

CEO Overconfidence and Bank Risk Taking*

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Abstract

Recent studies document that executives tend to be overconfident. That is, they believe that they have more precise knowledge about future events than they actually have. In this paper, we examine the relationship between CEO overconfidence and bank risk taking. We measure CEO overconfidence using media coverage, and bank risk taking using the standard deviation of the bank's stock returns. We find that banks managed by overconfident CEOs take more risk. This effect is economically significant, and is robust to controlling for a number of variables and bank fixed effects.

Keywords: CEO overconfidence; Risk taking; Banking

JEL classification: G21; G28

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1 Introduction

Bank failures have significant effects on the real economy. Bernanke (1983), for example, argues that the bank failures of 1930–1933 in the U.S. affected the real economy by reducing credit supply. Ashcraft (2005) shows that bank failures still matter today. Thus, understanding the risk-taking behavior of banks has been an important topic in the banking literature. In this paper, we present evidence suggesting that banks managed by overconfident CEOs take more risk.

Our analysis is motivated by recent studies reporting that executives tend to be overconfident. That is, they believe that they have more precise knowledge about future events than they actually have. Ben-David, Graham, and Harvey (2007), for example, ask hundreds of executives to predict stock market returns, and find that the confidence intervals provided by the executives are too narrow: realized market returns are within the executives' 80% confidence intervals only 38% of the time. Goel and Thakor (2008) argue that overconfident executives are more likely to be promoted to CEOs.

CEO overconfidence can affect risk taking in at least two ways. First, overconfident CEOs may overestimate the precision of exogenous noisy signals as in Gervais, Heaton, and Odean (2007). Second, overconfident CEOs may underestimate the riskiness of future cash flows as in Hackbarth (2008). In both scenarios, overconfidence leads to more risk taking.

We construct a data set of 108 publicly traded U.S. banks between 1994 and 2002. We measure bank risk taking using the standard deviation of the bank's stock returns, and CEO overconfidence using media coverage as in Malmendier and Tate (2008). Specifically, we hand collect articles published in the *American Banker* that characterize the sample CEOs as either confident or cautious.

We find a positive and statistically significant relationship between CEO overconfidence and bank risk taking, after controlling for a number of variables that

are known to influence bank risk. This finding is robust to controlling for bank fixed effects. Moreover, the effect is economically significant: all else equal, banks managed by overconfident CEOs are 7% riskier.

Our paper contributes to the literature that seeks to explain the risk-taking behavior of banks. Prior research has documented several determinants of bank risk taking, including ownership structure (e.g., Anderson and Fraser, 2000; Chen, Steiner, and Whyte, 1998; Gorton and Rosen, 1995; Laeven and Levine, 2008; Saunders, Strock, and Travlos, 1990), CEO option-based compensation (e.g., Chen, Steiner, and Whyte, 2006; Mehran and Rosenberg, 2008), and bank size (e.g., Demsetz and Strahan, 1997). Our results suggest that CEO overconfidence also helps to explain the risk-taking behavior of banks.

Our paper also contributes to the growing literature on behavior corporate finance.¹ This line of research relates managerial biases to a wide range of corporate decisions such as investment policies (Malmendier and Tate, 2005), financial policies (Malmendier, Tate, and Yan, 2007), merger decisions (Malmendier and Tate, 2008), financial contracting (Landier and Thesmar, 2009), and payout policies (Ben-David, Graham, and Harvey, 2007). Having a sample of firms from the same industry limits the generality of our analysis. The advantage of our analysis, however, is that it controls for omitted variables that might confound the interpretation of inter-industry studies.

The rest of this paper is organized as follows. Section 2 reviews the literature on bank risk taking. Section 3 describes the data and presents the summary statistics. Section 4 reports the empirical results. Section 5 concludes.

¹See Baker, Ruback, and Wurgler (2007) for an excellent survey of this literature.

