Managerial Overconfidence and Bank Risk Taking: A Cross-Country Analysis

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Abstract

This paper examines the effects of managerial overconfidence on bank risk taking and investigates whether improvements in governance can help to mitigate the adverse effects of managerial overconfidence on bank risk taking by using ordinary least squares method. The sample consists of the financial institutions in G20 and Taiwan over the period of 2005-2012. The executive overconfidence is measured by press data. The risks are defined as credit risk and insolvency risk. Controlling a number of corporate governance variables, bank-specific variables and country-specific variables, this paper finds that overconfident CEOs or CFOs tend to take more credit risk and insolvency risk, especially in the recession periods, but they would lower their risk exposure in the boom and profit periods. Banks can mitigate the negative impacts of managerial overconfidence by expanding the size of the board and preventing a manager from being also a board chairman. Supervisory authorities can reduce bank risks by strengthening official supervisory power.

Keywords：Bank, overconfidence, corporate governance, risk taking

1. Introduction

Banks mainly play the roles of risk transformer to earn profits and to take risks by issuing riskless deposits and liquid liabilities to finance risky illiquid assets or off-balance-sheet activities in the financial markets (Bryant, 1980; Diamond and Dybvig, 1983; Holmstrom and Tirole, 1998; Kashyap et al., 2002). But their higher leverage and greater opacity would make the financial supervisory authority not be able to control the degree of bank risk taking effectively.

The incentive, characteristics and risk preferences of bank stakeholders are usually the key factors of risk-taking decisions. Amihud and Lev (1981) and Hirshleifer and Thakor (1992) argue that managers may spend corporate resources to diversify their companies' operational risks to protect their positions in the firm due to career concerns and un-diversifiable employment risk. Saunders et al. (1990), John et al. (2008) and Laeven and Levine (2009) also find that bank managers are likely to be more risk-averse than shareholders regardless of ownership structure. However, management-controlled banks would take more risky and the least profit-making investments (Gorton and Rosen, 1995 and Knopf and Teall, 1996). The OECD report in 2009[1] even reveals that managers in the banks with weak corporate control would be rewarded for short term risk taking. Therefore, no consensus has been reached regarding the risk preferences of bank managers in the literature.

Bank shareholders are usually inclined to be more risk-pursuing than bank managers under the protection of deposit insurance. Dispersed shareholders tend to increase risk compared to blockholders because they are more diversified (Demsetz and Lehn, 1985, Esty, 1998). But Barry et al. (2011) show that unlike individuals or families, a higher equity stake of institutional investors or non-financial companies is associated with an increase in risks. In addition, regulations also influence the risk-taking incentives of owners that are different from the ones of managers. The large shareholders usually have weak influence on asking the bank managers to bear excess risks in a country with stronger supervisory power.

Recently, Bertrand and Schoar (2003), Bamber et al. (2010) and Ge et al. (2011) show that the characteristics of CEOs and CFOs have powerful influences on the companies' decisions. Some corporate finance studies find that overconfidence is positively associated with innovation (Hirshleifer et al., 2012) and overconfident CEOs are more likely to issue more optimistic earnings forecasts (Hribar and Yang, 2011). However, overconfidence may result in inefficient investment (Malmendier and Tate, 2005a; 2005b; 2008) and misstated financial statements (Schrand and Zechman, 2012).

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[1] The title is "*Corporate Governance and the Financial Crisis*".

Doukas and Petmezas (2007) argue that managerial overconfidence results from a self-attribution bias. Therefore, better self-abilities cause good results but bad outcomes come from misfortune in overconfident CEOs' views. In other words, overconfident CEOs feel that they have superior decision-making abilities and are more capable than their peers. The presence of these cognitive biases encourages CEOs to emphasize their own judgment in decision-making and engage in highly complex transactions. Because of their overconfidence, these CEOs tend to underestimate the risks or overestimate the precision of exogenous noisy signals and their problem-solving capabilities. This overconfidence may explain why executives are willing to suffer large wealth losses and continue to hold options and shares of their own firms (Fahlenbrach and Stulz, 2011).

For banks, the primary investment project is lending money to consumers. Bank executives examine past events and then estimate the loan loss provision based on current and expected future changes in non-performing loans (Beatty and Liao, 2011). Overconfident bank executives believe that future prospects for loan recovery and profitability are better than non-overconfident executives believe them to be. Hence, they will overestimate their loan performance and underestimate the loan losses, and then recognize lower loan loss provisions compared to other executives. These behaviors would lead to future expected deterioration in loan portfolio quality differently than other bank executives behave. Consequently, the tendencies toward overconfident of bank executives not only affect their decision effects but also influence their levels of risk-taking. However, there are few studies in this issue.

Graham et al. (2009) find that important behavioral characteristics such as optimism and patience differ significantly between U.S. and non-U.S. executives. This implies that overconfidence is likely to vary globally and causes bank risk taking behavior different between U.S and other countries. Most studies use the propensity of managers to hold in-the-money equity options as their measure of managerial overconfidence and their sample is mostly based on U.S companies or financial institutions. Unfortunately, such option holding data is not available for international executives. Furthermore, whether a bank risk taking behavior controlled by managers or by shareholders is conditional on its corporate governance that is influenced by national primary religion, legal regime or regulation. However, prior research has controlled either corporate governance factor or the country-specific factor. Although few of studies incorporate with both factors, none of literatures consider combining managerial overconfidence, corporate governance and the country-specific factors.

