CEO Overconfidence, Financial Institution Failures and Risk-taking Behaviors

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Abstract

This paper proposes a new perspective in demonstrating the causes of financial institution failures from the aspect of CEO overconfidence. For simplicity, financial institutions with and without overconfident CEOs are referred to as "overconfident institutions" and "non-overconfident institutions." Analyses were conducted to determine whether CEO overconfidence contributes to institutional failure. First, we find that overconfident institutions tend to have higher risk-taking behavior. Second, overconfident institutions tend to have higher default risks than non-overconfident institutions. Empirical results also confirm the notion that higher risk-taking behaviors of overconfident institutions can bring higher default risks to these institutions.

Keywords: financial institution, CEO overconfidence, risk-taking behaviors, default risk.
JEL: G21, G28, G31, G32, G34

I. Introduction

The financial crisis from 2007 to 2008 has thrown economies around the world into severe recession. As the financial crisis peaked, experts and analysts feared that the crisis would create large repercussions on the real economy. At that time, the stock market capitalization of major financial institutions declined by more than 300%. As such, the crisis severely hurt many U.S. financial institutions. For example, within the S&P 1500 companies, Bear Stearns, Lehman Brothers, American International Group (AIG), Washington Mutual, Franklin Bank, Bank United Financial Corporation, and Downey Financial Corporation were in default between 2007 and 2008.[1]

The sources of financial institution failures are still being debated even in recent times. Many scholars attribute the occurrence of failures to systematic liquidity risk, macroeconomic conditions, weak regulatory oversight,[2] rating agencies, and financial innovation in the form of asset securitization. Other factors also include strong reliance on short-term financing before the crisis, CEO's incentives, banks with shareholder-friendly boards, weak risk management, and greater increases in real estate loans before the crisis (Acharya, Philippon,

[1] Colonial BancGroup Inc., FirstFed Financial Corporation, CORUS Bankshares Inc., Irwin Financial Corporation, Frontier Financial Corporation, and UCBH Holdings Inc. were also in default in 2009.
[2] There are no regulations to prohibit financial institutions from increasing their leverage ratios by creating more off-balance-sheet conduits.

Richardson, and Roubini, 2009; Obstfeld and Rogoff, 2009; Taylor, 2009; Demyanyk and Hasan, 2010; Keys, Mukherjee, and Seru, 2010; Laeven and Valencia, 2010; Brown and Dinç, 2011; Laeven, 2011; Fahlenbrach and Stulz, 2011; Wu and Hong, 2012; Fahlenbrach, Prilmeier, and Stulz, 2012; Beltratti and Stulz, 2012; Ellul and Yerramilli, 2013; Ma, 2014).[3]

However, aside from the stated reasons, one important factor of financial institution failure is the risk-taking behavior of the shareholders themselves. Few studies have examined this issue, with only two empirical studies related to it. Laeven and Levine (2009) show that the risk-taking behavior of banks positively alters the comparative power of shareholders within the corporate governance structure. Similarly, Houston, Lin, Lin, and Ma (2010) find that stronger creditor rights tend to promote greater risk-taking of banks. They also suggested that more information-sharing may lead to lower bank risks and a reduced likelihood of a financial crisis. More importantly, there are only few studies that attempted to demonstrate why financial institutions are willing to take those excess risks. For example, Acharya and Naqvi (2012) develop a theoretical model to explain that bank over-lending and excessive risk-taking may stem from the managers' intent to obtain higher compensation in the presence of an agency problem between the bank manager and the shareholders. Hence, managerial attitudes toward risk have impact on firms' risk. Several studies indicate that managerial overconfidence could cause CEOs to enact risk-taking behaviors as well.[4] The current study attempts to answer this question regarding CEO overconfidence of financial institutions, and for the sake of simplicity, financial institutions with and without overconfident CEOs are referred to as "overconfident institutions" and "non-overconfident institutions," respectively.

