The Impact of Voluntary Adoption of Clawback Provisions on the Risk-taking Behavior of Financial Institutions

by

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ABSTRACT

In this study, we use a sample of 228 financial firms over the period of 2007-2012 to examine the impact of voluntary adoption of clawback provisions on these firms' risk-taking behavior. We find that financial firms exhibit a significant reduction in risk after adopting clawback provisions. The financial firms also exhibit a significant decrease in the volatility of ROE, total return risk and idiosyncratic risk. The reduction in risk is mainly driven by the improvement in the volatility of return on assets and subsample of banks and brokers. In addition, we find that financial firms are less likely to adopt clawback provisions with higher management and director ownership, more insiders on the board, and whose CEO is not the chairman of the board.

Keywords: financial institutions, clawback provisions, voluntary, risk-taking behavior

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Dedication

To my parents

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1. Introduction

With the increasing number of financial fraud in recent years, regulators have taken necessary steps to help prevent or reduce such incidences. The first introduction of clawback provisions was in the Sarbanes-Oxley Act of 2002 (SOX). The Section 304 of the SOX states that "if an issuer is required to prepare an accounting restatement due to the misconduct activities, the CEO and CFO shall reimburse the issuer for any bonus or other incentive-based or equity-based compensation" and "any profits realized from the sale of securities" received "during 12-month period following the issuance of the misstated financial statements". Later Dodd-Frank Act was introduced in 2010. The section 954 of Dodd-Frank states that if "an issuer is required to prepare an accounting restatement due to the material noncompliance of the issuer with any financial reporting requirement", "the issuer will recover from any current or former executive officer who received incentive-based compensation during the 3-year period preceding the date on which the issuer is required to prepare an accounting restatement". However, both provisions are not mandatory. In response to these regulatory enforcement, the number of firms with voluntary clawback provisions has increased from less than 1% in 2000 to more than 50% in 2012 (Babenko *et al.*, 2015).

Prior studies have found that voluntary adoption of clawback provisions is associated with positive stock price response, less moral hazard problems and higher CEO compensation (Iskandar and Jia, 2013). The adoption of clawback provisions also helps reduce the accounting manipulation, improve actual and investors' perceptions of financial accounting quality, reduce

future accounting restatements and reduce the R&D expenditures to achieve short term profit target. (Chan *et al.*, 2012; Dehaan *et al.*, 2013; and Mburu and Tang, 2015).

The clawback provisions in the executive compensation contracts are related to the incentive-based compensation, equity-based compensation and stock profits of executive officers, which makes the executives' earnings at risk. Sawers *et* al. (2010) show that managers whose eanings are threatened will tend to decrease the risk-taking behavior. The executive officers may be more conservative and cautious towards risk-taking and investment decisions. In addition, firms who take excessive risk are more likely to result in negative outcomes, which will increase the likelihood of manipulating their financial statement (Babenko *et al*. 2015). Because the adoption of clawback provisions will penalize the executive officers for the misstated financial statement, executive officers are less likely to take excessive risk. Furthermore, because firms with clawback provisions may want to demonstrate the appearance of a better governance and improve the investors' perceptions of the firm's future development, they tend to avoid excessive risk-taking behavior. Therefore, we expect that financial institutions will decrease risk-taking behavior subsequent to the adoption of clawback provisions.

Babenko *et al.* (2015) examine the characteristics of firms with clawback provisions and the effect of clawback provisions on the executives' compensation and risk behavior. They find that the likelihood of clawback provision adoption is higher in firms whose executives engage in a prior misconduct activity, whose misconduct activity is difficult to discover, whose restatements are due to the compensation-related reasons and whose board is independent. They also find that the adoption of clawback provisions will lead to higher equity-based compensation, lower

risk-taking and lower R&D expenditure. This paper extends Babenko *et al.* (2015) by examining the effect of clawback provisions adoption on financial institutions' risk-taking behavior. Although our paper is closely related to *et al.* (2015), there exists significant differences between our study and theirs. First, Babenko *et al.* (2015) focus on the sample of S&P 1500 and exclude firms that received funding from government due to the Troubled Asset Relief Program (TARP) because these firms are required to adopt clawback provisions. Brown *et al.* (2015) indicate that financial institutions are difference from non-financial firms in terms of financial leverage and investment opportunities, which will affect the risk-taking behavior. Kirkpatrick (2009) finds that financial crisis is mainly caused by worse corporate governance and excessive risk-taking behavior of financial institutions. Therefore, we focus on the sample of financial institutions excluding TARP. Second, while Babenko *et al.* (2015) use future growth in stock return volatility to measure firm risk, we provide more insights about the financial institutions' risk-taking incentives using both the accounting and market risk measures. The accounting risk measures include z-score and volatility of return on equity (ROE), which captures the probability of bankruptcy. The market risk measures include total return risk and idiosyncratic risk, which reflects market perceptions about the firms' future profit, growth and risk. Third, we further investigate the source of risk reduction following the adoption of clawback provisions by examining the components of z-score. Fourth, the different roles of financial institutions might have different risk-taking behavior among the subsamples. For example, the main operation of banks is borrowing money, which makes banks higher leveraged (Brown *et al.*, 2015). Brokers serve as the intermediary between the sellers and buyers of the securities transactions.

Investment companies pool the funds from individuals and manage the portfolio investment. Insurance companies collect the premiums from individuals or firms and pay for the claims that occurred. Therefore, we analyze the risk-taking behaviors of the subsamples (banks, brokers, insurance companies and investment companies) to see whether there are any differences between these groups.

To this end, we analyze how voluntary adoption of clawback provisions impact financial institutions' risk-taking behavior using a sample of 228 financial firms and 228 control firms in the U.S. over the period of 2007-2012. We use both the accounting (z-score and volatility of ROE) and market (total return risk and idiosyncratic risk) risk measurements. Consistent with our hypothesis and Babenko *et al.* (2015), we find that financial firms exhibit a significant reduction in risk measured by z-score following the clawback provisions adoption, but find no such changes in control firms. We further analyze the source of risk reduction and find that the reduction in risk for the financial firms is mainly driven by the improvement in the volatility of return on assets. We also find that financial firms with clawback provisions have stronger incentives to take more risk when financial firms have no financial experts on the board, when the CEOs are also the founder of the company and when top management and directors have higher ownership. Consistent with the results of z-score, the financial firms also exhibit a significant decrease in volatility of return on equity, total return risk and idiosyncratic risk. In addition, we analyze the subsamples of financial institutions and find that the result of risk reduction in the full sample following clawback provisions adoption is driven by banks and brokers. Investment companies, on the contrary, experience more risk-taking behaviors

comparing to the control firms. Insurance companies experience no significant changes in the risk-taking behavior subsequent to the adoption of clawback provisions.

Prior studies on the voluntary adoption of clawback provisions usually exclude the financial firms (Chan *et al*., 2012; Mburu and Tang, 2015; and Dehaan *et al*., 2013). In this paper, we extend the literature by examining the relationship between corporate governance characteristic and voluntary adoption of clawback provisions for financial firms. We find that financial firms whose CEO is also the chairman of the board have stronger incentives to voluntary adopt the clawback provisions. Under the monitoring from the institutional investors and large audit firms, CEOs who are also the chairman of board may want to demonstrate the appearance of better governance by voluntarily adopting the clawback provisions. (Brown *et al*., 2011) In addition, we find that the likelihood of clawback provisions adoption is lower in financial firms with higher management and directors' ownership and with more insiders on the board.

This paper contributes to the literature in the following aspects. First, to our best knowledge, this paper is the first one to examine the impact of clawback provisions adoption on the risk-taking behavior of financial institutions. We focus on the sample of financial institutions, because the recent financial crisis was mainly caused by worse corporate governance and excessive risk-taking behavior of financial institutions (Kirkpatrick, 2009) and their risk behavior will affect the growth of economic.(Bhagat *et al.* 2015) Second, we provide a deeper insight into the financial institutions' risk incentives of clawback adoption by using both the accounting and market risk measures, while Babenko *et al.* (2015) only use future growth in stock return volatility to examine such impact. Third, we fill the void in the literature by examining the

relationship between governance characteristic and the clawback adoption from the financial institutions perspective.

The rest of the paper proceeds as follows. Section 2 discusses the literature review. Section 3 presents the sample and data description. Section 4 shows the methodology. Section 5 illustrates the correlation, univariate and multivariate regression results. The robustness tests are presented in section 6 and section 7 concludes.