So far, most of the studies about bank risk taking behavior ignore that macroeconomics, managerial characteristics, corporate governance and the country-specific factors would affect the bank decisions simultaneously. Therefore, to

fill this gap in the literature, this paper tries to combine the interaction of business cycle and bank earnings with controlling the impacts of corporate governance, bank characteristics and country characteristics to examine the effects of managerial overconfidence on bank risk taking and investigates whether improvements in governance can help to mitigate the adverse effects of managerial overconfidence on bank risk taking by using ordinary least squares method. The sample consists of the financial institutions in G20 and Taiwan over the period of 2005-2012.

The empirical results show that overconfident CEOs or CFOs tend to take more credit risk and insolvency risk, especially in the recession periods, but they would lower their risk exposure in the boom and profit periods. Banks can mitigate the negative impacts of managerial overconfidence by expanding the size of the board and preventing a manager from being also a board chairman. Supervisory authorities can reduce bank risks by strengthening official supervisory power.

The remainder of this study is organized as follows. Section 2 reviews the existing literature. Section 3 describes the sample, variables, and regression framework. Section 4 explores and analyzes the empirical results. Section 5 concludes the study.

2. Literature review

Prior research has identified several determinants of bank risk taking. Demsetz and Strahan (1997) show that bank size would affect a bank's risk-taking behavior. They find that large banks are better diversified than small banks though they have used their diversification advantage to pursue riskier lending and operate with greater leverage.

A large body of literature finds that ownership structure affects bank risk taking. For example, Saunders et al. (1990) find a positive relation between insider ownership and bank risk taking, but Chen et al. (1998) find an opposite result. Anderson and Fraser (2000) show that the relationship between insider ownership and bank risk taking depends on bank regulation. During periods of relative deregulation, the relationship is positive as documented in Saunders et al. (1990). During periods of re-regulation, the relationship will become negative as documented in Chen et al. (1998).

The agency problems between shareholders and managers also influence bank risk-taking policy. Laeven and Levine (2009) find that bank risk-taking varies positively with the comparative power of shareholders. They also find that the effectiveness of certain bank regulations depends on bank ownership structure. Pathan (2009) shows that strong boards positively affect bank risk taking, while CEO power negatively affects bank risk taking due to career protection (Amihud and Lev, 1981,

Hirshleifer and Thakor, 1992).

However, Gorton and Rosen (1995) propose a model of corporate control and find that ownership structure could be explained the bank failures in the 1980s. Their evidence and Knopf and Teall (1996) show that management-controlled banks would take more risky and the least profit-making investments, and dispersed shareholders also tend to increase risk compared to large blockholders because they are more diversified (Demsetz and Lehn, 1985, Esty, 1998). The OECD report in 2009 also reveals that managers in the banks with weak corporate control would be rewarded for short term risk taking. Keeley (1990) documents that increased competition reduced bank franchise value in the 1960s and 1970s, which then led to increased risk taking. Demsetz et al. (1997) further study the interactions between ownership structure and franchise value. They find a positive relation between insider ownership and bank risk taking, but only at low franchise value banks. At high franchise value banks, there is no such relation.

Therefore, bank risk taking decisions are dependent on the incentives and risk preferences of bank stakeholders. Recently, some studies also find that the characteristics of CEOs and CFOs have important influences on the companies' decisions (i.e. Bertrand and Schoar, 2003, Bamber et al., 2010 and Ge et al., 2011). Some corporate finance studies even focus on the issue of executive overconfidence. Gervais et al. (2002) define overconfidence as individuals believe their knowledge to be more precise than it actually is. Doukas and Petmezas (2007) argue that managerial overconfidence results from a self-attribution bias. Therefore, better self-abilities cause good results but bad outcomes come from misfortune in overconfident CEOs' views. In other words, overconfident CEOs tend to underestimate the risks or overestimate the precision of exogenous noisy signals and their problem-solving capabilities under over-optimism.

Li and Tang (2010) use the sample of manufacturing firms in China to find that overconfident CEOs would take more risk when CEO managerial discretion was stronger and when a firm had a CEO who also chaired its board. Niu (2010) measures CEO overconfidence using press data, and bank risk-taking using the standard deviation of stock returns. The results show that banks managed by overconfident CEOs take more risk and bank regulators could rely on capital requirements to constrain banks from taking excessive risk. Black and Gallemore (2012) find that overconfident bank CEOs and CFOs recognize lower loan loss provisions and incorporate current and future deterioration in nonperforming loans in their loan loss provisions less than other bank CEOs and CFOs by using the sample of U.S financial firms. Graham et al. (2009) find that important behavioral characteristics such as optimism and patience

differ significantly between U.S. and non-U.S. executives. This implies that overconfidence is likely to vary globally and causes bank risk-taking behavior different between U.S and other countries.

Hence, it is worthy to investigate whether the U.S results regarding bank risk taking by overconfident managers hold internationally because none of cross-country studies discuss this issue that combines managerial overconfident, corporate governance and bank risk taking.

3. Data and empirical design

3.1 Sample and data source

The sample consists of annual financial statement data and corporate governance data on all banks[2] covered by *Bankscope* in the G20 and Taiwan from 2005 to 2012. Banks with no commercial real estate or outstanding commercial and industrial loans or has zero deposits are excluded from the sample. As a result, the sample contains 885 bank-year observations.