Recently, the influence of CEO overconfidence on corporate policies has received increasing attention. Malmendier and Tate (2005) proposed a model to empirically demonstrate that CEO overconfidence can cause corporate investment distortions due to the overestimation of future cash flows of firms. In another study, they further suggested that overconfident CEOs tend to overestimate their skills, with regards to their ability to generate higher returns; they

[3] See Barajas, Dell'Ariccia, and Levchenko (2009); Laeven (2011); Diamond and Rajan (2012); and Rajan and Ramcharan (2012) for discussions of the role played by credit booms in causing bank failures. These articles aim at providing explanations for why lending booms can lead to bank failures. In particular, Barajas et al. (2009) find that larger and longer-lasting booms are more likely to end in crisis. Rajan and Ramcharan (2012) examine the rise of loan prices in the U.S. during the early 20th century and highlighted the role played by availability of easy credit in exacerbating the farm land price boom and the subsequent spate of bank failures. Fahlenbrach et al. (2012) find that banks, which perform poorly in a financial crisis, rely more on short-term financing before the crisis. Fahlenbrach and Stulz (2011) report that poorly performing banks during the financial crisis gave out higher incentives to their CEOs. Beltratti and Stulz (2012) suggest that banks with more shareholder-friendly boards would perform worse. Ellul and Yerramilli (2013) also suggest that banks with lower risk management tend to perform worse. Finally, Ma (2014) showed that banks with overconfident CEOs tended to increase real-estate loans before the crisis.

[4] See Goel and Thakor (2008), Niu (2010), and Hirshleifer, Low, and Teoh (2012) for the details.

also reported that overconfident CEOs are more likely to pursue value-destroying mergers and acquisitions (M&As) and pay excessive amounts for the target companies (Malmendier and Tate, 2008). Similarly, Campbell et al. (2011) found that, theoretically, over-optimism can lead a risk-averse CEO to choose the over-investment level that, in turn, reduces the value of the shareholder. Moreover, Malmendier et al. (2011) suggested that, compared with rational CEOs, overconfident CEOs are more likely to choose debt financing for certain financing needs; Goel and Thakor (2008), Niu (2010), and Hirshleifer, Low, and Teoh (2012) also reported that firms with overconfident CEOs have greater return volatility, which implies that those firms simultaneously have larger credit risks. Similarly, Chen and Wang (2012) employ CEO overconfidence to explain why a constrained firm would buy back its own shares even when the buyback does not enhance shareholder wealth. They find that financially constrained firms experience a lower stock price and operating performance, but a higher default risk than unconstrained firms in the post-buyback period. Therefore, based on the over-investment and larger credit risk view, we expect that overconfident institutions tend to have higher risk-taking behaviors compared with non-overconfident institutions.

The current study proposes an alternative explanation for financial institution failures. Rather than focus on macroeconomic conditions and financial innovation, we relate those failures to the personal characteristics of the top decision-makers inside the firm, namely, the CEOs. Our focus is on overconfident CEOs, who mainly think they are better than they objectively are in terms of relevant characteristics, such as skills, and judgment on prospects of a successful outcome. Just as CEOs generally influence corporate investment decisions, CEOs of financial institutions play a crucial role in sanctioning and accepting new investment projects. We expect that the overconfident CEOs of institutions could affect institutions' risk taking behaviors in two ways, based on the characteristics of overconfidence. First, overconfident managers typically overestimate the precision of exogenous noisy signals (Malmendier and Tate, 2008; Gervais, Heaton, and Odean, 2011). As a result, they overestimate the probability of good situations and outcomes when the economy is in an upturn; hence, they are more willing to invest more projects. Second, overconfident managers underestimate the riskiness of their investments (Hirshleifer and Luo, 2001), so they tend to invest in low quality (high risk) projects. Both scenarios lead to institutions increasing their risk-taking behaviors. Consequently, we infer that overconfident institutions are more likely to take more risks than non-overconfident institutions.

Given that overconfident institutions take more risks, we expect that overconfident institutions are more likely to invest in risky and low quality projects, which would lead to lower and more volatile profits, lower portfolio quality, and higher vulnerability to macroeconomic shocks (Dell'Ariccia and Marquez, 2006). Hence, once macroeconomics

quickly drop (e.g., dot-com bubble, subprime bubble, and financial crisis), we believe that the overconfident institutions are likely to suffer failures. These findings provide evidence and channels with which to explain how overconfident institutions cause or exacerbate financial instability when macroeconomic risk is high.

