mechanism design literature, risk-averse agents are myopic, sometimes foregoing positive NPV projects to avoid additional risks. To align agents' long-term objective with that of the shareholders', managers are generally granted options. However, effective as the option grants could be, managers sometime are motivated to take more risks than expected. This could create significant problem when negative shocks hits the company. Therefore, it could be the case that the overdosing of option grant incentives exacerbates the U.S. financial crisis and in this chapter I investigate how managerial compensation of the U.S. banks affects CEOs' decisions to invest in credit risky securities. As predicted, using a sample composed of top 1,000 bank holding companies from 2001 to 2009, I find that managers, when their wealth is more sensitive to stock return volatility due to their option holdings, tend to structure the firms' debt investments with a higher proportion of credit risky securities. This empirical evidence is relevant to both researchers and practitioners when they reconsidering structure of bankers' compensation.

Chapter 4 studies various factors that affect managers' decision to classify securities into AFS vs. into trading category under the SFAS 115. Classification of one debt security into AFS or into trading category actually is choosing a hybrid of fair value and historical cost accounting or a purely fair value accounting. As long as the debt security is classified into AFS, recognition of fair value changes into income statement is delayed. Moreover, managers have dictation on when to recognize that debt security's accumulated unrealized gains/losses by selling it before its maturity. So it is understandable that banks tend to classify more debt securities into AFS than into trading category when they desire to have control over net income. The classification is also motivated by the asymmetric accounting treatment of these two categories. I document that banks classify a high proportion of risky securities into

trading category for banks with a large size, with strong interest revenue, with income-decreasing accruals, or with less risky assets. when the capital adequacy ratio is low. During the crisis period, banks classify a significant proportion of securities into the AFS category to avoid earnings decrease, while they classify a much higher proportion of the securities into the trading category before year 2007. This sharp contrast of security classification pattern before and after the financial crisis indicates that banks re-classify their assets into AFS during the crisis for income increasing concerns.

Chapter 5 demonstrates that banks strategically time sales of AFS securities to realize accumulated unrealized gains/losses. In particular, I document that banks strategically sell AFS securities to smooth earnings, to meet earnings targets, to reduce regulatory costs, or to facilitate seasonal equity offering. First, I show that, when banks' earnings (excluding AFS gains/losses) are among top deciles in the industry, they realize lower level of gains from the AFS securities. In contrast, when banks' earnings (excluding AFS gains/losses) are among the bottom deciles, they realize higher level of the AFS gains to increase their income. This evidence indicates that cherry-picking strategy on AFS serves as a tool for banks to smooth their earnings. Second, I show that firms strategically sell AFS to meet various earnings targets, namely, the break-even point, the random walk benchmark, and the analyst forecast benchmark. That is, when banks' ROEs (excluding AFS gains/losses) are slightly below zero, or slightly lower than reported ROEs[1] of the last quarter, or when their EPSs meet or beat analyst forecasts by less than 1 cent, they realized higher proportion of their AFS gains than their peers do. Third, banks with low regulatory capital ratio, which stands for high regulatory costs, realize high level of fair value gains on AFS securities. Fourth, banks who issue ordinary shares in future one year

[1] The term "slightly below zero" refers to the fact that an ROE falls short of zero by 1%. Similarly, the term "slightly lower than previous quarter's reported ROE" refers to the fact that an ROE falls short of previous quarter's reported ROE by 1%.

also demonstrate a higher proportion of gains from the AFS securities sales. Taking these evidences together, it can be inferred that banks' incentives play an important role in the timing of sales of AFS securities. To collaborate with this inference and to ensure that the observed correlation between AFS gains and banks' incentives is not spurious, I replicate the above-mentioned study by replacing the dependent variable with the total AFS gains/losses[2], which is less subject to managerial discretion than the realized AFS gains/losses. Results show that there exists no correlation between the above-mentioned incentives and the total AFS gains/losses, confirming my prediction that banks time the disposal of AFS securities to smooth earnings, to meet certain earnings target, to reduce regulatory costs, or to facilitate seasonal equity offering.

Chapter 6 investigates market reactions to banks' income from fair value changes of the AFS and from trading revenues of the assets in the Trading category. I show that trading revenue from the Trading category are more persistent, with greater value relevance, and drive more significant stock returns. This evidence indicates that artificially classifying securities with trading purpose into the AFS category may have negative impacts on firm values.

Chapter 7 concludes and provides discussions on the implication of this study.

[2] The sum of the AFS gains/losses are composed of realized gains/losses (usually by selling), which are incorporated into current earnings, and unrealized ones, which are off income statement and are kept in equity. The sum of the AFS gains/losses is not subject to managers' discretions.

Chapter 2. Big Picture: Size and Types of Security Investments in U.S. Banking Industry

This chapter has two objectives. The first is to introduce my sample of banks and data source of debt security. The second is to provide a basic description about debt security investments in U.S. banking industry from 1996 to 2009. The ratio of debt securities to bank loans was around 40% in 1990s; this number increased to 50% in 2000s. That means debt securities are an important asset class for banks and that importance is increasing. Further analyses on subcategories of debt securities from 2001 to 2009 reveal following interesting facts among others: 1) more than 70% of debt securities were classified into AFS category; 2) securities in trading category increased rapidly and largely contributed to the increase of debt securities in total; 3) mortgage backed securities (MBS) issued by government agencies accounted for 39% of all debt securities, and non-agency MBS accounted another 10%. At last, I estimated fair value changes (i.e. capital gains) for each type of debt securities in AFS category quarter by quarter. Not surprisingly, returns for credit-risky securities were more volatile; prices of non-agency MBS and asset backed securities (ABS) suffered drastic slump in 2007 and 2008.

The reminder of this chapter is organized as follows. Section 2.1 discusses the sample of bank holding companies of this study. Section 2.2 elaborates disclosures on debt securities (and in subcategories of debt securities) in form "FR Y9C" issued to the Federal Reserve. Then size of debt securities in total and in subcategories across time is depicted. Section 2.3 shows credit risks of each type of securities by estimating their quarterly fair value changes across time. Section 2.4 concludes.

2.1. Bank Holding Company Sample

My sample consists of U.S. bank holding companies (BHCs)[3]. A bank holding company may be consisted of one or several individual commercial bank(s). I study top-tier bank holding companies to get a comprehensive view on U.S. banking industry. Certain BHCs[4] are required to issue a form "consolidated financial statements for bank holding companies – FR Y-9C" on a quarterly basis. This form contains detailed information about BHC's balance sheet, income statement, capital adequacy, etc. That information of bank holding companies (BHCs) is available to public in Federal Reserves' website[5]. "FR Y-9C" reports of BHCs are generally available within 40 to 50 days after calendar quarter end[6]. I choose this database instead of other alternatives such as COMPUSTAT because: 1) this database covers all significant BHCs; and 2) all items are well constructed (we know the reporting form's structure and reporting guidance); 3) details about debt security holdings (which are main research objectives of mine) are available. Many studies on U.S. banking industry use BHCs as research objective and get data from FR Y-9C forms (e.g. Ahmed, Takeda and Thomas (1999); Beatty, Ke and Petroni (2002); Hodder, Kohlbeck and McAnally (2002); Stiroh (2006); Liu and Ryan (2006); Hodder, Hopkins and Wahlen (2006); Ahmed, Kilic and Lobo (2006)).

I get BHCs' financial information for all firm-quarters from 1994Q1 to 2009Q4,

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[3] In the United States, a bank holding company, as provided by the Bank Holding Company Act of 1956, is broadly defined as any company that has control over a bank. All bank holding companies in the US are required to register with the Board of Governors of the Federal Reserve System.

[4] Bank Holding Companies with total consolidated assets exceeding a threshold and all multibank holding companies with debt outstanding to the general public or engaged in certain nonbanking activities are required to issue form FR Y-9C.

[5] Relevant information could be found in http://www.federalreserve.gov/reportforms/default.cfm and http://www.chicagofed.org/webpages/banking/financial_institution_reports/bhc_data.cfm.

[6] http://www.ffiec.gov/nicpubweb/content/help/HelpFrequencyUpdate.htm.

requiring total assets of the BHC larger than 0[7]. Figure 2.1 Panel A shows number of BHCs and industry-level aggregate total assets of all BHCs at the end of each calendar quarter during this period. It is immediately noticed that number of BHCs increased from 1994 to 2005 and dropped suddenly on 2006Q1. There're 2,264 BHCs in 2005Q4; however this number dropped to 1001 on 2006Q1. Sum of total assets decreased from 16.17 trillion USD to 11.49 trillion USD, at the same time. This drop is mainly due to disclosure requirements changed at that time spot. Before 2006, the report form is to be filed by bank holding companies with total consolidated assets of $150 million or more. Starting from 2006, BHCs with total consolidated assets of $500 million or more are required to issue this form. Another disclosure change at that time is about BHC's subsidiaries. Starting from 2006Q1, only top-tier BHC is obligated to issue FR Y-9C; in contrast, in previous periods, subsidiaries with total assets larger than 1 billion USD are required to issue FR Y-9C. Therefore, size of this industry is exaggerated before 2006 if I simply add up all firms' total assets without considering subsidiaries' effects. That bias could be huge because some largest BHCs are subsidiaries of others.

Another influential event to SFAS 115 is related to the effects of unrealized fair value changes on regulatory capital. At the beginning of implementation of SFAS 115, unrealized gains/losses from AFS securities directly affected regulatory capital. Accordingly, banks intended to classify securities as HTM instead of AFS to reduce regulatory risk at the expense of lower liquidity. In October 1994, the Federal Reserve revised their original decision by excluding unrealized gains/losses on AFS securities from regulatory capital. By then, regulatory risk related to AFS securities vanished. In November 1995, the Financial Accounting Standards Board (FASB) decided to allow firms do a one-time reclassification from HTM to AFS category. Hodder et al. (2002)

[7] SFAS No. 115, which requires certain debt and equity securities to be classified in either trading securities, HTM securities, or AFS ones, is in effective for fiscal years beginning or after December 15, 1993. Therefore, my sample period is starting from 1994 Q1.

find that banks reclassified too many securities into HTM category before 1995Q4 and reclassified huge amounts of securities from HTM to AFS after that event. HTM became quite trivial since 1995Q4. I decide to start my sample period from 1996Q1 to avoid impacts from that rule change.

To maintain comparability across time, I did following four steps to clean the original sample as shown in Figure 2.1 Panel A. Originally, there're 100607 firm quarters from 1994Q1 to 2009Q4, with an industry-level quarterly-average aggregate total assets of 11.78 trillion USD; as Figure 2.1 Panel A shows. Step 2 and step 3 are aimed to exclude subsidiaries. In step 2, bank quarters did not answer a question, which must be answered by top-tier BHC[8], are deleted. In step 3, I delete observations without tier1 capital ratio information. By excluding subsidiaries, mean value of assets held by all banks in each quarter (a proxy for size of this industry) decreased from 11.78 trillion to 9.84 trillion USD (dollar value is adjusted to 2009 USD). In step 4, I delete observations in year 1994 and 1995, when fair value changes of AFS securities affect regulatory capital, which largely influenced how banks classified securities among AFS and HTM categories. Finally I keep top 1000 BHCs for each quarter. Since there're 1001 BHCs on 2006Q1, this requirement basically keeps all BHCs after 2006 and those with comparable size before 2006. Comparing firm number and total assets in step 5 to those in step 4, we can find number of BHCs decreased by 36% but total assets held by all banks dropped by a mere 1%.

Table 2.1 Panel B compares the sample in step 3 to the sample in step 5. From 1996 to 2005, number of observations decreased a lot; starting from 2006, majority of observations came into my final sample. In terms of industry-level total assets, my final sample in step 5 is quite representative (at least 97% of total assets employed by the whole industry). Given these two facts, not surprisingly, we find size of individual

[8] That question is: All changes in investments and activities have been reported to the Federal Reserve on the Bank Holding Company Report of Changes in Investments and Activities (FR Y–6A) (Enter "1" for yes; enter "2" for no)

banks in my final sample is much larger than those in step 3 from 1996 to 2005.

Figure 2.1 Panel B shows patterns of number and size of BHCs for my final sample. Number of BHCs remains stable across years. From 2006Q2 to 2008Q4, number of observations is slightly below 1000. Total assets held by top 1000 BHCs continuously increases; it started from 5.8 trillion USD in 1996Q1 to 15.9 trillion USD in 2009Q4, with an annualized increasing rate of 8.1%. In this study, I'll focus on this sample or subsample of it due to data availability.

2.2. A Description of Debt Securities

2.2.1. Disclosure of Debt Securities in Form FR Y-9C

Since debt securities are main research objectives of this paper, I'll describe in detail about how debt securities are disclosed in FR Y9C. In "Schedule HC—Consolidated Balance Sheet", BHCs report values of trading assets, available-for-sale securities and held-to-maturity securities. Trading assets and AFS securities are measured at fair value; HTM securities are measured at amortized costs. Background information about classifications of trading, available-for-sale and held-to-maturity categories could be found in Appendix B.

In addition to overall value of those three categories, detailed information about each of them is reported too. Table 2.2 summarizes detailed disclosures for trading, AFS and HTM in form "FR Y-9C". For trading assets, from 1995Q1 to 2000Q4[9], detailed information is reported in "Schedule HC-B Part II —Trading Assets and

[9] "FR Y-9C" Forms from 1996Q2 to 2009Q4 are available in http://www.federalreserve.gov/reportforms/ReportDetail.cfm?WhichFormId=FR_Y-9C&Historical=1. For time period 1995Q1 to 1996Q1, I find data items of trading assets according to 1996Q2's FR Y-9C form. But for time period from 1994Q1 to 1994Q4, I can't find data. It's possible that in 1994, banks disclosed detailed information about trading assets using different data items. Since I focus on time period from 1996 to 2009, I don't need that information.

Liabilities"; from 2001Q1 to 2009Q4, that information is disclosed in "Schedule HC-D —Trading Assets and Liabilities". From 1995 to 2007, there're 3 broad categories within trading assets: trading assets in domestic offices, trading assets in foreign offices and derivatives with positive value. Trading assets in domestic offices include debt securities and other trading assets. Loans held for trading, certificate deposits, commercial paper, bankers' acceptances, etc. are classified into "other trading assets" category. Debt securities in domestic offices are further classified into subcategories according to issuer or fund usage. More specifically, they are U.S. Treasury securities, U.S. government agency obligations (excluding MBS), securities issued by states and political subdivisions, agency MBS, non-agency MBS and others. Starting from 2008, consolidated and domestic values of each subcategory is disclosed.

For AFS/HTM securities, detailed information is disclosed in "HC-A — Securities" from 1994Q1 to 2000Q4; and in "HC-B — Securities" from 2001Q1 to 2009Q4. Both fair value and amortized cost of subcategories in AFS/HTM securities are reported. From 1994Q1 to 2000Q4, AFS securities are decomposed into two types: equity or debt securities issued by U.S. corporations or governments; and those issued by foreign corporations or governments. For U.S. securities, there're four types: Treasury securities, government agency and corporation obligations (including MBS), securities issued by states and political subdivisions, and other U.S. debt/equity securities. Starting from 2001Q1, more detailed information for AFS securities is disclosed. Equity securities are disclosed seperately, no matter being issued by domestic or foreign entities. For debt securities, a lump-sum number for foreign debt securities is reported. For domestic debt securities, there're six subcategories: Treasury securities, government agency and corporation obligations (excluding MBS), securities issued by states and political subdivisions, MBS, asset-backed securities, and other domestic debt securities. For MBS, there're six further subcategories disclosed and I regroup them into three subcategories as those in trading assets: pass-through securities issued or guaranteed by GNMA, FNMA or FHLMC; other

MBS issued or guaranteed by GNMA, FNMA or FHLMC; and other MBS not issued or guaranteed by those agencies. As for HTM securities, the only difference comparing to AFS securities is equity securities are nonsexist within it, by definition of "held-to-maturity".

Two issues are worthy of discussion. First, not all securities are eligible to be classified into any of three categories: trading, AFS and HTM. Treasury securities, U.S. government securities, state securities, MBS, and other U.S. debt securities could be classified into any of those three categories. On the other hand, derivatives with positive value, loans held for trading, commercial paper, etc. are only eligible to be classified into trading assets; equity securities cannot be classified into HTM category. Second, measurement baselines for trading securities and for AFS/HTM securities are different. For trading securities, detailed information for securities held by domestic offices is disclosed; while only a lump-sum number is reported for those held by foreign offices. For AFS/HTM securities, consolidated numbers for securities issued by U.S. entities and by foreigners are presented separately. So it is clear that trading securities report numbers based on location of bank's own offices; AFS/HTM securities report figures based on location of issuers.

By observing up mentioned discrepancies between trading assets and AFS/HTM securities, I made necessary judgments to facilitate comparison of same security among trading/AFS/HTM across time. First, I focus on the time period from 2001 to 2009 when studying issues about subcategories of securities. It is because detailed information for AFS/HTM securities was not available before 2001. Second, I only consider debt securities could be classified into any of three categories: trading, AFS or HTM. Third, for trading assets, I choose to use numbers in domestic offices since consolidated data is only available after 2008. Therefore, when I compare agency MBSs in trading category to those in AFS category, I'm comparing domestic offices' number in trading to consolidated number in AFS. The concern of that obvious underestimation of trading securities could be alleviated by two reasons. First, small

fraction of banks (8.4%) held positive trading assets; fewer (1.9%) held trading assets in foreign offices. Secondly, and more importantly, trading assets in foreign offices are generally composed of assets issued by foreign institutions. Therefore, when studying securities issued by U.S. institutions, ignorance of securities in foreign offices would have minor impacts.

2.2.2. Size of Debt Securities

This section describes size of debt securities as a whole and in each subcategory. Figure 2.2 Panel A shows ratio of securities to loans across time. The ratio of securities relative to loans increased from 38% in 1990s to 50% in 2000s. Figure 2.2 Panel B shows that in 1996Q1 trading assets were only 5% of loans; by the end of 2009, trading assets equaled to 25% of loans[10]. AFS securities increased moderately from 25% in 1996 to 37% in 2009. HTM securities (measured at fair value) decayed from 6% to 2% during this period. Another interesting pattern is, in year 2008, AFS and HTM did not decrease much or even slightly increased; however trading assets slumped from 22% to 15%, especially in the fourth quarter. This evidence is consistent with U.S. banks reclassified some securities from trading category into AFS/HTM category. In year 2009, ratio of AFS to loans and ratio of trading assets to loans rebounded quickly and hit historical highs. Fair value increase certainly contributed to that reverse; fresh funds the Federal Reserve pumped into U.S. banking system could be a more direct explanation.

Table 2.2 shows average size of each subcategory for top 1000 BHCs from 2001 to 2009. Panel A presents absolute size (in year 2009 USD) and relative size (as a percentage of all assets in trading, AFS and HTM securities) for each subcategory. For 36 quarters from 2001Q1 to 2009Q4, average value of all assets in trading, AFS and HTM categories held by top 1000 bank holding companies was 3216 billion USD. Trading assets accounted for 39.2%; AFS securities took another 57.4%; remaining

[10] Derivatives are excluded from trading assets since they are fundamentally different from other securities.

3.5% were in HTM category.

Some types of securities are eligible to be classified into either of trading/AFS/HTM category[11]; other types are not eligible (be put into "others" group in Appendix B). There're four types assets in "others" group: equities, other trading assets, other trading assets in foreign offices, and derivatives with positive fair value. Derivatives (8.4% of all financial assets in three categories) and equities (4.5%) are not debt securities and therefore I exclude them from following study. For trading assets in foreign offices, detailed discussion is needed. BHCs report their trading assets in three broad types: derivatives, trading assets in domestic offices and trading assets in foreign offices. So it is not hard to understand why other trading assets in foreign offices (OTA_foreign) were so large: 312 billion or 9.7% of all financial assets in trading/AFS/HTM categories. That is a big difference in disclosure when comparing trading assets to AFS/HTM securities. BHCs report consolidated values for AFS/HTM securities. For trading assets, BHCs did not do so until 2008Q1. As will be discussed later, in Chapter 3 I need to identify credit riskiness of securities, in Chapter 4 I'll study banks' classification decision among securities. Since trading assets in foreign offices contain everything I have to exclude them from my research sample. That will certainly underestimate debt securities in each subcategory for trading assets. The magnitude of that bias could be evaluated by comparing consolidated and domestic value of each subcategory in trading assets BHCs reported since 2008Q1. Results in table 2.3 show that banks' foreign offices held small amounts of Treasury securities (5.3%), government securities (0.5%), state securities (0.5%), and agency MBS (0.3%), but considerable non-agency MBS (17.7%). For ODS (other debt securities) and OTA (other trading assets), there're big gaps between consolidated and domestic values; but that is anticipated, because all securities issued by other than U.S. entities would be allocated into these 2 subcategories for trading

[11] Following six types of securities: U.S. Treasury securities, securities issued by U.S. government agencies, securities issued by U.S. States, agency MBS, non-agency MBS, and other debt securities (ODSs) could be classified into either of trading/AFS/HTM category. ODSs consist of asset backed securities (ABSs), other domestic debt securities (ODSDs) and foreign securities (ODSFs). All those information could be found in Appendix B.

assets held in foreign offices. In sum, I have no choice but excluding other trading assets in foreign offices. What fortunate is, that exclusion has limited effects on measurement of trading assets, given that in trading category, BHCs' foreign offices did not hold significant amounts of debt securities issued by U.S. entities, which are my research focus. Finally, I exclude OTA (other trading assets in domestic offices), too. That subcategory contains trading assets such as certificates deposits, commercial paper and loans, all of them are not debt securities.

After excluding financial assets in "others", we get Table 2.2 Panel B, which only contains debt securities. The largest part is agency MBS in AFS securities, 32.3% of total financial assets under trading, AFS and HTM. Next are ODS (other domestic debt security) in AFS (19.1%). Non-agency MBS in AFS (7.4%) and government securities in AFS (7.7%) are quite significant, too. 49.0% of debt securities are mortgage backed securities; this ratio shows how deeply BHCs involved in financing of U.S. housing market.

Table 2.4 Panel A and Figure 2.3 describe trends of each subcategory in trading assets across time. Banks' holding of trading assets in foreign offices gradually increased from 29.9% to 37.7% from 2001 to 2009. However, other debt securities in domestic offices decreased from 17.9% to 12.5%. Proportion of agency MBS suddenly first increased in 2007 and 2008 from 10.3% to 20.4% and then decreased to 13.5% by the end of 2009. It is possible that some trading assets (e.g. assets backed securities, loans held for sale) depreciated more during 2007/2008 and rebounded faster than agency MBS. It is also possible that banks sold MBS to the Federal Reserve in 2009. Non-agency MBS stated from 3.0% in 2001Q1 to 8.5% in 2007Q1 and then declined to 2.7% in 2009Q4. Another explanation is banks reclassified certain types of securities out of trading category in 2007/2008 and then undid that reclassification in 2009 when debt securities' price rebounded.

Table 2.4 Panel B and Figure 2.4 present trends of each subcategory in AFS

category across time. As has been noticed, agency MBS is the dominating subcategory in AFS. Average percentage of agency MBS is 42.7%. Proportion of agency MBS slipped a little bit during 2007 to 2009 (44.3% to 41.3%). Non-agency MBS's pattern is interesting. Its significance among AFS securities doubled in first eight years of 2000's. In year 2008, its proportion decreased from 15.5% to 10.1% and remained at that level by the end of 2009.

In sum, by looking at debt securities in detail, we realize that: 1) they are very important assets for banks; 2) significances of subcategories in Trading/AFS/HTM could be quite different from each other; 3) those significances changed a lot over time. Banks' evolving businesses and responses to different market conditions could provide explanations for those patterns.

2.3. Fair Value Changes of AFS Securities across Time

This section is to estimate quarterly fair value changes on each category of AFS securities. It shows how market conditions changed across time, especially after 2007. It also helps us understand which securities are more risky. In addition, estimates of quarterly fair value changes for each subcategory of securities could be used to figure out "normal" gains/losses from AFS securities for any bank at any quarter. That is what I'll do in Chapter 5. Using that method, I can isolate "normal" fair value changes out of total fair value changes and further investigate characteristics of "abnormal" part of fair value changes.

Theoretically, fair value of a debt security equals to its discounted future cash flow. For any time period, if nothing changed, interest income would be equal to beginning fair value multiplied by effective interest rate and be recorded in banks' total interest income. Fair value of that debt security will remain unchanged by the end of period. Fair values of AFS securities will change if prevailing risk free rate or

counter party's credit worthiness change. Given other factors unchanged, credit risky debt securities' fair value gains/losses should be more volatile than credit safer ones.

AFS securities include many subtypes, as already discussed. It is reasonable to believe that fair value changes are different, for each subcategory and for each period. So for each quarter, I regress fair value changes on each subcategory of AFS securities. Estimated coefficient should be gains/losses for 1 unit of that type of debt security in that quarter. Estimation method is quite straightforward.

$$Fair\ Value\ Change\ (t+1) = \alpha 1 + \sum_{i=1}^{n} \beta_i * AFS_i(t) + \varepsilon \quad (2.1)$$

I deflated dependent and independent variables in equation 2.1 by total assets to deal with hetroskedasticity problems. Then I add an intercept to get equation 2.2.

$$\frac{Fair\ ValueChange(t+1)}{Total\ Assets\ (t)} = \alpha 1 * \frac{1}{Total\ Assets\ (t)} + \alpha 2 + \sum_{i=1}^{n} \beta_i * \frac{AFS_i(t)}{Total\ Assets\ (t)} + \delta \quad (2.2)$$

Fair value change includes two parts: 1) realized gains (losses) on AFS securities (from "Schedule HI – Consolidated Income Statement"), and 2) unrealized gains (losses) on AFS securities. The second item could be calculated as the difference of quarter end and quarter beginning "Net unrealized gains (losses) on AFS securities" (from "Schedule HC-R – Regulatory Capital"). HTM securities are not studied here because information about accumulated unrealized gains (losses) on HTM securities is unavailable. Additionally, size of HTM securities is quite small after 1996, comparing to that of AFS securities. AFS_i stands for quarter beginning fair value of one kind of AFS securities.

As has been discussed in section 2.2., there're nine subcategories in AFS securities:

Treasury securities, Government securities, State securities, Agency MBS, non-agency MBS, ABS, ODSD (other domestic debt securities), ODSF (foreign debt securities) and EQ (equities). Agency MBS are mortgage backed securities issued or guaranteed by GNMA, FNMA and FHLMC. Non-agency MBS are all other mortgage backed securities.

Because detailed information on subcategories is only available after 2001 and previous quarter's information is needed to calculate unrealized gains/losses from AFS securities, my sample period is from 2001 Q2 to 2009 Q4, total 35 quarters.

2.3.1 Sample Selection and Descriptive Statistics

Variables are defined in table 2.5. I delete observations with extreme fair value changes (at 1% and 99%) since I'm interested in "normal" fair value changes. Those extreme fair value changes could be due to measurement error or firm-specific factors not shared by most other banks. Then model 2.2 is regressed for each quarter. Observations with highest or lowest 1 percent error terms are deleted because I do not need those influential or "hard to explain" observations. Finally, there're 32762 firm quarters in total. For each quarter, there're about 936 banks. Table 2.6 lists sample selection process.

Table 2.7 is a statistical description. Mean value of fair value changes is 0.004% of total assets, quite small at first glance. But that is exactly what banks want. They do not make money from fair value changes and hope price fluctuations be stable. But 25^{th} percentile is -0.067% and 75^{th} percentile is 0.080%; these numbers are considerable given a representative bank's quarterly ROA is about 0.3%. Therefore, fair value changes could still be significant in some periods. Agency MBS, government securities, and debt securities are more popular. For example, for 50% of observations, agency MBS exceeded 5.4% of total assets. Non-agency MBS and other domestic debt securities are held by a small number of banks.

2.3.2 Cross Sectional Regression Results

I estimate quarterly fair value change for each AFS security category by regressing model 2.2 quarter by quarter. Adjusted R squares range from 10% to 86%, with a mean value of 42%. Detailed results are reported in table 2.8. Mean values of estimated coefficients for each AFS security category from 35 quarterly regressions are insignificantly different from zero except non-agency MBS. Insignificant coefficients are expected because factors driving fair value changes are unpredictable.

Time series patterns of fair value changes for each category are presented in figure 2.4. Variance of safe securities: Treasury securities, government securities, state ones, and agency MBS was small. Their fair value changed range from -1.5% to 1.5%. Other risky securities varied quite widely, especially from 2007 to 2009.

2.4. Conclusions

Debt securities were about 50% of loans in banks' balance sheet. More than 74% of them are classified into AFS category; about 5% are in HTM securities; other 21% are trading assets. Although AFS and HTM securities are relatively popular for all banks, trading securities are held by a few large banks. This chapter also shows compositions of debt securities as well as other financial assets in trading/AFS/HTM categories. Half of debt securities are MBS (mortgage backed securities). This is evident that U.S. banks financed housing market with a significant proportion of their funds; considerable amounts of estate loans have been securitized. Agency MBS occupy 39% of all debt securities; more than 80% of them are in AFS category.