2. Literature review

2.1 Clawback provisions

Clawback provision is a special contractual clause, which refers to a compensation or benefits that have been given out but need to be clawed back for a specified reason. The use of clawback provisions is increasing popular among public companies due to the introduction of Sarbanes-Oxley Act of 2002, which authorized the Securities and Exchange Commission (SEC) to reverse certain compensation from CEOs and CFOs. According to Section 304 of SOX, "if an issuer is required to prepare an accounting restatement due to the misconduct activities", the CEOs and CFOs who are involved in a fraud "shall reimburse the company for any bonus or other incentive-based or equity-based compensation", and "any profits realized from the sale of securities", received during "the 12-month period following the issuance of the misstated financial statements" In 2010, Congress enacted another restatement-related clawback provision, i.e., Section 954 of the Dodd-Frank Act. According to The section 954 of Dodd-Frank, if "an issuer is required to prepare an accounting restatement due to the material noncompliance of the

issuer with any financial reporting requirement", "the issuer will recover from any current or former executive officer who received incentive-based compensation during the three-year period preceding the date on which the issuer is required to prepare an accounting restatement". Latham and Watkins (2010) shows that Dodd-Frank 954 does not replace the SOX 304. Instead, they coexist. Table 1 shows a detailed comparison between the SOX (2002) and Dodd-Frank Act (2010). First, CEOs and CFOs are the enforcees of clawback in the SOX, while all current and former executive officers are the enforcees of clawback in the Dodd-Frank. Second, the clawback provision in the SOX is mainly triggered by the misconduct activities. The clawback provision in the Dodd-Frank is triggered by material noncompliance with reporting requirements, regardless of fraud. Third, SOX requires firms to implement the repayment of all incentive-based or equity-based compensation and securities profits, while Dodd-Frank requires to claw back only excess of incentive-based compensation under the misrepresented statement, compared with the correct statement. Fourth, SOX applies to the compensation received during the year following the issuance of the misreported statements, while Dodd-Frank applies to the compensation received during the three years following the date when the firm is required to prepare the restatement.

[Insert Table 1 about here]

2.2 The benefits of clawback provisions

Chan *et al.* (2012) analyze 343 firms with clawback provisions over the period of 2000-2009 and show that firms initiating the compensation clawback provision will lead to a decline in

accounting restatements, improvement in accounting quality and lower audit risk. Iskandar and Jia (2013) analyze 246 firms with clawback provisions during the period of 2005-2009 and find that the adoption of clawback provisions tends to increase the firm value, especially for the firms with restatement history. For firms with a prior experience of restatement, the clawback provisions are associated with the positive stock price response, higher information quality and less moral hazard problems. In addition, they find that total CEO compensations will not increase after the adoption of clawback provisions compared to control firms. Chen *et al.* (2013) find that voluntarily adopting a compensation clawback provision reduces the information uncertainty and cost of finance. Bank will provide loan contracts with more financial covenants, lower interest rate, longer maturity and less loan collateral. Dehaan *et al.* (2013) find that voluntary adoption of clawback provisions will improve both the actual financial reporting quality and investors' perceptions of financial reporting quality. Fung *et al.* (2015) examine the impact of insider trading on the link between the adoption of clawback provisions and fraud risk for a sample of 414 firms during 2003-2012. They find that firms exhibit a significant decrease in fraud risk after adoption of clawback provisions. However, insider trading will weaken the effect of firm-initial clawback provisions on the risk of fraudulent financial reporting.

Evidence regarding the benefit of government-mandated clawback provisions is mixed. Chan *et al.* (2012) argue that voluntary clawback provisions are usually triggered by the misconduct activities, whereas government-mandated clawback provisions are triggered by material noncompliance with the reporting requirements, regardless of misconduct. Therefore, mandatory clawback is stronger than the voluntary clawback. If the adoption of voluntary

clawback provisions will improve the financial statement quality, the adoption of mandatory clawback should also have a beneficial effect. On the contrary, Denis (2012) concludes that the net effect of mandatory adoption of clawback provision on firms and the whole economy maybe not positive. The adoption of clawback provisions will improve the investors' and auditors' perceptions of financial statements quality. Therefore, they tend to spend less time inspecting the financial statement, which will make the misstatement difficult to detect. Chen *et al.* (2014) investigate both the mandatory and voluntary adoption of clawback provisions. They analyze the theoretical model and find that risk-averse managers, variable earnings and poor quality of internal accounting information will make the costs of mandatory clawback provisions outweigh the benefits, which reduces managerial effort and shareholder value. They also analyze publicly traded Fortune 1000 companies who voluntarily adopted clawback provisions during 2004-2011 and find when CEOs have lower risk aversion, underlying earnings are stable, or when managers have better private information, firms are more likely to voluntarily use clawback provisions.

2.3 Risk taking behavior

Previous studies on financial firms' risk taking behavior have mainly focused on ownership, competition, compensation and privatization. Saunders *et al.* (1990) show that banks with stockholder ownership exhibit higher risks than those with managerial ownership especially during the periods of deregulation. Calem and Rob (1999) use the dataset of banking industry from 1984 to 1993 and find a U-shaped relationship between bank capital and risk taking behavior. The increase in capital induces the banks to reduce the risk first, and then increase the

risk. Leaven and Levine (2009) examine the conflicts between bank owners and non-shareholding managers over the risk-taking behavior and find that equity holders have higher incentives to engage in risk behavior than managers. Delis and Kouretas (2010) examine the relationship between interest rates and bank risk-taking behavior on 16 Euro area countries during 2001-2008. They find that low interest rates environment tends to increase the bank risk-taking behavior, especially for banks with more off-balance sheet items. Anginer *et al.* (2012) investigate the link between the bank competition and the diversified risks and show that banks with greater competition have incentives to take more diversified risks than those with less competition, which makes the banking system more stable. Mohsni and Otchere (2014) examine the impact of bank privatization on the risk taking behavior and find significantly lower risk during the five years after privatization. They also find a U-shaped relationship between government/private ownership and banks' risk taking behavior. Brown *et al.* (2015) find a positive correlation between ex ante CEO severance and risk taking behavior among the financial services firms.

Corporate governance is also an important determinant of the risk taking behavior for the financial firms (Dinc, 2006; Pathan, 2009). Gorton and Rosen (1995) focus on the corporate control problem in the bank risk-taking. They find that when the outside equity holders lose the ability to control the managers, managers will have strong incentives to take on excessive risk. Dinc (2006) analyzes 84 Japanese banks during 1984-1989 and concludes that the large shareholders tend to reduce the lending of real estate loans, which are riskier than the banks' average loans. Pathan (2009) analyzes 212 US bank holding companies during the period of

1997-2004 and finds that a stronger board structure (the board of directors protects more of shareholder interests) and a lower CEO power (CEO is difficult to affect the board's decision) are associated with an increase in the bank risk taking behavior. Bhagat *et al.* (2015) find that large financial institutions with high leverage tend to take more risks, especially in the year before financial crisis (2002-2006) and during the period of financial crisis (2007-2009). In addition, they find that banks with better governance have less incentives to engage in risk-taking behaviors.

Several papers have studied how the adoption of clawback provisions could impact firm's risks. Mburu and Tang (2015) investigate a sample of 418 firms during the period of 2010 to 2013 and find that firms with clawback provisions are more risk-aversion compared to firms without clawback provisions. The executives in firms with clawback provisions are more likely to achieve the short-term earning target and sacrifice the long-term target. Babenko *et al.* (2015) analyze the sample of S&P 1500 firms and find that the adoption of clawback provisions will lead to higher equity-based compensation, lower risk-taking and lower R&D expenditure.

2.4 Corporate governance and clawback provisions

In the financial restatement literature, studies have found that the likelihood of restatement is lower for firms with independent directors and members with financial expertise on the board or audit committee. The occurrence of restatement is higher when CEOs are also the founders (or belongs to the founding family) of the companies. (Abbott *et al.*, 2004; Anup and Sahiba, 2005).

Given the close relation between the restatement and clawback provisions, several studies have investigated the link between the corporate governance characteristics and adoption of clawback provisions. Gao *et al.* (2010) find that the firm with a prior restatement is more likely to adopt the clawback provisions. Furthermore, they find that the independent board and less powerful CEO increase the likelihood of voluntarily adopting a clawback provision. Anna *et al.* (2011) analyze the S&P 1500 firms during the 2005-2009 and show that firms with more managerial power relative to the power of board of directors are less likely to adopt clawback provisions voluntarily. Firms with shorter-serving CEOs, smaller portion of CEOs salary and more directors on the board will increase the likelihood of adopting clawback provisions. In addition, large merge and acquisition bonuses and goodwill impairments will be more inclined to adopt clawback provisions. Babenko *et al.* (2012) and Babenko *et al.* (2015) investigate a sample of S&P 1500 firms with clawback provisions and find that the likelihood of voluntarily adoption clawback provisions is higher in firms whose executives engage in a prior misconduct activity, whose misconduct activity is difficult to discover, whose restatements are due to the compensation-related reasons, whose board is independent and who have higher external monitoring. They find that higher executive pay, increasing executive turnover and decreasing CEO tenure are related to the adoption of clawback provisions. In addition, they also find that the stock market reaction is positive after the announcement of clawback provisions. Whereas much of the extant literature eliminates the sample of financial firms, we focus on the relationship between corporate governance characteristic and the adoption of clawback provisions for the financial firms in this paper.