Most studies use the propensity of managers to hold in-the-money equity options as their primary measure of managerial overconfidence. This method also makes the sample is mostly based on U.S firms or banks due to the data source. However, such option holding data is not available for international executives. Thus, a comparable measure of overconfidence cannot be constructed for our sample. But Malmendier and Tate (2008) estimate an overconfidence measure based on press releases that we can calculate for our set of global banks. To construct this press based measure of overconfidence, we use global news sources contained in the Factiva database.

Some control variables related to country characteristics are obtained from La Porta et al. (1999), Kaufmann et al. (2009), Bank Regulation and Supervision Database provided by World Bank, and IFS database reported by the International Monetary Fund.

3.2 Independent variables

(1) Managerial overconfidence (*OC*)

We use global news sources contained in the Factiva database to eliminate any bias in the nature and extent of coverage which might occur with local media and to construct the press based measure of overconfidence. We limit our analysis to global wires (i.e., *Dow Jones* and *Reuters*) and global business publications (i.e.,

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[2] These banks include bank holding companies, commercial banks, medium- and long-term credit banks, and cooperative or savings banks.

Wall Street Journal (North American, European and Asian editions), *Financial Times,* and the *Economist*). We record the number of articles related to the bank in *Factiva* during 2005-2012 that refer to the CEO or CFO using the terms (a) "confident" or "confidence," (b) "optimistic" or "optimism," (c) "not confident," (d) "not optimistic," and (e) "reliable,""cautious," "conservative," "practical," "frugal," or "steady." *TOTAL* is the total number of articles that mentioned the name of the CEO or CFO. We then develop a continuous variable, *OC*, to capture the frequency with which a CEO or CFO is described as confident or optimistic relative to not confident, not optimistic, reliable, cautious, conservative, practical, frugal, or steady, and is computed as follows:

$$OC=[(a+b)-(c+d+e)] \, / \, TOTAL \qquad (1)$$

The measure ranges from -1 to 1. This proxy provides direct insight into the type of person classified as overconfident and its strength is its ability to measure executive beliefs as assessed by outsiders. That is, we classify a CEO or CFO as overconfident (non-overconfident) if the value is close to 1 (-1). Observations are assigned a value of 0 when a CEO or CFO is neutral. We do not classify a CEO or CFO with respect to overconfidence if we fail to find any articles that mentioned the executive. Niu (2010) find that banks managed by overconfident CEOs take more risk. Therefore, we expect that banks would take more risks if their managers are inclined to be overconfident.

(2) Total articles (*TOTAL*)

Following Hribar and Yang (2011), we employ the total number of articles that mentioned the name of the CEO or CFO in *Factiva* during 2005-2012 as a proxy for executive reputation (Francis et al., 2008). More total number of article mentions means that the executive of a bank is paid more attention.

(3) Earnings (*ER_G / ER_B*)

We measure bank earnings using adjusted return on equity (ROE) or adjusted return on assets (ROA)[3]. *ER_G* represents the extent of profit and *ER_B* means the extent of loss for a bank. Then, we use two interactions including *OC*ER_G* and *OC*ER_B* to investigate whether the relationship between managerial overconfidence and bank risk taking varies with earnings.

(4) Corporate governance mechanisms (*Governance*)

We use the interactions to investigate the impacts of bank corporate governance mechanisms on the relationship between managerial overconfidence and bank risk

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[3] We use the earnings before loan loss provision and tax to prevent banks from earning smoothing by using loan loss provision.

taking. Three corporate governance variables are listed as follows:

1. The degree of ownership concentration (*OWNER*): it defines as "the maximum of the direct or indirect shareholding for a shareholder". Shareholders typically have larger incentives to raise their risk taking than managers and debt holders. Moreover, majority shareholders are more likely to monitor and control managers than minority shareholders, and thereby induce them to increase risks (Shleifer and Vishny, 1986; Morck et al, 2005, Stulz, 2005). Therefore, we expect a positive relation between the degree of ownership concentration and bank risk taking for banks with executive overconfidence.

2. Board size (*BOARD*): it refers to the number of directors on the board. Lipton and Lorsch (1992) and Jensen (1993) suggests that a larger board is less efficient and slower in decision-making because arranging meetings and reaching a consensus would be more difficult for the board. They argue that with a larger board size, the CEO can more easily dominate the board, increasing his or her decision-making power (Jensen, 1993). This is consistent with the argument of Smith and Stulz (1985) that controlling board decisions by CEO power negatively affects bank risk taking due to risk aversion. Yermack (1996) and Hermalin and Weisbach (2003) also find that the negative relationship between board size and firm performance exists. However, Dalton et al. (1999) use meta-analysis to show that larger boards benefit firm performance by increasing the pool of expertise and resources available to the organization. Strong bank boards that reflecting most bank shareholders interest positively affect bank risk taking (e.g. Jensen and Meckling, 1976, Merton, 1977, Pathan, 2009). Although banks with overconfident executives tend to take more risk, the risk of banks with larger and weak boards is less than the one of banks with larger and strong boards.

3. Whether or not the executive is also the chairman of the board (*DUAL*): it is a dummy variable. If the CEO or CFO is also the chairman of the board, this variable equals one, and zero otherwise. Chairmen exert a tremendous amount of control over the operating business of a bank which is run by the officers. When the bank's executive is also its major supervisor, an important control tool for principal-agent-conflicts is lost and this bank would be regarded as the bank with a low degree of separation between ownership and control. Li and Tang (2010) find that overconfident CEOs would take more risk when a firm had a CEO who also chaired its board. Therefore, we expect that a bank with overconfident CEO or CFO who is also the chairman of the board would take more risk.