2 Related literature

Prior research has identified and empirically explored several determinants of bank risk taking that we briefly discuss below.

2.1 Ownership structure

Starting with Jensen and Meckling (1976), numerous studies have established that ownership structure influences corporate risk taking. Diversified shareholders have incentives to take more risk in order to increase their equity value. By contrast, managers have incentives to take less risk in order to protect their firm-specific human capital and private benefits of control (John, Litov, and Yeung, 2008). The issue is complicated by several features of the banking industry. First, deposit insurance intensifies the risk-taking incentives of shareholders (Merton, 1977). Second, franchise value reduces the risk-taking incentives of shareholders (Marcus, 1984).² Finally, banks are heavily regulated, and the same regulation may influence the risk-taking incentives of shareholders and managers differently (Laeven and Levine, 2008).

Given all these complications, not surprisingly, previous studies have documented both positive and negative relationship between ownership structure and bank risk taking, reflecting the different time periods in their analysis (see, in particular, Anderson and Fraser, 2000; Chen, Steiner, and Whyte, 1998; Saunders, Strock, and Travlos, 1990).

2.2 Option-based compensation

Due to the convex payoff structure of options, the value of a manager's option portfolio increases with risk. Thus, shareholders can increase the risk-taking

²Franchise value (also known as charter value) is the capitalized value of expected future profits, a value that will be lost if a bank goes bankrupt. Thus, from the bank shareholders' perspective, franchise value represents the opportunity cost of going bankrupt.

incentives of managers through options (Guay, 1999). Focusing on banking industry, Chen, Steiner, and Whyte (2006) find that following deregulation, shareholders have increasingly employed option-based compensation. They also find that both the structure of managerial compensation and the stock of option-based wealth lead to more risk taking in banking.³

To estimate the sensitivity of option portfolio value to change in stock-return volatility, researchers used to gather details on each of the annual option grants that comprise the portfolio. Core and Guay (2002) propose an “one-year approximation” method that substantially reduces the data collection costs.⁴ Using this method, Mehran and Rosenberg (2008) find that stock option grants lead CEOs to undertake riskier investments.

2.3 Bank size

Finally, in empirical studies of bank risk taking, researchers typically document a negative relationship between size and firm-specific risk, and a positive relationship between size and systematic risk (see, e.g., Chen, Steiner, and Whyte, 2006; Mehran and Rosenberg, 2008). This finding is consistent with the notion that large banks are better able to reduce firm-specific risk through diversification (Diamond, 1984) and, at the same time, large banks have used their diversification advantage to pursue riskier activities (Demsetz and Strahan, 1997).

³John, Saunders, and Senbet (2000) argue that incorporating managerial compensation into the pricing scheme of deposit insurance is a better way than capital requirements to refrain banks from taking excessive risk.

⁴Knopf, Nam, and Thornton, Jr. (2002) show that the Core and Guay (2002) method provides a more powerful test of managerial incentives than other proxies such as the number of options.

3 Data and summary statistics

We begin with the set of bank holding companies that are included in the Standard & Poor’s ExecuComp database between 1994 and 2002. To be included in the sample, a bank must have stock return data on the Center for Research in Security Prices (CRSP), managerial ownership data on the EDGAR database,⁵ CEO compensation data on the ExecuComp database, and balance sheet data on the Federal Reserve’s Consolidated Financial Statements for Bank Holding Companies (FR Y-9C). Our final sample consists of 108 banks with 141 CEOs and 463 bank-year observations.

3.1 Bank risk taking

We use the following single-index market model to estimate the return-generating process for each bank j in each year:

$$R_{jt} = \alpha + \beta R_{mt} + u_{jt}, \quad (1)$$

where R_{jt} is the daily return on the bank stock, R_{mt} is the daily return on the CRSP equal-weighted index, and u_{jt} is a random error term.⁶

We derive three measures of risk: total risk (the standard deviation of R_{jt}), systematic risk (β), and firm-specific risk (the standard deviation of u_{jt}).