3. Sample and Data

The clawback data are obtained from the MSCI ESG Research. MSCI ESG acquired GMI Ratings (formerly known as Corporate Library) in 2014. The initial sample consists of 386 financial firms with clawback provisions adoption in the U.S. during the period of 2007-2012. We exclude 101 financial institutions that received funding from government due to the Troubled Asset Relief Program (TARP) because these firms were mandatorily requested to adopt the clawback provisions. We require firms adopting the clawback provisions over the entire sample period. Therefore, 35 firms that initially adopted the clawback provisions but then didn't continue in the later years are eliminated, which leaves us with 250 financial firms with voluntary clawback provisions[1]. The financial data, stock market data are obtained from Compustat and CRSP, respectively. The corporate governance data is also obtained from the MSCI ESG Research.

We extract 2304 financial firms without clawback provisions from Compustat over the entire sample period. Panel A of Table 2 presents the univariate results of firm size (measured by natural logarithm of total assets), leverage ratio and return on assets between the clawback adopters and non-adopters without matching. There are significant differences in terms of the size and leverage between the two groups. Financial firms with clawback provisions have larger firm size and higher leverage ratio compared to financial firms without clawback provisions. As suggested by Brown *et al.* (2011), clawback adopters have bigger firm size. Chan *et al.* (2012)

[1] We double check these firms using the EDGAR proxy filings to make sure the discontinuation of clawback provisions after initial adoption is not due to the errors in the data.

also find that leverage ratio and profitability (ROA) are important determinants of likelihood of clawback provisions. They find that clawback firms have higher leverage ratio and higher return on assets. Therefore, we use propensity score matching (PSM) to control for these firm characteristic between the clawback adopters and non-adopters.

We run a logistic model to estimate the probability of adopting clawback provisions as a function of firm size, leverage ratio and ROA, using the 2006 data[2]. A clawback adopter is matched with a clawback non-adopter that has the minimum propensity score from the logistic regression with a caliper of 0.03. (Lawrence *et al.,* 2011) We obtain a propensity score matched sample of 456 financial institutions, of which 228 financial firms are clawback adopters and 228 are clawback non-adopters. Panel B of Table 2 presents the univariate results after the propensity score matching. There are no longer any significant differences between the two groups based on size, leverage and ROA, which suggests that the propensity score matching is successful. Thus our final sample consists of 228 pairs of financial firms with clawback provisions and control firms for the period of 2007 to 2012.

Panel C of Table 2 presents the distribution of the sample by the first year of adopting clawback provisions. About 58% of the adoption occurred during the period of 2010 to 2012. Panel D of Table 2 presents the industry distribution of the sample based on two-digit SIC codes.

[2] Although corporate governance characteristics are also determinants of clawback provision adoption (Gao *et al.*,2010; Anna *et al.,* 2011; Babenko *et al.*,2012), we will lose substantial observations if we include governance variables in the PSM due to the data limitation of the MSCI ESG Research. There will be only around 60 financial firms if we include governance variables in the PSM, and the results are quantitatively the same.

The sample of 228 financial institutions consists of 69 banks, 72 insurance companies, 55 investment companies, 28 brokers and 4 real estate firms.

[Insert Table 2 about here]

4. Methodology

4. 1 Measurement of risk-taking behavior

4.1.1 Accounting measures of risk taking behavior

We first use the accounting risk measures to examine the impact of voluntary adoption of clawback provisions on the risk taking behavior of financial institutions. The z-score is the main accounting risk measure and other alternative measure, ROE volatility, is used for the robustness checks.

Following Boyd.*et al.* (1993) and Mohsni and Otchere (2014), the z-score is estimated as the net income to total assets ratio (ROA) plus the capital to assets ratio (CAR), then divided by the standard deviation of net income to total assets ratio (σ(ROA)).

$$\text{z score} = \frac{ROA+CAR}{\sigma(ROA)} \qquad \left(\text{ROA} = \frac{net\ income}{assets}, CAR = \frac{capital}{assets}\right) \tag{1}$$

Where the Capital is measured as the market value of total equity. We use three years prior to and three years after the first year of clawback provisions adoption to calculate the standard deviation of ROA.

The natural logarithm of the z-score is used to estimate the risk taking behavior of financial firms, which is normally distributed and less skewed. (Boyd *et al.,* 1993) As pointed out by Mohsni and Otchere (2014), a higher z-score indicates lower risk taking behavior.

The ROE is calculated as the ratio of net income to the book value of equity. The alternative accounting risk measure, i.e., the volatility of ROE is calculated as the standard deviation of ROE using three-year period prior and after the adoption of clawback provisions.

4.1.2 Market measures of risk taking behavior

We mainly use the total risk and idiosyncratic risk as market risk measures to examine the effect of voluntary adoption of clawback provisions on the risk-taking behavior in the financial services sector. We also analyze whether interest rate risk of financial firms will change due to the adoption of clawback provisions. Following Mohsni and Otchere (2014), the two-index model is used to calculate the market risk measures.

$$R_{jt} = \alpha_1 + \beta_m R_{mt} + \beta_i Interest_t + \varepsilon_{jt} \quad (2)$$

where R_{jt} is the daily stock return of financial firm j; R_{mt} is the daily return of S&P 500 market index; $Interest_t$ is the daily yield change of ten-year treasury bond obtained from Federal Reserve Bank of St. Louise; β_m measures the systematic risk; β_i measures the interest rate risk and ε_{jt} is the random error term. Four market measures of risk are derived from equation (2). First, total risk is calculated as the standard deviation of the firms' daily stock return, which represents the whole risk of stock return of financial institutions and reflects the markets' expectations about the risk. Second, systematic risk is measured by the coefficient β_m, which is the non-diversifiable risk of the firm. Third, the interest rate risk is measured by the coefficient β_i. The last market risk measure is the idiosyncratic risk, which is calculated as the standard deviation of the residual ε_{jt}. We use these risk measures to analyze the effect of the

adoption of clawback provision on the market risk measures, compared to non-adopters in the financial services sector.

4.2 Examining the impact of clawback provisions adoption on risk-taking

The following regression is used to examine the impact of voluntary adoption of clawback provisions on the risk taking behavior among financial services sector.

$$Risk_{i,j} = \alpha_0 + \alpha_1 clw_{i,j} + \alpha_2 post_{i,j} + \alpha_3 clw_{i,j} * post_{i,j} + \sum_{n=4}^{6} \alpha_n firm_{character_{i,j}} + \sum_{m=7}^{14} \alpha_m gover_{i,j} + \sum_{l=15}^{19} \alpha_l Clw * gover_{i,j} + \varepsilon_{i,j} \quad (3)$$

where $Risk_{i,j}$ is the z-score or other risk measures for financial firm *i* in year *j*. $clw_{i,j}$ is a dummy variable that equals to one for financial firms *i* with clawback provisions in year *j* and 0 for control firms. $post_{i,j}$ is a dummy variable, which equals to one for the three years after the adoption of clawback provisions for firm *i* in year *j*, and zero otherwise. $clw_{i,j} * post_{i,j}$ is the interaction term, which is our main variable of interest. We expect a positive sign if financial firms exhibit lower risk taking behavior after the adoption of clawback provisions.

Firm characteristics including leverage, size and return on equity (ROE) are used as control variables. Following Mohsni and Otchere (2014), we define the leverage variable as the ratio of book value of total capital to total assets. A higher ratio of capital to assets refers to a lower financial leverage ratio. Chan *et al.* (2012) find that higher leverage ratio will increase the likelihood of clawback provisions adoption. Thus we expect a positive sign for the leverage if financial firms with higher leverage ratio exhibit higher risk-taking behavior. Size is calculated as the natural logarithm of the total assets, which is adjusted by the consumer price index in 2006.

Since large firms with high leverage tend to take more risks (Bhagat *et al.*, 2015), we expect a negative sign for the firm size. ROE is calculated as the ratio of net income to the book value of total equity. We expect a positive sign for the ROE, since profitable banks (higher return on equity) will take less risk (Mohsni and Otchere, 2014).

Because corporate governance characteristics are also important determinants of firms' risk taking behavior (Dinc, 206; Pathan, 2009; Bhagat *et al*., 2015), we add additional governance variables as control variables as well, including CEOCHAIR, CEOFOUNDER, FINAEXPERT, INSIDERPCTG, DIRINSIDEPCT, DIR4BOARDSPCT, DIROVER70PCT and DIRPROBPCT.