(5) Country-specific variables (*Country*)

Prowse (1997), Macey and O'Hara (2003) and Levine (2004) argue that due to the high level of regulation, principal-agent problems may be more severe in the banking sector than in other sectors. To investigate the relationship between bank risk taking and bank regulation, four country-specific variables are listed as follows:

1. Bank activity restrictions (*RESTRICT*): it is an index of regulatory restrictions on the activities of banks from Barth et al. (2006). This index measures regulatory impediments to banks engaging in (1) securities market activities, (2) insurance activities, (3) real estate activities, and (4) the ownership of nonfinancial firms. The index ranges from 4 to 12 with higher values indicating more restrictions. Agoraki et al. (2011) show that higher activity restrictions in combination with more market power reduce credit risk for the Central and Eastern European banking sectors. Hence, banks are expected to take less risk in a country with higher activity restrictions.

2. Official supervisory power (*OFFICIAL*): this index is from the investigation of World Bank. It includes capital requirements, supervision requirements and the power of intervening problem banks. The index ranges from 0 to 14[4] with higher values indicating greater power of the supervisory authority. Levine (2003) shows that powerful bank supervision could improve corporate governance and increase bank competition. Agoraki et al. (2011) also find that supervisory power is effective in reducing bank risk. Therefore, we expect that banks take less risk in a country with greater supervisory power.

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[4] This variable is determined by adding 1 if the answer is yes and 0 otherwise, for each one of the following fourteen questions: (1) Does the supervisory agency have the right to meet with external auditors to discuss their report without the approval of the bank? (2) Are auditors required by law to communicate directly to the supervisory agency any presumed involvement of bank directors or senior managers in illicit activities, fraud, or insider abuse? (3) Can supervisors take legal action against external auditors for negligence? (4) Can the supervisory authorities force a bank to change its internal organizational structure? (5) Are off-balance sheet items disclosed to supervisors? (6) Can the supervisory agency order the bank's directors or management to constitute provisions to cover actual or potential losses? (7) Can the supervisory agency suspend director's decision to distribute dividends? (8) Can the supervisory agency suspend director's decision to distribute bonuses? (9) Can the supervisory agency suspend director's decision to distribute management fees? (10) Can the supervisory agency supersede bank shareholder rights and declare bank insolvent? (11) Does banking law allow supervisory agency or any other government agency (other than court) to suspend some or all ownership rights of a problem bank? (12) Regarding bank restructuring and reorganization, can the supervisory agency or any other government agency (other than court) supersede shareholder rights? (13) Regarding bank restructuring & reorganization, can supervisory agency or any other government agency (other than court) remove and replace management? (14) Regarding bank restructuring & reorganization, can supervisory agency or any other government agency (other than court) remove and replace directors?

3. Control of corruption (CORRUPTION): it captures the perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as the control of state exercised by elites and private interests. This index is calculated by Kaufmann et al. (2009). Higher values correspond to the extent of corruption controlled more effectively. Jeon et al. (2014) find that more severe corruption increases the risk-taking of banks in emerging economies. We expect that banks take less risk in a country with higher degree of corruption control.

4. Shareholder rights (SR): this paper uses anti-director index that aggregates shareholder rights[5] to measure legal protections of investors (Caprio et al., 2007, Laeven and Levine, 2009). It is calculated by La Porta et al. (1999) and ranges from 0 to 6. Higher values represent stronger shareholder rights. John et al. (2008) show that better investor protection reduces these private benefits and may therefore induce insiders to choose riskier but value enhancing investment policy. A bank with strong shareholder rights is expected to take more risks.

(6) Bank-specific variables (*Bank*)

This paper uses the ratio of net loans to total assets (*NLTA*) and franchise value (*FRANCHISE*) to reflect the bank characteristics. Higher franchise value represents the bank has greater loss when it occur insolvency. We expect that the former has a positive impact on the bank risk taking but the latter has a negative impact.

3.3 Dependent variables

Two kinds of risks including credit risk and insolvency risk are employed to reflect the bank risk-taking.

(1) Credit risk: Cole and Gunther (1998), Logan (2001), and Bennett and Unal (2010) use the indicators on the bank balance sheet such as capitalization or non-performing loan (NPL) ratio to predict the probability of bankruptcy. Hence, credit risk is measured with NPL ratio. The larger this ratio, the riskier is the bank in terms of credit risk.

(2) Insolvency risk: this paper uses adjusted Z-score[6] to measure the bank's probability of insolvency. A higher Z-score indicates that the bank is more stable.

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[5] The index is formed by adding 1 when: (1) the country allows shareholders to mail their proxy vote to the firm; (2) shareholders are not required to deposit their shares prior to a General Shareholder's Meeting; (3) cumulative voting or proportional representation of minorities in the board of directors is allowed; (4) an oppressed minorities mechanism is in place; (5) the minimum percentage of share capital that entitles a shareholder to call an Extraordinary Shareholders Meeting is less than or equal to 10%; or (6) shareholders have preemptive rights that can only be waived by a shareholders' vote.
[6] It equals the adjusted return on assets plus the capital-asset ratio divided by the standard deviation of

Since the Z-score is highly skewed, we use the natural logarithm of the Z-score, which is normally distributed.