⁵Managerial ownership data are available on the EDGAR database starting from 1994. This is why our sample period starts in 1994. The sample period ends in 2002 to facilitate a comparison of our results with those obtained by previous researchers (e.g., Chen, Steiner, and Whyte, 2006; Mehran and Rosenberg, 2008).

⁶We also tried a two-index market model as in Saunders, Strock, and Travlos (1990). The results are similar.

3.2 CEO overconfidence

Following Malmendier and Tate (2008), we measure CEO overconfidence using media coverage. Specifically, using LexisNexis, we search for articles published in the American Banker between 1992 and 2001 that characterize the sample CEOs as either confident or cautious. A “CEO confident” article refers to a sample CEO using the word “confident,” “confidence,” “optimistic,” or “optimism.” A “CEO cautious” article refers to a sample CEO using the word “cautious,” “conservative,” “practical,” “frugal,” “reliable,” “steady,” “not confident,” or “not optimistic.” We hand check each article to ensure that the word refers to the CEO in question.

Also following Malmendier and Tate (2008), for each CEO in each sample year, we construct an indicator variable, TOTALconfident, that equals one if the total number of CEO confident articles up to the previous year exceeds that of CEO cautious articles, and zero otherwise. Note that this variable is constructed only using past articles to ensure that bank risk taking in the current year does not affect this variable.

We use the American Banker as our media source mainly for two reasons. First, the American Banker has been a leading information resource servicing the U.S. banking and financial services community since 1835.⁷ Second, the American Banker provides a better coverage of small U.S. banks than any other leading business publications. Indeed, an editor of the journal once stated that (the American Banker, 1992):

Though each of us is young enough to qualify for the 40-Under-40 list in this issue, collectively we have more than 35 years of bank reporting experience. In fact, I can’t think of any three journalists that – on a daily basis – watch the U.S. banking industry more closely.

⁷See <http://www.americanbanker.com>

Table 1 presents summary statistics of CEO articles. There are a total of 201 articles. These articles focus on a variety of topics such as the CEO, company earnings, a merger or acquisition, and the banking industry as a whole. Table 1 also reports the source of assessment, i.e., the identity of the person who characterized the CEO. Note that 48% of CEO confident articles are based on CEO quote, compared with 27% of CEO cautious articles. This pattern is similar to that reported in Malmendier and Tate (2008). They suggest that this is because confident CEOs as a group are more outgoing and assertive than cautious CEOs.

3.3 Managerial ownership

Consistent with prior research, we measure managerial ownership using the percent of shares of a bank held by all directors and executive officers of the bank as a group. Managerial ownership is measured at the beginning of each year.

3.4 Vega

Following Mehran and Rosenberg (2008), we use the “one-year approximation” method developed in Core and Guay (2002) to measure the effect of option-based compensation on CEO risk-taking incentives. Specifically, we define vega as the change in the Black-Scholes value (in millions of dollars) of the CEO’s stock options for a 1% change in the annualized standard deviation of the bank’s stock returns. CEO stock options are measured at the end of each fiscal year.

3.5 Bank size

Consistent with prior research, we measure bank size using the natural logarithm of the total assets (in millions of dollars) of the bank. Size is measured at the

beginning of each year.⁸

3.6 Other control variables

We include a number of additional control variables that have been used in previous studies. First, we control for capital ratio, defined as the book value of equity divided by total assets. Second, we control for asset composition of each bank as in Demsetz and Strahan (1997) and Mehran and Rosenberg (2008). Specifically, we compute the share of real estate loans to total loans, commercial and industrial (C&I) loans to total loans, and consumer loans to total loans. Finally, we control for loan concentration, defined as the sum of squared loan shares. All these variables are measured at the beginning of each year.