CEOCHAIR is a dummy variable, which equals to one if CEO is also the chairman of the board chair, and zero otherwise. CEOFOUNDER is a dummy variable, which equals to one if CEO is also the founder of the company, and zero otherwise. Pathan (2009) examines the effect of strong boards and CEO power on the banks risk taking behavior and finds that stronger bank boards and lower CEO power tend to take excessive risk. However, Tang *et al*. (2016) find that CEOs who are also the founder of the company have stronger incentives to take more risk due to overconfidence. Thus, we expect a positive sign for CEOCHAIR and a negative sign for CEOFOUNDER. DIRINSIDEPCT is the percentage of directors who are also executives of the company. We expect a negative sign because independent directors are negatively related to the risk taking behavior (Pathan, 2009). FINAEXPERT is a dummy variable that is equal to one when there exists at least one designated financial expert on the board, and zero otherwise. INSIDERPCTG is the percentage of the outstanding shares held by the top management and directors. DIR4BOARDSPCT is the percentage of directors with more than 4 corporate

directorships on a given board, which means the directors will have potential less time to protect the shareholders' interests. DIROVER70PCT is the percentage of directors over the age of 70 on a given board. DIRPROBPCT is the percentage of problem directors on a board. We also examine the interaction effects of the governance variables with the *clawback* dummy to check whether financial firms with clawback provisions exhibit governance characteristic that lead to different risk-taking behavior compared to the control firms. The year fixed effects and industry fixed effects are controlled in all the regressions. The White test is used for heteroskedastic consistent error terms in the regression models.

4. 3 Regression examining the relation between corporate governance and clawback adoptions

To investigate the relationship between the corporate governance and the voluntary adoption of clawback provisions, we estimate the following logistic regression:

$$CLW = \alpha_1 + \alpha_2 \text{CEOCHAIR} + \alpha_3 \text{CEOFOUNDER} + \alpha_4 \text{FINAEXPERT} + \alpha_5 \text{INSIDERPCTG} + \alpha_6 \text{DIRINSIDEPCT} + \alpha_7 \text{DIR4BOARDSPCT} + \alpha_8 \text{DIROVER70PCT} + \alpha_9 \text{DIRPROBPCT} + \varepsilon \quad (4)$$

where the governance characteristic variables are the same as defined in equation (3).

5. Results

5.1 Correlation

Table 3 presents the correlation matrix between the independent and explanatory variables. The *clawback* dummy and the risk (measured by z-score) is significantly and positively related. This suggests that financial firms with clawback provisions exhibit lower risk taking behavior

than those without clawback provisions. The *post* dummy is significantly and positively related to risk (measured by z-score), indicating that the financial firms experience a decrease in risk after the adoption of clawback provisions. The z-score is significantly and positively related to return on assets (ROA), and negatively related to capital to assets ratio (CAR) and volatility of ROA, indicating that financial firms with higher profitability, lower capital adequacy ratio and lower volatility of ROA tends to take lower risk. The *clawback* dummy is significantly and positively correlated with return on assets (ROA) and firm size, and negatively correlated with capital to assets ratio (CAR) and volatility of ROA, which suggests that clawback adopters have higher return on assets, bigger size, lower capital adequacy ratio and lower volatility of ROA. The return on assets (ROA) is significantly and positively related to capital to assets (CAR) and return on equity (ROE). Capital to assets (CAR) is positively correlated with the volatility of ROA and negatively correlated with the firm size, indicating that firms with higher capital adequacy ratio have higher volatility of ROA and smaller size. The volatility of ROA is negatively correlated with the size, indicating that large firms have lower volatility of ROA.

[Insert Table 3 about here]

5.2. Univariate Results

5.2.1 Univariate results of accounting risk measures

Table 4 shows the mean, median and difference in means of the accounting risk measures three years prior to and three years after the adoption of clawback provisions for the sample and control firms. For clawback adopters, the average z-score increased from 3.40 (three years prior

to the adoption of clawback) to 3.76 (three years after the adoption of clawback) and the change was significant at 1%, which suggests that financial firms experienced a significant reduction in risk (measured by an increase in the z-score) after the adoption of clawback provisions. Column e and Column g of Table 4 show that although clawback non-adopters also exhibit a decrease in the risk-taking behavior, such decrease is not statistically significant. Thus the decrease in risk for the financial firms is not due to industry-wide phenomenon. The last three columns of Table 4 show that clawback non-adopters were marginally riskier than the financial firms with clawback provisions in the three years prior to the adoption of clawback. However, the financial firms with clawback provisions exhibit a larger reduction in risk than control firms in the three year after the adoption of clawback. The results are similar using the alternative risk measure, i.e., volatility of return on equity. The clawback adopters also experience a significant decrease in the volatility of ROE while the non-adopters exhibit a significant increase in the volatility of ROE. These results indicate that financial firms exhibit a significant reduction in accounting risk measures after the voluntary adoption of clawback provisions and this reduction is not due to industry-wide phenomenon. However, these firms didn't exhibit any significant change in ROE and ROA after the adoption of clawback provisions.

[Insert Table 4 about here]

5.2.2 Univariate results of market risk measures

The market measures of risk reflect the market perceptions about the firms' future growth and risk. The four primary market measures of risk-taking include total return risk, systematic

risk, idiosyncratic risk and interest rate risk. Table 5 shows the univariate results of market risk measures for our sample and control firms. The total return risk and idiosyncratic risk are significantly lower for clawback adopters than their counterparts. This results are consistent with the findings of Chen *et al.* (2013) and Dehaan *et al.* (2013) that the adoption of clawback provision will reduce information uncertainty and cost of finance, improve operating performance and the investors' and analysts' perceptions of financial reporting quality. There are no differences in terms of systematic risk and interest rate risk between the two groups.

[Insert Table 5 about here]

5. 3 Regression results using accounting risk measures

The linear regression results are presented in Table 6. Model 1 does not include any control variables. Model 2 includes the firm characteristic variables as control variables. Model 3 includes firm characteristic and governance variables as control variables. Model 4 includes the firm characteristic, governance variables and the interaction terms of *clawback* dummy and governance variables as control variables. The coefficient of *clawback* dummy is significant and positive in Model 1 and 2, indicating that financial firms with clawback provisions tend to take less risk than the control firms. The coefficient of *post* dummy is negative and significant in Model 1, which suggests that financial firms (including clawback adopters and control firms) exhibit higher risk-taking in the three years following the clawback adoption. Consistent with the univariate results, the coefficient of $clw_{i,j} * post_{i,j}$ is significant and positive in Model 1, indicating that financial firms exhibit a significant decrease in risk taking behavior (higher

z-score) after adopting the clawback provisions. The coefficient remains significant and positive in Model 2, Model 3 and Model 4 after including the firm characteristic variables, corporate governance variables and the interaction terms of *clawback* dummy and governance variables as control variables. This result is also consistent with Babenko *et al.* (2015) who find a decrease in risk following voluntary clawback provisions adoption using different risk measurements and Mburu and Tang (2015) who find executives in firms with clawback provisions are more risk-averse than those in firms without clawback provisions. The adoption of clawback provisions makes the executives' earning at risk. Sawers *et al.* (2010) find that if the earnings of managers are threatened, they are less likely to take excessive risk. Therefore, executives may be more conservative towards the risk-taking behavior.

Consistent with the finding of Mohsni and Otchere(2014), the coefficients of *leverage* and *size* are significant and positive in Model 2, indicating that larger financial firms with less financial leverage exhibit lower risk taking behavior (higher z-score). The coefficient of CEOFOUNDER is significant and negative, indicating that financial firms whose CEO is the founder of the company exhibit higher risk taking behavior. This result is consistent with the findings of Tang *et al*. (2016) that CEOs who are also the founder of the firm are likely to take more risks due to overconfidence. Consistent with the literature (Adams *et al*., 2005; John *et al*. 2008), the coefficient of INSIDERPCTG is significantly positive, which suggests that financial firms with more outstanding shares held by the top management and directors prefer take less risks. The coefficient of DIRINSIDEPCT is significantly negative, suggesting that financial firms with more independent directors have less incentives to take risks, which is consistent with

the findings of Pathan (2009) that independent directors consider both the shareholders' and other stakeholders' interests and thus less willing to take high risks. The coefficient of DIR4BOARDSPCT is significant and positive, indicating that financial firms with a higher percentage of directors with more than four corporate directorships have the incentives to take less risks. Directors who sit on more than four boards may not have enough time to monitor the management's decisions, and thus prefer less risks. The coefficient of DIRPROBPCT is significant and negative, which suggests that financial firms with more problem directors on the board are more conservative and prefer lower risks. The coefficient of FINAEXPERT*Clw is significant and positive, indicating that if financial firms with clawback provisions have at least one financial expert on the board, they are less likely to take excessive risk. The coefficients of CEOFOUNDER*Clw and INSIDERPCTG*Clw are significant and negative, indicating that financial firms with clawback provisions have stronger incentives to take more risk when the CEOs are also the founder of the company and top management and directors have higher ownership.