In order to understand whether business cycle will also affect bank risk-taking decisions, this paper uses real gross domestic product (GDP) growth rate to reflect the level of economic development of a country. We compare the country's real GDP growth rate of this year with its average real GDP growth rate of the previous three years. If the former is higher than the latter, we regard the economy as boom (GDP_G), otherwise regarded as recession (GDP_B). Then, the whole sample is divided into two categories according to economics.

3.4 Empirical model

This study uses ordinary least square model to investigate the relation between managerial overconfident and bank risk taking under different economics and corrects for heteroskedasticity and autocorrelation. The empirical model is formulated as follows:

$$Risk_{ijt} = \beta_0 + \beta_1 OC_{ijt-1} + \beta_2 Total\_OC_{ijt-1} + \beta_3 OC_{ijt-1} \times ER\_G_{ijt} + \beta_4 OC_{ijt-1} \times ER\_B_{ijt} + \beta_5 OC_{ijt-1} \times Governance_{ijt-1} + \beta_6 Country_{ijt-1} + \beta_7 Bank_{ijt-1} + \delta_{ijt} \ (2)$$

where $Governance_{i,j,t-1}$, $Country_{i,j,t-1}$, $Bank_{i,j,t-1}$ are matrix for bank i in country j at time t-1, i=1,2,…,n, j=1,2,…,k, t=1,2,…,T, and δ_{ijt} is an error term in Eq. (2). All independent variables except ER_G and ER_B are lagged variables that are measured in the previous period to minimize any unintentional feedback from the endogenous variables.

By observing Eq. (2) where the coefficient of β_1, we can find the impact of managerial overconfidence on the bank risk taking after controlling the corporate governance, country- and bank-specific factors. If the coefficient is significantly greater (less) than zero, indicating that managers tend to overconfidence will make bank bear more (less) risk. But if the coefficient is not statistically significant, indicating that there is no any impact of managerial overconfidence on bank risk taking. In addition, we can compare the coefficient of β_3 with the coefficient of β_4 to show whether risk taking behavior of overconfident managers would change under different earnings.

Based on prospect theory that proposed by Tversky and Kahneman (1992), people make decisions based on the potential value of losses and gains rather than the final outcome, and that people evaluate these losses and gains using a reference point. They

asset returns.

use the experimental evidence to confirm a distinctive fourfold pattern of risk attitudes: risk aversion for gains and risk seeking for losses of high probability; risk seeking for gains and risk aversion for losses of low probability.

Because overconfident managers would owe better performance of bank to their superior decision-making abilities but they blame bad luck for poor earnings of bank, we combine the findings of Tversky and Kahneman (1992) with the characteristics of managerial overconfidence to expect:

(1) Overconfident managers tend to be risk aversion due to high probability of gain during the periods of boom and profit.

(2) Overconfident managers tend to blame bad luck and take more risk during the periods of boom and loss.

(3) Overconfident managers tend to be risk loving because they feel that they have superior self-abilities during the periods of recession and profit.

(4) Overconfident managers tend to be risk seeking due to higher probability of loss during the periods of recession and loss.

4. Empirical model

4.1 Sample description

According to the behavioral characteristics of CEO or CFO, the sample banks with managerial overconfidence, neutral and non overconfidence are 64, 2 and 70 banks, respectively. We observe that 85.3% of them are taken between 2009 and 2011. About 41% of our sample banks are from U.S., followed in frequency by Canada (9.6%), U.K. (6.6%), and Denmark (5.1%).

Table 1 presents the descriptive statistics on the empirical variables, which are divided into the full sample, the economic boom periods and the economic recession periods. Panel A is the results of the full sample, which show that the mean of managerial overconfidence (*OC*), total articles (*TOTAL*), *ROE* and *ROA* are -0.118, 40.1765, 0.0892, and 0.0139 respectively. All of them have a larger value in the economic boom periods, but the median and the standard deviation of managerial overconfidence are smaller than the ones in the economic recession periods. The degree of ownership concentration (*OWNER*) and board size (*BOARD*) have a relatively large value for both mean in the economic boom periods. In terms of country-specific variables, the mean of bank activity restrictions (*RESTRICT*), official

supervisory power (*OFFICIAL*), control of corruption (CORRUPTION), and shareholder rights (SR) are approximately 10.5073, 10.9485, 1.2277 and 3.92 respectively and all of them have smaller values during the economic recession periods. With regard to bank-specific variables, the median of the ratio of net loans to total assets (NLTA) and franchise value (FRANCHISE) are 0.5964 and 0.9817 respectively during the economic boom periods. Both of them have a smaller value comparing with the ones in the economic recession periods. However, the non-performing loan ratio *(NPL)* and the adjusted Z-score (Z-score) has smaller value during the economic recession periods and their mean are about 4.0148% and 34.8218 respectively, indicating that sample banks take less credit risk but bear more insolvency risk.

4.2 The impacts of managerial overconfidence on bank risk taking

4.2.1 Credit Risk

We use NPL ratio to measure credit risk of banks. The results are listed in Table 2. For the full sample, Panel A shows that overconfident CEOs or CFOs does not significantly affect banks' credit risk taking without controlling the corporate governance, country- and bank-specific factors. But banks will increase their NPL ratio in the loss situation. During the boom periods, a bank with overconfident managers will reduce its NPL ratio when it has profit. However, during economic recession periods, overconfident CEOs or CFOs will reduce their banks' NPL ratios but they will increase NPL ratios regardless of bank earnings.