3.7 Summary statistics

Table 2 presents summary statistics of the data set. The means of total risk, systematic risk, and firm-specific risk are 0.0192, 0.9817, and 0.0173, respectively. These numbers are similar to those reported in Chen, Steiner, and Whyte (2006). The mean value of vega (in millions of dollars) is 0.1273 with a standard deviation of 0.1928. An average bank in our sample has a capital ratio of 8%, a real estate loan share of 48% , a C&I loan share of 23%, a consumer loan share of 16%, and a loan concentration ratio of 37%. These numbers are similar to those reported in Mehran and Rosenberg (2008), suggesting that our sample is similar to theirs. Finally, the TOTALconfident variable shows that about 24% of CEOs are characterized as overconfident on the basis of media coverage.

⁸Specifically, we obtain the data from the year-end report for the proceeding year. For example, we obtain the size of a bank at the beginning of 1994 from the bank's December 1993 FR Y-9C report.

4 Empirical results

4.1 Empirical model

To examine the relationship between CEO overconfidence and bank risk taking, we estimate the following model:

$$\begin{aligned} Risk_{jt} = & \alpha_0 + \alpha_1 TOTALconfident_{jt} + \alpha_2 (Managerial\ ownership)_{jt} \quad (2) \\ & + \alpha_3 Vega_{jt-1} + \alpha_4 (Capital\ ratio)_{jt} + \alpha_5 Size_{jt} \\ & + \alpha_6 (Real\ estate\ loan\ share)_{jt} + \alpha_7 (C\&I\ loan\ share)_{jt} \\ & + \alpha_8 (Consumer\ loan\ share)_{jt} + \alpha_9 (Loan\ concentration)_{jt} \\ & + \gamma_t + \epsilon_{jt}, \end{aligned}$$

where in separate regressions $Risk_{jt}$ equals total risk, systematic risk, or firm-specific risk of bank j in year t ; γ_t controls for year fixed effects; and ϵ_{jt} is the random error term.

Following Mehran and Rosenberg (2008), we use the lagged value of vega in the model. They suggest that such a setup helps to mitigate endogeneity problem, because incentives are in place before the risk taking decisions are made.⁹ We include year fixed effects to control for possible structural changes in the banking industry over time.

4.2 OLS regressions

Table 3 presents the regression results of Eq. (2) using pooled ordinary least squares (OLS). The dependent variables in regression (1), (2), and (3) are total risk,

⁹In the long run, bank risk taking and CEO compensation are better viewed as determined jointly (see Chen, Steiner, and Whyte, 2006). In the short term, risk taking can be viewed as an endogenous decision of the bank impacted by its ownership structure, CEO compensation, and other control variables (see Saunders, Strock, and Travlos, 1990).

systematic risk, and firm-specific risk, respectively. For brevity, the coefficients on year fixed effects are not reported. The standard errors are adjusted for heteroskedasticity and clustering at the bank level (see Petersen, 2008).

The coefficients on `TOTALconfident` are positive in all three regressions, and significant in regression (1) and (3). These results suggest that CEO overconfidence is associated with more risk taking. The economic magnitudes of these coefficients are significant as well. For example, the coefficient on `TOTALconfident` is 0.00137 in regression (1). Given that the mean value of total risk is 0.0192 (see Table 2), this coefficient implies that banks managed by overconfident CEOs are 7% riskier.

The coefficients on managerial ownership are not significant. These results parallel the findings of Anderson and Fraser (2000), who document that the relationship between managerial ownership and total and firm-specific risk changed over time.

The coefficients on `vega` are positive and significant in all three regressions. These results are consistent with those of Chen, Steiner, and Whyte (2006) and Mehran and Rosenberg (2008), and suggest that CEO option-based compensation leads to more risk taking in banking.

Size is negatively associated with total risk and firm-specific risk, suggesting that larger banks are better able to reduce their firm-specific risk through diversification. The coefficients on capital ratio are negative in all three regressions, and significant in regression (2). These results support the view that capital requirements can constrain bank risk taking (see, e.g., Repullo, 2004).