Finally I show quarterly fair value changes for each subcategory of AFS securities in each quarter. Not surprisingly, fair value changes are more volatile for credit risky securities such as non-agency MBS, ABS, and other U.S. debt securities. Total fair value changes from AFS securities exceeded 0.07% of total assets for more

than 50% of bank-quarters. That impact is non-trivial given that bank's quarterly ROA is about 0.3%. All these evidences show that debt securities are important for banks either from balance sheet perspective or from income statement perspective.

Chapter 3. Debt Security Investments and Executive Compensation

3.1. Introduction

The U.S. banking industry was in turmoil during the credit crisis in year 2007-2008. Media and public opinions have attributed the banking industry's failure to managers' myopic views and their extensive risk-taking behaviors. Moreover, it is believed that these risk taking behaviors are shaped by the twisted compensation plans that induce risk-taking behaviors. For example, a quote from President Obama's remark on the executive compensation in January, 2009 clearly expresses such a concern:

"Finally, these guidelines we're putting in place are only the beginning of a long-term effort. We're going to examine the ways in which the means and manner of executive compensation have contributed to a reckless culture and quarter-by-quarter mentality that in turn have wrought havoc in our financial system. We're going to be taking a look at broader reforms so that executives are compensated for sound risk management and rewarded for growth measured over years, not just days or weeks."[12]

Regulators also express similar concerns. The Federal Deposit Insurance Corporation (FDIC) considers to charge a higher premium to banks with the compensation plans that could induce executives' excessive risk-taking behaviors

[12] From http://www.whitehouse.gov/the_press_office/RemarksbyPresidentBarackObamaOnExecutiveCompensationSecretaryGeithner

(Crittenden (2010)).

It is important to understand effects of managerial compensation on performance and operating activities for U.S. banking industry before and during the credit crisis period. Using a sample of 98 largest commercial as well as investment banks, Fahlenbrach and Stulz (2009) find when CEO's shareholding is higher, bank's performance during the financial crisis is worse (in terms of stock returns and accounting performance). However, managerial compensation (in the form of cash, equity and options) seems not related to bank's performance. Their results do not lend support to the argument that managerial compensation induced managers to take high risks in U.S. banking industry and as a consequence some banks suffered during the financial crisis.

To further investigate whether managerial compensation played a role in the financial crisis, I focus on banks' debt security investments in this chapter. More specifically, I study whether managerial compensation could explain cross-sectional variation of banks' risk appetites in debt security investments. "Risk appetite in debt security investment" is measured as proportion of credit-risky debt securities to all debt securities. As has been discussed in Chapter 2, some of debt securities (such as non-agency MBS) are more credit-risky than others (e.g. U.S. treasury bonds). My simple logic is, if managerial compensation did affect risk-taking behavior, some banks would invest in risky debt securities with a high proportion.

In contrast to convenient proxies for risk-taking activities such as firm-specific return volatility, riskiness of debt security has some advantages. First, it is an intuitive and direct proxy for ex ante risk-taking choice. For a given amount of funds, if a bank chooses to invest in credit-risky debt securities instead of credit-safe ones, that bank will get higher interest income by taking higher risks. Second, ex post, we know those

risky debt securities plumped in the crisis period (as be shown in Figure 2.4). Those banks heavily invested in credit-risky debt securities were hit badly. Third, debt security portfolios are large and popular for banks as has been shown in Chapter 2. So debt security investment stands for an important and representative operating activity for banks.

Fourth, reverse causality concern is alleviated for this research question. When we studying relations between firm's risk taking behavior and executive compensation, we know that endogeneity problem is real. On one hand, executive compensation (mainly because of stock options) affects top managers' risk appetite. On the other hand, compensation package is designed by boards/shareholders in order to encourage managers to fully explore all NPV projects. Ex-anti risk taking behavior preferred by shareholders is probably realized through channels including executive compensation as observed firm's ex-post risk taking behavior. Consistently, Guay (1999) finds M/B ratio (a proxy for growth opportunities) is one important determinant of option grants. For banks, operating activities such as loan initiation are affected by bank's individual characteristics (specialization, location, licenses, etc). Be aware of each bank's special investment opportunity set, shareholders/boards design appropriate compensation packages for individual bank's top management. But debt security investment represents a special operating activity for banks, since they face very a similar investment opportunity: an open, deep and liquid debt security market. My argument is, debt security market cannot explain banks' investment opportunity variation, therefore is less likely affect banks' compensation arrangement. I must admit that reverse causality is still a concern; for example, for banks specialized in risky debt security investment.

Empirical results in this chapter confirm that when CEO's risk taking incentives (which stem from options) are high, that bank's debt security investment is composed

of high proportion of risky debt securities. This relation is significant for top 5 executives as well.

The positive correlation between managerial risk-taking incentives from option holdings and banks' risk-taking activity doesn't guarantee legitimacy of proposed or even has been enforced regulatory intervention on managerial compensation for banks. What really should be concerned is whether stock options induced bankers to take "excessive" risks from the standing point of general public. It is possible that compensation package satisfactorily aligns incentives between managers and shareholders. Therefore real problem is banks' shareholders demand high profits by taking "excessive" risk at the cost of not only debtors but all tax payers. Using a sample including 1142 banks from 25 OECD countries, Gropp and Kohler (2010) finds owner controlled banks had higher profits in the years before the crisis, incurred larger losses and were more likely to require government assistance during the crisis compared to manager-controlled banks. The authors directly point out "*The results suggest that privately optimal contracts aligning the incentives of management and shareholders may not be socially optimal in banks*". Under this scenario, shareholders demand "excess" risks; stock options are used to induce mangers to do so. Regulating managerial compensation is a way but probably not the most efficient way to deal with bank owners' opportunistic behavior.

This chapter is organized as follows. Section 3.2 is literature review and hypothesis development. Section 3.3 is research design. Section 3.3 discusses sample selection and shows descriptive statistics. Section 3.4 presents empirical results. The final section concludes.

3.2. Prior Literature and Hypothesis Development

Within managerial compensation package, stock options are the main source providing managers incentives to take risk (Core and Guay (2002)). Shareholders are usually regarded as risk-neutral and managers are believed to be risk-averse. Since manager's firm-specific assets (in terms of stocks, pensions, human capital, etc.) are hard to fully diversified, managers may bypass profitable but risky projects. Therefore stock options, which increase risky projects' value, are granted to managers to alleviate underinvestment problem.

Empirical studies generally support the view that option grants could provide managers with incentives to take risk (Guay (1999), Rajgopal and Shevlin (2002), Coles, Daniel and Naveen (2006)). It is found that when managerial wealth sensitivity to stock-return volatility (vega) is high, firms engage in more risky operating, investing and financing activities. Most of those studies do not consider banking industry since managerial compensation in banking industry is different. In banking industry, CEO generally receive less cash compensation and stocks/ options grants are less important in their compensation packages (Houston and James (1995)); pay-for-performance sensitivity is lower (John and Qian (2003)). Nevertheless, Mehran and Rosenberg (2007) and DeYoung, Peng and Yan (2010) still finds that the bank's risk-taking activities are more pronounced as CEO stock option sensitivity to stock-return volatility increases. As for the financial crisis period, Fahlenbrach and Stulz (2009) find no connection between managerial wealth sensitivity to stock return volatility (which is mainly from stock option holdings) and bank's performance.

In this chapter, I pick bank's debt security investment as research focus. Main reasons have been discussed in the last section: debt security investment has economic importance; riskiness of that kind of investment is easy to measure; it is less affected by bank's characteristics (such as location, license, loan business specialization, etc),

therefore has less endogeneity concern. I specifically investigate whether banks hold more credit risky debt securities when managerial wealth sensitivity to stock return volatility (mainly stem from stock option holdings) is high. The reasoning is not new; it just follows prior literature. I pick banks' debt security investment as the channel to investigate banks' risk-taking behavior before and during the 2007/08 financial crisis. I hope this study can shed light on whether or not banks' compensation could be a reason for dramatic losses during the crisis.

Hypothesis in this chapter can be stated formally as:

When managerial wealth sensitivity to stock return volatility (mainly stem from stock option holdings) is high, banks hold high proportion of credit-risky debt securities.

3.3. Research Design and Variable Definition

I have a yearly panel data from 2001 to 2009 for banks with necessary information about debt security holdings, compensation and other controlling items. To find whether managerial option holdings lead banks to buy and hold more risky debt securities, I run the following regression clustered by firm with year dummies included:

$$\text{Ratio\_Risk}_t = \alpha * \text{VOLSEN}_{t-1} + \sum_{i=1}^{k} \beta_i * \text{Controls}_{i,t-1} + \text{Intercept}_t + \varepsilon_t$$

Ratio_Risk, the proportion of risky debt securities to all debt securities, is used to capture banks' risk appetite in debt security investment. I make following decisions to come up with a measure for Ratio_Risk. First, my sample period is from 2001 to 2009. Before 2001, as has been discussed in Chapter 2, subcategories in AFS/HTM securities are very broad. So it is hard to tell which subcategory is more risky. Second,

I exclude investments in "others" category in Table 2.3 Panel A because those investments are less likely to be substitutive alternative investments to debt securities in left columns. In short, they are quite different. Third, I exclude "ODSF" category in Table 2.3 Panel B since it is hard to tell whether debt securities issued by foreigners are more risky than a specific U.S. debt security. There's a big variation in terms of credit riskiness among foreign debt securities. Fourth, for trading category, I only consider trading securities in domestic offices since banks did not disclose consolidated numbers until 2008. That will underestimate debt securities but influence won't be large because banks' foreign offices are less likely to buy U.S. debt securities as Table 2.4 shows. Additionally, there're only a small number of banks holding significant trading securities in foreign offices, therefore that bias would not have a big influence in my pooling regression. Finally, I exclude HTM securities because liquidity of HTM securities is much lower than that of debt securities in trading/AFS category.

At last I get debt securities in trading/AFS categories which are similar excepting in credit riskiness. Treasury securities, government securities, state securities, and MBSs issued or guaranteed by FNMA, FHLMC, or GNMA are regarded as "SAFE" securities. Others (non-agency MBS and Other Domestic Debt Securities) are regarded as "RISK" ones. Ratio_Risk equals to RISK/(RISK+SAFE), which varies from zero to one.

Since Ratio_Risk is bounded within the interval [0, 1], it is not suitable as dependent variable in OLS regressions. Following Morck, Yeung and Yu (2000), I apply logistic transformations to Ratio_Risk.

$$\text{Log\_RR} = \log\left(\frac{\text{Ratio\_Risk}}{1 - \text{Ratio\_Risk}}\right)$$

Dependent variable is replaced by Log_RR.

$$\text{Log\_RR}_t = \alpha * \text{VOLSEN}_{t-1} + \sum_{i=1}^{k} \beta_i * \text{Controls}_{i,t-1} + \text{Intercept}_t + \varepsilon_t \quad 3.1$$

I apply a second transformation to Ratio_Risk. Dummy variable High_RR equals to 1, if Ratio_Risk is larger than quarterly median, it equals to 0, otherwise. I run a logistic regression using model 3.2:

$$\text{High\_RR}_t = \alpha * \text{VOLSEN}_{t-1} + \sum_{i=1}^{k} \beta_i * \text{Controls}_{i,t-1} + \text{Intercept}_t + \varepsilon_t \quad 3.2$$

VOLSEN is logarithm of dollar value (in thousands) of manager's wealth sensitivity to stock-return volatility. This almost solely comes from manager's stock options, and reflects magnitude of manager's wealth increase when bank's stock-return volatility increase by 0.01. Firms are required to disclose top 5 managers' compensation yearly. I measure VOLSEN for CEO and for other top four managers, respectively. If their wealth is highly sensitive to stock return volatility, managers would be more likely to buy risky securities to increase firm specific risk. Predicted sign for alpha is positive.

Control variables

Literature hasn't directly studied bank's risk appetite in debt security investments. Therefore I use factors affecting bank's overall riskiness as control variables.

PRCSEN is logarithm of dollar value (in thousands) of manager's wealth sensitivity to 1% change of stock price. Manager's wealth including stocks and options is largely affected by stock price. Literature generally finds that managers are less likely to take risks when their personal wealth is very sensitive to stock price change. Predicted sign for this variable is negative. Calculation of VOLSEN and PRCSEN strictly follows prior literature (details are discussed in Appendix C).

Firm size is logarithm of fiscal year beginning total assets (in thousands). Large firms could buy high proportion of riskier securities because they have more resources

(experts, technology) and high risk tolerance (risk diversification among different departments). Expected sign of this variable is positive.

M2B is the ratio of market value of equity to book value of equity at fiscal year beginning. As have been discussed, banks face almost the same investment opportunity in debt security market; therefore growth opportunity seems unrelated to bank's choice over security investment. The expected sign is zero.

LogCA is logarithm of tier1 capital ratio at fiscal year beginning. It is negatively correlated with bank's overall leverage. High tier1 capital ratio indicates that bank is relatively conservative. The relation between risk-taking in security investment and tier1 capital ratio is unclear. Banks with high tier1 capital ratio may incline not to hold high proportion of riskier securities. But at the same time, these banks have higher ability to hold riskier securities given their low leverage. The expected sign is uncertain.

Following a set of control variables are bank's loans and liability composition. I include them following the spirit of Mehran and Rosenberg (2007). Main idea is that other assets and liabilities position could affect banks' overall risk level and investment decision on debt securities. These control variables are: consumer loans, real estate loans, commercial loans, deposits, federal funds purchased and securities sold under agreements to repurchase (REPO, short-term financing), and other borrowed money. All these six variables are deflated by total assets and measured at fiscal year beginning. Compositions of loans and liabilities could affect bank's overall riskiness directly. But how those factors influence debt security investments is hard to predict. All variables are defined in Table 3.1.

3.4. Sample and Summary Statistics

Table 3.2 describes the sample selection process. I start from all bank-quarters from 1996Q1 to 2009 Q4 discussed in Table 2.1 Step 5. Since details of debt securities in AFS category are available from 2001, my sample period is from 2001 to 2009. There are 35788 firm quarters in total. Then I require stock price and return information is available for firm-quarters in CRSP. There're 13139 firm-quarters left. Mean value of total assets for this sample is much larger than the original sample (25.96 billion versus 10.32 billion). It is not surprising that listed banks are larger. Given that managerial compensation information is updated at each fiscal year end, I need to make decisions on when to measure debt security investment (dependent variable). I decide to measure dependent variable at fiscal quarter one[13]. There're 3323 firm-quarters left. Compensation data is from EXECUTIVE COMPENSATION in COMPUSTAT. This database provides top managers' compensation details collected from firms' proxy statements. Data is available from 1992 to 2008. I require firm's SIC code is within 6000 and 6999 to ensure they are from financial sector. Finally I have 778 observations. Mean value of total assets increases to 98.55 billion. My final sample in this chapter consists of large banks.

Descriptive statistics are reported in Table 3.3. Mean value of Ratio_Risk is 0.16, standard deviation of it is 0.18. Cross-sectional variation of proportion of risky securities is considerable. Ratio_Risk could equal to zero or one. That makes logistic transformation impossible. I winsorize Ratio_Risk at [1E-6, 1-1E-6]. Boundary values are chosen to 1) only affecting zero and one; 2) be quite close to minimum nonzero value[14].

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[13] Alternatively, I measure dependent variable at the end of fiscal quarter 2/3/4, respectively. Empirical results remain quantitatively unchanged. Pooling all firm quarters together is not appropriate since dependent variable would be the same.

[14] Changing lower boundary values to alternatives such as 1E-8, 1E-7 or upper boundary value such as 0.9999,

Mean value of CEO's wealth sensitivity to stock return volatility is 220 thousand USD. That value for top five executives is 97 thousand USD. If bank's stock price increases 1%, representative CEO's (top 5 executives') wealth will increase 1192 (356) thousand USD. These numbers are quite close to those reported by Fahlenbrach and Stulz (2009) for 98 big commercial and investment banks.

Mean M2B ratio is 1.13, lower than manufacturing firms. Many financial assets/liabilities are measured using fair value, which could be a reason why banks' M2B is close to 1. "Real Estate Loans" accounts for 40% of total assets; "Commercial Loans" accounts for 13%; "Consumer Loans" accounts for 6%. "Deposits" is about 67% of total assets; "Repo" is about 7%; and "Other Borrowed Money" accounts for another 10% for a representative bank.

3.5. Regression Results

Table 3.5 and Table 3.6 show relations between top managers' wealth sensitivity to stock return volatility stemming from option holdings and proportion of credit risky securities in banking industry from 2001 to 2009. Proportion of risky debt securities investments are positively related to option-induced risk taking incentives for CEO and for top5 executives. That relation is statistically significant for the full period and for the period from 2001 to 2006; but is not statistically significant for the crisis period: from 2007 to 2009. This difference is understandable, because personal wealth consideration could be suppressed by other strong factors (e.g. government intervene, CEO turnover) during the financial crisis period.

Top executives' wealth sensitivity to stock price seems not consistently affecting

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0.99999, etc. won't affect conclusion.

riskiness of bank's debt security portfolio.

Large firms normally hold more risky debt securities. But that relation is statistically insignificant for most regressions. M2B, which stands for bank's growth opportunity, doesn't explain riskiness of debt security portfolio. That is consistent with my story that all banks face similar investment opportunities when considering debt security investment. Bank-specific investment opportunity set is not a fundamental characteristic determining bank's investment on debt securities.

Bank's regulatory capital level is negatively related to riskiness of debt security investments. That relation is statistically significant for OLS (in normal period) but not logistical regressions. Banks with high capital adequacy tend to buy less risky debt securities. Operating conservatism (as reflected in high capital adequacy) but not regulatory costs may explain that pattern.

Assets and liability compositions have explanatory power on bank's investments on debt securities. Specifically, banks with high weights on a certain kind of loans hold less risky debt securities. For the liability part, banks with high proportion of Repo (federal funds purchased and securities sold under agreements to repurchase), therefore heavily on short-term financing, buy risky debt securities in a low proportion.

Multicollinearity Problem

This "Imperfect Multicollinearity" problem is very real for this line of research. In Table 3.4, correlation between VOLSEN and PRCSEN is as high as 0.7. VOLSEN and PRCSEN are highly positively correlated since managers who have lots of stocks usually have lots of options, too. In previous literature it's common that both VOLSEN and PRCSEN are included in regression without discussing that problem.

To explicitly address "Imperfect Multicollinearity" problem, Dong, Wang and Xie (2010) did two additional regressions in table 4. In the first regression, only VOLSEN and intercept are kept as independent variables. In the second one, PRCSEN is excluded and all other control variables and VOLSEN are kept.

Following their methods, I first run regressions with intercept and VOLSEN as only explaining variables. Results are qualitatively the same. VOLSEN, no matter is measured using CEO or TOP5 executives information, is positively related to dependent variables: LogRatio and High, for the full sample period; or for 2001-2006; but not for 2007-2009.

Then I run regressions excluding only one independent variable: PRCSEN. For regressions with LogRatio as dependent variable, VOLSEN is positive but insignificant (T values vary from 1.3 to 1.6). For regressions with "High" (which equals to 1 if ratio of risky debt securities to all debt securities is higher than quarterly median value; equals to zero otherwise) as dependent variable, results become stronger (T values are generally higher than 2.5); for any sample period.

In sum, "Imperfect Multicollinearity" is a real problem in my study. "LogRatio" is not that robust; but dummy variable "High" is fine: with or without PRCSEN, VOLSEN consistently explains "High".

3.6. Conclusions

Suppose a bank chooses to invest in risky debt securities instead of safe ones, that bank can collect high interest income in peaceful period but will suffer in crisis period. That is exactly the pattern we observed for U.S. banking industry in 2000s. Using a sample of bank holding companies from year 2001 to 2009, I find for given amounts

of debt security holdings, proportion of risky debt securities (such as non-agency MBS, ABS and other U.S. debt securities) increases with top management's wealth sensitivity to stock-return volatility.

Given that shareholders prefer risk-taking than managers do and stock option compensation is a vehicle used to induce managers to take more risks in banking industry (Chen, Steiner and Whyte (2006); Mehran and Rosenberg (2007)), banks' risk-taking activities may be ultimately driven by shareholders. Gropp and Kohler (2010)'s findings suggest it is owners rather than managers who are keen on risks in banking industry. In this case, reform on banker's pay probably is not the most efficient way to fix incentive conflicts between general public and banks' shareholders.

Could option holdings induce "excessive" risk taking even from the perspective of shareholders? Dong, Wang and Xie (2010) finds that firms would more be likely to choose debt-financing over equity-financing when CEO's wealth is more sensitive to stock return volatility due to option holdings. That pattern holds for all firms, including those have been over leveraged relative to their optimal capital structure. Their sample doesn't include banks because bank' leverage is different in nature.

Bank-specific investment opportunities are the driving force based on which shareholders design managerial stock option compensation so as to provide them with appropriate risk-taking incentives not to bypass positive NPV projects. Given that all banks almost share the same investment opportunities in debt security market, it is possible that stock options are not granted to managers to encourage them invest in more risky debt securities. Therefore, observed connections between option induced incentives and debt security investment possibly is not banks' shareholders originally expected. In this case, even conflict interests between banks' shareholders and general

public have been taken care of, restructuring managerial compensation is still necessary. Deferred compensation has potential to balance side effects of equity-based compensation in banking industry. For example, Tung and Wang (2010) find CEO's inside debt holdings before the financial crisis are positively related to bank's performance and negatively related to bank's risk-taking during the financial crisis.

Chapter 4. Accounting Discretion: classification of debt securities into AFS or into trading category?

4.1. Introduction

Under SFAS 115, the same debt security will affect firms' earnings and equity very differently should it be classified into different categories (trading, AFS, or HTM). Accounting treatments to trading assets are fair value accounting. Amortized cost accounting governs assets in HTM category. While AFS securities are treated by a mixture of fair value accounting and amortized cost accounting (see Appendix B). Classification of one security into trading category rather into AFS or HTM category actually is choosing fair value accounting over amortized cost accounting and as a result brings more timely and consistent information into net income and regulatory capital[15].

Literature has documented plenty of empirical evidence supporting that fair value accounting is preferable to amortized cost accounting, especially when fair value could be reliably determined (Barth (1994); Nelson (1996); Eccher, Ramesh and Thiagarajan (1996); Park, Park and Ro (1999); Khurana and Kim (2003); Hodder et al. (2006)). General approach applied by those researches is to investigate whether accounting numbers under fair value accounting provides additional information than those under historical cost accounting to explain market numbers (usually price and returns).

However, providing more useful accounting information may not be the top

[15] Exhibit 6.1 "Fair Value Example" in Ryan's book "Financial Instruments and Institutions: Accounting and Disclosure Rules" (page 137) is helpful to understand this point.

priority in managers' agenda. Moreover, banks sometimes choose to manipulate accounting numbers to fulfill other objectives: to smooth earnings (Kanagaretnam, Lobo and Mathieu (2003); Liu and Ryan (2006)), to avoid earnings declines (Beatty et al. (2002)), and to reduce regulatory costs (Ahmed et al. (1999)). Banks can manage accruals (e.g., loan loss provisions) or engage in real economic activities (e.g. timing asset transactions, roll-over problematic credits) to achieve those objectives.

For a debt security that are bought and held principally for the purpose of selling it in the near term, managers should classify it into trading category according to SFAS 115. But managers' investment intention is hard to be verified and managers do have an alternative choice: classify that debt security into AFS category. Classify a security into AFS instead of into trading category can reduce volatility of net income and regulatory capital. At the same time managers can grab more discretionary power over income and equity. My research question in this chapter is **Do managers intentionally classify less debt securities into trading category in order to get a tight control over accounting numbers**?

This is an accounting choice particularly important for banks. Since classification of debt securities into trading or into AFS would largely affect how fair value changes affect bank's earnings and regulatory capital, and because large size of debt securities held by those biggest banks, classification decision is important.

Prior research has studied research questions closely related to mine. Hodder et al. (2002) shows how banks trade off benefits and costs related to classification issues between AFS and HTM. Before 1995, unrealized gains/losses from AFS category directly affect regulatory capital. That is a big concern for banks given the significant size and volatility of debt security portfolio. As a result, managers classified huge amounts of debt securities into HTM category to reduce regulatory costs at the

expenses of lower liquidity before 1995. Starting from 1995, unrealized gains/losses from AFS category are excluded from regulatory capital. Fair value changes would not be a concern to regulatory costs any more. Accordingly, banks are allowed to do a one-time reclassification on the end of 1995 and from then on they typically classify very few securities into HTM category (as shown in Figure 2.2 Panel B).

Unger and Fiechter (2009) and Bischof et al. (2010) document how IFRS (International Financial Reporting Standards) banks reclassified securities from held-for-trading and AFS category into AFS/HTM categories at the peak of 2008 financial crisis. In October 2008, the IASB issued an amendment to IAS 39 which enables entities to abandon fair value accounting for selected financial assets. Banks avoided huge fair value loss and kept regulatory capital at an acceptable level through reclassification. That example clearly shows accounting treatment (for example, classification/reclassification of debt securities into AFS or into trading) is usually a less costly way to honor contracts under dramatic changing circumstances. Considering banks in year 2008 financial crisis, when they faced huge losses and shrinking equities/funds, what they can do? Accepting government bailout, issuing new equities/debts, or, classifying debt securities from trading into AFS? Classification/reclassification could be regarded as an option, which is at least valuable to shareholders.

Different from IFRS, FAS (Financial Accounting Standards, which applies to U.S. firms) doesn't prohibit reclassifications among three categories[16]. U.S. banks may have reclassified debt securities well before 2008Q3. Figure 4.1 shows relative importance of trading/AFS/HTM did change before 2008Q3. Specifically, trading

[16] Reclassification of HTM incurs high costs. A company that sells or classifies any significant proportion of its HTM assets must reclassify all of its remaining HTM assets as AFS for the remainder of the current period and the next two financial years.

assets decreased; other two categories increased. In this figure, HTM are measured using fair value too. Relative importance changes seem more pronounced for non-agency MBS and ODS, which are hit by credit crisis mostly. Most significant changes happened in 2008Q3.

Hodder et al. (2002), Unger and Fiechter (2009) and Bischof et al. (2010) are all event studies focusing on how banks adjust classifications when confronting exogenous shocks. This chapter studies cross-sectional variation of banks' classification decision between AFS and trading categories from 2001 to 2009. My research question can be interpreted as, given that managers decide not to hold a security to maturity, which category to put that security in: AFS or trading? Would managers be reluctant to classify securities into trading category since they have a desire to control earnings?

I did not consider securities in HTM for two reasons. First, size of HTM is small (about 3% of all debt securities), which means HTM securities' economic significance is low. Second, liquidity of debt securities in HTM is much lower than those in other two categories. In that sense, debt securities in HTM are quite different from those in AFS/trading categories.

I find banks less likely to classify risky debt securities into trading than into AFS category when: 1) interest revenue is high; 2) assets concentration is high; 3) risky assets proportion is high; 4) previous abnormal loan loss provisions are low; 5) bank's size is large. However, I do not find connections between classification choices and regulatory capital level. When I turn to study classification decision for safe debt securities, only bank's size still could explain classification choices. That is understandable. Since fair value changes on risky securities are more volatile, classification of risky securities into AFS instead of into trading could more

efficiently reduce bank's overall volatility in earnings and in regulatory capital.

The reminder of this chapter is organized as following. Section 4.2 is research design. Section 4.3 discusses sample and descriptions. Section 4.4 presents empirical results. Section 4.5 concludes.

4.2. Research Design

As has been discussed, classifying a debt security into AFS category rather than into trading category could reduce volatility of earnings and regulatory capital. Additionally, accumulated unrealized gains/losses on AFS securities could be realized at any time by simply selling related AFS securities. Keeping other things unchanged, if having a high level of control over fair value changes on debt securities is important for some banks, those banks would be more likely to classify securities into AFS over into trading category, as a result proportion of debt securities in trading category would be relatively lower.

Fair value changes of risky debt securities are more volatile, therefore the hypothetical relation between classification decision and banks' desire to control earnings should be more pronounced for risky debt securities than for safe ones. That is to say, when managers consider putting some securities fitting definition of trading assets into AFS category so as to reduce earnings volatility, credit risky securities would be better candidates. Therefore, I study classification issues for risky securities and for safe securities, respectively. Definition of safe and risky securities is the same to that in Chapter 3.

For risky securities, classification decision is measured as $P\_RISK = \frac{\text{Risk\_in\_Trad}}{\text{RISK}}$. Where "RISK" is dollar value of non-agency MBS and other domestic debt securities

a BHC holds by the end of quarter. "Risk_in_Trad" is dollar value of "RISK" in trading category. Similarly, for safe securities, classification decision is measured as $P\_SAFE = \frac{\text{Safe\_in\_Trad}}{\text{SAFE}}$. Where "SAFE" is dollar value of Treasury, government securities, state securities and agency MBS measured at quarter end. "Safe_in_Trad" is dollar value of "SAFE" in trading category.

These two variables are bounded within the intervals [0, 1]. It is problematic for OLS regression since forecasted value could be out of that range. I apply logistic transformations to them (ln(p_risk/(1-p_risk)) and ln(p_safe/(1-p_safe))), which is a standard solution to this kind of problems (e.g. Morck et al. (2000)). As a result, original variables are mapped to the whole real number space. I constructed dummy variables HIGH_PSAFE and HIGH_PRISK as alternative dependent variables. HIGH_PSAFE equals to 1 if P_SAFE is higher than quarterly median; equals to 0, otherwise. Definition of HIGH_PRISK is similarly. Finally I have two sets of dependent variables: Log_PSAFE / HIGH_PSAFE for safe securities; Log_PRISK / HIGH_PRISK for risky securities. All four variables are measured at quarter end.