[Insert Table 6 about here]

5. 4 Source of risk reduction

The results in the previous section show that financial firms exhibit significant reduction in risk taking behavior after the adopting the clawback provisions. In this section, we further investigate the source of risk reduction. The z-score is estimated as the net income to total assets ratio (ROA) plus the capital to assets ratio (CAR), then divided by the standard deviation of net

income to total assets ratio (SdROA). Thus, the changes in z-score can be caused by the changes in firms' profitability, the capital adequacy ratio or the volatility of ROA. We use ROA, CAR and SdROA as dependent variables to run the regression (3) again. The results are presented in Table 7. The coefficient of $clw_{i,j} * post_{i,j}$ is only significant and negative when SdROA is the dependent variable. It is not significant when either ROA or CAR is the dependent variable in the regression. This finding suggests that the reduction in the risk taking behavior for clawback adopters is mainly driven by the improvement in the volatility of return on assets (SdROA).

[Insert Table 7 about here]

5.5 Subsample results

In this section, we further analyze the impact of clawback provisions adoption on the risk-taking behavior for the subsamples. The four subsamples include banks, insurance companies, investment companies and brokers. The results of equation (3) by subsamples using z-score are shown in Table 8. The coefficients of $clw_{i,j} * post_{i,j}$ are significant and positive in Model 1 and Model 4. indicating that banks and brokers exhibit decrease in risk-taking behavior after the adoption of clawback provisions. The coefficients of $clw_{i,j} * post_{i,j}$ are significant and negative in Model 3, indicating that the investment companies tend to increase the risk-taking behavior subsequent to the clawback adoption. With the adoption of clawback provisions, investment companies may accept risky but value-increasing projects for the shareholders' interests. The coefficients of $clw_{i,j} * post_{i,j}$ are not significant in Model 2, indicating that the risk-taking behavior of insurance companies is not significantly related to the clawback

provisions adoption. The overall results suggest the reduction of risks following adoption of clawback provisions in the full sample is mainly driven by banks and brokers.

[Insert Table 8 about here]

5.6 Regression results using market risk measures.

Table 9 shows the regression results using total return risk and idiosyncratic risk as the dependent variables. Consistent with the univariate results, the coefficients of *clawback* in both regressions are significant and negative, which suggests that financial firms with clawback provisions exhibit lower total return risk and idiosyncratic risk than those without clawback provisions. The coefficients of size are significant and negative, suggesting that larger financial firms are less likely to take risk than smaller firms. Since large firms usually have less information asymmetry problems than small firms, it's easier for them to diversify the idiosyncratic risk. We also find that leverage and return on equity are negatively related to total return risk and idiosyncratic risk, indicating that financial firms with lower leverage ratio and higher return tend to take less risk and be more stable, which is consistent with the findings of Mohsni and Otchere (2014) that larger banks with higher return on equity and lower leverage ratio are less likely to take risks.

[Insert Table 9 about here]

5. 7 Corporate governance characteristics and voluntary adoption of clawback provisions

Most of the studies on the determinants of the voluntary adoption of clawback provision have excluded financial firms for their analysis. In this section, we extend the literature by investigating the relationship between corporate governance characteristic and the voluntary adoption of clawback provisions for the financial firms. The descriptive statistics for the financial firms with clawback provisions and control samples are presented in Table 10. Financial firms whose CEO is also the chairman of the board have higher likelihood of voluntarily adopting clawback provision. Financial firms whose CEO is also the founder of the company are less likely to adopt the clawback provisions. Financial firms with clawback provisions have a smaller proportion of outstanding shares held by the top management and directors than those without the provisions. Similar to the finding of Brown *et al.* (2011), financial firms with more independent directors on the board have stronger incentives to adopt the clawback provisions.

[Insert Table 10 about here]

The results of logistic regressions are presented in Table 11. Consistent with the univariate results, the coefficient of CEOCHAIR is positive and significant, indicating that financial firms whose CEO is also the chairman of the board are more likely to voluntarily adopt the clawback provision. This result is also consistent with the findings of Addy *et al*. (2011) that when CEO is also the chairman of the board, he/she is more willing to adopt the clawback provision because he/she is confident about his/her ability to prevent the clawback provisions implementation in event of restatement and wants to show the appearance of better governance. Brown *et al.* (2011) argue that with the strong monitor from the institutional investors and large audit firms, CEO

who is also the chairman may increase the likelihood of adopting the clawback provision. The coefficients of INSIDERPCTG and DIRINSIDEPCT are negative and significant, indicating that financial firms with more outstanding shares held by the top management and directors, and with more insiders on the board are less likely to voluntarily adopt the clawback provisions. This result is consistent with the finding of Gao *et al.* (2010) that firms with more independent directors on the board will increase the likelihood of voluntary adoption of clawback provisions. However, the results indicate that the percentage of directors with more than 4 corporate directorships, the percentage of directors over the age of 70 and the percentage of problem directors and whether there exists at least a financial expert on the board are not significantly related to the voluntary adoption of clawback provisions.

[Insert Table 11 about here]

6. Robustness checks

In this section, we address four aspects of robustness checks. First, we use quarterly data instead of annual data to re-estimate the impact of voluntary adoption of clawback provision on the risk-taking behavior (z-score) for the three years prior to and three years after the provisions adoption. The results of Equation (3) using z-score as risk measurement and quarterly data are presented in Panel A of Table 12. Consistent with results using the annual data, the coefficients of $clw_{i,j} * post_{i,j}$ (our main variable of interest) are significant and positive in Model 1 and Model 2, indicating that financial firms exhibit a significant reduction in risk after the adoption of clawback provisions.

Second, we use the annual data to estimate the Equation (3) using the alternative risk measure, volatility of ROE, as the dependent variable. The results are shown in Panel B of Table 12. Consistent with the z-score, the coefficient of $clw_{i,j} * post_{i,j}$ is still significant and negative, which suggests that the financial firms exhibit lower volatility of return on equity (lower risk) after the adoption of the clawback provisions.

Third, since financial firms suffered severe liquidity shocks during the period of financial crisis, we exclude the data during the period of financial crisis (year 2007 and year 2008) to re-estimate the Equation (3) and see if our results still hold. 61 firms that adopted the clawback provisions in 2007 and 2008 are excluded. Both risk measures z-score and volatility of ROE are used as dependent variables. The results are presented in Panel C of Table 12. Consistent with the previous findings, the coefficients of $clw_{i,j} * post_{i,j}$ still remain significant and positive in Model 1 and Model 2 using z-score, and significantly negative in Model 3 and Model 4 using volatility of ROE. This result indicates that the financial firms experience a significant decrease in risk after adopting the clawback provisions. So our findings are robust even after excluding financial firms that adopted the clawback provisions during the financial crisis.

Fourth, we re-estimate the Equation (3) excluding the firms that had restatement(s) prior to adoption of clawback provisions because firms with prior restatement (s) have stronger incentives to voluntarily adopt the clawback provisions (Gao *et al.,* 2010). 81 financial firms with restatements in the past (out of 228 sample firms) are excluded. Both risk measures are used as dependent variables. The regression results are presented in Panel D of Table 12. Similar to the previous findings, the coefficients of $clw_{i,j} * post_{i,j}$ are significantly positive in Model 1

and Model 2 and significantly negative in Model 3 and Model 4, which suggests that financial firms exhibit a significant reduction in risk after voluntary adoption of clawback provisions. Our results are also robust after excluding financial firms that had prior restatement(s).

[Insert Table 12 about here]

7. Conclusion

This study examines the impact of voluntary clawback provisions adoption on the risk-taking behavior of financial institutions. We mainly use the z-score as the risk measure, which is also defined as the probability of bankruptcy. (Boyd *et al.*, 1993) Using a sample of 228 financial firms with clawback provisions during the period of 2007-2012, we find that financial institutions exhibit a significant decrease in risk-taking behavior after the voluntary adoption of clawback provisions, compared to non-adopters. The results are robust using both the annual and quarterly data. The results are also robust using alternative risk measure (volatility of return on equity), and excluding observations during the financial crisis and firms with prior restatement (s). We also find that financial firms with clawback provisions have stronger incentives to take less risk-taking behavior when financial firms have at least one financial expert on the board, when the CEOs are not the founder of the company and when top management and directors have lower ownership.

We further analyze the sources of risk reduction and find that the reduction in the risk for the clawback adopters is mainly caused by the improvement in the volatility of return on assets. The subsample analysis shows that the risk reduction in the full sample are drive by banks and

brokers. When total return risk and idiosyncratic risk are used as market risk measures, we find that financial firms with clawback provisions exhibit lower total return risk and idiosyncratic risk than those without the provisions. Larger financial firms with lower leverage ratio and higher return tend to take less risk and be more stable.