As far as other control variables are concerned, larger share of real estate loans and consumer loans are both associated with lower bank risk, whereas higher loan concentration is associated with greater bank risk. These results are similar to those of Mehran and Rosenberg (2008).

4.3 Bank fixed-effects regressions

One potential concern with the OLS regression results is that there might be unobservable bank-specific variables that influence bank risk taking. To address this concern, we re-estimate Eq. (2) with bank fixed effects. The results are reported in Table 4.

The statistical significance of the coefficients on several control variables is reduced (due to the addition of 108 control variables). For example, the coefficients on size is no longer statistically significant in any of the regressions. However, in terms of signs, statistical significance, and economic magnitude, the coefficients on TOTALconfident are similar to those in OLS regressions. Our main results thus are robust to the addition of bank fixed effects.

5 Conclusion

This paper examines the relationship between CEO overconfidence and bank risk taking. We find that banks managed by overconfident CEOs take more risk. This finding is robust to controlling for a number of variables and bank fixed effects. Our paper thus helps to explain the risk-taking behavior of banks.

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Table 1. Summary statistics of CEO articles

This table presents the summary statistics of all the articles published in the American Banker between 1992 and 2001 that characterize the sample CEOs as confident or cautious. We categorize articles using the criteria described in Malmendier and Tate (2008). A “CEO confident” article refers to a sample CEO using the word “confident,” “confidence,” “optimistic,” or “optimism.” A “CEO cautious” article refers to a sample CEO using the word “cautious,” “conservative,” “practical,” “frugal,” “reliable,” “steady,” “not confident,” or “not optimistic.” Source of assessment is the identity of the person who characterized the CEO.

| | Full sample | CEO confident | CEO cautious |
|----------------------------------|-------------|---------------|--------------|
| Number of articles | 201 | 122 | 79 |
| Article type (percent) | | | |
| About the CEO | 22 | 25 | 18 |
| About company earnings | 21 | 20 | 22 |
| About a merger or acquisition | 22 | 16 | 32 |
| About banking industry | 12 | 16 | 6 |
| Other (e.g., dividend) | 22 | 22 | 23 |
| Source of assessment (percent) | | | |
| CEO quote | 40 | 48 | 27 |
| Journalist’s assessment | 44 | 44 | 44 |
| Other assessment (e.g., analyst) | 16 | 7 | 29 |

Table 2. Summary statistics of the data set

The data set consists of 463 observations of 108 banks from 1994 to 2002. Total risk is the standard deviation of daily stock returns calculated over a year. Systematic risk and firm-specific risk are obtained by a regression of daily stock returns on CRSP equal-weighted index for each year. TOTALconfident is an indicator variable that equals one when the total number of CEO confident articles up to the previous year exceeds that of CEO cautious articles. Managerial ownership is the percent of shares of a bank held by all directors and executive officers of the bank as a group. Vega is the change in the Black-Scholes value (in millions of dollars) of the CEO's stock options for a 1% change in the annualized standard deviation of the bank's stock returns. Capital ratio is the book value of equity divided by total assets. Size is the natural logarithm of total assets (in millions of dollars). All loan shares are calculated as a fraction of total loans. Loan concentration is the sum of squared loan shares.

| | Mean | Std. Dev. | Minimum | Maximum |
|------------------------|--------|-----------|---------|---------|
| Dependent variables | | | | |
| Total risk | 0.0192 | 0.0065 | 0.0074 | 0.0640 |
| Systematic risk | 0.9817 | 0.4150 | -0.2457 | 2.9089 |
| Firm-specific risk | 0.0173 | 0.0059 | 0.0073 | 0.0532 |
| Control variables | | | | |
| TOTALconfident | 0.2441 | 0.4300 | 0.0000 | 1.0000 |
| Managerial ownership | 0.0607 | 0.0707 | 0.0001 | 0.4499 |
| Vega | 0.1273 | 0.1928 | 0.0000 | 1.6343 |
| Capital ratio | 0.0809 | 0.0165 | 0.0407 | 0.1716 |
| Size | 9.9221 | 1.2764 | 6.8260 | 13.4805 |
| Real estate loan share | 0.4777 | 0.1833 | 0.0000 | 0.9641 |
| C&I loan share | 0.2261 | 0.1145 | 0.0000 | 0.8273 |
| Consumer loan share | 0.1574 | 0.1230 | 0.0000 | 0.9071 |
| Loan concentration | 0.3658 | 0.1481 | 0.0017 | 0.9307 |