I identified some factors may affecting banks' desire to control earnings. Then I investigate whether those factors could explain banks' debt security classifications.

$$\frac{\text{Trading}}{\text{Trading} + \text{AFS}}\ (\text{p}) = \text{Intercept} + \text{Size} + \text{Riskiness of assets} + \text{Regulatory costs} + \text{Operating performance} + \text{Accrual management} + \text{Listed} + \varepsilon$$

Independent Variables:

Size

Large banks are better diversified and could take more risk in a single business line than small ones (Demsetz and Strahan (1997)). Consistent with that observation,

large banks engage in more trading activities chasing trading profits. Additionally, large banks more likely have huge brokerage business, which provides liquidity to the whole debt security market. Since security inventory must be classified as trading assets, proportion of trading securities would be high. Size is measured as logarithm of quarter beginning total assets. Expected sign of estimated coefficient for Size is positive.

Regulatory Costs

Under regulatory capital requirements, banks must maintain various measures of equity above certain percentages of corresponding measures of assets. When bank's regulatory capital is low, so regulators' intervene is highly possible, classifying securities into AFS rather than into trading would alleviate pressures on regulatory capital. Regulatory costs are measured as logarithm of tier1 capital ratio at quarter beginning. Expected sign of estimated coefficient for Regulatory Costs is positive.

Riskiness of Assets

If assets are employed in more risky businesses, demand for control over earnings would be higher. Similarly, if assets are concentrated in a single business line, less diversification would increase performance volatility and increase managers' demand for tight control over earnings. I use proportion of commercial loans, real estate loans, consumer loans, risky securities (RISKSEC), and safe securities (SAFESEC) over total assets at quarter beginning as proxies for riskiness of assets. Those five classes of assets represent majority of assets held by banks in my sample. Mean value of sum of those five types of assets divided by quarter beginning total assets is about 70%.

Those variables are expected to be negatively correlated with dependent variables for following two reasons. First, when a bank's assets are concentrated in any single type of assets, diversification benefits would be small. Those banks are vulnerable to

shocks to single class of assets. SAFESEC (e.g. US treasury bonds) is "safe" in terms of credit worthiness. But these type of assets bare significant inflation risk. For banks holding significant SAFESEC, if inflation rate increases, earnings would deteriorate more quickly than banks holding high-risk high-yield assets. Second, on average, banks have 10% cash or quasi-cash. Negative estimated coefficient for SAFESEC (and other four variables) may reveals that those assets are risky than cash. Even for SAFESEC (which including debt securities issued by states), credit-riskiness is still higher than cash.

Interest Income from Loans

When bank's accounting performance is low, managers have incentives to increase proportion of AFS relative to trading so as to have more power over accounting numbers. Convenient proxies of accounting performance such as ROA/ ROE are affected by types of and classification of debt securities. Therefore, I use interest income from loans to measure accounting performance. It is calculated as previous 4 quarter's mean value of interest and fee income on loans and leases divided by total assets. Interest income from loans deflated by total assets also measures importance of loans. This variable is expected to be positively correlated with dependent variables.

Accrual Management

When a bank managed earnings up by booking positive discretional accruals, I expect it would intend to classify few securities in trading category. Abnormal Loan Loss Provision serves as a proxy for a bank's directional earnings management behavior. I use an established approach (e.g., Moyer (1990); Beatty, Chamberlain and Magliolo (1995); Collins, Shackelford and Wahlen (1995); Ahmed et al. (1999); Beatty et al. (2002)) to estimate the nondiscretionary portion of the loan loss provision. Following is the regression model:

$$\textit{Loan Loss Provisions}_t$$

$$= \beta_0 + \beta_1 \textit{Loan Loss Reserves}_{t-1} + \beta_2 \textit{Net Chargeoffs}_{t-1}$$
$$+ \beta_3 \Delta\, \textit{Pastdue Loans}_{t-1} + \beta_4 \Delta\, \textit{Nonaccrual Loans}_{t-1}$$
$$+ \beta_5 \textit{Commercial Loans}_{t-1} + \beta_6 \textit{Consumer Loans}_{t-1}$$
$$+ \beta_7 \textit{Real Estate Loans}_{t-1} + \beta_8 \textit{Log(Total Assets)}_{t-1} + \varepsilon$$

All variables are deflated by quarter beginning total assets, except the last explaining variable: log (total assets). I run this regression quarterly and influential observations are deleted using Cook (1977) distance criteria. For each firm-quarter, I get an Epsilon, which stands for discretionary portion of the loan loss provision. At last, I calculate a mean value of Epsilon during previous 4 quarters for a given firm-quarter. That number is used to proxy for my independent variable Abnormal Loan Loss Provision and it is expected to be positively related to dependent variables.

Variable definition and measurement for "loan loss provision" mentioned above follow Bischof, Bruggemann and Daske (2010). They find in 2008/09, European banks with high abnormal loan loss provisions in previous years would be less likely reclassify debt securities from trading category into AFS/HTM. Similarly, in my setting, if a bank has accumulated positive abnormal loan loss provision during previous periods, it would be easy for the bank to maintain strong earnings and capital adequacy in the future. Therefore, classifying debt securities into trading category (therefore introduce high earnings volatility) is more acceptable. On the other situation, if a bank has expensed abnormally lower loan loss provision, future would be a hard time. I predict that kind of banks would be reluctant to classify debt securities into trading category.

Listed

Listed banks may have strong pressure to have a decent earnings number. So I use a dummy variable "Listed" to capture this difference. Expected sign is negative.

Definitions for all variables are listed in Table 4.1.

4.3 Data

Since I study banks' classification decision using risky and safe securities separately, I need detail information about debt securities which is available after 2001. Therefore I started with a sample consisting of top 1000 banks from 2001Q2 to 2009Q4 as discussed in chapter 2. Sample period begins in 2001Q2, because I require debt security information in last quarter. So I start with 34787 bank-quarters. Secondly, I require a bank-quarter be included in my sample if that bank held positive trading securities, AFS securities, risky securities and safe securities in that quarter. If a bank did not hold any risky security or safe securities, dependent variable P_RISK and P_SAFE would be undefined. Additionally, majority of banks did not hold trading securities. It is possible that classification of securities into trading or into AFS is not a real question for those banks. They simply do not hold debt securities for trading purpose. So I exclude bank-quarters with zero investments in trading or in AFS category. There're 2226 bank-quarters holding positive debt securities in trading, AFS, risky and safe categories. Number of observations decreased mainly due to "having positive trading securities" requirement. Finally, I require all independent variables are available. There're 2176 bank-quarters in my sample (on average 62 banks in each quarter). Sample selection process is summarized in table 4.2 Panel A. Banks left in my studied sample are very large and representative. Comparing to the original sample (34787 bank-quarters), they hold 79% of total assets, 70% of AFS securities, 94% of trading securities, 75% of safe securities and 79% of risky securities.

Table 4.2 Panel B presents proportion of dollar amounts invested in each

subcategory. 52% of investments are in SAFE securities in AFS category; 20% in SAFE/TRAD category; 15% in RISK/AFS category; and 13% in RISK/TRAD category. 46% of risky securities are in trading category, while only 28% of safe securities are in trading category. It suggests risky securities are more likely held for trading purpose. Table 4.2 Panel C shows 31% of observations in my final sample do not have securities in RISK/TRAD category. Majority of bank-quarters have investments in other 3 subcategories.

Table 4.3 is descriptive statistics. Mean value of P_RISK is 0.26; while mean value of P_SAFE is 0.10. Contrary to intuition, banks classify higher proportion of risky securities into trading category. That could be due to certain types of business nature. Table 4.4 presents correlations between variables. Spearman correlation between P_RISK and P_SAFE is 0.347. Correlations between variables are not very high.

4.4. Empirical Results

Before running regressions, I partition sample into five groups according to a certain independent variable. Then I simply compare composition of securities in the highest and lowest groups.

For risky securities, I find big banks classify more securities into trading category. Banks with low proportion of risky securities /safe securities /commercial loans /real estate loans tend to classify more risky securities into trading category. It is consistent with concentration of certain type of assets could be a concern and needs higher control over earnings. Banks have high interest revenue from loans, or have positive abnormal loan loss provisions classify more risky debt securities into trading category. All these patterns are as expected. Listed banks do allocate low proportion of risky

securities into trading. However, patterns for capital adequacy ratio and for consumer loans are contradict to prediction. For safe securities, patterns are similar except for RiskSec. Additionally, group differences partitioned by four factors are not significantly different. All these results are summarized in Table 4.5.

Table 4.6 Panel A presents regression results for risky debt securities. All predictions are valid except that three factors (capital adequacy ratio, consumer loans and Listed) do not load.

Large banks have higher proportion of risky debt securities classified into trading category. Large banks may actively participate in trading activities. Banks with high capital adequacy ratio do not classify more risky debt securities into trading than other banks.

We find both coefficients for RiskSec and SafeSec are significantly negative. But absolute value of coefficient before RiskSec is economically and statistically larger than that before SafeSec. That means not only assets concentration but also riskiness of assets would affect bank's classification decision. Banks with high proportion of assets in commercial loans or in real estate loans tend to classify less risky debt securities into trading category. For consumer loans, there is a similar relation but not statistically significant.

Banks with high interest income from loans (those have a profitable lending business) put a higher proportion of risky debt securities in trading category. Similarly, banks have accumulated a large loan loss provisions in previous periods (those get prepared for future possible bad years) classify more risky debt securities into trading category.

I expect listed banks have more pressures to keep earnings in "correct" track; therefore they would be less likely put risky debt securities in trading category. That relation seems valid, but not statistically significant.

It is possible classification decision for risky debt securities and for safe ones are correlated. I include bank's classification of safe debt securities as control variable in two model specifications. I find significant positive relation between two classification decisions when both decisions are measured using dummy variables.

Table 4.6 Panel B is regression results for safe debt securities. Only loaded variable is Size. That is not surprising, because price volatility of safe securities is lower. Classifying safe securities such as U.S. treasury bonds into AFS instead of into trading category would not improve managers' dictation on earnings significantly.

4.5. Conclusions

This study extends our understanding on classification decisions under SFAS 115. Using quarterly data from 2001Q2 to 2009Q4, I find banks classify smaller proportion of risky debt securities into trading category if those banks need tight control of earnings. Specifically, I find assets composition significantly affect banks' classification decision. For example, when assets are concentrated in risky securities, safe securities, commercial loans, or real estate loans, banks classify less risky securities into trading category. That negative relation is strongest for risky debt securities, which is quite interesting. In addition, I find banks with high performance, measured as interest income from loans, tend to classify more risky debt securities into trading category. Bank's abnormal loan loss provision is found to be positively correlated with proportion of risky securities in trading category, too. That suggests banks have prepared large amounts of reserves would be less likely acquire additional

earnings discretion through classification decision. That reflects a substitutive effect of different earnings management channels.

Prior literature has investigated banks' classification decision under SFAS 115 or IAS 39. Hodder et al. (2002) studies how banks classify debt securities into HTM versus into AFS before and after 1995. Before 1995, unrealized gains/losses from AFS securities affect regulatory capital; after that, unrealized capital gains would not affect banks' capital adequacy ratio. Unger and Fiechter (2009) and Bischof et al. (2010) shows international evidence on banks' reclassification of securities from trading/ AFS to AFS/HTM categories after 2008 October when IASB issued an amendment to IAS 39 allowing reclassification behavior. My study in this chapter investigates how relative significance of debt securities in trading versus in AFS varies along with firm characteristics. It is aim to find whether managers' desire of control over earnings affects that classification decision in "normal" period. Picking classification decision of trading versus AFS (without considering HTM) simplifies research question. I do not consider HTM since its size is small as we have discussed. The sample consists of 50 to 60 mega banks in each quarter, since I require the bank has trading securities. Results may only be limited to those very large banks.

Chapter 5. Banks' Cherry-picking among Available-for-sale Securities

5.1. Introduction

Chapter 4 has documented that banks of certain characteristics are reluctant to classify risky debt securities into trading category than into AFS category. After a debt security being classified into AFS category, banks gain dictation on when to recognize accumulated unrealized fair value changes on that debt security. That is the only difference classification of securities into AFS instead of into trading category makes. Then two related questions emerge: first, do outsiders treat fair value changes from trading and those from AFS securities differently? Chapter 6 will try to answer this question. The second question is, provided that a debt security has been classified into AFS category, how do banks actually time recognition of fair value changes? This is the research question of this chapter.

As early as in 1980s, when investment securities are measured at historical costs, banks employ several means including gains trading on investment securities to increase earnings/ to reduce regulatory costs (Moyer (1990)). After SFAS 115 is in effect, fair value of investment securities are recognized in balance sheet but not directly into net income (Appendix B discusses accounting differences for trading, AFS and HTM categories under SFAS 115). Additionally, historical costs of investment securities are still available[17]. It is reasonable to believe that effectiveness of cherry-picking strategy will decrease. Outsiders now have enough information to get a comprehensive income number including effects of unrealized gains/losses on

[17] Fair value and historical costs for AFS and HTM securities are reported in "Schedule HC-B—Securities" in FR Y-9C.

investment securities. It should be emphasized that unrealized fair value changes are disclosed although not recognized. Does recognition versus disclosure matter? Literature generally finds that an accounting item attracts more attention from financial information users when it is recognized than when it is disclosed (Ahmed et al. (2006)). Consistently, investors react more positively to realized fair value changes on AFS securities than to unrealized parts; moreover, investors seem overreacted to realized gains/losses on AFS securities (Dong, Ryan and Zhang (2009)). Given all these evidences, cherry-picking on AFS securities could still be an efficient earnings management method. Research does find that gains trading under SFAS 115 (selectively selling AFS securities with realized gains/losses affecting earnings) still exists in financial industry (Jordan, Clark and Smith (1997); Lifschutz (2002)).

This chapter revisits cherry-picking on AFS securities for following reasons. First, I investigate top 1000 BHCs which are more representative for the whole U.S. banking industry. Results of prior research are generally drawn from large banks of small numbers. Smaller banks are quite different from large ones. Small banks usually have concentrated ownership structure. It is harder to mislead sophisticated controlling shareholders using cherry-picking strategy. Cherry-picking strategy incurs transaction costs and deviates from previous optimal assets allocation. Other less costly earnings management methods such as manipulation of loan loss provision would be preferred by controlling shareholder who has a long-term orientation. On the other hand, managers of non-listed small banks may have weaker earnings management incentives since no stock market investors push them. Therefore, cherry-picking behavior may not exist for large scale of banks.

Second, prior research has omitted variable problem. Composition of AFS securities could affect banks' overall ROA and fair value gains/losses on AFS securities at the same time. Keeping other things equal, if a bank's AFS securities are

composed of more risky ones, ROA will be higher since higher interest incomes are required to compensate for higher credit risks. Meanwhile, fair value losses would be more likely happen for that bank due to credit risks have been taken. Given that realized gains/losses positively correlate to total fair value changes, we'll expect a negative correlation between ROA and realized gains/losses on AFS securities, which has been regarded as evidence of cherry-picking on AFS securities to smooth earnings. Therefore, it is important to control for AFS security composition when exploring banks' cherry-picking activities[18].

Third, prior literature links gains trading among AFS securities to managerial incentives to smooth earnings and to reduce regulatory costs. In addition to these two types of earnings management incentives, I investigate whether managers do gains trading on AFS securities to achieve earnings targets or to facilitate equity raising.

I find all four types of incentives can explain realized gains/losses on AFS securities after controlling for effects of AFS security composition. In contrast, those earnings management incentives cannot explain total fair value changes on AFS securities (the sum of realized and unrealized fair value changes on AFS securities). That is consistent with the idea that gains trading on AFS securities only affects how the pie being divided but not the size of that pie.

Banks with more AFS securities are found to have higher realized gains on AFS securities but not total fair value changes. That suggests banks prefer to sell debt securities with accumulated unrealized gains than those with accumulated unrealized losses.

[18] AFS securities' detailed composition data is not available until 2001. Sample periods of prior literature on gains trading among AFS securities usually are in 1990s, during which detailed AFS composition information is not available.

This chapter proceeds as follows. Research design is discussed in section 5.2. Section 5.3 presents the sample formation process and descriptive statistics of my sample. Section 5.4 reports empirical results. Section5.5 concludes.

5.2. Research Design

Do banks selectively sell AFS securities to manage earnings? I employ the following model to answer this question:

$$Disposal\ Gains = \alpha_k * Incentives_k + \beta 1 * AFS + \beta 2 * Pool + \sum_{n=1}^{10} \gamma_n * FVCn + Intercept + \varepsilon$$

Disposal gains/losses are realized gains/losses on AFS securities, which are directly reported in income statement. Intuitively, disposal gains can come from two sources: fair value changes in current period and unrealized ones in prior periods. POOL is accumulated unrealized gains/losses on AFS securities[19] at quarter beginning, could be viewed as a reservoir of unrealized fair value changes which will eventually flow into net income. Beta2 is interpreted as normal flow speed of that reservoir.

To control for current period's fair value changes, I included estimated current fair value changes on 10 subcategories (FVC_n). FVCn in a specific quarter is the multiplier of a specific type of AFS securities and fair value change ratio for that type of AFS security at that specific quarter (which has been estimated in Chapter 2). For example, estimated fair value changes for U.S. Treasury in 2009Q4 is 0.14%, for a

[19] Accumulated unrealized gains/losses from AFS securities are part of "other comprehensive income" in equity. That information is not reported in balance sheet but be available in "Schedule HC-R—Regulatory Capital", because accumulated unrealized gains/losses are teased out from equity to get regulatory capital.

bank whose quarter beginning holding of Treasury is 1 million, estimated fair value changes for that bank in 2009Q4 would be 1.4 thousand, and be included as a control variable. $Gamma_n$ represents the average proportion of current fair value changes on n^{th} type of AFS securities be realized in current period. Therefore, Beta2 and Gammas reflect average speeds of "being recognized into earnings" for accumulated unrealized (in stock sense) and current (in flow sense) fair value changes, respectively. Expected value of Beta2 and Gammas should range from 0 to 1.

It should be noticed that reported fair value changes (no matter are from prior periods or from current periods) are netted value. For example, in a quarter, a bank's fair value gains are 1 and fair value losses are 2. Then fair value changes are -1. That bank still can recognize fair value gains as 1 and book unrealized fair value losses as -2. That capacity of recognizing fair value gains/losses is not captured by disclosed "netted" fair value changes. Therefore, I include AFS securities at quarter beginning as a proxy for both fair value gains and fair value losses a bank can recognize. As size of AFS securities increases, size of recognizable fair value gains and fair value losses would increase, too. If banks are more likely to recognize fair value gains, Beta1 will be positive; otherwise, Beta1 will be negative. Beta1 would be zero if banks have no preference.

I identified four potential earnings management incentives that may affect banks' decision on selling AFS securities. The first one is to smooth earnings. Banks smooth earnings by increasing loan loss provision (LLP) in good time and decreasing LLP in bad time (Liu and Ryan (2006)). Realized gains/losses from AFS securities are negatively correlated to ROA for insurance firms and for banks, which is consistent with those financial firms engage in gains trading on AFS securities to smooth earnings (Jordan et al. (1997); Lifschutz (2002)). Bank's ROE (quarterly net income before extraordinary items minus realized gains/losses from AFS securities, divided

by quarter beginning equity) would be regarded as high, if it is among top 10% of ROEs in a quarter. On the other hand, if ROE is among bottom 10%, it will be regarded as low ROE. If banks smooth earnings through gains trading on AFS securities, I expect "High ROE" banks have negative realized gains/losses on AFS securities; "Low ROE" banks have positive ones.

Following prior literature, I identify three types of earnings targets: zero, last quarter's earnings and analyst's forecasted earnings. "To Keep Positive" labels banks whose ROE before realized gains/losses on AFS is lower than zero but higher than -1%. "To Keep Increase" tags banks whose ROE before disposal gains on AFS securities is lower than last quarter's reported ROE, but that gap is smaller than 1%. "Barely MBE" identifies banks that meet or beat the last analyst forecast before quarter end by less than one cent. Since quarter end is the last moment a bank can employ gains trading strategy and it is hard to predict future analyst forecasts by that moment, I pick the last analyst forecast before quarter end as bank's earnings target intend to beat. All these three variables are predicted to be positively correlated with realized gains/losses on AFS securities, if banks really do gains trading on AFS securities to meet earnings targets.

For any earnings target (zero, last period's earnings, or analyst forecast), those firms slightly exceeding the target are usually regarded as "suspects" of conducing earnings management in literature. But here for two earnings targets (zero and last period's earnings) I prefer to use alternative proxies: whether or not net income before disposal gains from AFS securities is below the target by a small magnitude. The reason is "earnings slightly above target" group includes firms using accounting manipulations other than cherry picking to successfully achieve their targets; "earnings slightly above target" type of proxies would reduce testing power. Second, to undo effects of cherry picking to get earnings before disposal gains is easy in this

setting. A significant and positive estimated coefficient for "earnings before disposal gains slightly below target" group suggests that kind of banks on average use gains trading on AFS debt securities to exceed earnings target.

To reduce regulatory costs is a unique earnings management incentive for banks. As long as a bank's regulatory capital ratio falls below a red line, bank regulators will step in and take corrective actions. Banks, especially managers would never want to be in that situation. At another hand, low capital ratio prevents a bank to borrow/lend further, which is costly, too. Since unrealized fair value changes on AFS securities do not affect regulatory capital ratio, gains trading on AFS securities can reduce regulatory costs for banks. "Low Capital Adequacy" identifies banks with lowest 10% tier1 capital ratio in each quarter. Dummy variable "Not Well Capitalized" equals to 1 for banks not well capitalized; equals to zero, otherwise. If tier1 ratio is lower than 5%, or risk based tier1 ratio is lower than 6%, or risk-based total ratio is lower than 10%, that bank is regarded by bank regulators as not well capitalized (As shown in Appendix E). Expected signs before "Low Capital Adequacy" and "Not Well Capitalized" are positive.

Different from disposal gains on AFS securities, total fair value changes on AFS securities are hard to be manipulate, hypothetically. For each quarter, total fair value changes are related to amount of investments in each kind of AFS securities at quarter beginning. Returns to unit investment of each kind of AFS securities differ across time, as Chapter 2 shows. Total fair value changes on AFS securities consist two parts: realized part (i.e. disposal gains/losses from AFS securities, be reported in current income statement) and unrealized part (which could be calculated as quarterly difference of accumulated unrealized gains/losses on AFS securities[20]).

[20] Accumulated unrealized gains/losses from AFS securities are part of "other comprehensive income" in equity. That information is not reported in balance sheet but be available in "Schedule HC-R—Regulatory Capital", because accumulated unrealized gains/losses are teased out from equity to get regulatory capital.

The reasoning process been discussed in this section is summarized in Figure 5.1. First, both total fair value changes on AFS securities and disposal gains come from two sources: each component of AFS securities and accumulated unrealized gains/losses on AFS securities. Second, earnings management incentives are supposed to affect disposal gains but not total fair value changes.

5.3. Sample and Descriptive Statistics

My sample period in this chapter is from 2001Q2 to 2009Q4. Originally there're 34,788 firm-quarters. After requiring quarter beginning AFS securities to be positive and quarterly realized & unrealized fair value changes on AFS securities to be available, I get 34,066 firm-quarters. Finally I delete observations with extreme dependent variables (below 1th percentile or above 99th percentile) in each quarter. As a result, there're 32,867 firm-quarters in total. Sample selection process is summarized in Table 5.2.

Table 5.3 presents descriptive statistics for all variables. On average, Realized gains on AFS securities are 0.05‰ of total assets. Both 25th and 75th percentiles of Realized_Gains are zero. Actually, 58% of observations did not sell any debt securities. That suggests when investment securities are classified in AFS category, recognition of fair value changes into earnings is largely delayed. Fair_Value_Change is total fair value changes on AFS securities. Mean value of Fair_Value_Change is 0.00%, smaller than Realized_Gains, suggesting banks tend to book positive fair value changes on AFS securities into earnings.

Mean value of "High ROE" and "Low ROE" is 9.64% and 9.57%, respectively. There're 2.44% of observations whose ROE is slightly negative. 38.43% of

observations have a ROA quite close but below to last quarter's nominal ROA. Proportion of banks who barely meet or beat analyst forecast is 20.11%. 56.85% of observations raise equities in current or future 3 quarters. 5.29% of observations are not well capitalized. AFS securities occupy 17.94% of total assets, on average. Average ratio of accumulated unrealized gains/losses to total assets is 0.05%. Fair value changes on each subcategory are quite small, but variances of them have considerable size.

5.4. Empirical Results

OLS regression (clustered by firm, quarter dummies included) in Table 5.4 confirms earnings management incentives do affect realized gains/losses on AFS securities. For banks with highest 10% quarterly ROA, realized gains/losses on AFS securities would be lower; for banks with lowest 10% quarterly ROE, realized gains/losses would be higher. This is consistent with banks use AFS securities to smooth earnings. Three types of banks are believed to have a strong incentive to increase earnings and may pick AFS securities with positive unrealized fair value changes to sell: 1) those barely meet or beat analyst forecast; 2) whose ROE is a little bit lower than last quarter's before considering realized gains/losses on AFS securities; 3) whose ROE is slightly negative before considering realized gains/losses on AFS securities. Table 5.4 columns 2 to 4 confirm that prediction. Table 5.4 columns 5 and 6 shows banks going to raise ordinary shares in the near future recognize higher disposal gains from AFS securities. They probably use this method to boost earnings and attract investors. Columns 7 and 8 demonstrate that banks with low capital adequacy or not well capitalized have high realized gains/losses on AFS securities. That evidence supports banks strategically pick in-money securities to sell in order to improve capital adequacy. Coefficients and robust standard errors for incentives and intercept have been multiplied by 1000 in table 5.4. The purpose is to let those

numbers readable since they are very small. Significance levels won't be affected.

Independent variable "AFS" stands for size of AFS securities with positive and negative fair value changes. The Coefficient before "AFS" is positive and significant, suggesting banks intend to sell appreciated AFS securities in general. It is possible because bank want to increase current earnings. It is also possible that when banks need cash (liquidity), they sell in-money AFS securities first, an observed investment behavior among small investors (Odean (1998)). However, "AFS" could simply stand for higher debt security picking ability. That is, banks with larger AFS security portfolio have better sense on which debt security will appreciate in the future. The coefficient before "AFS" in Table 5.5 is not statistically different from zero, therefore exclude that alternative explanation.

"Pool" and current fair value changes on each subcategory of AFS securities can explain realized gains/losses on AFS securities. Estimated coefficients vary from zero to 0.07. It is interesting to note that coefficients before safe securities seem lower than those before risky securities.

Models in Table 5.5 regress total fair value changes from AFS on same sets of independent variables in Table 5.4. Managers' earnings management incentives remain unchanged but managers' ability to change total fair value gains/losses are doubted. Results confirm that earnings management incentives have no explanatory power on total fair value changes, as expected.

5.5. Conclusions

Prior literature has documented that financial institutions engage in cherry-picking activities related to AFS securities based on limited number of big

banks or insurance firms. However, there're omitted variable problems for their research design.. I control for current fair value changes on components of AFS securities, accumulated unrealized gains/losses at the beginning of period, and total AFS securities. All of them are significantly positively related to disposal gains/losses, means they should be used to gauge "normal" level of disposal gains. One interesting finding is, current fair value changes on agency MBS, non-agency MBS and equity investments are significantly positive, while those on other components of AFS securities do not. That finding shows three types of AFS securities traded most frequently for banks in general.

After controlling for those important variables, I confirm that banks strategically recognize accumulated unrealized gains/losses on AFS securities as earnings management incentives predicted for top 1000 bank holding companies during a long period (year 2001 to 2009). Those earnings management incentives are: smoothing earnings, meet or beat earnings targets, helping SEO, and reducing regulatory costs. This evidence further supports Chapter 4 on why banks inclined to classify debt securities into AFS category rather than into trading category.

Since information such as fair value, historical costs, and accumulated unrealized fair value changes is available to outsiders, people can see through cherry picking behavior by undoing any effects of gains trading on AFS securities. Why banks still do that? Market may cannot "see through" banks' earnings management through that channel since people only have limited attention. Dong, Ryan and Zhang (2009) suggest that market over-reacts to realized part of fair value changes on AFS securities, which is consistent with my findings. Second, banks may manipulate earnings for reasons other than misleading capital market participants. For example, gains trading on AFS securities could be used to smooth earnings to help maintain a stable regulatory capital level, which is very important for banks.

Chapter 6. Properties of fair value gains and losses on Trading and on AFS category

6.1. Introduction

Are fair value changes on trading securities and those on AFS securities the same? This is the research question of this chapter. Earnings characteristics such as persistence should be the same if the difference between trading and AFS is purely from classification. Classification per se could not affect economic essence of earnings components. If outsiders understand that point, value relevance of two types of earnings should be the same, too.