In addition, we investigate the relationship between corporate governance characteristics and the voluntary adoption of clawback provisions for financial firms. We find that the likelihood of voluntary adoption of clawback provisions is higher in financial firms with lower management and director ownership, more independent directors on the board and whose CEO is the chairman of the board.

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Appendix A: Examples of clawback provisions

Example 1. American Financial Group Inc. clawback provision in the proxy dated March 20, 2011.

"Recoupment of Awards: In the event of a restatement of materially inaccurate financial results, the Committee has the discretion to recover bonus awards that were paid under the Equity Bonus Plan to a participant with respect to the period covered by the restatement. If the payment of a bonus award would have been lower had the achievement of applicable financial performance targets been calculated based on such restated financial results, the Committee may, if it determines appropriate in its sole discretion, to the extent permitted by law, recover from the participant the portion of the bonus award paid in excess of the payment that would have been made based on the restated financial results."

Example 2: American National Insurance Company clawback provision in the proxy dated on March 23, 2012.

"Clawback Policy: At its February 22, 2012 meeting, the Committee adopted a formal clawback policy with respect to incentive awards to executive officers awarded subsequent to 2011. Under this policy, the Company is authorized to recover all or a portion of incentive awards paid within three years of a financial statement that is inaccurate due to material noncompliance with any financial reporting requirement under the securities laws. Recovery applies to the extent a lesser amount would have been paid under the restated financial statement."

Table 1. Differences between the SOX (2002) and Dodd-Frank (2010)

This table shows a comparison between the Sarbanes-Oxley Act of 2002 and Dodd-Frank Act of 2010 from four aspects regarding the clawback provision.

	Sarbanes-Oxley (2002)	**Dodd-Frank (2010)**
Executives covered	CEOs and CFOs	All current and former executive officers
Clawback Trigger	Misconduct activities	Material noncompliance with reporting requirements
Compensation need to be clawed back	All incentive-based or equity-based compensation, and stock profits	Only excess incentive-based compensation
Period	The year following the issuance of the misreported financial statements	Three years following the date when the firm is required to prepare the restatement

Table 2. Sample descriptive statistics

Panel A shows the summary statistics for size, leverage and ROA for the sample and control firms before propensity score matching. Panel B shows the summary statistics for size, leverage and ROA for the sample and control firms after the propensity score matching. Size is the natural logarithm of total assets ($ million dollars, which is adjusted by the consumer price index in 2006. Leverage is the ratio of book value of total capital to total assets. ROE is the ratio of net income to the book value of equity. *p*-value is calculated based on the two-tailed t-test for the difference in means between sample and control firms. Panel C shows the yearly frequency distribution for the final sample of 228 financial firms. Panel D shows the industry distribution for the final sample of 228 financial firms. Significance at 1%, 5% and 10% is denoted by ***, ** and *, respectively.

Panel A: Univariate result before PSM			
	Clawback	No clawback	*p*-value
Size	8.45	6.63	0.00***
Leverage	0.28	0.06	0.02**
ROA	0.04	0.02	0.64
N	250	2304	
Panel B: Univariate result after PSM			
	Clawback	No clawback	*p*-value
Size	8.35	8.20	0.35
Leverage	0.29	0.32	0.18
ROA	0.04	0.03	0.32
N	228	228	

Panel C: Frequency distribution		
Year	Frequency	Percent
2007	31	13.60%
2008	30	13.16%
2009	36	15.79%
2010	54	23.68%
2011	27	11.84%
2012	50	21.93%
Total	228	100.00%
Panel D: Industry distribution		
Industry (SIC)	Frequency	Percent
Banks (60,61)	69	30.26%
Brokers (62)	28	12.28%
Insurance companies (63,64)	72	31.58%
Real estate firms (65)	4	1.75%
Investment companies (67)	55	24.12%
Total	228	100.00%

Table 3. Correlation matrix

This table shows the correlations between the main variables used in regression. Risk is the natural logarithm of the z-score. Z-score is estimated as the net income to total assets ratio plus the capital to assets ratio, then divided by the standard deviation of net income to total assets ratio. Clawback is a dummy variable that equals to one for financial firms with clawback provisions, and zero for control firms. Post is a dummy variable, which equals to one for the three year after the adoption of clawback provisions, and zero otherwise. ROA is the ratio of return on assets. CAR is the ratio of capital to assets. SdROA is the standard deviation of ROA three years prior to and after the fiscal year that the financial institutions first adopt the clawback provisions. Size is the natural logarithm of total assets, which is adjusted by the consumer price index in 2006. *P-values* are reported in parentheses. Significance at 1%, 5% and 10% is denoted by ***, ** and *, respectively.

	Z-score	Clawback	Post	ROA	CAR	SdROA	Size
Clawback	0.10***	1					
	(0.00)						
Post	0.08***	0.00	1				
	(0.00)	(0.92)					
ROA	0.09***	0.04*	-0.01	1			
	(0.00)	(0.09)	(0.81)				
CAR	-0.06***	-0.12***	-0.02	0.09***	1		
	(0.00)	(0.00)	(0.45)	(0.00)			
SdROA	-0.42***	-0.06**	-0.00	-0.27***	0.26***	1	
	(0.00)	(0.01)	(0.99)	(0.00)	(0.00)		
Size	0.04	0.10***	-0.11***	0.03	-0.53***	-0.25***	1
	(0.12)	(0.00)	(0.00)	(0.21)	(0.00)	(0.00)	
ROE	0.03	-0.02	0.03	0.04*	0.02	-0.03	0.01
	(0.16)	(0.33)	(0.17)	(0.06)	(0.50)	(0.25)	(0.52)

Table 4. Univariate and difference in mean tests for sample and control firms

This table shows the mean, median, difference in mean and difference in difference means test of z-score, volatility of return on equity (SdROE), return on equity (ROE) and return on assets (ROA) for the sample and control firms based on PSM. *P-values* are reported in parentheses. Significance at 1%, 5% and 10% is denoted by ***, ** and *, respectively.

	Firms with clawback					Firms without clawback					Difference		
	Pre		Post		Post - Pre	Pre		Post		Post - Pre	Pre	Post	Post - Pre
	Mean (a)	Median (b)	Mean (c)	Median (d)	Mean (c-a)	Mean (e)	Median (f)	Mean (g)	Median (h)	Mean (g-e)	Mean (a-e)	Mean (c-g)	Mean (c-g)-(a-e)
Z-score	3.40	3.52	3.76	3.72	0.36*** (0.00)	3.25	3.32	3.32	3.49	0.07 (0.52)	0.15* (0.10)	0.44*** (0.00)	0.29* (0.06)
SdROE	0.58	0.03	0.09	0.03	-0.48** (0.03)	0.13	0.04	0.37	0.03	0.24** (0.01)	0.45** (0.04)	-0.28*** (0.00)	-1.05*** (0.00)
ROE	-0.16	0.09	0.09	0.08	0.25 (0.24)	0.06	0.08	0.13	0.07	0.07 (0.46)	-0.22 (0.31)	-0.04 (0.70)	0.29 (0.41)
ROA	0.02	0.02	0.03	0.01	0.01 (0.44)	0.02	0.01	0.01	0.01	-0.01 (0.22)	-0.00 (0.86)	0.02** (0.03)	0.03* (0.08)

Table 5. Market risk univariate result

This table shows the mean and difference in means tests for the total return risk, systematic risk, idiosyncratic risk and interest rate risk for the sample and control firms. The market risk measures are calculated using the following two-index model.

$$R_{jt} = \alpha_1 + \beta_m R_{mt} + \beta_i Interest_t + \varepsilon_{jt} \quad (2)$$

where R_{jt} is the daily stock return of financial firm j; R_{mt} is the daily return of S&P 500 market index; R_{it} is the daily yield change of ten-year treasury bond. Total return risk is calculated as the standard deviation of the firms' daily stock return. Systematic risk is measured by the coefficient of the regression β_m. Idiosyncratic risk is calculated as the standard deviation of the residual ε_{jt}. The interest rate risk is measured by the coefficient β_i. *P-values* are reported in parentheses. Significance at 1%, 5% and 10% is denoted by ***, ** and *, respectively.