First, our empirical findings suggest that, on average, overconfident institutions take more risks than non-overconfident institutions. Second, the excessive risk-taking behavior of overconfident institutions brings them higher default risks. This paper contributes to the literature in three ways. First, we relate CEO overconfidence to the risk-taking behavior of financial institutions. Previous studies usually focus on the influence of CEO overconfidence on investment and financial policies based on industrial firms (Malmendier and Tate, 2005, 2008; Hackbarth, 2008; Malmendier, Tate, and Yan, 2011) and their stock volatility (Niu, 2010).

In this study, we propose a novel viewpoint in exploring such risk-taking behavior of institutions by examining the relation between CEO overconfidence and financial institutions. Consistent with the findings in industrial firms, we believe that CEO overconfidence has a significant impact on their risk-taking behavior, and can cause distortions on their investments' behavior. Recently, Acharya and Naqvi (2012) discuses managers' actions and their high risk-taking behaviors; they then developed a theoretical model to explain such behavior. In this model, bank over-lending may result from the managers' desire to obtain higher compensation in the presence of an agency problem between the bank manager and the shareholders. While Acharya and Naqvi (2012) examine who will lend more from a perspective of managerial agency problems, we answered this question through a managerial trait, namely, the overly optimistic belief held by an overconfident CEO about the future.

Second, this paper provides a new perspective with which to explain the causes of financial institution failures. Earlier studies typically focus on systematic liquidity risk, macroeconomic conditions, financial innovation, weak regulatory oversight, rating agencies, strong reliance on short-term financing, CEO's incentives, banks' shareholder-friendly board, weak risk management, and greater increases in real estate loans prior to the crisis (Acharya et al., 2009; Laeven, 2011; Wu and Hong, 2012; Fahlenbrach et al., 2012; Fahlenbrach and Stulz, 2011; Beltratti and Stulz, 2012; Ellul and Yerramilli, 2013; Ma, 2014). Aside from various opinions of literature, we find another key factor that can explain the issue: our empirical evidence suggests that overconfident institutions are more likely to take more risks than non-overconfident institutions. Based on this fact, this paper complements the literature on financial institution failures by investigating the risk-taking behaviors of overconfident institutions.

The remainder of the current paper is organized as follows: Section II describes data and overconfidence measures, Section III presents descriptive statistics, Section IV presents the empirical results, and Section V concludes this paper.

II. Data and Overconfidence Measure

II.1 Data

We started with all financial institutions found from two databases containing information on the accounting data of financial institutions: the Compustat Bank Database and Standard & Poor's ExecuComp Database. We looked for intersections on the data to be used in examining CEO overconfidence level of financial institutions from 1993 to 2012, respectively. Our sample only includes commercial banks and savings institutions (SIC codes 6020, 6035, and 6036). We also calculated the risk-taking measure, based on the data of 1993; hence, we used the data from 1993 to 2012 for the analysis. Next, we winsorized our accounting data at 1% and 99% in all the analyses, in order to prevent outliers from affecting the results. After intersecting these two databases, the final sample includes 191 financial institutions and 1,601 firm-year observations from 1993 to 2012. Although the sample is not very large, our sample well represents financial institutions, which are the top 191 financial institutions in the U.S.

To proxy for the default risk of a firm, we also follow the studies of Santos (2010) and Chava and Purnanandam (2011) to employ expect default frequency (EDF) from the modified KMV model (Bharath and Shumway, 2008). This, in turn, allowed us to calculate the expected default probability in the robustness check section. Furthermore, we use the stock price from Center for Research on Security Prices (CRSP) and accounting data from Compustat quarterly database to calculate the EDF of each bank. For clarity, we summarized the detailed definition of each variable in Table 1.

Refer Table 1

II.2 Overconfidence Measure

In this paper, we adopted the criteria for the CEO overconfidence indicator employed in Campbell et al. (2011). Following the argument of Malmendier and Tate, Campbell et al. (2011) identified CEOs as overconfident when CEOs they delay to exercise highly in-the-money options. Next, we followed the classification of overconfident CEOs in Goel and Thakor (2008), and in Campbell et al. (2011) to categorize managerial overconfidence into three types: highly overconfident CEOs, moderately overconfident CEOs, and low overconfident CEOs. In particular, for sample size limitation, we define highly overconfident CEOs as the overconfident group, whereas moderately and low overconfident CEOs as the non-overconfident group.[5]

[5] There are only 191 financial institutions observed in S & P's ExecuComp Database from 1993 to 2012.