SFAS defines trading assets as "*Debt and equity securities that are bought and held principally for the purpose of selling them in the near term are classified as trading securities*". By definition, holding trading assets is mainly targeted at capital gains. Banks typically hold trading securities in a shorter time period than they do on AFS securities. It is possible that accounting definition does consistent with reality, that is to say, banks do hold trading securities and AFS securities for different purposes.

If a bank has ability to identify arbitrage opportunities in debt security market (as high-paid traders supposed to do), or if a bank acts as a broker, provides liquidity to investors in debt market, and charges a bid-ask spread from transactions, gains from trading securities should be persistent at least in a certain degree. For AFS securities, banks hold them mainly to manage interest risk and liquidity. If debt securities' future cash flow behaves as expected, which means credit risk doesn't change much, the most influential factor driving debt security's price would be expectations on future Treasury bond's interest (denominator factor). If that expectation doesn't go in a

single direction, fair value changes on AFS securities would not be persistent.

I think fair value changes from trading securities are persistent, but those from AFS are not. If that is the case, ERC for the former would be larger than the latter. And news about fair value changes from trading category would drive stock returns more.

Fair value gains and losses on AFS securities are measured as the sum of realized and unrealized gains/losses from AFS securities. I do not differentiate realized and unrealized part separately because comparing realized or unrealized part of fair value changes on AFS securities alone to "total" fair value changes on trading assets are comparing apple to orange. In Chapter 5, we find total fair value changes on AFS securities seem not subject to managers' manipulation. But realized part as well as unrealized part are. Therefore comparing any one of them to "total" fair value changes on trading securities is not appropriate. Again from statistics in Chapter 5, we know that more than 50% of bank-quarters did not sell any AFS securities (so realized part is zero). Additionally, variance of total fair value changes is 4 times larger than that of realized part. Unrealized gains/losses are much larger than realized part for majority of firm-quarters. Dong et al. (2009) provides evidence that shareholders overreact to disposal gains/losses (realized part) on AFS securities. That will bias against this chapter's finding to be discussed later.

I measure fair value changes on trading securities using trading revenue. I have to admit that is a noisy measure. Trading revenue includes gains/losses from derivatives. Given that derivatives are used to hedge against certain risks banks exposed to, persistence and value relevance should not be high. Trading revenues also includes fair value changes from trading liabilities. Most important part among trading liabilities is derivatives with negative fair value. Other items are quite insignificant.

Lastly, trading revenues also come from some trading assets like loans which are not available in AFS securities. Those types of trading assets account about 15% of all trading assets. I do not know whether incomes generated from those trading assets are more persistent or value relevant than those from debt securities.

I compare persistence of fair value changes on trading and on AFS category in section 6.2. In section 6.3 and 6.4 I investigate which one is more value relevant using ERC and VAR approach, respectively. I find trading revenues are more persistent, and have higher value relevance than fair value changes on AFS securities do. In section 6.4 I also find that non-interest income drives more firm-specific returns than interest income dose. That is consistent with the trend that banks are engaging into more businesses other than lending. Section 6.5 concludes.

6.2. Earnings Persistence

I follow Sloan (1996) to compare persistence of trading revenue and gains/losses on AFS securities.

$$\text{Earnings}(t) = \alpha + \beta 1 * \text{Tradrev}(t-1) + \beta 2 * \text{GAFS}(t-1) + \beta 3 * \text{Others}(t-1) + e(t)$$

"Earnings" equals to income before extraordinary items plus unrealized gains from AFS. It could be regarded as one type of comprehensive income. "Earnings" is decomposed into three parts: Tradrev, GAFS and Others. Tradrev is annual trading revenue. GAFS is sum of realized and unrealized gains (losses) from AFS securities. Others equals to Earnings minus GAFS and Earnings. All four variables are deflated by year beginning market value. If beta 1 is larger than beta 2, trading revenue is more persistent than fair value changes on AFS securities.

It's interesting to know whether realized and unrealized fair value changes on AFS securities have similar earnings persistence. Therefore I decompose GAFS into realized part and unrealized part.

$$\text{Earnings}(t) = \alpha + \beta 1 * \text{Tradrev}(t-1) + \beta 2 * \text{Disposal Gains}(t-1) + \beta 3 * \text{Unrealzied AFS Gains}(t-1) + \beta 4 * \text{Others}(t-1) + e(t)$$

There're 4,328 firm years with necessary variables form 1996 to 2008 (Table 6.1). Table 6.2 shows that on average, annual trading revenue is 0.13% of market value. Since only big banks generate trading revenue, real economic significance is larger than this number suggests. GAFS, total fair value changes on AFS securities, equal to 0.37% of firm's market value on average. Disposal gains is 0.09%; unrealized AFS gains is 0.28%.

In Table 6.3 Panel A, we find previous year's trading revenue is positively related to current year's earnings; and relation between last year's gains & losses from AFS securities and current year's earnings is negative. This evidence shows trading revenue is persistent in a certain degree and gains & losses from AFS securities are mean-reverting. Further evidence in Table 6.3 Panel B show that disposal gains/losses are transitory (its estimated coefficient is statistically insignificant from zero). Unrealized part, like GAFS, has a negative and significant estimated coefficient.

6.3. Value relevance: ERC approach

I follow Ali and Zarowin (1992) to compare ERC for trading revenue and gains/losses on AFS. Both change and level of earnings components are included as explanatory variables.

$$\text{yret (t)} = \alpha + \beta 1 * \Delta\text{Tradrev} + \beta 2 * \Delta\text{GAFS} + \beta 3 * \Delta\text{Others} + \gamma 1 * \text{Tradrev} + \gamma 2 * \text{GAFS} + \gamma 3 * \text{Others} + e$$

This is a pooling OLS regression on annual market adjusted return Yret, which is accumulated from April to next year's March. Tradrev is annual trading revenue. GAFS is sum of realized and unrealized gains (losses) from AFS securities. Others equals to Earnings minus GAFS and Tradrev. "Earnings" is income before extraordinary items plus unrealized gains from AFS. Δtradrev, ΔGAFS, and Δothers are annual change of Tradrev, GAFS and Others, respectively. All variables except Yret are deflated by year beginning market value. (t) and (t-1) are symbols for current and previous year, respectively. Year dummies are included. Independent variables are winsorized at 1% and 99%.

If sum of beta1 and gamma 1 is larger than that of beta 2 and gamma 2, ERC of trading revenue is higher, suggest trading revenue is more value relevant.

ERC results in Table 6.4 Panel A confirm that trading revenue is more value-relevant than gains/losses from AFS securities. It is consistent with the finding gains/losses from AFS are less persistent.

I decompose GAFS into realized part and unrealized part and get this regression.

$$\text{yret (t)} = \alpha + \beta 1 * \Delta\text{Tradrev} + \beta 2 * \Delta\text{Disposal Gains} + \beta 3 * \Delta\text{Unrealzied AFS Gains} + \beta 4 * \Delta\text{Others} + \gamma 1 * \text{Tradrev} + \gamma 2 * \text{Disposal Gains} + \gamma 3 * \text{Unrealized AFS Gains} + \gamma 4 * \text{Others} + e$$

What I'm interested in is whether disposal gains have similar ERC as unrealized AFS gains/losses do. Results in Table 6.4 Panel B show that realized part has a larger ERC than unrealized part does (0.63 versus 0.36). However, the difference is

statistically insignificant.

6.4. Value relevance: VAR approach

Finally, I use VAR approach to investigate whether trading revenue drives stock price more than gains/losses from AFS do.

Vuolteenaho (2002) uses a vector autoregressive model to decompose to decompose an individual firm's stock return into two components: changes in cash-flow expectations and changes in discount rates. He finds that firm-level stock returns are mainly driven by cash-flow news. Accounting research employs this research approach to decompose earnings into components and investigate which one is more value relevant after controlling effects of unexpected discount rate changes (Callen and Segal (2004); Callen, Hope and Segal (2005)).

Before I study relative value relevance of trading revenue versus fair value changes on AFS securities, I investigate value relevance of interest income versus non-interest income first. Effects of interest income and non-interesting income on bank's income and risks are evolving, reflecting changes of banks' business model (Stiroh (2004); Stiroh (2006); Lepetit, Nys, Rous and Tarazi (2008)).

6.4.1. Interest income versus Non-interest income

In this section, fist I discuss VAR approach used to investigate relative value relevance of interest income and noninterest income in detail; then I present the findings.

6.4.1.1. VAR approach

Starting from Vuolteenaho 2002, we have

$$r_t - E_{t-1}(r_t) = \Delta E_t \sum_{j=0}^{\infty} \rho^j \left(roe_{t+j} - i_{t+j}\right) - \Delta E_t \sum_{j=1}^{\infty} \rho^j r_{t+j} \qquad (6.1)$$

Where:

Δ = first differencing operator

E_t= expectations operator and $\Delta E_t = E_t(*) - E_{t-1}(*)$

r_t = log of 1 plus equity return (cum dividend) in period t in excess of the risk free rate

ρ = constant error approximation term

i_t = log of 1 plus risk free rate in period t

roe_t= log book return on equity in period t, equals to log (1+ X_t/BV_{t-1})

X_t= income before extraordinary items in period t

BV_{t-1} = book value of equity at the end of period t-1

Equation (6.1) says unexpected stock return equals to expectation change about firm's future ROE, minus expectation change about firm's future capital costs.

Following Callen et al. (2005), I decompose bank's income before extraordinary items ***X*** into three parts: net interest income ***I***, noninterest income ***NonI***, and other expenses ***EXP***.

All accounting information mentioned here is from "FR Y-9C Reporting form, Schedule HI – Consolidated Income Statement", which is filed by bank holding companies following Federal Reserve Banks' requirement.

Net interest income ***I*** equals to "total interest income" (item 1.h), net of "total interest expense" (item 2.f) as well as "provision for loan and lease losses" (item 4). Noninterest income ***NonI*** includes "total noninterest income" (item 5.m), "realized gains (losses) on held-to-maturity securities" (item 6.a), and "realized gains (losses) on available-for-sale securities" (item 6.b). Other expenses ***EXP*** include "total noninterest expense" (item 7.c, which including salaries and employee benefits,

expenses of premises and fixed assets, etc.), "applicable income taxes" (item 9) and "minority interest" (item 10). ***EXP*** generally is negative.

Net interest income plus noninterest income and other expenses equals to "Income (loss) before extraordinary items and other adjustments" (item 11). That is,

$$I + NonI + EXP = X$$

Therefore, *roe* could be rewritten as,

$$roe_t = log(1 + X_t/BV_{t-1})$$

$$\approx X_t/BV_{t-1}$$

$$= I_t/BV_{t-1} + NonI_t/BV_{t-1} + Exp_t/BV_{t-1}$$

Unexpected return could be explained by expectation changes from earnings components and by expectation changes of required rate of return. Equation (6.1) could be written as:

$$r_t - E_{t-1}(r_t) = \Delta E_t \sum_{j=0}^{\infty} \rho^j \left(Exp_{t+j} - i_{t+j}\right) + \Delta E_t \sum_{j=0}^{\infty} \rho^j \left(I_{t+j}\right) + \Delta E_t \sum_{j=0}^{\infty} \rho^j \left(NonI_{t+j}\right) -$$

$$\Delta E_t \sum_{j=1}^{\infty} \rho^j \, r_{t+j} \qquad (6.2.a)$$

Or, equivalently,

$$r_t - E_{t-1}(r_t) = nExp_t + nI_t + nNonI_t - nr_t \qquad (6.2.b)$$

Therefore variance of current unexpected stock return could be decomposed into parts as following:

$$var\{r_t - E_{t-1}(r_t)\} =$$

$$var(nExp_t) + var(nI_t) + var(nNonI_t) + var(nr_t) + 2cov(nExp_t, nI_t) +$$

$$2cov(nI_t, nNonI_t) + 2cov(nExp_t, nNonI_t) - 2cov(nr_t, nExp_t) - 2cov(nr_t, nI_t) -$$

$$2cov(nr_t, nNonI_t) \qquad (6.3)$$

I assume stock return, earnings components, and book to market ratio follow a vector autoregressive system:

$$z_{i,t} = Az_{i,t-1} + \eta_{i,t} \qquad (6.4.a)$$

Or, alternatively,

$$r_t = \alpha_1 r_{t-1} + \alpha_2 Exp_{t-1} + \alpha_3 I_{t-1} + \alpha_4 NonI_{t-1} + \alpha_5 bm_{t-1} + \eta_{1,t} \qquad (6.4.b1)$$

$$Exp_t = \beta_1 r_{t-1} + \beta_2 Exp_{t-1} + \beta_3 I_{t-1} + \beta_4 NonI_{t-1} + \beta_5 bm_{t-1} + \eta_{2,t} \qquad (6.4.b2)$$

$$I_t = \gamma_1 r_{t-1} + \gamma_2 Exp_{t-1} + \gamma_3 I_{t-1} + \gamma_4 NonI_{t-1} + \gamma_5 bm_{t-1} + \eta_{3,t} \qquad (6.4.b3)$$

$$NonI_t = \iota_1 r_{t-1} + \iota_2 Exp_{t-1} + \iota_3 I_{t-1} + \iota_4 NonI_{t-1} + \iota_5 bm_{t-1} + \eta_{4,t} \qquad (6.4.b4)$$

$$bm_t = \kappa_1 r_{t-1} + \kappa_2 Exp_{t-1} + \kappa_3 I_{t-1} + \kappa_4 NonI_{t-1} + \kappa_5 bm_{t-1} + \eta_{5,t} \qquad (6.4.b5)$$

From equation (4.b1), we can get,

$$r_t - E_{t-1}(r_t) = \eta_{1,t} = e1'\eta_{i,t}$$

Where e1'= (1, 0, 0, 0, 0),

From equation system (4.a),

$$E_t(z_{i,t+1+j}) = A^{j+1} z_{i,t}$$

We can get,

$$nr_t = \Delta E_t \sum_{j=1}^{\infty} \rho^j r_{t+j} \stackrel{\text{def}}{=} E_t \sum_{j=1}^{\infty} \rho^j r_{t+j} - E_{t-1} \sum_{j=1}^{\infty} \rho^j r_{t+j} = e1' \sum_{j=1}^{\infty} \rho^j A^j \eta_{i,t}$$

$$= e1'\rho A(I - \rho A)^{-1}\eta_{i,t} = \lambda_1'\eta_{i,t}$$

Similarly,

$$nI_t = \Delta E_t \sum_{j=0}^{\infty} \rho^j \left(I_{t+j}\right) \stackrel{\text{def}}{=} \Delta E_t \sum_{j=0}^{\infty} \rho^j \left(I_{t+j}\right) - \Delta E_{t-1} \sum_{j=0}^{\infty} \rho^j \left(I_{t+j}\right) = e3'(I - \rho A)^{-1}\eta_{i,t} = \lambda_3'\eta_{i,t}$$

Where e3'= (0, 0, 1, 0, 0),

$$nNonl_t = \Delta E_t \sum_{j=0}^{\infty} \rho^j \left(Nonl_{t+j}\right) \stackrel{\text{def}}{=} \Delta E_t \sum_{j=0}^{\infty} \rho^j \left(Nonl_{t+j}\right) - \Delta E_{t-1} \sum_{j=0}^{\infty} \rho^j \left(Nonl_{t+j}\right)$$

$$= e4'(I - \rho A)^{-1}\eta_{i,t} = \lambda_4'\eta_{i,t}$$

Where e4'= (0, 0, 0, 1, 0),

Lastly, innovation from expenses ***EXP*** is calculated residually,

$$nExp_t = \Delta E_t \sum_{j=0}^{\infty} \rho^j \left(Exp_{t+j} - i_{t+j}\right)$$

$$\stackrel{\text{def}}{=} \{r_t - E_{t-1}(r_t)\}$$

$$- \left\{ \Delta E_t \sum_{j=0}^{\infty} \rho^j \left(I_{t+j}\right) + \Delta E_t \sum_{j=0}^{\infty} \rho^j \left(Nonl_{t+j}\right) - \Delta E_t \sum_{j=1}^{\infty} \rho^j r_{t+j} \right\}$$

$$= (e1' - e3' - e4')(I - \rho A)^{-1}\eta_{i,t} = \lambda_2'\eta_{i,t}$$

All these innovations could be calculated as long as coefficient matrix $\boldsymbol{A}$ and residual vector η have been estimated.

Variance of returns could be decomposed using following equations.

$$var\{r_t - E_{t-1}(r_t)\}$$

$$= var(nExp_t) + var(nI_t) + var(nNonI_t) + var(nr_t) + 2cov(nExp_t, nI_t)$$

$$+ 2cov(nI_t, nNonI_t) + 2cov(nExp_t, nNonI_t) - 2cov(nr_t, nExp_t)$$

$$- 2cov(nr_t, nI_t) - 2cov(nr_t, nNonI_t)$$

$$var(nr_t) = \lambda_1'\Omega\lambda_1$$

$$var(nExp_t) = \lambda_2'\Omega\lambda_2$$

$$var(nI_t) = \lambda_3'\Omega\lambda_3$$

$$var(nNonI_t) = \lambda_4'\Omega\lambda_4$$

$$cov(nExp_t, nI_t) = \lambda_2'\Omega\lambda_3$$

$$cov(nI_t, nNonI_t) = \lambda_3'\Omega\lambda_4$$

$$cov(nExp_t, nNonI_t) = \lambda_2'\Omega\lambda_4$$

$$cov(nr_t, nExp_t) = \lambda_1'\Omega\lambda_2$$

$$cov(nr_t, nI_t) = \lambda_1'\Omega\lambda_3$$

$$cov(nr_t, nNonI_t) = \lambda_1'\Omega\lambda_4$$

6.4.1.2. Data

Accounting information is from "FR Y-9C Reporting Form". Stock trading information is from monthly CRSP. Federal Reserve Bank of New York provides links connecting FRB identifier (RSSD9001) to CRSP identifier (Permco) in its website[21].

Variables needed:

1. Bank identity: RSSD9001 (unique bank identifier in FRB's system)
2. Quarter: from 1996Q3 to 2008Q4
3. Return: ***r***. r = log (1+Ret)-log (1+Rf). Ret is compounded 3-month cum dividend return, which is ended 1 month later than calendar quarter end. Rf is compounded 3-month T-bill rate during the same period.
4. Net interest income: ***I***. Net interest income equals to "total interest income" (item 1.h), net of "total interest expense" (item 2.f) as well as "provision for loan and lease losses" (item 4), then deflated by quarter beginning book value of equity.
5. Noninterest income: ***NonI***. Noninterest income includes "total noninterest income" (item 5.m), "realized gains (losses) on held-to-maturity securities" (item 6.a), and "realized gains (losses) on available-for-sale securities" (item 6.b), then deflated by quarter beginning book value of equity.
6. Other expenses: ***EXP***. $EXP = (XNI_t + TAX_t + Minority_t)/BV_{t-1} - \log(1 + Rf_t)$. XNI stands for "total noninterest expense" (item 7.e, which including salaries and employee benefits, expenses of premises and fixed assets, etc.). TAX stands for "applicable income taxes" (item 9). Minority is "minority interest" (item 10). XNI,

[21] http://www.newyorkfed.org/research/banking_research/datasets.html

TAX and Minority are negative if the bank had noninterest expenses, paid tax, or had positive earnings shared with minority shareholders.

7. Book to market ratio: ***bm***. $bm = \log(\frac{BV_t}{MV_t})$

6.4.1.3 Results

I divide full time period into 2 parts: from 1996 to 2006 and from 2007 to 2008. One VAR structure probably cannot fit crisis period and normal period well at the same time. Results in table 6.6 show that coefficients are quite different for these two periods.

Table 6.7 shows that non-interest income news is more influential on bank's stock returns, comparing to interest income, in both periods.

6.4.2. Trading revenue versus fair value changes on AFS securities

I decompose comprehensive income (income before extraordinary items plus unrealized gains/losses on AFS securities) into three parts: trading revenue, total fair value changes on AFS securities and others. Sample studied in this section is the same as those used in section 6.2 and 6.3. Using VAR approach to control news on required rate of return, I find news about trading revenue explains 5% of stock's total return volatility and news about AFS fair value changes explains less than 1% (Table 6.8).

6.5. Conclusions

Overall, trading revenue, which mainly comes from fair value changes of trading assets, are more persistent than fair value changes on AFS securities. Persistence of trading revenue is quite high (0.92); while fair value changes on AFS securities are significantly negatively related to future earnings (-0.22).

Comparing to fair value changes on AFS securities, trading revenues have high

ERC, and drive stock market more significantly.

Those differences are consistent with the view that investment purposes and business models for trading assets and AFS securities are different. Banks probably could generate persistent earnings from trading assets. Please be reminded that only a few large banks hold considerable trading assets. They act as brokers by providing liquidity to debt security market and charge bid-ask spreads. It is also possible that highly-paid traders can successfully find mispriced debt securities. On the other hand, majority of banks hold significant amounts of AFS securities and do not trade them frequently. Fair value changes on AFS securities exhibit annual reverting patterns (Table 6.3). Interest income may be more important for banks to hold AFS securities.

Given that valuation multiplier for fair value changes on trading securities are higher, classifying one security held for trading into AFS category may incur costs.

Chapter 7 Conclusions

This study examines risk-taking in and financial reporting of debt security investments in the U.S. banking industry. It is motivated by 2008 financial crisis. I think two research questions are important.

Why banks take toxic debt securities? By examining debt securities held by U.S. bank holding companies from 2001 to 2009, I find banks tend to structure debt security portfolio with a higher proportion of credit risky ones when top executives' wealth is more sensitive to stock return volatility due to their option holdings. That means mangers are motivated by option grants to buy and hold high proportion of risky debt securities. Those securities such as non-agency MBS brought high interests income before 2007 but huge capital losses during the financial crisis period to banks. Using a sample of international banks, Gropp and Kohler (2010) finds owner controlled banks had higher profits in the years before the crisis, incurred larger losses and were more likely to require government assistance during the crisis compared to manager-controlled banks. So it is possible that owners' risk appetite is the driving force of banks' risk-taking behaviors. Option grants are merely an efficient way to motivate managers to take risks as shareholders want. Based on this explanation, to reduce future possibility of bailing out banks, regulators may consider how to deal with bank owner's incentives to take advantage of general public by taking highly risky projects. A regulation on banks' managerial compensation may not be the most efficient way to achieve that objective.

However, it is possible that managers' incentives are not satisfactorily aligned with those of banks' shareholders. For each bank, option compensation packages are designed by shareholders to encourage managers to take firm-specific investment opportunities. Debt securities represent an investment opportunity accessible to all

banks (not firm-specific). That is to say, option grants may not be used to induce risk-taking in debt security investments, from the perspective of shareholders. My finding therefore could be interpreted as managers are induced by option holdings to take excessive risks even against shareholders' will. Based on this explanation, regulation on managerial compensation in the banking industry is still necessary. Deferred compensation could be a balance to option grants. Increasing relative weights of payments after retirement, for example, can make managers more carefully balance risk and returns when they make decisions. Tung and Wang (2010) provides evidence that bank CEOs' inside debt holdings preceding the financial crisis are significantly positively associated with bank performance and significantly negatively associated with bank risk taking during the Crisis.

My second question is how do managers make the choice of classifying debt securities into AFS or into trading category. According to SFAS 115, fair value changes on trading securities would be recognized into net income; however, fair value changes on AFS securities won't affect earnings immediately until those securities be sold or until maturity. So that classification decision actually is choosing fair value accounting versus historical costs accounting. Classify one security into AFS category would delay recognition of fair value changes; reduce volatility of earnings and of regulatory capital; increase managers' earnings management ability. Consistent with those advantages, I find banks inclined to classify credit-riskier securities into AFS rather than into trading category, especially when banks need to disguise their income (interest revenue is low, abnormal loan loss provision is low, or risky assets holdings are high). In addition, U.S. banks' holding of trading securities decreased significantly during the financial crisis period; but their holdings of AFS/HTM securities increased a lot at the same time. That means they reclassified securities from trading category into AFS/HTM, just as European banks did in 2008/2009. All these evidence support the idea that classification of debt securities

into AFS or into trading category is affected by how banks desire to get a control over earnings.

I investigate whether and why banks employ cherry-picking strategy on AFS securities, which further deepen our understanding of classification decision. I find accumulated unrealized fair value changes from AFS securities does become banks' cookie jar. Managers strategically time the recognitions of those accumulated unrealized fair value changes from AFS securities to smooth earnings, to meet earnings targets, to reduce regulatory costs, or to facilitate seasonal equity offering. Therefore people should be aware of realized gains/losses as well as accumulated unrealized gains/losses on AFS securities, especially when banks' capital adequacy is low, or when earnings are deteriorating. By now, market seems overreact to disposal gains/losses on AFS securities (Dong et al. (2009)).

Finally, I investigate characteristics of fair value changes on trading securities and on AFS securities. Is trading versus AFS a pure accounting classification issue? Comparing to fair value changes on AFS securities, trading revenues are more persistent, have higher value relevance, and drive stock returns more significantly. That evidence suggests investment purpose and business model regarding trading securities and AFS securities are different. Only a few largest banks hold significant level of trading securities. They act as broker by providing liquidity to debt security market. Possibly they are capable of finding under-valued debt securities. Therefore, capital gains (fair value changes) are important for trading securities. In contrast, most banks hold considerable amounts of AFS securities. AFS securities provide liquidity and diversification, and are a kind of favored collateral. Interest income, not capital gains are more important for AFS securities.

There're several caveats in my dissertation. First one is related to sample

selection process. Only top 1000 bank holding companies are studied. Smaller bank holding companies, other commercial banks, financial firms, and investment banks are not included in my sample. They may behavior differently in terms of debt security investment and classification. In addition, I have not separated my research sample into big banks and small ones. That separation may yield new insights for different type of banks' behavior given the fact that top 50 banks dominate the whole industry. Due to data requirements (Compensation data availability in Ch3 and "trading security holding being positive" in Ch4), my main results are actually based on large banks.

Second, endogeneity problem is real in my research, especially for Chapter 3. Managerial compensation and debt security investments may jointly be determined by boards/shareholders. Two-stage least squares regression or other standard method may provides some helps to clarify whether managerial compensation per se affects bank's debt security investment.

Third, some research designs could be improved. For Chapter 3, it would be very helpful to find another credit-riskiness measure for bank's debt security investment. For current measure, using multiple dummies such as percentage of US treasury, percentage of US treasury and government debt securities, etc. may provide more validity and robustness. For Chapter 4, an additional question could be interesting, too. Which kind of banks will hold trading securities? In current version, I only studied banks having investments in trading securities. For Chapter 5, in terms of asking "do banks having incentives to manipulate earnings realize abnormal disposal gains?", studying "whether banks having abnormal disposal gains successfully fulfilled various purposes?" may provide more insights. Main benefit is, contributing factors on those "targets" documented in previous literature could be controlled, then looking at whether cherry picking activity indeed helps banks to achieve those targets. In that

sense, cherry-picking's economic consequence could be clearly identified. For example, I can run probit regression with MBE (slightly meet or beat analyst forecast) dummy as dependent variable, explanatory variables are: disposal gains and loan loss provision (a well established channel through which banks manipulate earnings).