	Firms with clawback	Firms without clawback	Difference
	Mean (a)	Mean (b)	Mean (a)-(b)
Total return risk	0.021	0.025	-0.003*** (0.00)
Systematic risk	1.297	1.229	0.068
Idiosyncratic risk	0.017	0.021	-0.004*** (0.00)
Interest rate risk	-0.036	-0.037	0.001

Table 6. Regression results

This table shows the regression results of the following model.

$$Risk_{i,j} = \alpha_0 + \alpha_1 clw_{i,j} + \alpha_2 post_{i,j} + \alpha_3 clw_{i,j} * post_{i,j} + \sum_{n=4}^{6} \alpha_n firm_{character_{i,j}} +$$

$$\sum_{m=7}^{14} \alpha_m gover_{i,j} + \sum_{l=15}^{19} \alpha_l Clw * gover_{i,j} + \varepsilon_{i,j} \quad (3)$$

Detailed variable descriptions are presented in section 4.2. Model 1 does not include any control variables. Model 2 includes the firm characteristic variables as control variables. Model 3 includes firm characteristic and governance variables as control variables. Model 4 includes firm characteristic, governance variables and interaction terms of clawback dummy and governance variables as control variables. *P-values* are reported in parentheses. Significance at 1%, 5% and 10% is denoted by ***, ** and *, respectively.

	Model 1	Model 2	Model 3	Model 4
Intercept	3.58*** (0.00)	2.63*** (0.00)	4.92*** (0.00)	3.34*** (0.00)
Clawback	0.16* (0.06)	0.19** (0.03)	0.10 (0.79)	0.73 (0.34)
post	-0.37*** (0.00)	-0.40*** (0.00)	-0.46 (0.26)	-1.06*** (0.00)
Clw*post	0.27** (0.03)	0.26** (0.03)	0.78* (0.06)	1.24*** (0.00)
Leverage		0.81*** (0.00)	0.80 (0.13)	1.00* (0.08)
Size		0.09*** (0.00)	-0.10 (0.16)	-0.08 (0.27)
ROE		0.02 (0.17)	2.92*** (0.00)	3.08*** (0.00)
CEOCHAIR			0.24 (0.14)	-0.13 (0.80)
CEOFOUNDER			-0.80** (0.03)	0.22 (0.65)
FINAEXPERT			-0.07 (0.85)	-0.69 (0.18)
INSIDERPCTG			1.50*** (0.00)	5.47*** (0.00)
DIRINSIDEPCT			-1.97* (0.08)	-0.78 (0.77)

Table 6. Continued

DIROVER70PCT			-0.17 (0.76)	0.45 (0.41)
DIR4BOARDSPCT			3.34* (0.06)	1.42 (0.40)
DIRPROBPCT			-4.23** (0.01)	-0.45 (0.79)
CEOCHAIR * Clw				0.30 (0.57)
CEOFOUNDER* Clw				-2.98*** (0.00)
FINAEXPERT* Clw				0.79* (0.08)
INSIDERPCTG* Clw				-5.54*** (0.00)
DIRINSIDEPCT* Clw				1.02 (0.71)
Year fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes
Number of observations	1990	1990	429	429
Adjusted R-Square	0.14	0.15	0.37	0.46

Table 7. Source of risk reduction

This table shows the regression results of the following model.

$$Risk_{i,j} = \alpha_0 + \alpha_1 clw_{i,j} + \alpha_2 post_{i,j} + \alpha_3 clw_{i,j} * post_{i,j} + \sum_{n=4}^{6} \alpha_n firm_{character_{i,j}} + \varepsilon_{i,j}$$

We use ROA, CAR and SdROA as dependent variables. $clw_{i,j}$ is a dummy variable that equals to one for financial firms *i* with clawback provisions in year j and 0 for control firms. $post_{i,j}$ is a dummy variable, which equals to one for the three years after the adoption of clawback provisions for firm i in year j, and zero otherwise. $clw_{i,j} * post_{i,j}$ is the interaction term. *Leverage* is the ratio of book value of total capital to total assets. *Size* is the natural logarithm of the total assets, which is adjusted by the consumer price index in 2006. *ROE* is the ratio of net income to the book value of total equity. *P-values* are reported in parentheses. Significance at 1%, 5% and 10% is denoted by ***, ** and *, respectively.

	ROA		SdROA		CAR	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
intercept	-3.29***	-4.10***	-4.27***	-3.74***	-0.62***	0.69***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Clawback	0.12	0.23***	-0.08	0.01	0.04	0.07*
	(0.11)	(0.00)	(0.35)	(0.91)	(0.39)	(0.08)
post	-0.04	0.13	0.35***	0.50***	-0.13**	0.00
	(0.68)	(0.16)	(0.00)	(0.00)	(0.04)	(0.98)
Clw*post	-0.02	-0.05	-0.31**	-0.31***	-0.03	-0.03
	(0.88)	(0.62)	(0.01)	(0.00)	(0.64)	(0.60)
Leverage		2.42***		1.13***		
		(0.00)		(0.00)		
Size		-0.09***		-0.20***		-0.22***
		(0.00)		(0.00)		(0.00)
ROE		-0.02**		-0.01		0.08***
		(0.03)		(0.38)		(0.00)
Year fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1990	1990	1990	1990	1990	1990
Adjusted R-Square	0.24	0.44	0.32	0.41	0.40	0.57

Table 8. Subsample

This table shows the regression results of following model for the subsamples (banks, insurance companies, investment companies and brokers).

$$Risk_{i,j} = \alpha_0 + \alpha_1 clw_{i,j} + \alpha_2 post_{i,j} + \alpha_3 clw_{i,j} * post_{i,j} + \sum_{n=4}^{6} \alpha_n firm_{character_{i,j}} + \varepsilon_{i,j}$$

Model 1 shows the regression results of banks. Model 2 shows the regression results of insurance companies. Model 3 shows the regression results of investment companies. Model 4 shows the regression results of brokers. Risk is the natural logarithm of z-score. $clw_{i,j}$ is a dummy variable that equals to one for financial firms *i* with clawback provisions in year j and 0 for control firms. $post_{i,j}$ is a dummy variable, which equals to one for the three years after the adoption of clawback provisions for firm i in year j, and zero otherwise. $clw_{i,j} * post_{i,j}$ is the interaction term. *Leverage* is the ratio of book value of total capital to total assets. *Size* is the natural logarithm of the total assets, which is adjusted by the consumer price index in 2006. *ROE* is the ratio of net income to the book value of total equity. *P-values* are reported in parentheses. Significance at 1%, 5% and 10% is denoted by ***, ** and *, respectively.

	Banks	Insurance companies	Investment companies	Brokers
	Model 1	Model 2	Model 3	Model 4
Intercept	5.04*** (0.00)	2.82*** (0.00)	1.25** (0.04)	-1.00 (0.30)
Clawback	-0.03 (0.87)	-0.15 (0.36)	0.61*** (0.00)	-0.31 (0.24)
Post	-1.10*** (0.00)	-0.39** (0.02)	0.50** (0.03)	0.48 (0.25)
Clw*post	0.95*** (0.00)	0.18 (0.30)	-0.76*** (0.00)	0.70* (0.06)
Leverage	-1.07*** (0.00)	0.26 (0.23)	1.15*** (0.00)	2.12*** (0.00)
Size	-0.02 (0.61)	0.13*** (0.00)	0.14** (0.02)	0.33*** (0.00)
ROE	0.01 (0.43)	3.06*** (0.00)	0.87*** (0.00)	1.50*** (0.00)
Year fixed effect	Yes	Yes	Yes	Yes
Number of observations	594	643	480	232
Adjusted R-Square	0.14	0.25	0.06	0.19

Table 9. Regression using market risk

This table shows the regression results of following model.

$$Risk_{i,j} = \alpha_0 + \alpha_1 clw_{i,j} + \sum_{n=2}^{3} \alpha_n firm_{character_{i,j}} + \varepsilon_{i,j}$$

where $clw_{i,j}$ is a dummy variable that equals to one for financial firms *i* with clawback provisions in year j and 0 for control firms. *Leverage* is the ratio of book value of total capital to total assets. *Size* is the natural logarithm of the total assets, which is adjusted by the consumer price index in 2006. *ROE* is the ratio of net income to the book value of total equity. We use volatility of total return as dependent variable in model 1 and 2. We use idiosyncratic volatility as dependent variable in model 3 and 4. Model 1 and 3 do not include any control variables. Model 2 and 4 include the firm characteristic variables as control variables. *P-values* are reported in parentheses. Significance at 1%, 5% and 10% is denoted by ***, ** and *, respectively.