Following the requirement of Campbell et al. (2011), we required that CEOs exhibit behaviors that postpone exercising highly in-the-money options at least twice during their tenure. CEOs are assigned as highly overconfident CEOs when they start to exhibit such behavior. The realized value per option is estimated from the total realizable value of the exercisable options divided by the total number of exercisable options. Then, the estimated average exercise price of the options is computed from the fiscal year-end stock price minus the realized value per option. Hence, the percentages of average moneyness are obtained from per-option realized value divided by the estimated average exercise price. We choose 100% moneyness as the cutoff point to identify CEOs as highly overconfident.

To complete our managerial overconfidence classification, we also constructed a low overconfident indicator. Following the same logic that high overconfident CEOs hold deep in-the-money options too long, we classified a CEO as low overconfident when he exercises stock options that are less than 30% in the money, and does not keep any exercisable options, which are more than 30% in the money. We employed a similar methodology to the one above in order to measure the percentage moneyness of exercised options. The average realized value from exercising per option is calculated from the total value realized from exercising the stock options divided by the total number of options exercised. Then, we subtracted the per-option value realized from exercising from the stock price at the fiscal year-end to obtain the estimated average exercise price of exercised options. The percentage moneyness of average exercised options is derived from the realized value per option from exercising divided by the estimated average exercise price. The percentage moneyness of unexercised but exercisable options is defined in the previous statement. Similar to the high overconfident measure, we required that CEOs exhibit a conservative option exercise behavior at least twice during their tenure. We classified them as low overconfident CEOs when they first exhibit this behavior.

Finally, we constructed the moderate overconfident measure after we defined high and low overconfident. CEOs who hold and/or exercise options with moneyness between 30% and 100% are classified as moderately overconfident.

III. Empirical Results

III.1 Descriptive Statistics

Table 2 presents the descriptive statistics of overconfidence, bank characteristics, bank governance variables, and measures of risk-taking and default risk. The percentage of overconfident institutions over the total sample is 0.5984, with a standard deviation of 0.4904. The means of Bank Size, Loan Ratio, Deposit Ratio, and ROA are 16.7487, 0.6115, 0.6855

and 0.0103, respectively.[6] Moreover, the average boardsize, Ind_Dir, and Female_Dir are 13.5210, 0.7284 and 0.1093, respectively. Regarding the measures of risk-taking and default risk, the average Volatility, Idiosyncratic risk (IR), Z-score, EDF, and Tail_Risk, are 0.0386, 0.2880, 3.7240, 0.1126 and 0.0291, respectively. These numbers are also consistent with those reported in previous studies.

Refer Table 2

Table 3 shows the comparison of descriptive statistics between overconfident institutions and non-overconfident institutions. First, with respect to Bank Size, the mean values of overconfident and non-overconfident institutions are 16.6031 and 16.9648, respectively. As can be seen, the difference between the two is significantly negative, suggesting that overconfident institutions tend to be small institutions. Second, overconfident institutions show larger ROAs, suggesting that such institutions tend to have better performance compared with others. Third, with respect to bank governance variables, overconfident institutions are associated with smaller Ind_Dir and Female_Dir, suggesting that overconfident institutions tend to have worse governance.

Refer Table 3

In Table 4, we provide the correlation coefficient matrix of the variables. As can be seen, correlations between all variables are relatively small, making multicollinearity less of a concern. Moreover, we find that OC has significantly negative correlations with Bank_Size, Ind_Dir, and Female_Dir. This result likely suggests that overconfident institutions tend to be small institutions with fewer ratios of independent directors and women directors. We also observe that OC is positively correlated with ROA, indicating that overconfident institutions tend to have better performance.