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Appendixes

Appendix A: Banking Industry Performance

Figure A.1 Banks' quarterly accounting performance from 1994 to 2009

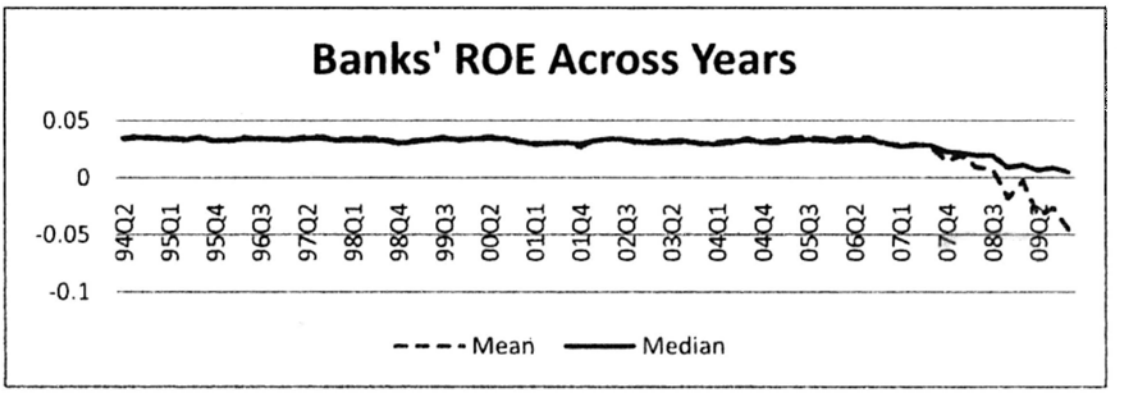


Figure A.2 Percentage of banks with negative quarterly earnings

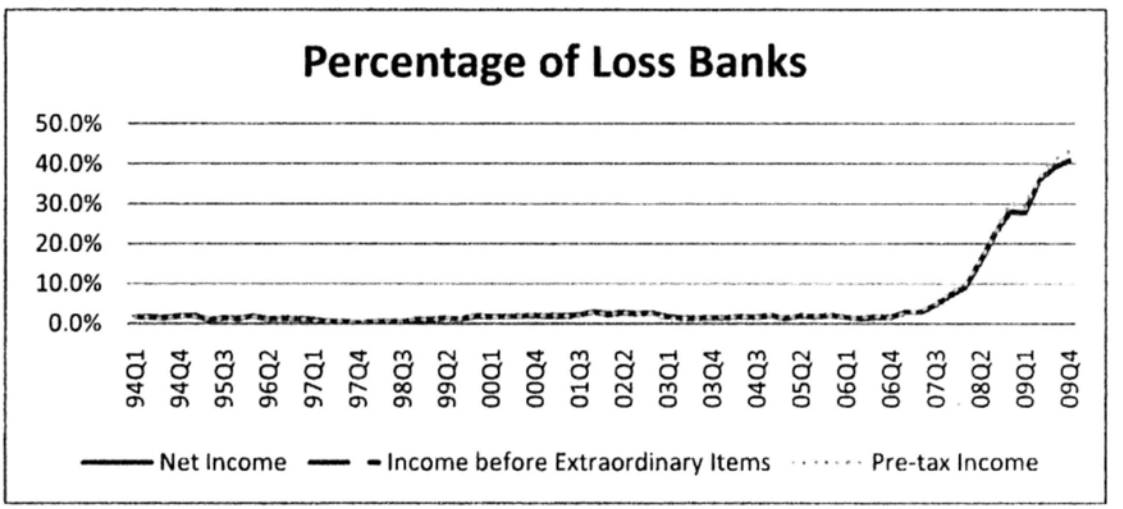
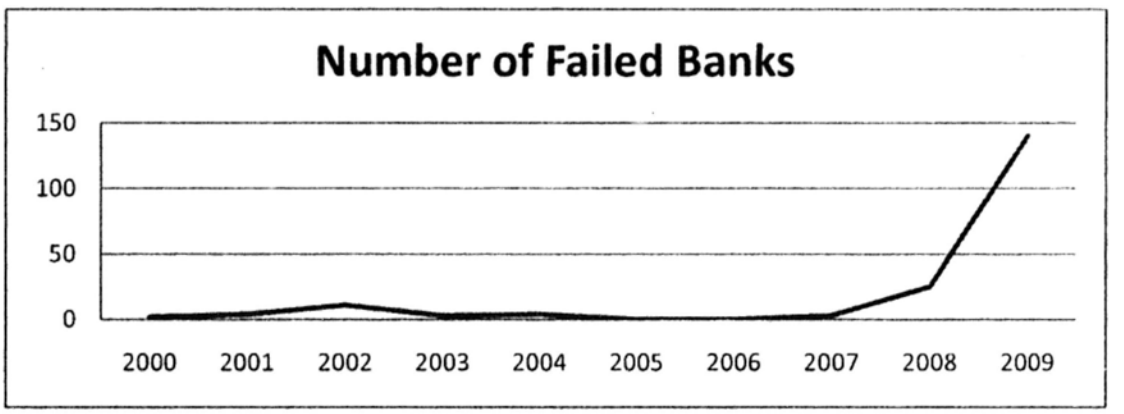


Figure A.3 Number of failed banks across years



(Data source of Figure A.2 and A.3: Federal Deposit Insurance Company)

Appendix B: Some background information about SFAS 115

Under US GAAP, upon initial purchase, securities could be classified into trading category, held-to-maturity, or available-for-sale, conditional on firm's investment purpose. SFAS 115 "*Accounting for Certain Investments in Debt and Equity Securities*" defines three classifications as:

- Debt securities that the enterprise has the positive intent and ability to hold to maturity are classified as *held-to-maturity* securities and reported at amortized cost.
- Debt and equity securities that are bought and held principally for the purpose of selling them in the near term are classified as *trading securities* and reported at fair value, with unrealized gains and losses included in earnings.
- Debt and equity securities not classified as either held-to-maturity securities or trading securities are classified as *available-for-sale securities* and reported at fair value, with unrealized gains and losses excluded from earnings and reported in a separate component of shareholders' equity.

The next table summarizes how fair value changes from debt securities affect accounting numbers and regulatory capital.

<table>
<tr><th></th><th>income statement</th><th>Balance Sheet</th><th>Regulatory Capital</th></tr>
<tr><td>Trading</td><td>recognized</td><td>recognized</td><td>recognized</td></tr>
<tr><td>AFS</td><td rowspan="2">not recognized</td><td>recognized in Other Comprehensive Income part in equity</td><td rowspan="2">not recognized</td></tr>
<tr><td>HTM</td><td>not recognized</td></tr>
</table>

The identical debt security will affect firms' earnings and equity very differently should they are classified into different categories (trading, AFS, or HTM). US GAAP doesn't prohibit firms from reclassifying securities among these three categories after initial purchase. But for HTM, if a firm sells one security or reclassifies it into

AFS/trading category, SEC will require reclassification of entire HTM portfolio as AFS and immediate recognition of unrealized gains/losses related to securities in HTM portfolio into incomes and regulatory capital.

During 2008 financial crisis, banks reclassified securities from trading to AFS/HTM in U.S. and in the whole world. Following table summarizes effects of reclassification.

during crisis	affect			
	capital adequacy	liquidity	net income	cherry picking capability
from trading to afs	yes	no	yes	yes
from afs to htm	no	yes	no	no
from trading to htm	yes	yes	yes	no

Appendix C: Computation of Wealth Sensitivities to Stock Price and to Stock Return Volatility for Top Management

We follow Core and Guay (2002) to compute individual stock option's value and its sensitivity to stock price or stock-return volatility. Calculation is based on the Black and Scholes (1973) formula for valuing European call options, as modified to account for dividend payouts by Merton (1973).

An individual option's value is determined by:

$$\text{Option Value} = Se^{-dT}N(Z) - Xe^{-rT}N(Z - \sigma T^{\frac{1}{2}})$$

Where

$$Z = \frac{\ln\left(\frac{S}{X}\right) + T(r - d + \frac{\sigma^2}{2})}{\sigma T^{1/2}}$$

N = cumulative probability function for the normal distribution

S = stock price at fiscal year end

X = exercise price of the option

σ = expected stock-return volatility over the life of the option, measured as annualized standard deviation of previous 2 years' daily stock returns

r = natural logarithm of risk-free interest rate, measured as natural logarithm of interest rate of Treasury bonds/notes with maturity equals to T

T = time to maturity of the option in years

d = natural logarithm of expected dividend yield over the life of the option, measured as natural logarithm of mean of dividend yield for prior 3 years

The sensitivity of option value with respect to a 1% change in stock price is defined as:

$$\text{delta(one option)} = \frac{\partial(\text{Option Value})}{\partial(\text{price})} * \frac{\text{price}}{100} = e^{-dT}N(Z) * (\frac{\text{price}}{100})$$

The sensitivity of option value with respect to a 0.01 change in stock-return volatility is defined as:

$$\text{vega(one option)} = \frac{\partial(\text{Option Value})}{\partial(\text{stock return volatility})} * 0.01 = e^{-dT}N'(Z)ST^{\frac{1}{2}} * (0.01)$$

Where N' is normal density function.

The sensitivity of stock value with respect to 1% change in stock price is:

$$\text{delta (one stock)} = \frac{\partial(\text{price})}{\partial(\text{price})} * \frac{\text{price}}{100} = \frac{\text{price}}{100}$$

The sensitivity of stock value with respect to 0.01 change in stock-return volatility is omitted since the stock portfolio vega is relatively small. Guay (1999) finds that the median CEO option portfolio vega is higher than $20,000; and median CEO stock portfolio vega is $2.

For a top manager, her/his wealth sensitivity to stock price is sum of delta from all options as well as stocks. Her/his wealth sensitivity to stock-return volatility is sum of vega from all options.

Appendix D: Bank Regulatory Capital Requirements

		Capital Status			
		Well Capitalized	Adequately Capitalized	Under-Capitalized	Appoint Receiver
Capital Ratio	Tier 1	5%	4%	3%	2%
	Risk-based Tier 1	6%	4%	3%	---
	Risk-based Total	10%	8%	6%	---

Tier 1 capital equals common equity with some adjustments, which reflect in part the reversal of partial fair value accounting for financial instruments, in part the inclusion of long-term, nondebt financing and in part the exclusion of less liquid, more subjectively measured, or riskier assets.

Total capital equals Tier 1 capital plus Tier 2 capital, where Tier 2 capital cannot exceed Tier 1 capital. Tier 2 capital includes six categories.

Assets are total assets reflecting adjustments consistent with those to Tier 1 capital.

Risk-adjusted assets generally equal the weighted sum of on–balance sheet assets using certain risk weights and off–balance sheet items using those risk weights and conversion factors, taking into account the special rules for derivatives, residual interests, recourse obligations, and certain direct credit substitutes.

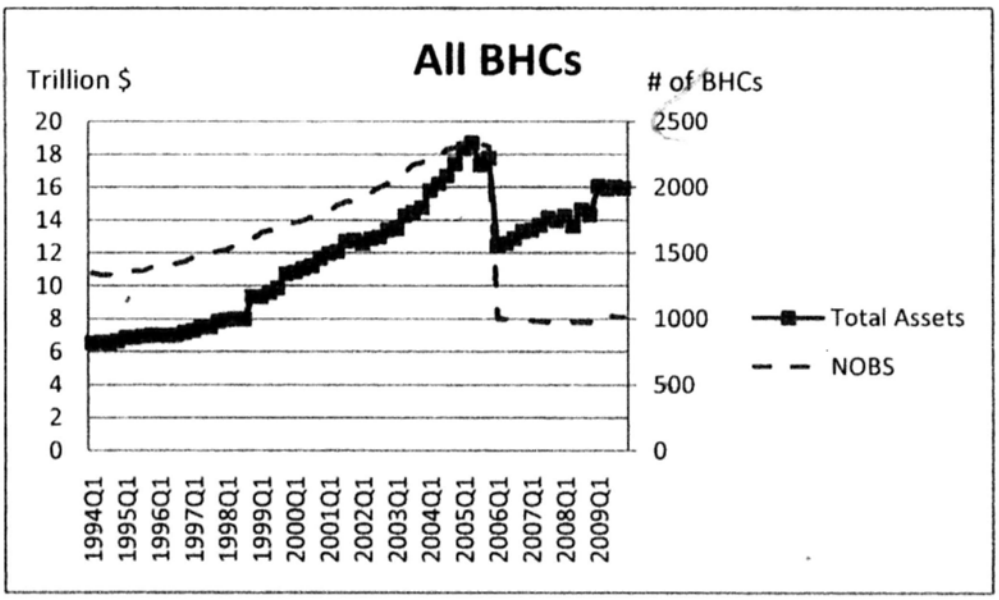
The Tier1 ratio is Tier 1 capital divided by assets. The Tier 1 risk-based capital ratio is Tier 1 capital divided by risk-adjusted assets. The total risk-based capital ratio is total capital divided by risk-adjusted assets.

All these information are from Ryan (2007) Chapter 2.

Figures

Figure 2.1 Sample Selection

Panel A. the Original sample for Bank Holding Companies as shown in Table 2.1 Step 1



Panel B. the final sample for Bank Holding Companies as shown in Table 2.1 Step 5

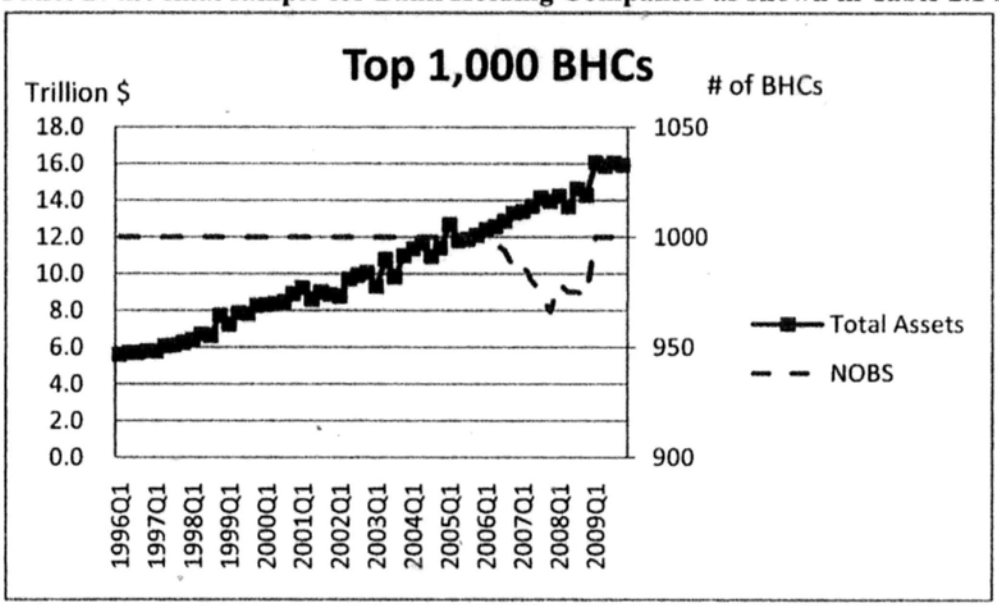
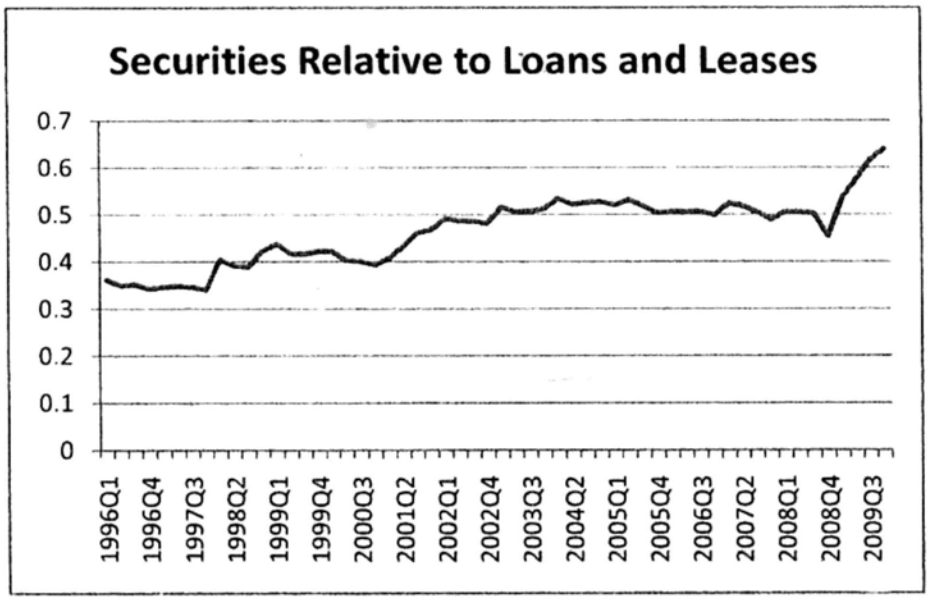
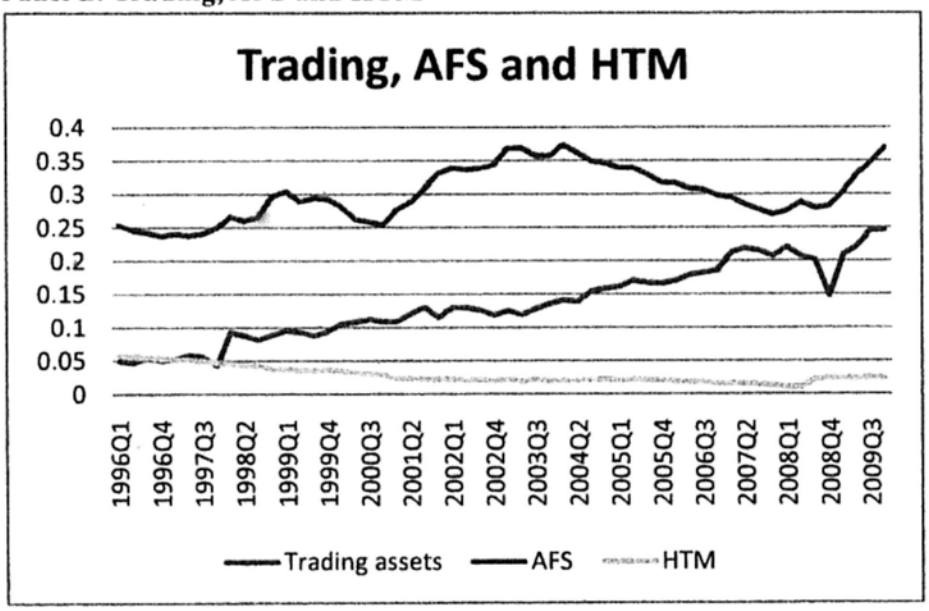


Figure 2.2 Securities relative to loans and leases

Panel A. All Securities



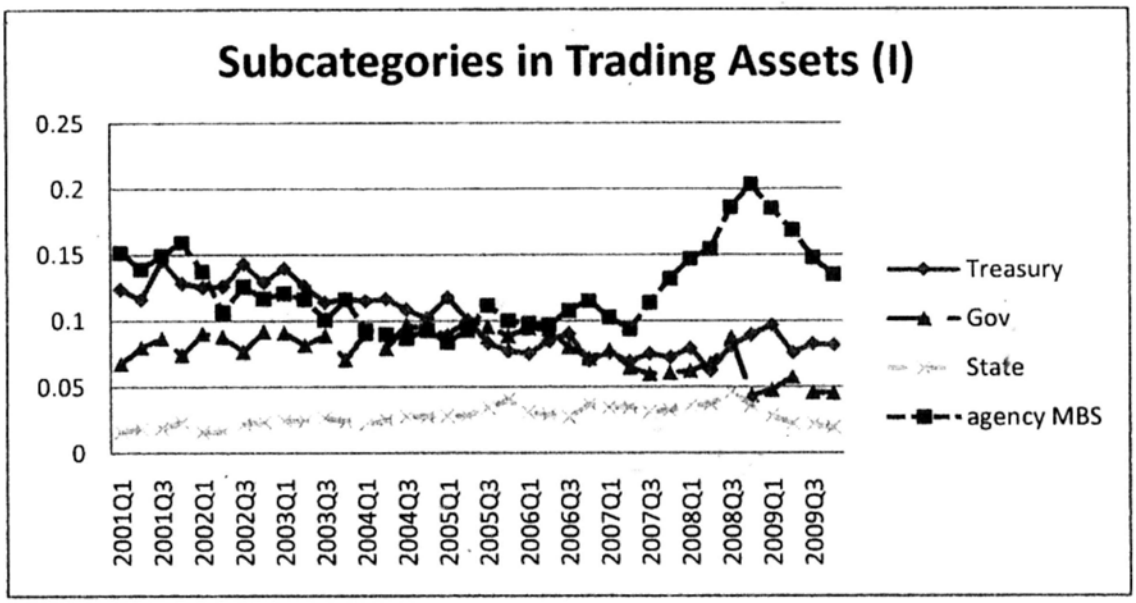
Panel B. Trading, AFS and HTM



All securities include trading category, AFS and HTM. Trading assets exclude derivatives with positive values. Loans are loans and leases including held-for-sale part, net of unearned income and allowance for loan and lease losses.

Figure 2.3 Proportions of Securities in Trading Category

A. Safe Securities



B. Others

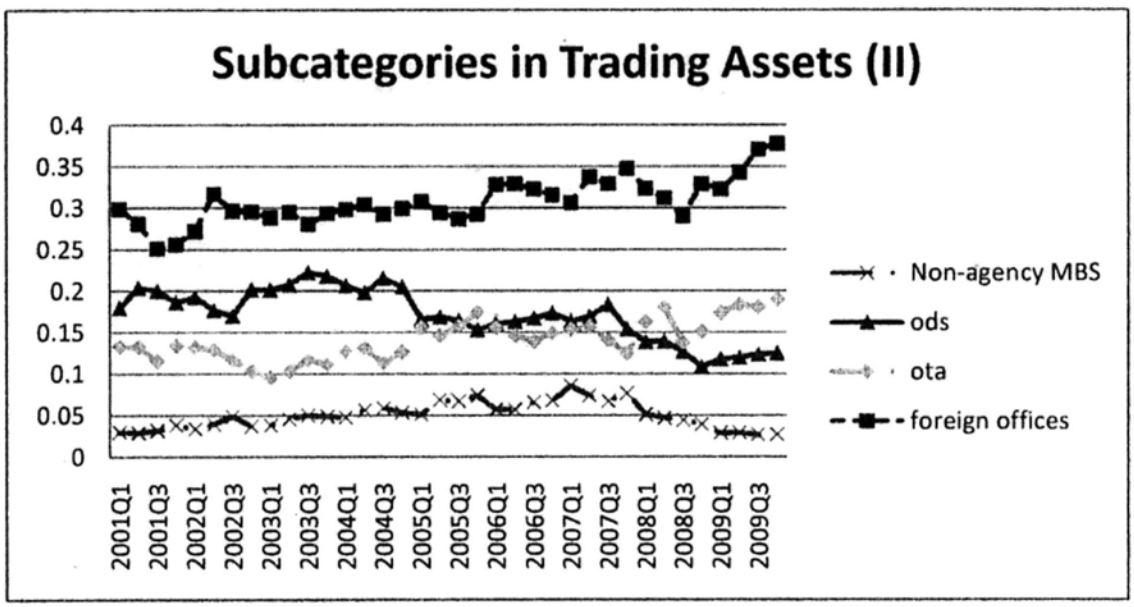
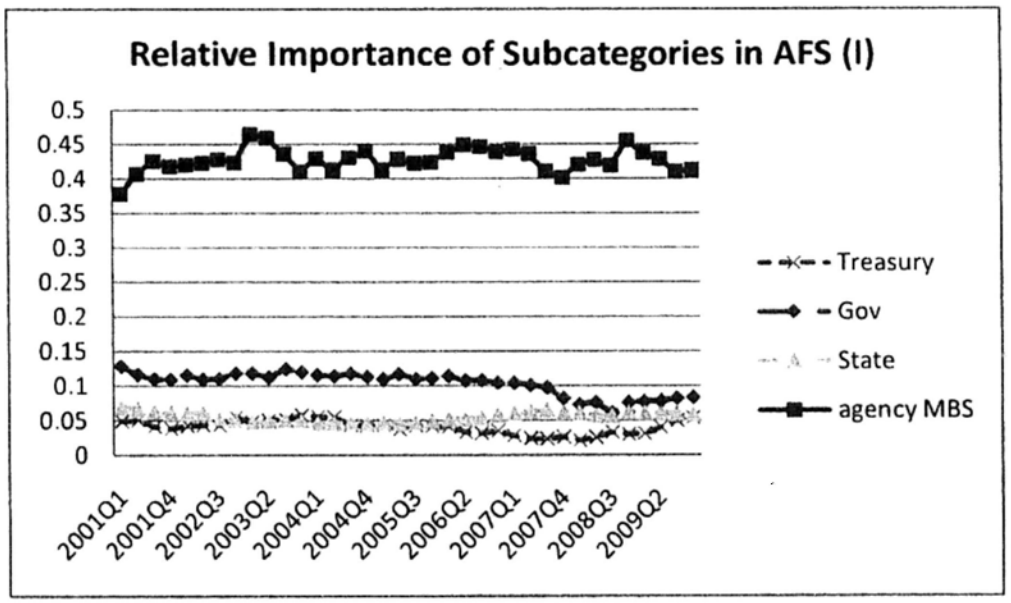


Figure 2.4 Proportions of Securities in AFS Category

A. Safe Securities



B. Credit Risky Securities

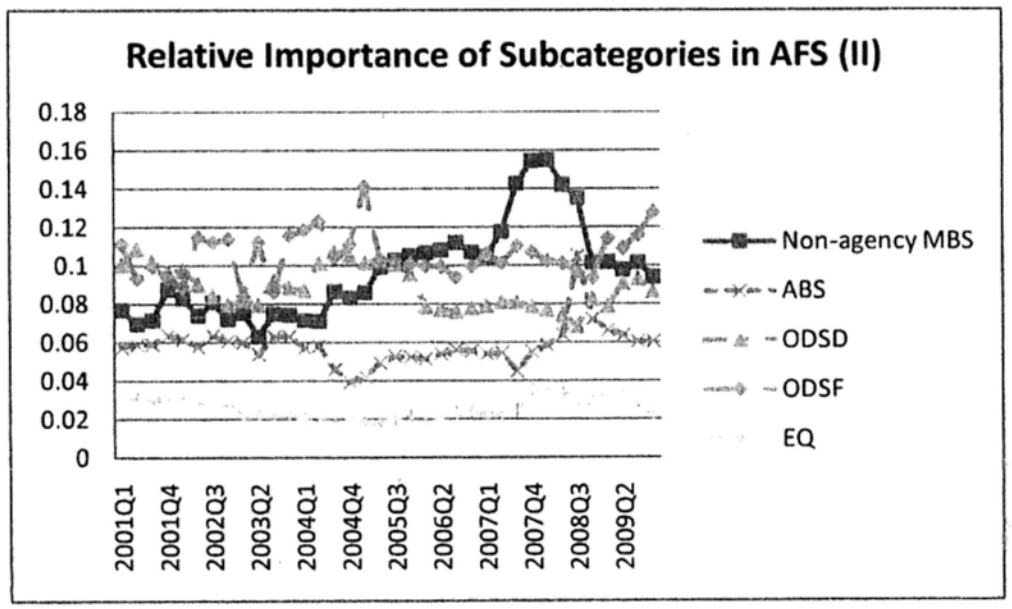
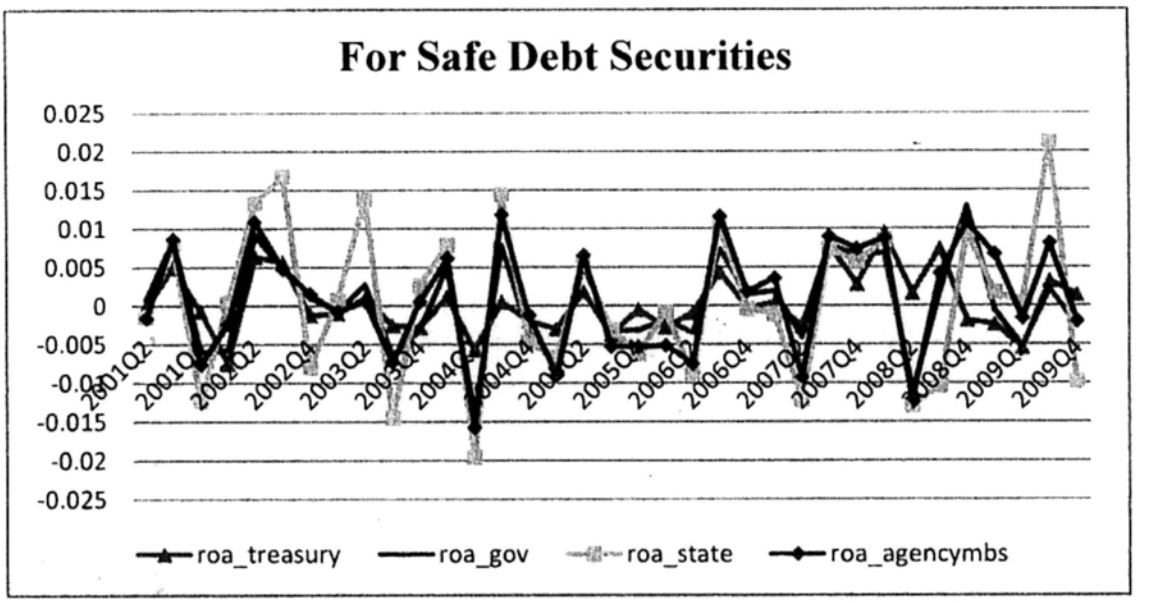