Panel B in Table 2 reveals the impacts of CEOs or CFOs overconfidence on bank credit risk taking after controlling corporate governance, country- and bank-specific actors. The results show that managerial overconfidence indeed positively affects bank risk taking during the boom periods. However, the relation between CEOs or CFOs overconfidence and bank credit risk taking is not statistically significant regardless of earnings. Moreover, during the recession periods, a bank with overconfident CEO or CFO will have higher NPL ratio only using ROA as the proxy of bank earnings.

Board size will reduce NPL ratio for banks with executive overconfidence in the full sample and during the boom periods. These results also imply that the boards of

the sample banks tend to be weak. Banks will have lower NPL ratio in a country with stronger official supervisory power for the full sample (ROE) and during the recession periods (ROA). A bank with higher net loans to total assets ratio will have significantly higher NPL ratio during the recession periods, but higher franchise value will significantly decrease NPL ratio for the full sample and during the boom periods.

Therefore, managerial overconfidence indeed raises bank credit risk taking. Banks with managerial overconfidence would take less credit risk during the boom and profit periods but these banks would have more risk-taking during the recession periods, which is consistent with our expectation. Supervisory authorities can reduce bank credit risk by strengthening official supervisory power, asking banks to increase their franchise values or expanding board size for banks with managerial overconfidence.

4.2.2 Insolvency Risk

We use adjusted Z-scores as the proxy of insolvency risk and the results are shown in Table 3. Table 3 presents that after controlling corporate governance, country- and bank-specific factors, a significantly negative relation between managerial overconfidence and insolvency risk exists for the full sample. However, higher ROE will increase adjusted Z-score and make the bank more stable. Greater (poorer) ROA will decrease (increase) bank insolvency risk during the economic recession periods.

Increasing the degree of ownership concentration will reduce adjusted Z-score for the banks managed by overconfident CEOs or CFOs in the full sample. In addition, to expend board size or to allow managers is also the chairman of the board will raise the adjusted Z-score during the economic recession periods. Fewer restrictions of bank activity, greater supervisory power or stronger shareholder rights will decrease bank insolvency risk for the full sample and during the recession periods, while higher control of corruption will increase the probability of insolvency.

In summary, managerial overconfidence will raise bank insolvency risk, especially in the recession and loss times. This result is consistent with our expectation. We suggest that the authority could increase the board size or strengthen supervisory power to make banks operate more stable.

5. Conclusion

This paper is to investigate the relationship between managerial overconfidence and bank risk taking and to find the effective methods that could mitigate the adverse effects of managerial overconfidence under combining the interaction of business cycle and bank earnings with controlling the impacts of corporate governance, bank characteristics and country characteristics. The sample consists of the financial institutions in G20 and Taiwan over the period of 2005-2012.

The empirical results show that overconfident CEOs or CFOs tend to take more credit risk and insolvency risk, especially in the recession periods. However, they would lower their credit risk exposure in the boom and profit periods. Banks can mitigate the negative impacts of managerial overconfidence by expanding the size of the board and preventing a manager from being also a board chairman during the recession periods. Supervisory authorities can reduce bank risks by strengthening official supervisory power.

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Table 1 Descriptive Statistics

Panel A： Full Sample

	Managerial Overconfidence	Total Articles	ROE	ROA	Ownership Concentration (%)	Board Size	Activity Restrictions	Official Supervisory Power	Control of Corruption	Shareholder Rights	Net Loans / Total Assets	Franchise Value	NPL Ratio (%)	Adjusted Z-score
Mean	-0.1180	40.1765	0.0892	0.0139	28.7955	12.37	10.5073	10.9485	1.2277	3.92	0.559	1.0118	4.0991	49.8049
Std. Dev	0.7914	65.7465	0.6415	0.0259	30.5025	4.1686	2.6387	2.6452	0.7838	1.2546	0.1726	0.2324	5.665	90.6953
Median	-0.0463	18.5000	0.1482	0.0143	15.88	13	11	12	1.265	4	0.5964	0.9866	2.22	29.1596
Max.	1	580	1.8547	0.1181	100	20	14	13	2.5193	5	0.9075	2.6905	34.1	820.3455
Min.	-1	1	-6.0385	-0.0942	0.03	2	5	5	-1.3667	0	0.0841	0.6031	0.03	-2.8131

Panel B： Economic Boom Periods

	Managerial Overconfidence	Total Articles	ROE	ROA	Ownership Concentration (%)	Board Size	Activity Restrictions	Official Supervisory Power	Control of Corruption	Shareholder Rights	Net Loans / Total Assets	Franchise Value	NPL Ratio (%)	Adjusted Z-score
Mean	-0.1053	46.6275	0.1269	0.0176	31.047	12.5263	10.5686	10.9901	1.3144	4.1578	0.5571	1.0156	4.1276	54.4966
Std. Dev	0.7884	72.7586	0.3136	0.0208	33.0715	3.9189	2.8337	2.7159	0.7451	1.0033	0.1736	0.2602	5.1178	101.7054
Median	-0.0886	25.5000	0.1415	0.0147	18.25	13	12	13	1.265	4	0.5964	0.9817	2.535	29.6466
Max.	1	580	0.5851	0.1181	100	20	14	13	2.5193	5	0.9075	2.6905	28.98	820.3455
Min.	-1	1	-2.7407	-0.0538	0.05	2	5	5	-1.3667	1	0.0841	0.6031	0.03	-1.2073