	Volatility of total return		Idiosyncratic volatility	
	Model 1	Model 2	Model 3	Model 4
intercept	0.019*** (0.000)	0.028*** (0.000)	0.018*** (0.000)	0.032*** (0.000)
Clawback	-0.003*** (0.000)	-0.003*** (0.000)	-0.004*** (0.000)	-0.003*** (0.000)
Leverage		-0.008*** (0.000)		-0.008*** (0.000)
Size		-0.001*** (0.003)		-0.002*** (0.000)
ROE		-0.009*** (0.000)		-0.010*** (0.000)
Year fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes
Number of observations	994	994	994	994
Adjusted R-Square	0.565	0.604	0.462	0.527

Table 10. Governance descriptive statistics for sample and control firms

This table shows the summary statistics of governance characteristic variables for the sample and control firms. *CEOCHAIR* is a dummy variable, which equals to one if CEO is also the chairman of the board chair, and zero otherwise. *CEOFOUNDER* is a dummy variable, which equals to one if CEO is also the founder of the company, and zero otherwise. *FINAEXPERT* is a dummy variable that is equal to one when there exists a designated financial expert on the board, and zero otherwise. *INSIDERPCTG* is the percentage of the outstanding shares held by the top management and directors. *DIRINSIDEPCT* is the percentage of directors who are also executives of the company. *DIR4BOARDSPCT* is the percentage of directors with more than 4 corporate directorships on a given board. *DIROVER70PCT* is the percentage of directors over the age of 70 on a given board. *DIRPROBPCT* is the percentage of problem directors on a board. *P-values* are reported in parentheses. Significance at 1%, 5% and 10% is denoted by ***, ** and *, respectively.

	Firms without clawback			Firms with clawback			Difference	
variable	N	Mean	SD	N	Mean	SD	Mean	t-stat
CEOCHAIR	86	0.51	0.50	203	0.62	0.49	-0.11	-1.71* (0.08)
CEOFOUNDER	86	0.14	0.35	203	0.06	0.25	0.09	1.87* (0.06)
FINAEXPERT	86	0.35	0.48	203	0.40	0.50	-0.05	-0.85 (0.39)
INSIDERPCTG	86	0.19	0.26	203	0.10	0.16	0.09	2.96*** (0.00)
DIRINSIDEPCT	86	0.22	0.11	203	0.17	0.09	0.05	3.65*** (0.00)
DIR4BOARDSPCT	86	0.37	1.04	203	0.33	0.88	0.04	0.29 (0.77)
DIROVER70PCT	86	0.13	0.13	203	0.11	0.12	0.02	1.30 (0.19)
DIRPROBPCT	86	0.02	0.10	203	0.02	0.08	-0.002	-0.17 (0.86)

Table 11. Logistic regression results

This table shows the logistic regression results of following model.

$$CLW = \alpha_1 + \alpha_2 \text{CEOCHAIR} + \alpha_3 \text{CEOFOUNDER} + \alpha_4 \text{FINAEXPERT} + \alpha_5 \text{INSIDERPCTG} + \alpha_6 \text{DIRINSIDEPCT} + \alpha_7 \text{DIR4BOARDSPCT} + \alpha_8 \text{DIROVER70PCT} + \alpha_9 \text{DIRPROBPCT} + \varepsilon \quad (4)$$

Clw is a dummy variable that equals to one for financial firms *i* with clawback provisions in year j and 0 for control firms. *CEOCHAIR* is a dummy variable, which equals to one if CEO is also the chairman of the board chair, and zero otherwise. *CEOFOUNDER* is a dummy variable, which equals to one if CEO is also the founder of the company, and zero otherwise. *FINAEXPERT* is a dummy variable that is equal to one when there exists a designated financial expert on the board, and zero otherwise. *INSIDERPCTG* is the percentage of the outstanding shares held by the top management and directors. *DIRINSIDEPCT* is the percentage of directors who are also executives of the company. *DIR4BOARDSPCT* is the percentage of directors with more than 4 corporate directorships on a given board. *DIROVER70PCT* is the percentage of directors over the age of 70 on a given board. *DIRPROBPCT* is the percentage of problem directors on a board. *P-values* are reported in parentheses. Significance at 1%, 5% and 10% is denoted by ***, ** and *, respectively.

	Model 1	Model 2
Intercept	0.22 (0.51)	1.21** (0.01)
CEOCHAIR	0.75** (0.03)	0.89** (0.02)
CEOFOUNDER	-0.79 (0.14)	-0.91* (0.10)
FINAEXPERT	0.50 (0.49)	0.74 (0.31)
INSIDERPCTG	-2.69*** (0.00)	-1.94** (0.02)
DIRINSIDEPCT		-4.77*** (0.00)
DIR4BOARDSPCT		-2.05 (0.57)
DIROVER70PCT		-0.60 (0.63)
DIRPROBPCT		-0.38 (0.81)
Year fixed effect	Yes	Yes
Industry fixed effect	Yes	Yes
Number of observations	289	289
Pseudo R-square	0.18	0.22

Table 12. Robustness checks

This tables shows the regression results of following model.

$$Risk_{i,j} = \alpha_0 + \alpha_1 clw_{i,j} + \alpha_2 post_{i,j} + \alpha_3 clw_{i,j} * post_{i,j} + \sum_{n=4}^{6} \alpha_n firm_{character_{i,j}} + \varepsilon_{i,j}$$

Detailed variable descriptions are presented in section 4.2. Panel A uses the quarterly data to re-estimate equation (3). z-score is used as the dependent variables in Model 1 and Model 2. In Panel B, we use volatility of ROE as dependent variable. In panel C, we exclude the data during the period of financial crisis (year 2007 and year 2008). Z-score is used as dependent variable in Model 1 and Model 2. Volatility of ROE is used as dependent variable in Model 3 and Model 4. In panel D, we exclude firms that had restatement(s) prior to the adoption of clawback provisions. Z-score is used as dependent variable in Model 1 and Model 2. Volatility of ROE is used as dependent variable in Model 3 and Model 4. *P-values* are reported in parentheses. Significance at 1%, 5% and 10% is denoted by ***, ** and *, respectively.

Panel A: Quarterly data using z-score		
	Model 1	Model 2
intercept	4.17*** (0.00)	3.04*** (0.00)
Clawback	0.28*** (0.00)	0.30*** (0.00)
post	-0.39*** (0.00)	-0.41*** (0.00)
Clw*post	0.30*** (0.00)	0.32*** (0.00)
Leverage		1.09*** (0.00)
Size		0.09*** (0.00)
ROE		0.07*** (0.00)
Year fixed effect	Yes	Yes
Industry fixed effect	Yes	Yes
Number of observations	9746	9746
Adjusted R-Square	0.15	0.18

Table 12. Continued

Panel B: Alternative risk measure (SdROE)		
	Model 1	Model 2
intercept	-0.46 (0.26)	0.58 (0.27)
Clawback	0.49** (0.01)	0.37* (0.04)
post	0.60** (0.02)	0.62*** (0.00)
Clw*post	-0.71*** (0.00)	-0.64*** (0.00)
Leverage		-0.09** (0.03)
Size		-0.90*** (0.00)
ROE		-0.42*** (0.00)
Year fixed effect	Yes	Yes
Industry fixed effect	Yes	Yes
Number of observations	1990	1990
Adjusted R-Square	0.00	0.17

Panel C: Excluding data during the period of financial crisis				
	Z-score		SdROE	
	Model 1	Model 2	Model 3	Model 4
intercept	3.25*** (0.00)	2.19*** (0.00)	-0.47 (0.39)	1.32** (0.04)
Clawback	0.16 (0.19)	0.16 (0.11)	0.64** (0.01)	0.47** (0.03)
post	-0.02 (0.92)	-0.05 (0.76)	0.61 (0.13)	0.54 (0.13)
Clw*post	0.26* (0.06)	0.26* (0.06)	-0.75** (0.03)	-0.59* (0.05)
Leverage		0.93*** (0.00)		-1.12*** (0.00)
Size		0.09*** (0.00)		-0.17*** (0.00)
ROE		0.01 (0.25)		-0.51*** (0.00)
Year fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes
Number of observations	1476	1476	1476	1476
Adjusted R-Square	0.17	0.18	0.01	0.25

Table 12. Continued

Panel D exclude firms that have a prior restatement prior to the adoption of clawback				
	Z-score		SdROE	
	Model 1	Model 2	Model 3	Model 4
	(1) z-score	(2) z-score	(3)sdROE	(4)sdROE
intercept	3.52***	3.12***	-0.21	-0.11
	(0.00)	(0.00)	(0.42)	(0.73)
Clawback	0.09	0.06	0.21*	0.20*
	(0.43)	(0.56)	(0.08)	(0.08)
post	-0.29**	-0.28**	0.48***	0.46***
	(0.04)	(0.04)	(0.00)	(0.00)
Clw*post	0.53***	0.52***	-0.47***	-0.48***
	(0.00)	(0.00)	(0.00)	(0.00)
Leverage		0.34*		-0.29
		(0.07)		(0.14)
Size		0.02		0.01
		(0.35)		(0.47)
ROE		1.75***		0.08***
		(0.00)		(0.00)
Year fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes
Number of observations	1222	1222	1222	1222
Adjusted R-Square	0.15	0.21	0.00	0.01