Figure 2.5 Fair Value Changes for Each Category of AFS Securities



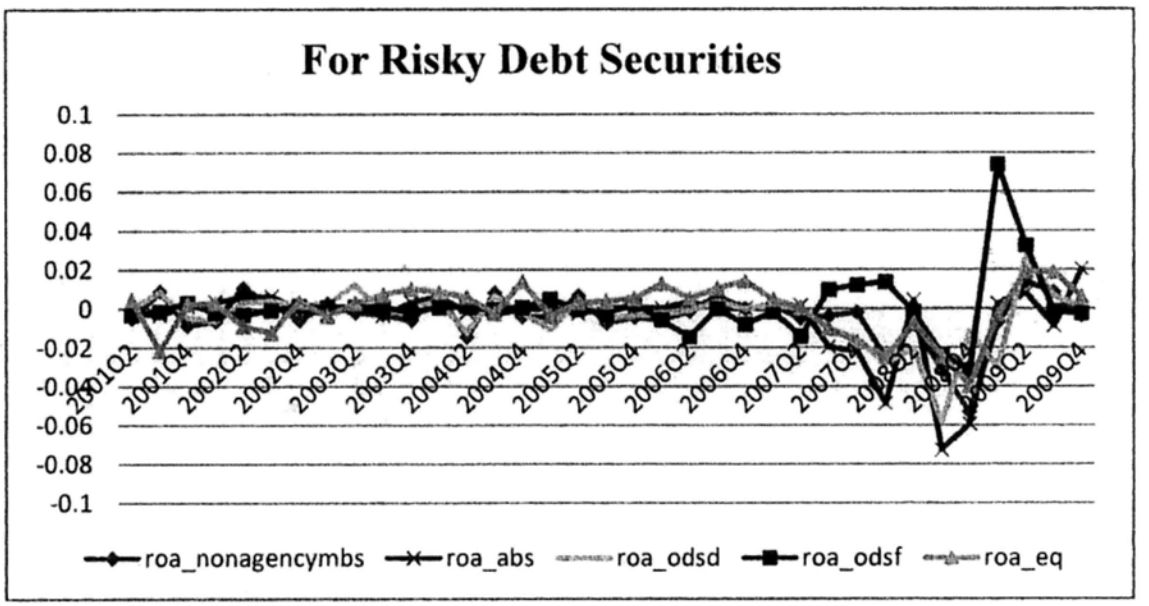
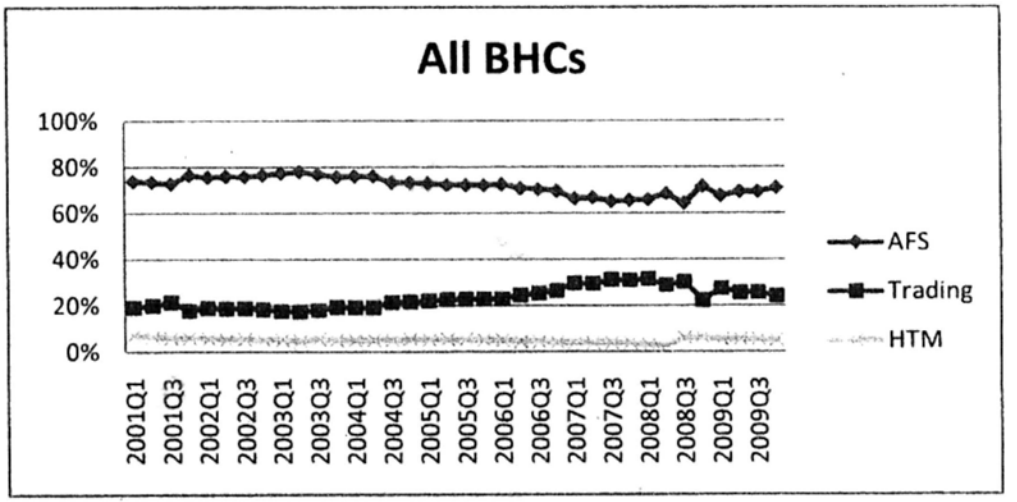
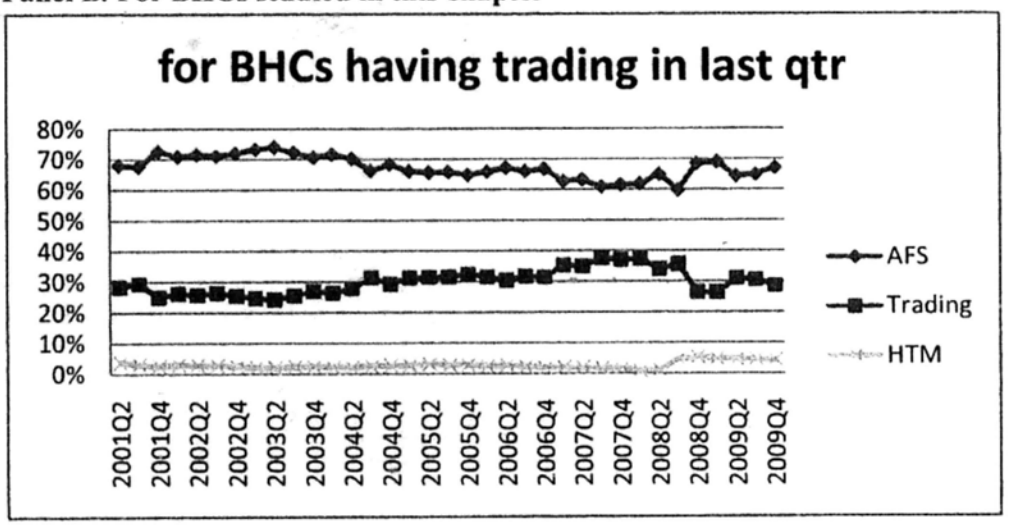


Figure 4.1 Percentage of debt securities classified as Trading, AFS and HTM

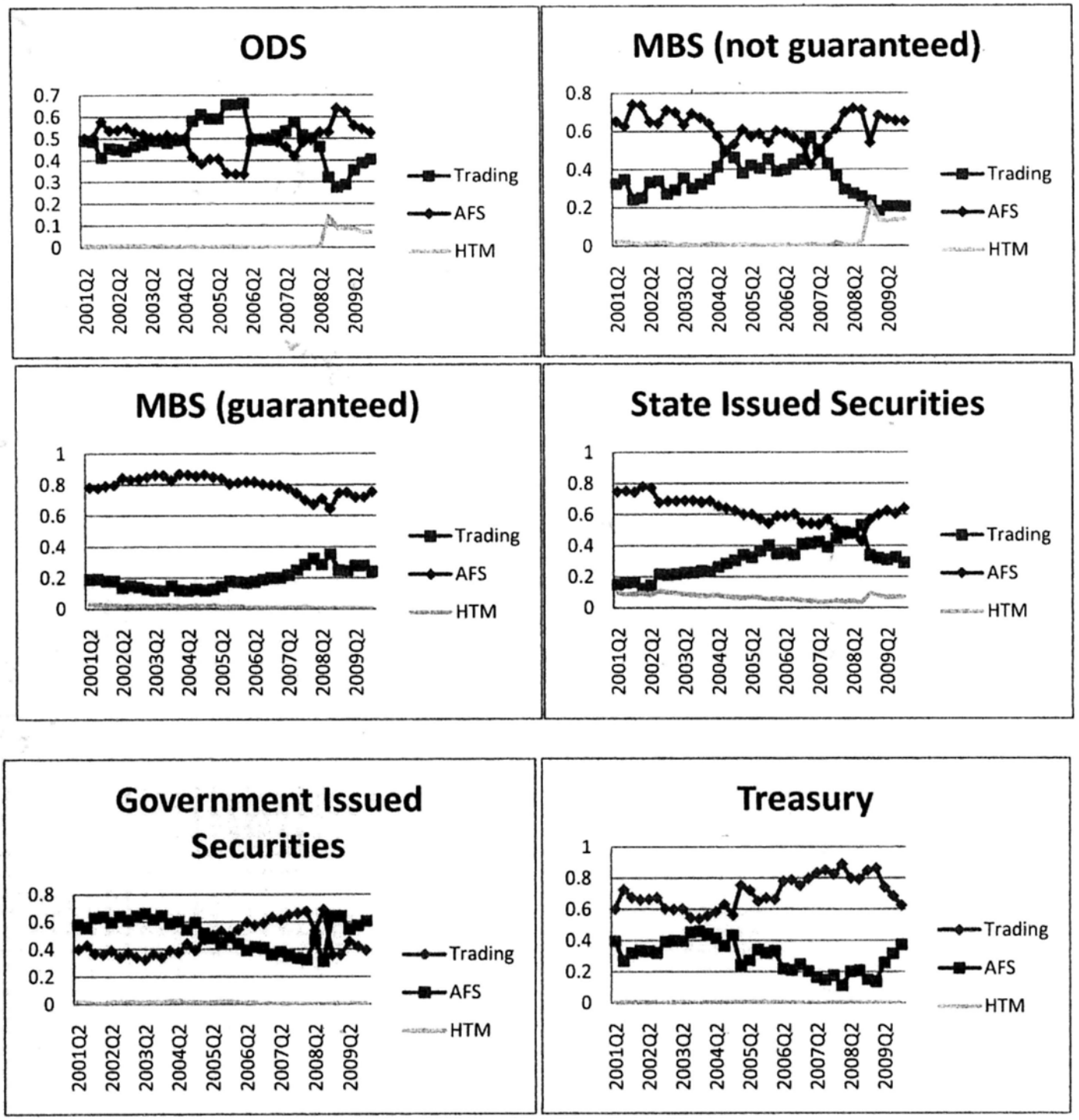
Panel A. From 2001 to 2009, all bank holding companies



Panel B. For BHCs studied in this chapter

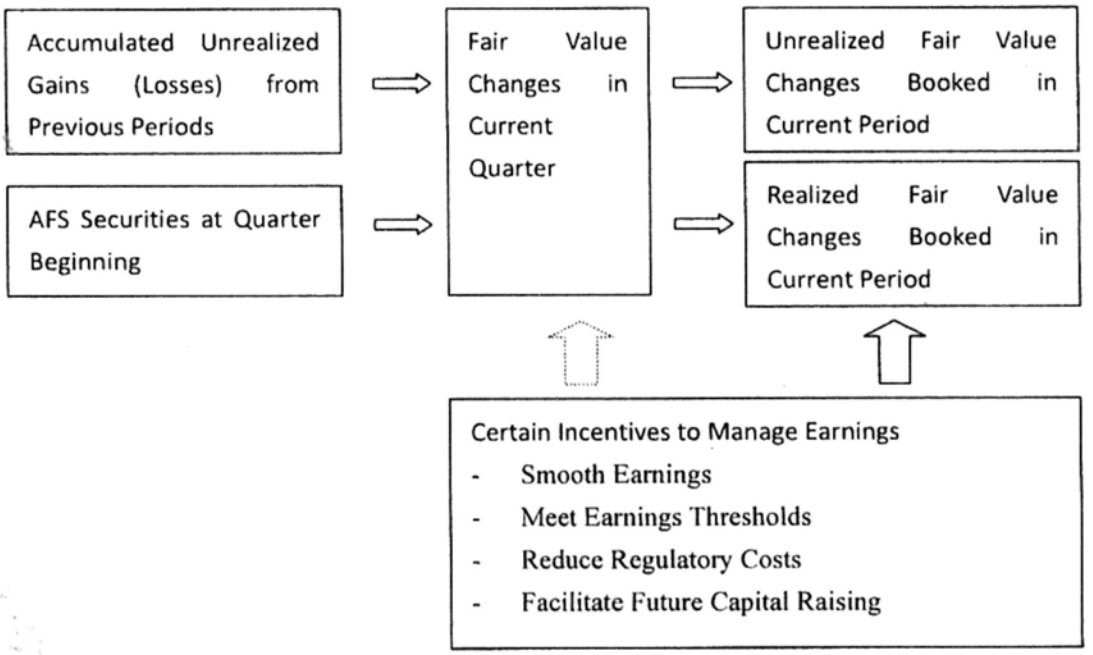


Panel D. For each subcategory of debt securities



Only considering securities could be classified into all categories

Figure 5.1 Fair value changes on AFS securities and incentives to cherry-picking



Tables

Table 1.1 Research Questions

	RISKY	SAFE	Sum
Trading	p1*R	p2*S	
AFS	(1-p1)*R	(1-p2)*S	
Sum	R	S	1

Two Research questions are about banks' debt investment decisions.

Assuming a bank has 1 dollar available to invest in debt securities, there're two decisions to make, as shown in table 1.1. One is to decide R (amounts invested in risky debt securities) and S (amounts put in safe products). The second one is to choose p1 and p2, which are proportions of securities classified as trading instead of AFS in risky and in safe debt securities, respectively. This second decision has two folds. First it is about deciding investment horizon or investment purpose. If that bank is going to do arbitrage transactions, or provide liquidity for others in debt market, it should classify debt securities into trading category. If debt securities are used to manage interest risk, to act as collateral for borrowed money, or to fulfill liquidity requirements, they should be classified into AFS category. On the other hand, it is an accounting decision having real economic consequence. Fair value changes from trading securities hit earnings and regulatory capital immediately; but fair value gains (losses) from AFS could be either postponed or recognized into earnings/ regulatory capital, upon bank's will. Aware of this accounting discrepancy, managers may decrease p1 to alleviate possible undesired effects on earnings or regulatory capital. Changing p1 could be real (actual investment behavior be altered) or be artificial (just accounting classification changes, and investment behavior remains the same). But unforthcoming accounting has costs, as we know. Outsiders, auditors and regulators don't like it and opaque information discounts stock price. In sum, managers will consider investment purpose as well as accounting effects when making the second decision.

Question 1: What's the value of R/S? How determined?

Question 2: How to determine p1 and p2? How does that decision affected by accounting?

Table 2.1 Bank holding companies in my sample

Panel A. Sample selection

Step	sample selection	NOBS	Industry total assets (in trillion)
1	from 1994Q1 to 2009Q4, total assets (bhck2170)>0	100,607	11.78
2	an item (bhck6416), which is only required to be disclosed by top-tier banks, be available	97,892	9.93
3	tier1 capital (bhck8274) not missing	97,113	9.84
4	from 1996Q1 to 2009Q4	86,873	10.43
5	keep largest 1000 BHCs in terms of total assets for each quarter	55,788	10.29

"Industry total assets" is quarterly mean value of assets held by all banks. Dollar values are CPI adjusted and transformed into year 2009 dollar. Step 2 and step 3 are to delete subsidiaries. All firms are allowed to do a one-time reclassification of securities in November 1995 because since October 1994, unrealized gains/losses from AFS securities no longer affect regulatory capital. Step 4 restricts my sample starting from 1996. Before 2006, BHCs with consolidated total assets larger than 150 million USD are required to issue FR Y-9c. Starting from 2006, BHCs whose total assets exceed 500 million are required to issue that form. Step 5 keeps top 1000 BHCs in each quarter in my sample, so as to make sample comparable across years.

Panel B. Representativeness of "Top1000" sample I studied

year	N Obs		Sum of Total Assets (trillion)			Mean of Total Assets (billion)	
	Without Subsidiaries	Top1000	Without Subsidiaries	Top1000	percent	Without Subsidiaries	Top1000
1994	1286		5.68			4.42	
1995	1307		5.84			4.47	
1996	1318	1000	5.89	5.81	99%	4.47	5.81
1997	1412	1000	6.36	6.26	98%	4.51	6.26
1998	1526	1000	7.87	7.74	98%	5.16	7.74
1999	1636	1000	8.43	8.27	98%	5.15	8.27
2000	1723	1000	9.10	8.91	98%	5.28	8.91
2001	1840	1000	9.09	8.87	98%	4.94	8.87
2002	1980	1000	10.34	10.08	97%	5.22	10.08
2003	2127	1000	11.29	10.99	97%	5.31	10.99
2004	2252	1000	11.75	11.41	97%	5.22	11.41
2005	2264	1000	12.46	12.10	97%	5.50	12.10
2006	986	986	13.30	13.30	100%	13.49	13.49
2007	966	966	13.96	13.96	100%	14.45	14.45
2008	973	973	14.29	14.29	100%	14.69	14.69
2009	1013	1000	15.93	15.92	100%	15.72	15.92

This panel displays number of observations, sum/mean of total assets for two samples ("without subsidiaries" in Panel A step 3 and "Top1000" in Panel A step 5) from end of 1994Q4 to end of 2009Q4. Dollar values are CPI adjusted and transferred to 2009Q4 USD.

Table 2.2 Disclosures about Debt Securities in Form FR Y-9C

<table>
<tr><td colspan="2">Trading Category</td><td colspan="2">AFS/HTM Category</td></tr>
<tr><td>1995Q1-2007Q4</td><td>2008Q1-2009Q4 (consolidated/domestic)</td><td>1994Q1-2000Q4</td><td>2001Q1-2009Q4</td></tr>
<tr><td>U.S. treasury securities in domestic offices</td><td>U.S. treasury securities</td><td colspan="2">U.S. treasury securities</td></tr>
<tr><td>U.S. government agency and corporation obligations in domestic offices (exclude mortgage-backed securities)</td><td>U.S. government agency and corporation obligations(exclude mortgage-backed securities)</td><td>U.S. government agency and corporation obligations</td><td>U.S. government agency and corporation obligations (exclude mortgage-backed securities)</td></tr>
<tr><td>securities issued by states and political subdivisions in the U.S. in domestic offices</td><td>securities issued by states and political subdivisions in the U.S.</td><td colspan="2">securities issued by states and political subdivisions in the U.S.</td></tr>
<tr><td>Mortgage-backed securities (MBS) in domestic offices:</td><td>Mortgage-backed securities (MBS):</td><td rowspan="6">U.S. securities</td><td>Mortgage-backed securities</td></tr>
<tr><td>a. Pass-through securities issued or guaranteed by FNMA, FHLMC, or GNMA</td><td>a. Pass-through securities issued or guaranteed by FNMA, FHLMC, or GNMA</td><td>a. Pass-through securities issued or guaranteed by FNMA, FHLMC, or GNMA</td></tr>
<tr><td>b. Other MBS issued or guaranteed by FNMA, FHLMC, or GNMA (include CMOs, REMICs, and stripped MBS)</td><td>b. Other MBS issued or guaranteed by FNMA, FHLMC, or GNMA (include CMOs, REMICs, and stripped MBS)</td><td>b. Other MBS issued or guaranteed by FNMA, FHLMC, or GNMA (include CMOs, REMICs, and stripped MBS)</td></tr>
<tr><td>c. All other mortgage-backed securities</td><td>c. All other mortgage-backed securities</td><td>c. All other mortgage-backed securities</td></tr>
<tr><td rowspan="2">Other debt securities in domestic offices</td><td rowspan="2">Other debt securities</td><td>Asset-backed securities</td></tr>
<tr><td>other domestic debt securities</td></tr>
<tr><td>other trading assets in domestic offices</td><td>Other trading assets</td><td rowspan="3">Foreign Securities</td><td>Other foreign debt securities</td></tr>
<tr><td>trading assets in foreign offices</td><td>not applicable</td><td rowspan="2">investments in mutual funds and other equity securities with readily determinable fair values (only for AFS category)</td></tr>
<tr><td>revaluation gains on interest rate, foreign exchange rate, equity, commodity and other contracts</td><td>Derivatives with a positive fair value</td></tr>
<tr><td colspan="2">Total Trading Assets</td><td colspan="2">Total AFS/HTM Securities</td></tr>
</table>

Table 2.3 Quarterly Average Value for Each Category in Banking Industry

Panel A: Including All Categories

Value (bil. $)	Treasury	Gov	State	Agency MBS	Non_Agency MBS	ODS	ABS	ODSD	ODSF	Others				sum
										EQ	OTA	OTA_Foreign	Derivatives	
trading	92	73	29	125	51	161					146	312	270	1259
AFS	75	189	101	788	180	466	107	162	197	46				1845
HTM	3	25	18	37	15	14	7	4	2					112
sum	170	287	148	950	246	641				46	146	312	270	3216
pct (%)														
trading	2.9	2.3	0.9	3.9	1.6	5.0					4.5	9.7	8.4	39.2
AFS	2.3	5.9	3.2	24.5	5.6	14.5	3.3	5.0	6.1	1.4				57.4
HTM	0.1	0.8	0.6	1.1	0.5	0.4	0.2	0.1	0.1					3.5
sum	5.3	8.9	4.6	29.6	7.6	19.9				1.4	4.5	9.7	8.4	100.0

Panel B: Only Including Debt Securities

Value (bil. $)	Treasury	Gov	State	Agency MBS	Non_Agency MBS	ODS	ABS	ODSD	ODSF	sum
trading	92	73	29	125	51	161				531
AFS	75	189	101	788	180	466	107	162	197	1799
HTM	3	25	18	37	15	14	7	4	2	112
sum	170	287	148	950	246	641				2442
pct (%)										
trading	3.8	3.0	1.2	5.1	2.1	6.6				21.7
AFS	3.1	7.7	4.2	32.3	7.4	19.1	4.4	6.7	8.0	73.7
HTM	0.1	1.0	0.7	1.5	0.6	0.6	0.3	0.2	0.1	4.6
sum	7.0	11.8	6.1	38.9	10.1	26.2				100.0

Sample period is from 2001Q1 to 2009Q4. Values are quarterly average sum for top 1000 U.S. bank holding companines for each category. For example, treasury securities in trading category is 92, meaning from 2001 to 2009, the whole banking industry on average holds 92 billion treasury securities in trading category. All values are adjusted to 2009 USD. Treasury is U.S. treasury securities. Gov is U.S. government agency obligations. State is Securities issued by states and political subdivisions in the U.S. Agency MBS is mortgage-backed securities issued or guaranteed by FNMA, FHLMC, or GNMA. Non_Agency MBS is mortgage-backed securities other than issued or guaranteed by FNMA, FHLMC, or GNMA. ODS is other debt securities. ODS includes ABS, ODSD and ODSF. ABS is Asset-backed securities and structured financial products. ODSD is other domestic debt securities. ODSF is foreign debt securities. EQ is investments in mutual funds and other equity securities with readily determinable fair values. OTA is other trading assets in domestic offices. OTA_Foreign is trading assets in foreign offices. Derivatives is derivative with a positive fair value.

Table 2.4 Significance of Trading Assets in Foreign Offices

	Domestic Offices	Consolidated	Pct of Domestic Offices
Treasury	114.00	120.42	94.67%
Gov	80.36	80.75	99.52%
State	42.49	42.69	99.52%
Agency MBS	230.86	231.57	99.70%
Non-agency MBS	50.69	61.62	82.25%
ODS	176.45	451.96	39.04%
OTA	241.24	419.15	57.55%

This table compares differences between consolidated trading assets and trading assets in domestic offices for each subcategory. Consolidated information for each subsidiary is available starting from 2008Q1.

Table 2.5 Details about Trading and AFS securities across time

Panel A: Proportions of subcategories in trading category

Pct (%)	Treasury	Gov	State	Agency MBS	Non-agency MBS	ODS	OTA	Foreign
Mean	10.05	7.72	2.75	12.45	4.97	17.14	14.12	30.81
STD	2.42	1.62	0.72	3.09	1.60	3.16	2.44	2.75
Average quarterly growth rate	-0.42	0.34	1.82	0.38	0.90	-0.71	1.67	0.85

Panel B: Proportions of subcategories in AFS category

Pct (%)	Treasury	Gov	State	Agency MBS	Non-agency MBS	ABS	ODSD	ODSF	EQ
Mean	4.04	10.33	5.52	42.68	9.69	5.81	8.84	10.57	2.51
STD	1.03	1.72	0.69	1.71	2.47	1.05	1.09	1.18	0.52
Average quarterly growth rate	0.26	-1.22	-0.5	0.25	0.58	0.14	-0.43	0.41	-0.75

All variables are in percentage.

Table 2.6 Variable Definition

Variables	Definition
GAFS	Sum of realized gains/losses and unrealized gains/losses from securities in AFS category
Treasury	Fair value of treasury securities at quarter beginning
Gov	Fair value of U.S. government agency and corporation obligations (exclude mortgage-backed securities) at quarter beginning
State	Fair value of securities issued by states and political subdivisions in the U.S. at quarter beginning
Agency MBS	Fair value of mortgage-backed securities issued or guaranteed by FNMA, FHLMC, or GNMA at quarter beginning
Non-Agency MBS	Fair value of mortgage-backed securities not issued or guaranteed by FNMA, FHLMC, or GNMA at quarter beginning
ABS	Fair value of asset-backed securities at quarter beginning
ODSD	Fair value of other domestic debt securities at quarter beginning
ODSF	Fair value of foreign debt securities at quarter beginning
EQ	Fair value of equity investments at quarter beginning
AT	Total assets at quarter beginning

All variables are deflated by AT excepte AT itself. All variables except AT are in percentage.

Table 2.7 Sample Selection

from 2001Q2 to 2009Q4 in FRB database	56354
Banks are in my sample as discussed in table 2.1 step 5	34788
Banks hold AFS securities at quarter beginning	34096
Current quarter's realized and unrealized gains/losses from AFS are available	34066
Dependent variable is truncated at (1%, 99%)	33386
Residuals from quarterly OLS regression are among (1%, 99%)	32762

Table 2.8 Descriptive Statistics

Variable	Mean	Std Dev	Minimum	25th Pctl	Median	75th Pctl	Maximum
GAFS	0.004	0.155	-0.703	-0.067	0.001	0.080	0.562
Treasury	0.570	2.162	0.000	0.000	0.000	0.228	56.573
Gov	5.380	5.639	0.000	1.196	3.858	7.740	53.766
State	2.628	3.361	0.000	0.077	1.257	4.103	31.450
Agency MBS	7.185	7.247	0.000	1.331	5.364	10.796	70.165
Non-Agency MBS	0.575	1.806	0.000	0.000	0.000	0.201	29.947
ABS	0.148	0.937	0.000	0.000	0.000	0.000	24.947
ODSD	0.831	2.121	0.000	0.000	0.035	0.726	35.816
ODSF	0.068	0.943	0.000	0.000	0.000	0.000	44.817
EQ	0.436	1.262	0.000	0.000	0.037	0.321	45.195

This table shows quarter beginning AFS securities in 9 subcategories and quarterly fair value changes on AFS securities, as percentage of total assets. All variables are defined in Table 5.

Table 2.9 Fama Macbeth Regression Results: Fair Value Changes on Each Subcategory of AFS Securities

Variable	n	meanEst	medianEst	estPos	estNeg	meant	mediant	tSigPos	tSigNeg	fmt	z2
Treasury	35	0.000	0.000	16	19	-0.009	-0.388	9	10	0.522	-0.016
GOV	35	0.000	0.001	18	17	0.244	1.639	17	16	0.302	0.103
State	35	0.000	0.000	18	17	0.081	0.665	14	15	0.256	0.039
Agency MBS	35	0.001	0.001	19	16	1.457	2.036	19	16	0.665	0.383
Non-Agency MBS	35	-0.004	-0.004	11	24	-1.985	-2.360	10	20	**-1.901**	**-2.036**
ABS	35	-0.005	0.000	19	16	-0.503	0.103	6	5	-1.612	-1.012
ODSD	35	-0.004	0.000	17	18	-1.319	-0.338	13	16	-1.604	-1.244
ODSF	35	0.001	-0.001	15	20	0.177	-0.121	6	4	0.374	0.545
EQ	35	0.000	0.003	22	13	0.935	2.127	20	11	-0.195	1.045
1/Total Assets	35	-11.890	-21.331	13	22	-0.409	-0.871	7	12	-1.371	-1.021
nobs	.	936	.	.	.	.	.	.	.	.	.
R-squared	.	0.426	.	.	.	.	.	.	.	.	.

This table shows summary results for quarter-by-quarter regressions of overall fair value changes on quarterly beginning AFS security categories. Sample period covers 35 quarters from 2001 Q2 - 2009 Q4. Dependent variable is GAFS. All variables are defined in Table 2.5. "meanEst" ("medianEst") is mean (median) value of estimated coefficients for each dependent variable from 35 quarterly regressions. "estPos" ("estNeg") is number of quarters with positive (negative) estimated coefficient for individual explanatory variable. "meant" ("median") is mean (median) value of t statistics from quarterly regressions. "tSigPos" ("tSigNeg") is number of quarters with significant positive (negative) t value. fmt = meanEst * sqrt(n-1) / stdEst; z2 = meant * sqrt(n-1) / stdt

"fmt" and "z2" are in bold if estimated coefficient is different from zero at a significance level of 10% or lower.

Table 3.1 Variable Definition

Variables	Definition
Dependent Variables	
RISK	non-agency MBS and other domestic debt securities
SAFE	U.S. treasury, Securities issued by U.S. government and states, and agency MBS
RATIO_RISK	the ratio of RISK to the sum of RISK and SAFE
Log_RR	logarithm of (RATIO_RISK/(1-RATIO_RISK)); RATIO_RISK is winsorized at 1E-6
High_RR	equals to 1, if RATIO_RISK is above median in each quarter; equals to 0, otherwise.
Compensation Variables	
Vega_CEO / Vega_TOP5	Vega_CEO is CEO's wealth sensitivity to stock-return volatility, measured as the change in value of CEO's stock option portfolio for a 1% change in the annualized standard deviation of the firm's stock returns. Similarly, Vega_TOP5 is mean value of other top 4 managers' wealth sensitivity to stock return volatility. Two variables are in thousands USD.
Delta_CEO / Delta _TOP5	Delta_CEO is CEO's wealth sensitivity to stock price change, measured as the change in value of CEO's stock option and common stock portfolio for a 1% change in the value of the firm's common stock price. Similarly, Delta_TOP5 is mean value of other top 4 managers' wealth sensitivity to stock price change. Two variables are in thousands USD.
VOLSEN_CEO / VOLSEN_TOP5	VOLSEN_CEO=ln(1+Vega_CEO); VOLSEN_TOP5=ln(1+Vega_TOP5).
PRCSEN_CEO / PRCSEN_TOP5	PRCSEN_CEO=ln(1+Delta_CEO); PRCSEN_TOP5=ln(1+Delta_TOP5).
Firm Characteristics	
Size	logarithm of total assets in thousands USD
M2B	market to book ratio
LogCA	logarithm of tier1 capital ratio
Commercial Loans	commercial and industry loans, deflated by total assets
Consumer Loans	loans to individuals for household, family, and other personal expenditures, deflated by total assets
Real Estate Loans	loans secured by real estate, deflated by total assets
Deposits	deposits, deflated by total assets
Short-term Financing	federal funds purchased and securities sold under agreements to repurchase, deflated by total assets
Other Borrowed Money	other borrowed money (bhck3190, contains liabilities financed in different ways), deflated by total assets

All independent variables are measured at last fiscal year's end. Dependent variables are measured at 1st fiscal quarter end in current year.