Refer Table 4

III.2 Overconfident Institutions and Risk-taking Behavior

The first econometric model is designed to measure the risk-taking behaviors of overconfident institutions. Following the studies of Laeven and Levine (2009), Houston et al. (2010), and Ellul and Yerramilli (2013), the econometric model is designed as follows

$$\text{Risk Taking}_{it} = \alpha_1 + \alpha_2\ \text{OC}_{it} + \beta\ \text{Z}_{it\text{-}1} + \text{firm and year dummies} + \varepsilon_{it} \quad , \qquad (1)$$

where Risk Taking_{it} refers to the risk-taking behavior of financial institutions i in year t proxied by Volatility, Idiosyncratic risk, and Z-score; OC_{it} is dummy variable equals one if the financial institutions i is overconfident institutions in year t and zero otherwise; and Z is

[6] For clarity, we summarize the detailed definition of each variable in Table 1.

the vector of control variables containing four bank characteristics and three bank governance variables. The four bank-characteristic control variables are Bank_Size, Loan_Ratio, Deposit_Ratio and ROA, while the three bank governance variables are boardsize, Ind_Dir, and Female_Dir. The selection of the control variables follows Laeven and Levine (2009), Houston et al. (2010), and Ellul and Yerramilli (2013).[7] Especially in all regression analyses, we use White's (1980) heteroskedasticity-consistent standard errors and Petersen's (2009) approach to adjust clustering at the bank level. Furthermore, the firm and year dummies are added to eliminate the firm and year fixed effects. The sample includes 191 financial institutions and 1,601 firm-year observations from 1993 to 2012.

Our first principal concern in the analysis is the coefficient of OC_{it} (α_2). A significantly positive coefficient would provide support for our argument that overconfident institutions have higher risk-taking behavior, compared with non-overconfident institutions. Table 5 presents the regression results. First, the dummy variable is significantly positively related to Volatility and Idiosyncratic risk, even after controlling for bank characteristics and governance variables suggested by previous studies. These positive links between overconfident institutions and risk taking behaviors are consistent with our expectation, confirming that overconfident institutions indeed have higher risk-taking behavior compared with non-overconfident institutions. With regards to bank characteristics, a higher risk-taking behavior is significantly associated with firms, which that have a smaller size, lower ROA, and larger board size compared with the others.

Refer Table 5

III.3 Overconfident Institutions and Default Risk

The second econometric model is designed to measure the default risk of overconfident institutions. Following the studies of Laeven and Levine (2009) and Ellul and Yerramilli (2013), the econometric model is designed as follows:

$$\text{Default Risk}_{it} = \alpha_1 + \alpha_2\ OC_{it} + \beta\ Z_{it\text{-}1} + \text{firm and year dummies} + \varepsilon_{it} \quad , \qquad (2)$$

where Default Risk_{it} refers to default risk of financial institutions *i* in year *t* proxied by EDF and Tail_Risk; OC_{it} is a dummy variable equals one if the financial institutions *i* is overconfident institutions in year *t,* and zero otherwise; and Z is the vector of control variables containing four bank characteristics and three bank governance variables. Our principal concern in the analysis is the coefficient of OC_{it} (α_2). A significantly positive coefficient would provide support for our argument that overconfident institutions have

[7] We skip the explanation of control variables, but they can be found in the reference cited therein.

higher default risk compared with non-overconfident institutions.

Table 6 presents the regression results. First, the dummy variable OC_{it} is significantly positively related to EDF and Tail_Risk, even after controlling for the other potential factors suggested by previous studies. Therefore, these positive links between overconfident institutions and default risks are consistent with our expectation, confirming that overconfident institutions, indeed, have higher default risk, compared with non-overconfident institutions.

Refer Table 6

IV. Conclusion

This paper proposes a new perspective in demonstrating the causes of financial institution failures from the aspect of CEO overconfidence. Here, financial institutions with and without overconfident CEOs are referred to as "overconfident institutions" and "non-overconfident institutions," respectively. First, we find that overconfident institutions tend to have a higher risk-taking behavior, based on the measures of Volatility and Idiosyncratic risk. Second, based on the EDF and Tail_Risk, we find that overconfident institutions tend to have higher default risks than non-overconfident institutions. Thus, empirical results confirm the notion that higher risk-taking behavior of overconfident institutions can bring higher default risks to institutions.