Table 3. OLS regression

All regressions also include year fixed effects but their coefficients are not reported. Standard errors that have been adjusted for heteroskedasticity and clustering at the bank level are reported in parentheses. * indicates significance at the 10% level, ** indicates significance at 5% level, and *** indicates significance at the 1% level.

| | (1) | (2) | (3) |
|------------------------|---------------------------|----------------------|---------------------------|
| | Total risk | Systematic risk | Firm-specific risk |
| TOTALconfident | 0.00137** (0.000576) | 0.0616 (0.0388) | 0.00112** (0.000515) |
| Managerial ownership | 0.00574 (0.00484) | -0.265 (0.337) | 0.00728 (0.00452) |
| Vega | 0.00509*** (0.00148) | 0.325** (0.145) | 0.00296** (0.00115) |
| Capital ratio | -0.0252 (0.0188) | -2.073** (1.016) | -0.0190 (0.0177) |
| Size | -0.000730** (0.000354) | 0.0244 (0.0215) | -0.000674** (0.000326) |
| Real estate loan share | -0.0197*** (0.00519) | -1.233*** (0.273) | -0.0170*** (0.00438) |
| C&I loan share | -0.000101 (0.00428) | -0.0773 (0.239) | -0.000263 (0.00376) |
| Consumer loan share | -0.00840** (0.00408) | -0.399* (0.231) | -0.00790** (0.00366) |
| Loan concentration | 0.0136** (0.00607) | 1.000*** (0.306) | 0.0117** (0.00506) |
| Number of observations | 463 | 463 | 463 |
| R^2 | 0.703 | 0.596 | 0.695 |

Table 4. Bank fixed-effects regressions

All regressions include year fixed effects and bank fixed effects but their coefficients are not reported. Standard errors that have been adjusted for heteroskedasticity and clustering at the bank level are reported in parentheses. * indicates significance at the 10% level, ** indicates significance at 5% level, and *** indicates significance at the 1% level.

| | (1) | (2) | (3) |
|------------------------|-------------------------|---------------------|-------------------------|
| | Total risk | Systematic risk | Firm-specific risk |
| TOTALconfident | 0.00178** (0.000813) | 0.122** (0.0566) | 0.00149** (0.000656) |
| Managerial ownership | 0.00598 (0.0106) | -1.030 (0.881) | 0.00628 (0.0106) |
| Vega | 0.00277* (0.00152) | 0.161 (0.159) | 0.000975 (0.00118) |
| Capital ratio | -0.0437 (0.0362) | -2.995* (1.766) | -0.0390 (0.0332) |
| Size | 0.000174 (0.000680) | 0.0291 (0.0592) | 0.000282 (0.000577) |
| Real estate loan share | -0.0176* (0.0104) | 1.152 (1.019) | -0.0206** (0.0104) |
| C&I loan share | -0.00734 (0.00665) | 0.0870 (0.408) | -0.00397 (0.00701) |
| Consumer loan share | -0.0144*** (0.00470) | 0.177 (0.428) | -0.0154*** (0.00486) |
| Loan concentration | -0.00567 (0.00937) | -1.845* (0.990) | 0.000736 (0.00942) |
| Number of observations | 463 | 463 | 463 |
| R^2 | 0.747 | 0.627 | 0.757 |