Table 3.2 Sample Selection

Require:	NOBS	mean of total assets (in billions)
in my sample from 1996 to 2009	55788	10.32
in my sample from 2001 to 2009	35788	12.19
be available by end of quarter in CRSP	13139	25.96
in fiscal quarter 1	3323	25.15
managerial compensation data is available in last year	778	98.55

"Mean of total assets" is adjusted to 2009 December USD.

Table 3.3 Descriptive Statistics

Variable	Mean	Std Dev	Minimum	25th Pctl	Median	75th Pctl	Maximum
Dependent Variable							
RATIO_RISK	0.16	0.18	0.00	0.02	0.09	0.22	1.00
Log_RR	-3.39	3.74	-13.82	-3.82	-2.35	-1.26	6.50
High_RR	0.51	0.50	0.00	0.00	1.00	1.00	1.00
Compensation Variables							
Vega_CEO	220	387	0	19	72	251	3541
Vega_TOP5	97	162	0	12	35	107	1238
Delta_CEO	1192	4668	0	97	296	841	75706
Delta_TOP5	356	1022	0	45	124	331	16456
VOLSEN_CEO	4.11	1.90	0.00	3.02	4.29	5.53	8.17
VOLSEN_TOP5	3.54	1.58	0.00	2.54	3.59	4.68	7.12
PRCSEN_CEO	5.51	1.89	0.00	4.58	5.69	6.74	11.23
PRCSEN_TOP5	4.76	1.56	0.00	3.83	4.83	5.81	9.71
Firm Characteristics							
Size	16.70	1.60	13.43	15.54	16.38	17.67	21.51
M2B	1.13	0.18	0.93	1.06	1.10	1.15	3.42
LogCA	-2.51	0.28	-3.26	-2.66	-2.53	-2.41	-0.35
Commercial Loans	0.13	0.08	0.00	0.08	0.13	0.17	0.51
Consumer Loans	0.06	0.07	0.00	0.02	0.04	0.09	0.66
Real Estate Loans	0.40	0.18	0.00	0.30	0.41	0.51	0.88
Deposits	0.67	0.15	0.00	0.62	0.69	0.77	0.91
Repo	0.07	0.07	0.00	0.02	0.05	0.10	0.44
Other Borrowed Money	0.10	0.07	0.00	0.04	0.09	0.14	0.51

Variable definition could be found in Table 3.2. All independent variables are measured at last fiscal year's end. Dependent variables are measured at one quarter after last fiscal year's end.

Table 3.4 Pearson (above) / Spearman (below) Correlations

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
RATIO_RISK (1)	1.00	0.62	0.68	0.26	0.27	0.23	0.25	0.30	-0.06	-0.21	-0.15	-0.23	-0.08	-0.30	0.02	0.14
Log_RR (2)	1.00	1.00	0.60	0.22	0.23	0.10	0.11	0.30	-0.14	-0.28	-0.11	-0.16	-0.02	-0.23	0.09	0.24
High_RR (3)	0.84	0.84	1.00	0.28	0.29	0.23	0.23	0.29	0.01	-0.12	-0.06	-0.18	-0.07	-0.25	0.03	0.17
VOLSEN_CEO (4)	0.31	0.31	0.28	1.00	0.92	0.73	0.71	0.66	-0.01	-0.18	0.25	-0.08	-0.36	-0.32	0.19	0.13
VOLSEN_TOP5 (5)	0.31	0.31	0.29	0.94	1.00	0.70	0.78	0.78	-0.01	-0.17	0.27	-0.06	-0.43	-0.38	0.22	0.16
PRCSEN_CEO (6)	0.27	0.27	0.27	0.74	0.73	1.00	0.90	0.51	0.22	-0.03	0.19	-0.16	-0.33	-0.37	0.21	0.09
PRCSEN_TOP5 (7)	0.26	0.26	0.26	0.73	0.78	0.93	1.00	0.62	0.24	-0.09	0.19	-0.13	-0.37	-0.37	0.23	0.11
Size (8)	0.30	0.30	0.24	0.73	0.81	0.60	0.66	1.00	-0.12	-0.26	0.23	-0.06	-0.41	-0.51	0.20	0.28
M2B (9)	-0.10	-0.10	-0.04	0.06	0.05	0.25	0.27	-0.16	1.00	0.54	0.03	-0.18	-0.23	-0.26	-0.09	-0.06
logCA (10)	-0.34	-0.34	-0.24	-0.29	-0.30	-0.28	-0.32	-0.33	0.01	1.00	0.11	0.08	-0.05	-0.10	-0.33	-0.03
Consumer Loans (11)	-0.08	-0.08	-0.06	0.20	0.21	0.07	0.07	0.24	0.01	-0.12	1.00	-0.07	-0.29	-0.05	-0.02	0.16
Commercial Loans (12)	-0.20	-0.20	-0.17	-0.09	-0.07	-0.17	-0.14	-0.02	-0.09	0.24	0.11	1.00	-0.07	0.39	-0.25	-0.18
Real Estate Loans (13)	-0.04	-0.04	-0.05	-0.38	-0.43	-0.32	-0.35	-0.39	-0.14	0.17	-0.30	-0.08	1.00	0.37	-0.20	0.17
Deposits (14)	-0.30	-0.30	-0.25	-0.46	-0.49	-0.40	-0.40	-0.59	0.16	0.26	-0.12	0.32	0.24	1.00	-0.37	-0.47
Repo (15)	0.08	0.08	0.03	0.22	0.24	0.23	0.23	0.30	-0.07	-0.39	0.18	-0.14	-0.12	-0.45	1.00	0.07
Other Borrowed Money (16)	0.19	0.19	0.16	0.16	0.17	0.09	0.10	0.27	-0.22	-0.11	0.15	-0.14	0.17	-0.66	0.06	1.00

Table 3.5 Riskiness of Debt Investments and CEO's Compensation

Time Period	2001-2006	2007-2009	2001-2009	2001-2006	2007-2009	2001-2009
VARIABLES	logratio	logratio	logratio	high	high	high
VOLSEN_CEO	0.3245*	0.3336	0.3399*	0.3299**	0.0933	0.2314*
	(1.937)	(0.988)	(1.865)	(2.339)	(0.579)	(1.815)
PRCSEN_CEO	-0.1712	-0.1803	-0.2569	-0.0640	0.2544	0.0128
	(-1.097)	(-0.551)	(-1.511)	(-0.542)	(1.104)	(0.108)
Size	0.2610	0.1456	0.3364*	0.0260	0.0682	0.0967
	(1.211)	(0.607)	(1.822)	(0.108)	(0.229)	(0.490)
M2B	-3.6651	-0.1128	-0.6744	-0.8829	-0.5979	-0.1878
	(-1.035)	(-0.038)	(-0.206)	(-0.684)	(-0.340)	(-0.156)
logCA	-3.5017**	-1.2151	-2.7998*	-1.5810	-1.1071	-1.3605
	(-2.408)	(-0.590)	(-1.917)	(-1.027)	(-1.088)	(-1.272)
Consumer Loans	-11.0924**	-2.7629	-10.1284*	-5.7326*	-2.8607	-5.2669*
	(-2.115)	(-0.409)	(-1.914)	(-1.776)	(-0.595)	(-1.916)
Real Estate Loans	-0.2009	-2.2959	-0.5161	0.1409	-0.5748	-0.0680
	(-0.103)	(-0.742)	(-0.269)	(0.101)	(-0.380)	(-0.055)
Commercial Loans	-5.2201	-8.3858	-5.5609	-5.5678**	-1.5730	-4.1220*
	(-1.247)	(-1.334)	(-1.398)	(-2.083)	(-0.567)	(-1.790)
Deposits	-2.5368	-3.2417	-2.5073	-4.7578	-7.5702	-4.6947
	(-1.151)	(-1.064)	(-1.297)	(-0.667)	(-1.381)	(-0.824)
Repo	-6.2428**	-8.7912	-5.7343*	-8.7860	-9.3129	-8.0947
	(-2.378)	(-1.193)	(-1.941)	(-1.230)	(-1.467)	(-1.427)
Other Borrowed Money	6.9258*	13.3738**	8.1872**	-2.1260	0.6998	-0.6503
	(1.897)	(2.165)	(2.206)	(-0.274)	(0.107)	(-0.103)
Constant	-9.9337	-5.7567	-12.7832*	0.4795	1.5650	-0.9711
	(-1.154)	(-0.676)	(-1.697)	(0.072)	(0.178)	(-0.157)
Observations	528	250	778	528	250	778
Adjusted R2	0.264	0.166	0.205			
Pseudo R2				0.145	0.189	0.141

All variables are defined in Table 3.2. I run OLS regressions for first three columns; I run logistic regressions for last three columns. Year-dummies are included but not tabulated. Standard errors are clustered at firm level. T statistics are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 3.6 Riskiness of Debt Investments and Top5 Executives' Compensation

Time Period	2001-2006	2007-2009	2001-2009	2001-2006	2007-2009	2001-2009
VARIABLES	logratio	logratio	logratio	high	high	high
VOLSEN_TOP5	0.4685*	0.9296*	0.5278*	0.5197**	0.3146	0.4087**
	(1.883)	(1.720)	(1.835)	(2.551)	(1.439)	(2.357)
PRCSEN_TOP5	-0.3291	-0.4564	-0.4677*	-0.1280	0.3252	-0.0456
	(-1.275)	(-0.886)	(-1.719)	(-0.768)	(1.079)	(-0.271)
Size	0.2497	-0.1392	0.3356	-0.0849	-0.1822	-0.0108
	(0.889)	(-0.445)	(1.364)	(-0.325)	(-0.607)	(-0.047)
M2B	-3.1735	0.6272	0.0022	-0.7732	-1.2786	-0.0597
	(-0.869)	(0.205)	(0.001)	(-0.527)	(-0.649)	(-0.043)
logCA	-3.8051***	-1.4830	-3.0813**	-1.8285	-1.1034	-1.5115
	(-2.656)	(-0.707)	(-2.088)	(-1.263)	(-1.022)	(-1.422)
Consumer Loans	-10.9324**	-3.0305	-10.1744*	-5.7199*	-2.1401	-5.1330*
	(-2.105)	(-0.444)	(-1.947)	(-1.763)	(-0.467)	(-1.858)
Real Estate Loans	-0.0492	-1.9700	-0.3758	0.3615	-0.3071	0.1330
	(-0.025)	(-0.626)	(-0.195)	(0.256)	(-0.192)	(0.106)
Commercial Loans	-5.0956	-8.7624	-5.5166	-5.4261**	-1.9982	-4.1639*
	(-1.235)	(-1.412)	(-1.395)	(-2.041)	(-0.703)	(-1.805)
Deposits	-2.4359	-4.1585	-2.3058	-4.6426	-9.8326	-5.0948
	(-1.137)	(-1.327)	(-1.251)	(-0.681)	(-1.618)	(-0.841)
Repo	-6.2056**	-9.7671	-5.6244*	-8.8957	-11.6165*	-8.5777
	(-2.360)	(-1.411)	(-1.894)	(-1.299)	(-1.670)	(-1.421)
Other Borrowed Money	6.9201*	12.8955**	8.1844**	-1.9144	-1.0692	-1.0045
	(1.910)	(2.043)	(2.239)	(-0.258)	(-0.148)	(-0.153)
Constant	-10.8752	-2.4125	-14.1120*	1.1610	7.5157	0.3924
	(-1.167)	(-0.302)	(-1.782)	(0.174)	(0.775)	(0.056)
Observations	528	250	778	528	250	778
Adjusted R2	0.265	0.190	0.209			
Pseudo R2				0.147	0.196	0.143

All variables are defined in Table 3.2. I run OLS regressions for first three columns; run logistic regressions for last three columns. Year-dummies are included and not tabulated. Standard errors are clustered at firm level. T statistics are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4.1 Variable Definition

Variables	Definition
Dependent Variables	
RISK	non-agency MBS and other domestic debt securities
SAFE	U.S. treasury, Securities issued by U.S. government and states, and agency MBS
TRAD	RISK or SAFE in trading category
AFS	RISK or SAFE in AFS category
RISK_in_TRAD	RISK in trading category
RISK_in_AFS	RISK in AFS category
SAFE_in_TRAD	SAFE in trading category
SAFE_in_AFS	SAFE in AFS category
P_RISK	the ratio of RISK_in_TRAD to RISK
P_SAFE	the ratio of SAFE_in_TRAD to SAFE
Log_PRISK	logarithm of (P_RISK/(1-P_RISK)); P_RISK is winsorized at [5E-7, 0.9999]
Log_PSAFE	logarithm of (P_SAFE/(1-P_SAFE)); ; P_SAFE is winsorized at [5E-7, 0.9999]
High_PRISK	equals to 1, if P_RISK is above median in each quarter; equals to 0, otherwise.
High_PSAFE	equals to 1, if P_SAFE is above median in each quarter; equals to 0, otherwise.
Independent Variables	
Size	Logarithm of total assets at quarter beginning
LogCA	Logarithm of tier1 capital ratio at quarter beginning
RiskSec	Ratio of RISK to total assets at quarter beginning
SafeSec	Ratio of SAFE to total assets at quarter beginning
Commercial Loans	Ratio of commercial and industry loans to total assets at quarter beginning
Consumer Loans	Ratio of loans to individuals for household, family, and other personal expenditures to total assets at quarter beginning
Real Estate Loans	Ratio of loans secured by real estate to total assets at quarter beginning
Interest Income from Loans	Mean value of interest and fee income on loans and leases, divided by total assets, in previous 4 quarters
Abnormal Loan Loss Provision	Average abnormal loan loss provision in previous 4 quarters. I use the following regression model to estimate the nondiscretionary portion of the loan loss provision ε: Loan Loss Provisions (t) = β0 + β1 Loan Loss Reserves (t-1) + β2 Net Charge-Offs (t) + β3 Δ Nonaccrual Loans (t) + β4 Δ Overdue Loans (t) +β5 Commercial Loans (t-1) +β6 Consumer Loans (t-1) +β7 Real Estate Loans (t-1) +β8 Size (t-1) + ε. All variables are deflated by last period end's total assets, except the variable "Size".
Listed	Equals to 1, if the bank is listed; equals to 0, otherwise.

Table 4.2 Sample Selection and Security Investments in Subcategories

Panel A. Sample Selection and Relative Size of Certain Variables in Each Step

Requirements	NOBS	Total Assets (%)	AFS (%)	Trading (%)	SAFE (%)	RISK (%)
top 1000 BHCs in each quarter from 2001Q2 to 2009Q4	34787	100	100	100	100	100
securities in AFS category is positive	34201	99	100	98	99	99
securities in trading category is positive	2450	81	71	98	77	81
securities in SAFE category is positive	2450	81	71	98	77	81
securities in Risky category is positive	2226	81	71	98	76	81
independent variables are available	2176	79	70	94	75	79

Panel B. Proportion of Securities in Each Subcategory for the Sample

Percentage	RISK	SAFE	SUM
TRAD	13	20	33
AFS	15	52	67
SUM	29	71	100

This panel presents proportion of dollar amounts invested in each subcategory for the full sample period.

Panel C. Percentage of Firm-Quarters Holding No Securities in a Certain Subcategory

	RISK	SAFE
TRAD	31	8
AFS	6	0

This panel presents proportion of bank-quarters with no security investments in a certain subcategory.

Table 4.3 Descriptive Statistics

Variable	Mean	Std Dev	Minimum	1st Pctl	25th Pctl	Median	75th Pctl	99th Pctl	Maximum	Skewness
P_RISK	0.26	0.37	0.00	0.00	0.00	0.02	0.50	1.00	1.00	1.11
Log_PRISK	-5.26	7.30	-14.51	-14.51	-14.51	-4.08	-0.01	9.21	9.21	0.06
High_PRISK	0.50	0.50	0.00	0.00	0.00	1.00	1.00	1.00	1.00	-0.02
P_SAFE	0.10	0.21	0.00	0.00	0.00	0.02	0.07	1.00	1.00	2.87
Log_PSAFE	-4.58	3.96	-14.51	-14.51	-6.03	-4.08	-2.53	5.68	9.21	-0.71
High_PSAFE	0.50	0.50	0.00	0.00	0.00	1.00	1.00	1.00	1.00	-0.02
Size	17.22	1.82	12.68	13.22	15.88	17.38	18.40	21.32	21.58	0.04
Tier1 Ratio	0.08	0.02	0.01	0.01	0.07	0.08	0.09	0.12	0.12	-0.70
Tier1 Risk Ratio	0.10	0.03	0.03	0.03	0.08	0.10	0.12	0.23	0.23	1.42
Total Risk Ratio	0.13	0.03	0.04	0.04	0.11	0.12	0.14	0.24	0.24	0.95
RiskSec	3.33	4.10	0.00	0.00	0.59	1.95	4.32	20.42	24.89	2.23
SafeSec	15.23	9.08	0.00	0.44	9.17	13.37	19.85	43.81	91.24	1.51
Commercial Loans	12.90	8.16	0.00	0.00	8.05	12.28	16.79	42.19	49.85	1.11
Consumer Loans	5.82	5.43	0.00	0.00	1.35	4.10	9.06	20.14	41.26	1.42
Real Estate Loans	33.43	17.00	0.00	0.00	23.29	34.17	46.65	67.42	78.86	-0.22
Interest Income from Loans	1.36	0.30	0.74	0.74	1.17	1.35	1.54	2.17	2.17	0.29
Abnormal Loan Loss Provision	-0.35	5.84	-22.87	-22.87	-2.65	-0.50	2.16	17.80	17.80	-0.42
Listed	0.69	0.46	0.00	0.00	0.00	1.00	1.00	1.00	1.00	-0.84

The sample consists of 2176 bank-quarters during the period 2001Q1–2009Q4. All variables except capital adequacy ratios are as defined in Table 4.2. Capital adequacy ratios, Interest Income from Loans, and Abnormal Loan Loss Provision are winsorized at their respective 1st and 99th percentiles.

Table 4.4 Pearson (above) / Spearman (below) Correlations

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
P_RISK (1)	1.000	**0.436**	**0.183**	**-0.268**	**-0.155**	**-0.160**	**-0.209**	**0.112**	**-0.093**	**0.057**	**0.098**	**-0.091**
P_SAFE (2)	**0.347**	1.000	**0.310**	**-0.575**	**0.114**	**-0.187**	**-0.328**	**-0.096**	**-0.241**	0.037	**-0.055**	**-0.162**
Size (3)	**0.299**	**0.331**	1.000	**-0.390**	**0.188**	**-0.331**	**-0.049**	**0.143**	**-0.291**	**-0.115**	**-0.108**	**0.259**
LogCA (4)	**-0.163**	**-0.249**	**-0.475**	1.000	**-0.176**	**0.055**	**0.283**	**0.085**	**0.292**	0.009	0.024	**0.206**
RiskSec (5)	**-0.068**	**0.183**	**0.242**	**-0.290**	1.000	0.018	**-0.187**	**-0.223**	**-0.374**	**-0.176**	0.000	0.007
SafeSec (6)	**-0.224**	**-0.189**	**-0.328**	**0.077**	-0.017	1.000	**-0.054**	**-0.085**	**-0.226**	**-0.143**	**0.067**	**-0.245**
Commercial Loans (7)	**-0.197**	**-0.195**	-0.017	**0.222**	**-0.139**	**-0.081**	1.000	**-0.059**	0.014	**0.109**	-0.037	**0.074**
Consumer Loans (8)	**0.078**	0.012	**0.185**	-0.025	**-0.161**	**-0.090**	**0.079**	1.000	0.006	**0.128**	-0.007	-0.038
Real Estate Loans (9)	**-0.077**	**-0.098**	**-0.278**	**0.211**	**-0.324**	**-0.182**	0.036	**0.057**	1.000	**0.374**	0.028	**0.226**
Interest Income from Loans (10)	0.026	0.028	**-0.131**	0.021	**-0.141**	**-0.131**	**0.122**	**0.153**	**0.381**	1.000	0.039	**0.085**
Abnormal Loan Loss Provision (11)	**0.109**	0.010	**-0.094**	-0.018	-0.019	**0.043**	**-0.057**	0.026	0.029	**0.046**	1.000	0.031
Listed (12)	-0.011	0.005	**0.254**	0.012	**-0.045**	**-0.238**	**0.105**	**0.090**	**0.221**	**0.081**	0.002	1.000

Correlation coefficients in bold indicate statistical significance at the 5% level or better.

Table 4.5 Tendencies to classify debt securities into trading vs. into AFS category for different partitions

Panel A. Mean value of P_RISK by different partitions

Partition Variables	Size	LogCA	RiskSec	SafeSec	Commercial Loans	Real Estate Loans	Consumer Loans	Interest Income from Loans	Abnormal Loan Loss Provision	Listed
Low	0.267	0.436	0.368	0.258	0.354	0.352	0.240	0.287	0.225	0.305
High	0.473	0.251	0.150	0.126	0.143	0.273	0.296	0.334	0.339	0.233
t test	<.0001	<.0001	<.0001	<.0001	<.0001	0.004	0.032	0.077	<.0001	<.0001
Wilcoxon test	<.0001	<.0001	0.001	<.0001	<.0001	0.023	0.076	0.026	<.0001	0.594

Panel B. Mean value of P_SAFE by different partitions

Partition Variables	Size	LogCA	RiskSec	SafeSec	Commercial Loans	Real Estate Loans	Consumer Loans	Interest Income from Loans	Abnormal Loan Loss Provision	Listed
Low	0.070	0.268	0.040	0.122	0.247	0.245	0.184	0.139	0.133	0.155
High	0.296	0.061	0.154	0.041	0.031	0.095	0.090	0.145	0.111	0.081
t test	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.735	0.159	<.0001
Wilcoxon test	<.0001	<.0001	0.001	<.0001	<.0001	<.0001	0.161	0.293	0.896	0.810

For each quarter, all firms are classified into five groups according to a partition variable. "Low" ("High") group consists of all firm-quarters with lowest (highest) 20 percentile value of that partition variable in a quarter. All partition variables are defined in Table 4.2. Two sample t test reports the probability of null hypothesis "mean values of two groups are equal" being true for each partition variable. Non-parametric Wilcoxon test reports the probability of null hypothesis "rank sum of two groups are equal" being true for each partition variable.

Table 4.6 Multivariate Regression Results

Panel A. Classification for RISK Securities

Model	Expected Sign	(1) Log_PRISK	(2) Log_PRISK	(3) High_PRISK=1	(4) High_PRISK=1
Size	+	0.7799*	0.7844*	0.4810***	0.4167***
		(0.399)	(0.400)	(0.120)	(0.120)
LogCA	+	0.0112	-0.0049	0.3602	0.3663
		(1.203)	(1.260)	(0.488)	(0.445)
RiskSec	-	-0.3725***	-0.3734***	-0.1752***	-0.1849***
		(0.112)	(0.115)	(0.042)	(0.042)
SafeSec	-	-0.1632***	-0.1633***	-0.0462***	-0.0401**
		(0.053)	(0.054)	(0.017)	(0.017)
Commercial Loans	-	-0.2147***	-0.2151***	-0.0830***	-0.0702***
		(0.074)	(0.074)	(0.025)	(0.023)
Consumer Loans	-	-0.0310	-0.0316	-0.0478	-0.0308
		(0.150)	(0.151)	(0.045)	(0.044)
Real Estate Loans	-	-0.1040**	-0.1041**	-0.0275*	-0.0300**
		(0.046)	(0.046)	(0.015)	(0.015)
Interest Income from Loans	+	5.3794**	5.3834**	2.5635***	2.8604***
		(2.685)	(2.702)	(0.904)	(0.874)
Abnormal Loan Loss Provision	+	0.1010**	0.1008**	0.0283**	0.0228*
		(0.044)	(0.043)	(0.013)	(0.014)
Listed	-	-0.4593	-0.4614	-0.5442	-0.4398
		(1.376)	(1.377)	(0.426)	(0.406)
Log_PSAFE	+		-0.0089		
			(0.134)		
High_PSAFE	+				1.3125***
					(0.266)
Constant		-18.6204**	-18.7637**	-7.9244***	-8.3656***
		(7.853)	(8.411)	(2.721)	(2.673)
Quarter Dummy		Yes	Yes	Yes	Yes
Observations		2176	2176	2176	2176
Adjusted (Pseudo) R-squared		0.179	0.178	0.181	0.234

Quarter-dummies are included and not reported. Standard errors are clustered at firm level. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Panel B. Classification for SAFE Securities

Model	Expected Sign	(5) Log_PSAFE	(6) Log_PSAFE	(7) High_PSAFE=1	(8) High_PSAFE=1
Size	+	0.4985***	0.5006***	0.3489***	0.2370**
		(0.180)	(0.187)	(0.103)	(0.098)
LogCA	+	-1.8268*	-1.8268*	-0.1167	-0.2877
		(0.988)	(0.990)	(0.500)	(0.438)
RiskSec	-	-0.1096	-0.1106	-0.0279	0.0154
		(0.090)	(0.089)	(0.053)	(0.052)
SafeSec	-	-0.0101	-0.0105	-0.0294*	-0.0190
		(0.036)	(0.034)	(0.017)	(0.017)
Commercial Loans	-	-0.0500	-0.0506	-0.0645***	-0.0469**
		(0.035)	(0.036)	(0.021)	(0.019)
Consumer Loans	-	-0.0666	-0.0667	-0.0591*	-0.0472
		(0.068)	(0.068)	(0.034)	(0.030)
Real Estate Loans	-	-0.0142	-0.0145	-0.0039	0.0032
		(0.031)	(0.030)	(0.014)	(0.013)
Interest Income from Loans	+	0.4500	0.4644	-0.0554	-0.7372
		(2.089)	(2.019)	(0.956)	(0.940)
Abnormal Loan Loss Provision	+	-0.0144	-0.0141	0.0180	0.0109
		(0.030)	(0.029)	(0.014)	(0.015)
Listed	-	-0.2305	-0.2318	-0.3758	-0.2601
		(0.648)	(0.648)	(0.387)	(0.367)
Log_PRISK	+		-0.0027		
			(0.041)		
High_PRISK	+				1.2802***
					(0.264)
Constant		-16.1914***	-16.2413***	-3.7827	-2.6339
		(4.534)	(4.666)	(2.341)	(2.255)
Quarter Dummy		Yes	Yes	Yes	Yes
Observations		2176	2176	2176	2176
Adjusted (Pseudo) R-squared		0.153	0.153	0.117	0.167

Quarter-dummies are included and not reported. Standard errors are clustered at firm level. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5.1 Variable Definition

Variables	Definition
Dependent Variables	
Realized Gains	Realized gains (losses) from AFS divided by quarter beginning total assets
Unrealized Gains	Change of net unrealized gains (losses) on AFS securities deflated by quarter beginning total assets
Total Fair Value Change	Sum of Realized Gains and Unrealized Gains
Incentives	
ROE before Disposal Gains	Income before extraordinary items excluding realized gains (losses) from AFS, divided by quarter beginning total equity
Nominal ROE	Income before extraordinary items, divided by quarter beginning total equity
High ROE before Disposal Gains	Equals to 1, if a bank's "ROE before Disposal Gains" is among top 10% in that quarter; equals to 0, otherwise.
Low ROE before Disposal Gains	Equals to 1, if a bank's "ROE before Disposal Gains" is among bottom 10% in that quarter; equals to 0, otherwise.
To Keep Positive	Equals to 1, if -1%<="ROE before Disposal Gains"<0; equals to 0, otherwise.
To Keep Increase	Equals to 1, if -1%<="ROE before Disposal Gains" - "Nominal ROE" in last quarter<0; equals to 0, otherwise.
Barely MBE	Equals to 1, if actual EPS from IBES meet or beat the last available analyst forecast before quarter end by less than one cent; equals to 0, otherwise.
log(Equity Raising)	Log((1+ ER)/ET0). ER is total proceeds from selling ordinary shares, perpetual preferred shares, or business combination in current and future 3 quarters. ET0 is quarter beginning total equity.
Dummy for Equity Raising	Equals to 1, if ER>0; equals to zero, otherwise
Low Capital Adequacy	Equals to 1, if the bank's tier1 ratio is among lowest 10% in that quarter; equals to 0, otherwise.
Not Well Capitalized	equals to 1, if the bank is not well capitalized, as defined by regulators as tier1 ratio lower than 5%, or risk based tier1 ratio lower than 6%, or total risk ratio lower than 10%; equals to 0, otherwise
Control Variables	
AFS	AFS securities at quarter beginning divided by total assets at quarter beginning
Pool	accumulated unrealized gains (losses) from AFS at quarter beginning divided by total assets at quarter beginning
FVC Security S	fair value changes on security S in current quarter; equals to quarter beginning amount of security S, deflated by quarter beginning total assets, and multiplied by estimated coefficient for security S for this quarter from chapter 2. Security S stands for treasury, government securities, state securities, agency MBS, non-agency MBS, ABS, other domestic debt securities, foreign debt securities, and equities.