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Table 1 Definition of variables

Variable	Definition	Source of Data
Overconfidence Variables		
OC	A dummy variable equals one if the bank is an overconfident bank, and zero otherwise. In an overconfident bank, CEOs exhibit behavior that postpones exercising highly in-the-money options at least twice during their tenure. CEOs are called highly overconfident CEOs when they start to exhibit this behavior. Following Campbell et al. (2011), we choose 100% moneyness as the cutoff point to identify CEOs as highly overconfident	Standard & Poor's ExecuComp
Bank Characteristic Variables		
Bank_Size	Natural log of Total Assets	Compustat bank
Loan_Ratio	Loans/Total Assets	Compustat bank
Deposit_Ratio	Total Deposits/Total Assets	Compustat bank
ROA	Net Income/Total Assets	Compustat bank
Bank Governance Variables		
Boardsize	Number of Directors	IRRC
Ind_Dir	Percentage of Independent Directors/Board Size	IRRC
Female_Dir	Percentage of women directors/Board Size	IRRC
Risk Taking Measures		
Volatility	Standard deviation of excess weekly returns that is estimated relative to the value-weighted market index for the 52 weeks preceding the fiscal year end date.	CRSP
Idiosyncratic Risk	Annualized standard deviation of the residuals from a market model regression estimated using daily returns over the fiscal year.	CRSP
Z-score	(ROA + Capital Asset Ratio)/Standard Deviation (ROA)	Compustat bank
Default Risk Measures		
EDF	An expected default frequency measure of the firm. It is the percentile ranking of a firm's default risk based on its distance to default (constructed from Bharath and Shumway, 2008)	CRSP and Compustat
Tail_Risk	Negative of the average bank's stock return estimated over the 5% worst days for the S&P 500 in a given year.	CRSP and Compustat

Table 2 Descriptive statistics of the variables

This table presents summary statistics for the sample includes 191 institutions and 1,601 bank-year observations from 1993 through 2012. The variable definitions can be found in Table 1. Superscripts *, ** and *** denote significance at the 10%, 5% and 1% levels, respectively.

	Obs.	Mean	Median	S.D.	Min	Max
Overconfidence Variables						
OC	1601	0.5984	1.0000	0.4904	0.0000	1.0000
Bank Characteristic Variables						
Bank_Size	1597	16.7487	16.4184	1.5354	12.7953	21.5816
Loan_Ratio	1597	0.6115	0.6587	0.1679	0.0121	0.9450
Deposit_Ratio	1597	0.6855	0.7140	0.1548	0.0006	0.9346
ROA	1597	0.0103	0.0112	0.0103	-0.0383	0.0564
Bank Governance Variables						
Boardsize	1142	13.5210	13.0000	3.5846	6.0000	26.0000
Ind_Dir	1142	0.7284	0.7500	0.1395	0.2000	1.0000
Female_Dir	1095	0.1093	0.1000	0.0762	0.0000	0.4615
Risk Taking Measures						
Volatility	1601	0.0386	0.0317	0.0250	0.0107	0.2056
IR	1601	0.2880	0.2336	0.1805	0.0872	1.4898
Z-score	1583	3.7240	3.8312	1.0563	-3.1578	5.8402
Default Risk Measures						
EDF	1557	0.1126	0.0005	0.2487	0.0000	0.9997
Tail_Risk	1601	0.0291	0.0220	0.0236	-0.0079	0.1495

Table 3 Comparison of bank characteristics between overconfident institutions and non-overconfident institutions

This table presents the means of the variables used in this study and the mean differences between OC and non-OC institutions. OC (Non-OC) institutions denote that the CEO of a bank is classified as overconfident (non-overconfident). The sample includes 191 institutions and 1,601 bank-year observations from 1993 through 2012. The variable definitions can be found in Table 1. Superscripts *, ** and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	OC Institutions	Non-OC Institutions	Diff	*t*-value
Bank Characteristic Variables				
Bank_Size	16.6031	16.9648	-0.3617***	-4.6465
Loan_Ratio	0.6110	0.6123	-0.0013	-0.1489
Deposit_Ratio	0.6888	0.6806	0.0082	1.0431
ROA	0.0118	0.0081	0.0037***	7.2566
Bank Governance Variables				
Boardsize	13.5347	13.4989	0.0358	0.1638
Ind_Dir	0.7159	0.7488	-0.0330***	-3.9039
Female_Dir	0.1013	0.1219	-0.0206***	-4.3904