Panel C： Economic Recession Periods

	Managerial Overconfidence	Total Articles	ROE	ROA	Ownership Concentration (%)	Board Size	Activity Restrictions	Official Supervisory Power	Control of Corruption	Shareholder Rights	Net Loans / Total Assets	Franchise Value	NPL Ratio (%)	Adjusted Z-score
Mean	-0.1563	20.8235	-0.0236	0.0026	23.7489	11.9062	10.3235	10.8235	0.9674	3.1666	0.5648	0.9999	4.0148	34.8218
Std. Dev	0.8112	31.0898	1.1683	0.0352	23.4987	4.8749	1.9651	2.4553	0.8491	1.6417	0.1726	0.1069	7.1585	35.7117
Median	0.0336	5.5000	0.162	0.0139	11.98	12.5	10.5	11.5	1.3589	3.5	0.599	1.0016	1.54	26.5704
Max.	1	136	1.8547	0.0334	99.99	20	13	13	2.0717	5	0.8208	1.1634	34.1	123.7443
Min.	-1	1	-6.0385	-0.0942	0.03	3	7	6	-0.5723	0	0.178	0.6899	0.18	-2.8131

Table 2 Credit risk taking-NPL ratio

	Panel A						Panel B					
	ROE			ROA			ROE			ROA		
	Full Sample	Boom	Recession	Full Sample	Boom	Recession	Full Sample	Boom	Recession	Full Sample	Boom	Recession
Constant	3.8791 (5.4604)***	4.5214 (6.1441)***	2.3355 (1.7316)*	3.8564 (5.6167)***	4.3732 (5.8603)***	2.2331 (1.5961)	35.7941 (2.0751)**	71.8072 (3.0669)***	6.6678 (0.1294)	50.7732 (2.6488)**	90.188 (4.1353)***	13.4368 (0.3337)
OC	-0.6734 (-0.5899)	3.1153 (2.539)**	-9.3148 (-3.8737)***	-0.2984 (-0.3209)	1.3882 (1.4501)	-8.0977 (-3.0407)***	10.5088 (1.9713)*	14.7173 (2.9171)***	28.0066 (1.2066)	8.4115 (1.6144)	13.3163 (2.7832)**	45.3879 (1.9566)*
TOTAL	0.0013 (0.109)	-0.0064 (-0.5543)	0.0149 (0.361)	-0.0006 (-0.057)	-0.0055 (-0.4663)	0.0182 (0.4242)	0.0003 (0.0159)	-0.000003 (-0.0001)	-0.0858 (-1.1991)	0.0061 (0.283)	0.0087 (0.436)	-0.1402 (-1.918)
OC×ER_G	0.7352 (0.1419)	-16.0753 (-2.714)***	29.2529 (3.1797)***	-20.9308 (-0.6207)	-53.1361 (-1.6686)*	288.6264 (2.0589)*	3.0165 (0.3922)	5.0231 (0.4162)	-13.1719 (-0.5742)	92.0536 (1.6625)	99.3209 (1.9086)	-700.5589 (-1.6857)
OC×ER_B	-9.132 (-1.8142)*	-7.0073 (-1.6078)	-112.1625 (-1.8004)*	-424.9668 (-2.8705)***	-402.7594 (-1.9009)*	-583.0488 (-2.5799)**	-4.0561 (-0.7021)	-1.8375 (-0.3802)	-69.8463 (-0.5376)	-150.9405 (-0.8272)	-167.1361 (-0.7648)	488.7432 (1.3599)
OC×OWNER	-	-	-	-	-	-	0.023 (0.5418)	0.0578 (1.4223)	-0.0624 (-0.4858)	0.0119 (0.2806)	0.0492 (1.2722)	-0.2449 (-1.3394)
OC×BOARD	-	-	-	-	-	-	-0.8862 (-2.3059)**	-1.1225 (-2.8525)***	-2.016 (-1.5212)	-0.7741 (-2.0209)**	-1.0531 (-2.9185)***	-2.2976 (-2.1105)*
OC×DUAL	-	-	-	-	-	-	1.5059 (0.6836)	2.9039 (1.1062)	1.9741 (0.3282)	1.4547 (0.6959)	2.8224 (1.1586)	4.7567 (1.107)
RESTRICT	-	-	-	-	-	-	1.2271 (1.0643)	0.3628 (0.2295)	1.7934 (0.6072)	0.5712 (0.4923)	-0.3321 (-0.2188)	1.0268 (0.4229)
OFFICIAL	-	-	-	-	-	-	-2.0089 (-1.8425)*	-1.0128 (-0.7113)	-5.2461 (-1.9103)	-1.5793 (-1.4879)	-0.51 (-0.3784)	-4.9737 (-2.2032)*
CORRUPTION	-	-	-	-	-	-	4.056 (1.5148)	3.0451 (0.9685)	6.0163 (0.7311)	2.4123 (0.8752)	1.2643 (0.413)	5.6695 (0.8602)
SR	-	-	-	-	-	-	-1.5805 (-1.5856)	-1.0925 (-0.9347)	-1.3636 (-0.4235)	-1.111 (-1.1054)	-0.9282 (-0.8509)	-2.4943 (-1.0303)
NLTA	-	-	-	-	-	-	10.192 (1.6252)	1.7948 (0.2823)	35.0761 (1.9594)*	8.5213 (1.3925)	2.0953 (0.3546)	47.3388 (2.6341)**
FRANCHISE	-	-	-	-	-	-	-27.1689 (-1.7741)*	-59.9742 (-2.8528)***	14.1761 (0.3637)	-38.7485 (-2.3628)**	-75.2448 (-3.9822)***	11.8385 (0.3745)
Adjusted R-squared	-0.003	0.09	0.31	0.04	0.04	0.27	0.19	0.36	0.46	0.24	0.45	0.59
F-statistic	0.91	2.98**	4.01**	2.38*	1.93	3.52**	2.04**	2.8**	2.29	2.36**	3.29***	3.16*

Note: The values in parentheses are t-statistic. ***, **, and * denote significant levels at the 1, 5, and 10% levels respectively.