Table 5.2 Sample Selection

Banks are in my sample as discussed in table 2.1 step 5	55,788
from 2001Q2 to 2009Q4	34,788
Banks hold AFS securities at quarter beginning	34,096
Current quarter's realized and unrealized gains/losses from AFS are available	34,066
Dependent variable is truncated at (1%, 99%)	32,867

Table 5.3 Descriptive Statistics

Variable	N	Mean	Std Dev	Minimum	25th Pctl	Median	75th Pctl	Maximum
Dependents								
Realized Gains	32867	0.0518	0.2966	-2.3856	0.0000	0.0000	0.0486	1.6917
Total Fair Value Change	32867	0.0341	1.6063	-7.0263	-0.6818	0.0058	0.8076	5.6248
Incentives								
High ROE before Disposal Gains	32867	0.0964	0.2952	0.0000	0.0000	0.0000	0.0000	1.0000
Low ROE before Disposal Gains	32867	0.0957	0.2943	0.0000	0.0000	0.0000	0.0000	1.0000
To Keep Positive	32867	0.0244	0.1543	0.0000	0.0000	0.0000	0.0000	1.0000
To Keep Increase	32584	0.3843	0.4864	0.0000	0.0000	0.0000	1.0000	1.0000
Barely MBE	7846	0.2011	0.4009	0.0000	0.0000	0.0000	0.0000	1.0000
Dummy for Equity Raising	32794	0.5685	0.4953	0.0000	0.0000	1.0000	1.0000	1.0000
log(Equity Raising)	32806	0.1339	0.3402	0.0000	0.0000	0.0035	0.0626	2.0651
Not Well Capitalized	32867	0.0529	0.2239	0.0000	0.0000	0.0000	0.0000	1.0000
Low Capital Adequacy	32812	0.0962	0.2949	0.0000	0.0000	0.0000	0.0000	1.0000
Controls								
AFS	32867	0.1794	0.1068	0.0000	0.1025	0.1647	0.2396	0.7254
Pool	32867	0.0005	0.0034	-0.0516	-0.0008	0.0002	0.0017	0.0666
fvc treasury	32867	0.0000	0.0001	-0.0023	0.0000	0.0000	0.0000	0.0028
fvc gov	32867	0.0000	0.0005	-0.0053	-0.0001	0.0000	0.0001	0.0040
fvc state	32867	0.0000	0.0004	-0.0033	0.0000	0.0000	0.0001	0.0042
fvc mbsg	32867	0.0001	0.0007	-0.0067	-0.0001	0.0000	0.0003	0.0056
fvc mbsng	32867	0.0000	0.0002	-0.0085	0.0000	0.0000	0.0000	0.0025
fvc abs	32867	0.0000	0.0001	-0.0056	0.0000	0.0000	0.0000	0.0028
fvc odsd	32867	0.0000	0.0002	-0.0200	0.0000	0.0000	0.0000	0.0083
fvc odsf	32867	0.0000	0.0001	-0.0029	0.0000	0.0000	0.0000	0.0074
fvc eq	32867	0.0000	0.0001	-0.0038	0.0000	0.0000	0.0000	0.0046

All variables are defined in Table 5.1. Two dependent variables are much larger than control variables since dependent variables have been multiplied by 1,000.

Table 5.4 Pearson (above) / Spearman (below) Correlations

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Realized Gains (1)	1.00	0.13	-0.04	0.06	0.06	0.06	0.04	0.01	-0.01	0.01	0.01	0.11	0.18
Total Fair Value Change (2)	0.12	1.00	0.01	0.00	0.01	-0.03	0.00	0.00	0.00	0.01	-0.01	-0.01	-0.15
High ROE before Disposal Gains (3)	-0.05	0.00	1.00	-0.11	-0.05	-0.09	0.02	-0.04	-0.02	0.04	0.08	-0.04	0.00
Low ROE before Disposal Gains (4)	0.03	0.00	-0.11	1.00	0.17	-0.09	-0.05	-0.01	0.03	0.09	0.07	0.01	-0.02
To Keep Positive (5)	0.05	0.01	-0.05	0.17	1.00	-0.05	-0.05	0.02	0.04	0.01	0.01	-0.03	-0.03
To Keep Increase (6)	0.09	-0.03	-0.09	-0.09	-0.05	1.00	0.09	0.00	-0.02	-0.07	-0.06	0.07	0.06
Barely MBE (7)	0.04	0.00	0.02	-0.05	-0.05	0.09	1.00	0.00	0.03	-0.03	-0.01	0.03	0.06
Dummy for Equity Raising (8)	0.03	0.00	-0.04	-0.01	0.02	0.00	0.00	1.00	0.34	0.00	0.02	-0.06	-0.10
log(Equity Raising) (9)	0.02	0.00	-0.03	0.00	0.03	0.00	0.04	0.89	1.00	0.04	0.04	-0.07	-0.08
Not Well Capitalized (10)	0.01	0.01	0.04	0.09	0.01	-0.07	-0.03	0.00	0.02	1.00	0.43	-0.09	-0.04
Low Capital Adequacy (11)	0.02	-0.01	0.08	0.07	0.01	-0.06	-0.01	0.02	0.03	0.43	1.00	0.01	-0.05
AFS (12)	0.16	0.00	-0.05	0.00	-0.03	0.07	0.04	-0.07	-0.09	-0.10	0.00	1.00	0.11
Pool (13)	0.22	-0.16	0.01	-0.04	-0.02	0.06	0.07	-0.10	-0.12	-0.02	-0.04	0.13	1.00

No correlations between different variables exceed 0.5.

Table 5.5 Realized Gains and Cherry-picking Incentives

Model	Earnings Smoothness		Earnings Target		Equity Raising		Regulatory Costs	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High ROE before Disposal Gains	-0.0356***							
	(-4.494)							
Low ROE before Disposal Gains	0.0557***							
	(6.645)							
To Keep Positive		0.1181***						
		(7.384)						
To Keep Increase			0.0286***					
			(8.051)					
Barely MBE				0.0142*				
				(1.772)				
log(Equity Raising)					0.0023***			
					(4.085)			
Dummy Equity Raising						0.0221***		
						(4.709)		
Low Capital Adequacy							0.0193**	
							(2.046)	
Not Well Capitalized								0.0255*
								(1.836)
AFS	0.2393***	0.2469***	0.2401***	0.2271**	0.2518***	0.2502***	0.2456***	0.2505***
	(7.868)	(8.043)	(7.793)	(2.281)	(8.175)	(8.098)	(7.930)	(7.947)

Pool	11.5440***	11.5283***	11.2545***	21.6756***	11.6897***	11.6883***	11.4641***	11.5057***
	(6.428)	(6.646)	(6.585)	(5.124)	(6.753)	(6.778)	(6.594)	(6.601)
fvc_treasury	18.8185	17.7604	15.2076	61.2762	18.7960	18.8382	18.1939	18.6256
	(0.940)	(0.887)	(0.746)	(1.164)	(0.933)	(0.934)	(0.903)	(0.931)
fvc_gov	2.3182	1.9573	1.6609	-2.5542	2.2062	2.2714	1.5010	1.5790
	(0.494)	(0.415)	(0.353)	(-0.190)	(0.466)	(0.480)	(0.318)	(0.336)
fvc_state	-3.8487	-3.9962	-4.3935	-12.5285	-4.3048	-4.2783	-4.3496	-4.2389
	(-0.671)	(-0.699)	(-0.767)	(-0.896)	(-0.750)	(-0.746)	(-0.759)	(-0.740)
fvc_mbsg	13.4408***	12.4986***	13.1165***	26.2391***	12.7516***	12.6990***	12.5427***	12.7153***
	(3.514)	(3.269)	(3.407)	(2.954)	(3.324)	(3.310)	(3.274)	(3.326)
fvc_mbsng	37.1234**	38.2938***	36.6116**	13.5759	37.3884**	37.4149**	37.6092**	37.0907**
	(2.534)	(2.617)	(2.525)	(0.608)	(2.567)	(2.568)	(2.572)	(2.539)
fvc_abs	62.2274	62.0122	61.6204	85.0834**	70.8461*	70.2935*	63.7043	62.6927
	(1.497)	(1.539)	(1.529)	(2.136)	(1.722)	(1.711)	(1.584)	(1.556)
fvc_odsd	21.9978*	21.3844*	21.7261*	94.3225**	31.1226**	31.1993**	21.8926*	21.9225*
	(1.835)	(1.717)	(1.761)	(2.568)	(2.536)	(2.542)	(1.796)	(1.803)
fvc_odsf	-1.4583	1.2529	-0.3249	141.1747*	37.1211	37.6491	-1.7801	0.6166
	(-0.036)	(0.034)	(-0.009)	(1.829)	(1.520)	(1.531)	(-0.042)	(0.016)
fvc_eq	63.7971***	67.0478***	68.5288***	37.1924*	65.0597***	65.0749***	66.5341***	66.5098***
	(3.670)	(3.775)	(3.844)	(1.726)	(3.615)	(3.617)	(3.724)	(3.732)
Constant	0.0448***	0.0345**	0.0390**	0.0244	0.0602***	0.0321*	0.0444***	0.0417**
	(2.705)	(2.077)	(2.324)	(0.603)	(3.527)	(1.898)	(2.648)	(2.488)
Observations	32867	32867	32584	7846	32794	32794	32812	32867
Adjusted R-squared	0.070	0.069	0.068	0.088	0.067	0.067	0.066	0.066

Dependent variable is "Realized Gains". All variables are defined in Table 5.1. Sample period is from 2001 Q2 to 2009 Q4. Quarter-dummies are included but not reported. Standard errors are clustered at firm level. Robust t statistics are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 5.6 Total Fair Value Change and Cherry-picking Incentives

Model	Earnings Smoothness	Earnings Target			Equity Raising		Regulatory Costs	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
High ROE before Disposal Gains	-0.0042							
	(-0.209)							
Low ROE before Disposal Gains	0.0032							
	(0.182)							
To Keep Positive		0.0381						
		(1.101)						
To Keep Increase			0.0123					
			(1.146)					
Barely MBE				0.0158				
				(0.884)				
log(Equity Raising)					-0.0006			
					(-0.560)			
Dummy for Equity Raising						0.0003		
						(0.033)		
Low Capital Adequacy							-0.0178	
							(-0.992)	
Not Well Capitalized								-0.0234
								(-0.923)
AFS	0.0003	0.0012	-0.0001	0.1944	-0.0048	-0.0029	0.0030	-0.0031
	(0.004)	(0.017)	(-0.002)	(1.510)	(-0.065)	(-0.040)	(0.041)	(-0.043)

Pool	-29.2970***	-29.2642***	-29.1142***	-42.2433***	-30.1207***	-30.0400***	-29.8594***	-29.3999***
	(-4.927)	(-4.925)	(-4.899)	(-4.865)	(-4.958)	(-4.950)	(-4.943)	(-4.932)
fvc_treasury	964.4655***	964.2578***	963.2082***	821.3824*	977.1069***	977.1359***	965.9692***	964.1868***
	(6.923)	(6.921)	(6.897)	(1.762)	(6.991)	(6.991)	(6.913)	(6.921)
fvc_gov	946.0470***	946.0952***	945.5565***	844.3962***	949.6901***	949.7862***	945.6075***	945.9635***
	(21.597)	(21.606)	(21.436)	(6.562)	(21.676)	(21.677)	(21.573)	(21.610)
fvc_state	966.1160***	966.1860***	966.2933***	925.3261***	964.8815***	964.9156***	965.2885***	966.0002***
	(22.767)	(22.774)	(22.627)	(11.394)	(22.774)	(22.773)	(22.753)	(22.764)
fvc_mbsg	958.2087***	958.1068***	957.6713***	965.4291***	958.7346***	958.7447***	957.9266***	958.0175***
	(33.504)	(33.509)	(33.305)	(21.981)	(33.500)	(33.499)	(33.473)	(33.516)
fvc_mbsng	968.4055***	968.8327***	966.4681***	865.6570***	956.1827***	956.5399***	967.6279***	968.3796***
	(12.226)	(12.234)	(12.194)	(6.663)	(12.455)	(12.452)	(12.219)	(12.231)
fvc_abs	686.3613***	686.2153***	681.3827***	984.6853***	728.9668***	729.2808***	685.2577***	686.2503***
	(3.523)	(3.525)	(3.505)	(5.955)	(3.672)	(3.674)	(3.513)	(3.521)
fvc_odsd	580.3548***	580.2712***	573.3208***	952.2141***	792.5563***	792.2850***	582.2503***	579.9361***
	(2.816)	(2.815)	(2.789)	(8.748)	(6.915)	(6.916)	(2.820)	(2.813)
fvc_odsf	242.0346	242.3214	242.4604	995.2081*	644.1682***	643.9548***	176.8384	242.6677
	(0.825)	(0.828)	(0.832)	(1.953)	(4.431)	(4.438)	(0.624)	(0.827)
fvc_eq	995.0264***	995.2937***	1,011.1078***	888.9844***	985.5328***	985.3816***	994.9446***	995.3934***
	(8.528)	(8.528)	(8.534)	(6.101)	(8.464)	(8.462)	(8.527)	(8.531)
Constant	0.0104	0.0067	0.0167	-0.1016*	0.0127	0.0161	0.0215	0.0136
	(0.336)	(0.215)	(0.547)	(-1.917)	(0.423)	(0.511)	(0.711)	(0.444)
Observations	32867	32867	32584	7846	32794	32794	32812	32867
Adjusted R-squared	0.680	0.680	0.680	0.746	0.683	0.683	0.680	0.680

Dependent variable is "Total Fair Value Change". All variables are defined in Table 5.1. Sample period is from 2001 Q2 to 2009 Q4. Quarter-dummies are included but not reported. Standard errors are clustered at firm level. Robust t statistics are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 6.1 Sample Selection

Requirements	firm-years
in the sample in Table 2.1 Step 4, keep fiscal 4th quarter observation	17086
Fiscal year end is Dec 31	16768
last year end's total equity is positive	14829
has valid PERMNO	5671
delete year 2009	5377
has yearly return	4950
has yearend market value of equity	4947
all independent variables are available	4328

Table 6.2 Descriptive Statistics

Variable	Mean	Std Dev	1st Pctl	25th Pctl	Median	75th Pctl	99th Pctl
Earnings(t)	6.94%	9.23%	-19.59%	5.38%	7.09%	9.27%	24.21%
Tradrev(t-1)	0.14%	0.62%	-0.09%	0.00%	0.00%	0.00%	3.18%
GAFS(t-1)	0.47%	2.51%	-6.22%	-0.02%	0.10%	0.77%	9.37%
Disposal Gains (t-1)	0.18%	0.63%	-1.66%	0.00%	0.03%	0.25%	2.58%
Unrealized AFS Gains (t-1)	0.29%	2.46%	-6.37%	0.00%	0.00%	0.24%	8.91%
Others(t-1)	7.19%	3.33%	-2.80%	5.56%	7.01%	8.78%	16.75%
Yret(t)	4.64%	34.77%	-64.48%	-18.02%	1.95%	24.74%	98.56%
Tradrev(t)	0.13%	0.64%	-0.18%	0.00%	0.00%	0.00%	3.31%
GAFS(t)	0.37%	2.76%	-7.77%	-0.03%	0.09%	0.73%	9.29%
Disposal Gains (t)	0.09%	1.42%	-2.78%	0.00%	0.03%	0.25%	2.81%
Unrealized AFS Gains (t)	0.28%	2.38%	-6.15%	0.00%	0.00%	0.18%	8.78%
Others(t)	6.50%	7.18%	-12.38%	5.38%	6.91%	8.63%	17.28%
ΔTradrev	0.00%	0.27%	-0.75%	0.00%	0.00%	0.00%	0.81%
ΔGAFS	-0.09%	4.05%	-10.64%	-0.83%	-0.02%	0.29%	12.90%
ΔDisposal Gains	-0.07%	1.40%	-3.32%	-0.14%	0.00%	0.15%	2.38%
ΔUnrealized AFS Gains	-0.02%	3.88%	-8.86%	-0.38%	0.00%	0.00%	13.94%
ΔOthers	0.03%	7.18%	-19.13%	-0.17%	0.69%	1.53%	9.94%

This table presents descriptive statistics for variables in Table 6.3 and Table 6.4.

"Yret" is market adjusted annual stock return, accumulated from April to next year's March. "Earnings" is income before extraordinary items plus unrealized gains from AFS. Tradrev is annual trading revenue. "GAFS" is sum of realized and unrealized gains (losses) from AFS securities. "Disposal Gains" and "Unrealized AFS Gains" are realized and unrealized gains (losses) from AFS securities. "Others" equals to Earnings minus GAFS and Tradrev. Δtradrev, ΔGAFS, ΔDisposal Gains, ΔUnrealized AFS Gains and Δothers are annual change of Tradrev, GAFS, Disposal Gains, Unrealized AFS Gains and Others, respectively. All variables except "Yret" are deflated by year beginning market value. (t) and (t-1) are symbols for current and previous year, respectively.

Table 6.3 Persistence of gains (losses) from trading securities and AFS securities

Panel A Trading Revenue and Total Fair Value Changes from AFS Securities

Variable	Parameter	Estimate	Std Err	t Value / F Value	Pr > |t| / Pr > |F|
Intercept		-0.09	0.01	-17.5	<.0001
Tradrev(t-1)	β1	0.92	0.2	4.59	<.0001
GAFS(t-1)	β2	-0.22	0.06	-3.49	0.01
Others(t-1)	β3	0.72	0.04	17.77	<.0001
test:	β2=β1			29.88	<.0001
NOBS			4328		
Adj R2			0.23		

Panel B Trading Revenue, Realized and Unrealized Fair Value Changes from AFS Securities

Variable	Parameter	Estimate	Std Err	t Value	Pr > |t|
Intercept		-0.08	0.01	-17.75	<.0001
Tradrev(t-1)	β1	0.74	0.18	4.19	<.0001
Disposal Gains (t-1)	β2	0.11	0.18	0.63	0.5279
Unrealized AFS Gains (t-1)	β3	-0.23	0.06	-3.96	<.0001
Others(t-1)	β4	0.60	0.04	16.72	<.0001
NOBS			4328		
Adj R2			0.26		

Panel A presents pooling OLS regression results of Earnings on three independent variables: Tradrev, GAFS and Others. "Earnings" is income before extraordinary items plus unrealized gains from AFS. "Tradrev" is annual trading revenue. "GAFS" is sum of realized and unrealized gains (losses) from AFS securities. "Others" equals to "Earnings" minus "GAFS" and "Tradrev". Panel B presents pooling OLS regression results of Earnings on four independent variables: Tradrev, Disposal Gains, Unrealized AFS Gains and Others. "Disposal Gains" and "Unrealized AFS Gains" are realized and unrealized gains (losses) from AFS securities. All variables are deflated by year beginning market value. (t) and (t-1) are symbols for current and previous year, respectively. Year dummies are included but not reported. Independent variables are winsorized at 1% and 99%.

Table 6.4 ERCs for gains (losses) from trading securities and from AFS securities

Panel A. Trading Revenue and Total Fair Value Changes from AFS Securities

Variable	Parameter	Estimate	Std Err	t Value / F Value	Pr > |t| / Pr > |F|
Intercept	1	-0.02	0.02	-1.50	0.13
Δtradrev	β1	1.39	0.70	1.99	0.05
ΔGAFS	β2	-0.35	0.17	-2.05	0.04
Δothers	β3	0.12	0.07	1.68	0.09
Tradrev(t)	γ1	1.07	0.43	2.48	0.01
GAFS(t)	γ2	0.83	0.24	3.50	0.00
Others(t)	γ3	0.78	0.07	11.02	<.0001
test:	β1+γ1=β2+γ2			11.68	0.0006
NOBS		4328			
Adj R2		0.53			

Panel B. Trading Revenue, Realized and Unrealized Fair Value Changes from AFS Securities

Variable	Parameter	Estimate	Std Err	t Value / F Value	Pr > |t| / Pr > |F|
Intercept	1	-0.02	0.02	-1.45	0.15
Δtradrev	β1	1.43	0.70	2.04	0.04
ΔDisposal Gains	β2	0.07	0.38	0.19	0.85
ΔUnrealized AFS Gains	β3	-0.34	0.19	-1.86	0.06
Δothers	β4	0.10	0.07	1.38	0.17
Tradrev(t)	γ1	1.06	0.43	2.46	0.01
Disposal Gains (t)	γ2	0.56	0.41	1.37	0.17
Unrealized AFS Gains (t)	γ3	0.70	0.30	2.32	0.02
Others(t)	γ4	0.80	0.07	11.06	<.0001
test:	β2+γ2=β3+γ3			1.02	0.31
NOBS		4328			
Adj R2		0.53			

This table presents results of two pooling OLS regressions on annual market adjusted return Yret. "Yret" is market adjusted annual stock return, accumulated from April to next year's March. "Tradrev" is annual trading revenue. "GAFS" is sum of realized and unrealized gains (losses) from AFS securities. "Disposal Gains" and "Unrealized AFS Gains" are realized and unrealized gains (losses) from AFS securities. "Others" equals to "Earnings" minus "GAFS" and "Tradrev". "Earnings" is income before extraordinary items plus unrealized gains from AFS. Δ is annual change symbol. All variables except "Yret" are deflated by year beginning market value. (t) and (t-1) are symbols for current and previous year, respectively. Year dummies are included but not reported. Independent variables are winsorized at 1% and 99%.

Table 6.5 Interest income versus non-interest income

Panel A . Sample Selection

Sample period is from 1996 to 2008.	
Require:	Firm-years
accounting variables available (in Federal Reserve Bank's database)	20868
and stock return, market value available (in CRSP)	4381
truncated at 1%, 99% for each of 5 lagged variables in VAR model	4091

Panel B. Descriptive Statistics

B1. Normal period, from 1996 to 2006, 3546 firm years and 622 unique firms

Variable	Mean	Std Dev	Median	Minimum	25th Pctl	75th Pctl	Maximum
MV	3141	15738	225	7	88	850	273691
BV	1419	7493	116	9	54	399	135271
AT	17380	94884	1354	152	611	4582	1884318
B2M	0.57	0.24	0.53	0.12	0.42	0.67	2.87
EXP	0.49	0.18	0.46	0.13	0.38	0.55	2.34
I	0.45	0.13	0.44	-0.12	0.37	0.52	1.61
NonI	0.18	0.15	0.14	-0.06	0.1	0.21	1.74
Return	0.18	0.32	0.14	-0.72	-0.04	0.37	2.47

B2. Crisis period, from 2007 to 2008, 545 firm years and 289 unique firms

Variable	Mean	Std Dev	Median	Minimum	25th Pctl	75th Pctl	Maximum
MV	2986	15432	210	5	82	764	183125
BV	3054	16515	193	23	91	556	177052
AT	36248	212345	2214	225	1043	5680	2187631
B2M	1.26	1.14	0.88	0.23	0.66	1.37	9.8
EXP	0.39	0.13	0.37	-0.06	0.31	0.45	0.98
I	0.31	0.14	0.32	-0.62	0.24	0.39	0.64
NonI	0.13	0.11	0.11	-0.75	0.07	0.17	0.91
Return	-0.33	0.27	-0.31	-0.97	-0.52	-0.12	0.59

MV is market value of common equity in millions at the end of quarter. BV is book value of common equity in millions at the end of quarter. AT is total assets in millions at the end of quarter. B2M is the ratio of BV to MV. EXP is noninterest expenses, tax, and minority interests; divided by quarter beginning BV. I is net interest income divided by quarter beginning BV. NonI is noninterest income divided by quarter beginning BV. Return is the cum dividend 3-month stock return, which ended 1 month after quarter end.

Table 6.6 Estimated Parameters of the VAR Model

	Normal period, from 1996 to 2006					Crisis period, from 2007 to 2008				
	Ret_t	EXP_t	I_t	$NonI_t$	bm_t	Ret_t	EXP_t	I_t	$NonI_t$	bm_t
Ret_{t-1}	0.052***	-0.009	0.030***	0.015***	-0.299***	1.615***	-0.120***	0.275***	0.047***	-1.275***
	(0.017)	(0.007)	(0.006)	(0.004)	(0.015)	(0.078)	(0.015)	(0.015)	(0.011)	(0.062)
EXP_{t-1}	1.054***	1.228***	-0.484***	-0.255***	-0.744***	-1.168**	1.342***	-0.582***	-0.355***	-0.442
	(0.103)	(0.044)	(0.036)	(0.025)	(0.091)	(0.561)	(0.105)	(0.111)	(0.079)	(0.45)
I_{t-1}	1.189***	0.494***	0.299***	-0.283***	-0.819***	-0.845*	0.532***	0.162	-0.275***	-0.414
	(0.098)	(0.042)	(0.034)	(0.024)	(0.087)	(0.507)	(0.095)	(0.101)	(0.072)	(0.407)
$NonI_{t-1}$	1.130***	0.367***	-0.526***	0.677***	-0.854***	-0.767	0.433***	-0.559***	0.547***	-0.762*
	(0.101)	(0.043)	(0.035)	(0.025)	(0.089)	(0.559)	(0.105)	(0.111)	(0.079)	(0.449)
bm_{t-1}	0.293***	0.076***	-0.076***	-0.031***	0.645***	-0.22***	0.046***	-0.067***	-0.032***	0.816***
	(0.015)	(0.006)	(0.005)	(0.004)	(0.013)	(0.079)	(0.015)	(0.016)	(0.011)	(0.063)
Adj R-square	0.10	0.62	0.53	0.81	0.61	0.61	0.69	0.73	0.68	0.77
NOBS			3546					545		

This table lists the parameter estimates for the vector autoregressive model. The model variables include cum dividend excess return r_t, noninterest expenses EXP_t, net interest income I_t, noninterest income $NonI_t$, and book to market ratio bm_t. These five variables are mean-adjusted and measured quarterly. The parameters in the table correspond to the VAR system mentioned above.

Two numbers are reported for each parameter. The first number is a weighted least squares point estimate of the parameter, where observations are weighted such that each quarter receives an equal weight. The second number in parentheses is standard error.

*** denotes significance at 1%, ** denotes significance at 5%, and * denotes significance at 10%. Standard errors are noted in parentheses.

Table 6.7 Variance Contribution

Panel A: Normal period, from 1996 to 2006

Variable	Variance Contribution	Delete-one Jackknife Std Dev	Relative Variance Contribution
Total Variance	0.07	0.002	
Var(nr)	0.02	0.001	30.7%
Var(nEXP)	0.38	0.033	521.8%
Var(nI)	**0.15**	**0.008**	199.0%
Var(nNonI)	**0.37**	**0.034**	510.0%
Cov(nr,nEXP)	-0.01	0.003	-11.0%
Cov(nr,nI)	0.00	0.002	-5.2%
Cov(nr,nNonI)	-0.01	0.003	-8.7%
Cov(nEXP,nI)	0.07	0.012	98.8%
Cov(nEXP,nNonI)	0.32	0.030	433.7%
Cov(nI, nNonI)	-0.04	0.011	-51.1%
Diff btw Var(nI) and Var(nNonI)	**-0.23**	**0.032**	

Panel B: Crisis period, from 2007 to 2008

Variable	Variance Contribution	Delete-one Jackknife Std Dev	Relative Variance Contribution
Total Variance	0.23	0.024	
Var(nr)	1.05	0.102	1445.0%
Var(nEXP)	0.83	0.150	1133.8%
Var(nI)	**0.11**	**0.014**	144.8%
Var(nNonI)	**0.33**	**0.053**	458.5%
Cov(nr,nEXP)	-0.53	0.098	-732.6%
Cov(nr,nI)	0.24	0.026	333.4%
Cov(nr,nNonI)	-0.18	0.057	-248.5%
Cov(nEXP,nI)	-0.08	0.020	-109.5%
Cov(nEXP,nNonI)	0.47	0.085	649.2%
Cov(nI, nNonI)	-0.05	0.017	-73.4%
Diff btw Var(nI) and Var(nNonI)	**-0.23**	**0.050**	

Standard errors are computed based on delete-one jackknife method. All variance contributions are significant at 1% level.

Table 6.8 Variance contributions to stock returns from trading securities and AFS securities

Variable	Variance Contribution	Delete-one Jackknife Std Dev	Relative Variance Contribution
Total Variance	0.074	0.002	100.0%
Var(nr)	0.027	0.001	36.9%
Var(nOthers)	0.050	0.003	66.9%
Var(nTradrev)	**0.004**	**0.001**	5.2%
Var(nGAFS)	**0.001**	**0.000**	0.8%
Cov(nr,nOthers)	-0.001	0.001	-2.0%
Cov(nr,nTradrev)	-0.001	0.000	-0.9%
Cov(nr,nGAFS)	0.001	0.000	0.9%
Cov(nOthers,nTradrev)	0.003	0.001	4.2%
Cov(nOthers,nGAFS)	-0.001	0.000	-1.1%
Cov(nTradrev, nGAFS)	0.000	0.000	0.2%
Diff btw Var(nTradrev) and Var(nGAFS)	**0.003**	**0.001**	4.3%

Tradrev is annual trading revenue. GAFS is sum of realized and unrealized gains (losses) from AFS securities. Others equals to Earnings minus GAFS and Tradrev. Earnings is income before extraordinary items plus unrealized gains from AFS. All variables are deflated by year beginning total equity. Variance of stock returns is decomposed into variances of required returns, earnings components, and their co-variances. Standard errors are computed based on delete-one jackknife method. All variance contributions are significant at 1% level.