Table 4 Correlation coefficient matrix of the variables

This table presents the Pearson correlation coefficient matrix of the variables that used in this study. The sample includes 191 institutions and 1,601 bank-year observations from 1993 through 2012. The variable definitions can be found in the Table 1. Superscripts *, ** and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	OC	Bank_Size	Loan_ Ratio	Deposit_ Ratio	ROA	Boardsize	Ind_Dir	Female_ Dir
OC	1.000							
Bank_Size	-0.116***	1.000						
Loan_Ratio	-0.004	-0.247***	1.000					
Deposit_Ratio	0.026	-0.463***	0.532***	1.000				
ROA	0.179***	-0.023	-0.208***	-0.241***	1.000			
Boardsize	0.005	0.241***	0.082***	0.001	0.055*	1.000		
Ind_Dir	-0.115***	0.147***	0.040	0.090***	-0.230***	-0.082***	1.000	
Female_Dir	-0.132***	0.249***	-0.089***	-0.094***	-0.078***	-0.026	0.287***	1.000

Table 5 Overconfident institutions and risk taking behavior

This table reports OLS regressions relating CEO overconfidence to measures of bank risk taking. Volatility is the standard deviation of weekly stock returns. Idiosyncratic risk is the annualized standard deviation of the residuals of a regression of excess bank stock returns on (excess) returns on the S&P 500. Z-Score, which is calculated by (ROA + Capital Asset Ratio)/Standard Deviation (ROA), is the measure of bank risk taking. The variable definitions can be found in Table 1. All regressions include firm and year dummies. In parentheses are *t*-statistics based on standard errors adjusted for heteroskedasticity (White, 1980). Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Normal Period	Volatility	Idiosyncratic risk	Z-score
Constant	0.1129***	0.7660***	-3.5392*
	(3.93)	(4.04)	(-1.83)
OC	0.0027***	0.0100*	-0.0093
	(2.84)	(1.73)	(-0.12)
Bank_Size	-0.0049***	-0.0344***	0.3667***
	(-3.37)	(-3.52)	(3.77)
Loan_Ratio	0.0101	0.0823*	0.1702
	(1.58)	(1.80)	(0.39)
Deposit_Ratio	0.0087	0.0662	-0.3325
	(1.02)	(1.04)	(-0.63)
ROA	-0.6880***	-4.1614***	32.2004***
	(-6.46)	(-5.98)	(5.61)
Boardsize	0.0005***	0.0029***	-0.0269***
	(3.46)	(3.19)	(-2.60)
Ind_Dir	0.0055*	0.0349	-0.9177***
	(1.65)	(1.61)	(-3.07)
Female_Dir	-0.0043	-0.0448	0.3649
	(-0.62)	(-0.97)	(0.70)
Firm fixed effect	YES	YES	YES
Year fixed effect	YES	YES	YES
Obs.	1,601	1,601	1,583
Adj-R^2	0.7047	0.7515	0.6338

Table 6 Overconfident institutions and Default Risk

This table reports OLS regressions relating CEO overconfidence to measures of bank default risk. EDF, the estimated default frequency, is measured from Moody's Analytics. Tail Risk, which captures the higher probability of big losses, is based on the 5% worst performing days of the S&P 500. The variable definitions can be found in Table 1. All regressions include firm and year dummies. In parentheses are t-statistics based on standard errors adjusted for heteroskedasticity (White, 1980). Superscripts *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Normal Period	EDF	Tail_Risk
Constant	-0.5388	0.0358*
	(-1.21)	(1.68)
OC	0.0339**	0.0015*
	(2.03)	(1.91)
Bank_Size	0.0273	-0.0010
	(1.22)	(-0.92)
Loan_Ratio	0.1088	0.0164***
	(1.12)	(4.03)
Deposit_Ratio	0.1870	-0.0225***
	(1.44)	(-4.00)
ROA	-6.5424***	-0.2009***
	(-4.65)	(-4.77)
Boardsize	0.0033	0.0002**
	(1.30)	(2.29)
Ind_Dir	0.0311	0.0019
	(0.60)	(0.75)
Female_Dir	-0.0339	0.0082
	(-0.24)	(1.59)
Firm fixed effect	YES	YES
Year fixed effect	YES	YES
Obs.	1,557	1,601
Adj-R^2	0.2787	0.7943

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