Table 3   Insolvency risk taking-Adjusted Z-Score

	Panel A						Panel B					
	ROE			ROA			ROE			ROA		
	Full Sample	Boom	Recession	Full Sample	Boom	Recession	Full Sample	Boom	Recession	Full Sample	Boom	Recession
Constant	1.4707 (32.2325)***	1.4931 (28.7639)***	1.4587 (13.5845)***	1.4663 (32.2335)***	1.4942 (28.6349)***	1.5184 (15.035)***	1.4293 (2.035)**	1.8929 (2.0965)**	1.7758 (0.767)	1.4858 (1.8744)*	2.4136 (2.3652)**	3.021 (2.393)*
OC	-0.0421 (-0.4794)	-0.037 (-0.3908)	-0.071 (-0.2862)	-0.0314 (-0.4496)	-0.0722 (-0.9477)	0.2579 (1.2166)	-0.5925 (-2.1478)**	-0.4707 (-1.285)	-1.6685 (-1.9127)	-0.502 (-1.768)*	-0.4138 (-1.1138)	-2.6288 (-3.329)**
TOTAL	-0.00002 (-0.0526)	-0.00001 (-0.0233)	-0.0035 (-1.1463)	0.0001 (0.1759)	-0.0001 (-0.1688)	-0.0025 (-0.9003)	0.0027 (2.2172)**	0.0034 (2.2641)**	0.0015 (0.6134)	0.0028 (2.2741)**	0.0038 (2.4704)**	0.0041 (1.8765)
OC× ER_G	0.1516 (0.3554)	0.1112 (0.2374)	0.3325 (0.2949)	1.5375 (0.6088)	2.6306 (1.0274)	-12.019 (-1.1095)	1.1189 (2.1314)**	0.9197 (1.1873)	1.8838 (0.9031)	3.5685 (1.1435)	4.5149 (1.1106)	29.788 (2.405)*
OC× ER_B	-1.9448 (-0.854)	-2.8446 (-1.0864)	-0.7029 (-0.1304)	18.7529 (0.5683)	-31.8327 (-0.8183)	155.2087 (2.2664)**	-3.631 (-1.5006)	-4.3397 (-1.3034)	5.6518 (0.92)	-4.0753 (-0.0993)	-30.6723 (-0.5176)	109.442 (2.4652)*
OC× OWNER	-	-	-	-	-	-	-0.0039 (-1.687)*	-0.003 (-0.9319)	0.0013 (0.2258)	-0.0024 (-1.0099)	-0.0015 (-0.5273)	0.0087 (1.5503)
OC× BOARD	-	-	-	-	-	-	0.0393 (1.9419)*	0.0363 (1.3582)	0.0859 (1.7918)	0.0385 (1.8213)*	0.0355 (1.2865)	0.1292 (3.2944)**
OC× DUAL	-	-	-	-	-	-	-0.0401 (-0.3362)	-0.1985 (-1.0654)	0.2945 (0.9699)	0.0067 (0.0559)	-0.2216 (-1.1736)	0.4483 (2.7535)**
RESTRICT	-	-	-	-	-	-	-0.167 (-2.824)***	-0.18 (-1.6564)	-0.2409 (-1.5766)	-0.1581 (-2.5268)**	-0.1885 (-1.6761)	-0.3058 (-4.123)***
OFFICIAL	-	-	-	-	-	-	0.1552 (2.7095)***	0.1591 (1.6057)	0.2456 (2.4611)*	0.1484 (2.5018)**	0.169 (1.6731)	0.2798 (3.7621)**
CORRUPTION	-	-	-	-	-	-	-0.4154 (-2.9538)***	-0.3697 (-1.6014)	-0.6794 (-1.6483)	-0.4313 (-2.8693)***	-0.4225 (-1.7663)*	-0.9058 (-4.5583)***
SR	-	-	-	-	-	-	0.0963 (1.9132)*	0.0673 (0.865)	0.1723 (1.2344)	0.0943 (1.7742)*	0.0607 (0.7579)	0.2715 (3.7395)**
NLTA	-	-	-	-	-	-	-0.1388 (-0.4391)	0.2138 (0.5055)	-0.8943 (-1.3959)	-0.1519 (-0.4635)	0.2011 (0.4688)	-1.5744 (-2.8684)**
FRANCHISE	-	-	-	-	-	-	0.2231 (0.3423)	-0.2832 (-0.3293)	0.0926 (0.0646)	0.1805 (0.255)	-0.7288 (-0.7925)	-0.6216 (-0.5996)
Adjusted R-squared	-0.02	-0.02	-0.1	-0.02	-0.02	0.09	0.11	-0.04	0.67	0.05	-0.07	0.82
F-statistic	0.19	0.3	0.33	0.22	0.37	1.67	1.58	0.86	3.86*	1.24	0.78	7.49**

Note: The values in parentheses are t-statistic. ***, **, and * denote significant levels at the 1, 5, and 10% levels respectively.