Can Board of Commissioners Minimize the Investment-Cash Flow Sensitivity of Overconfident CEO?

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Abstract

This study investigated the effects of managerial overconfidence on corporate investment decisions in Indonesia for the listed firms in Indonesian Stock Exchange during the period of 1999-2013. This study proposes several hypotheses about the effects of overconfidence on investment and on the investment-cash flow sensitivity. In behavioral finance perspective, it argues that overconfidence bias can cause distortions in corporate investment decisions. Overconfident managers often overestimate the returns on their investment projects and overestimate their ability to handle the projects. Therefore, they tend to make investment more than the investment made by non-overconfident managers. Overconfident CEOs tend to view external financing as unduly costly. They tend to over-invest when the internal fund is available, but hold the investment when the investment projects need external funding. Therefore, the investments made by the overconfident CEOs are more sensitive to cash flow than those made by non-overconfident CEOs. This study also wants to test whether the size of board commissioners and the number of independent commissioners could limit the effect of overconfidence bias. This study used the index of OC_FIRM4 and OC_FIRM5 as the measurement of overconfidence. Using panel data regressions we found that (1) cash flows and overconfidence bias have positive influence on investment; (2) overconfidence strengthen the positive influence of cash flows on investment; (3) the effect of overconfidence on investment-cash flow sensitivity can be limited through corporate governance mechanisms by increasing the board of commissioners size (COM).

Keywords: Overconfidence Bias; Investment Decision; Board of Commissioners.

Introduction

The investment decision is the decision-making process undertaken by the management to utilize its' capital for a variety of long-term investments in order to generate value for the company. Management performs a process of capital budgeting, which involve creating investment proposals, assessing, analyzing, and selecting the best investment proposals; and then implementing and

conducting follow-up on selected investment proposals with the ultimate goal of maximizing the value of the firm (Megginson, 1997). There are various basic motives in capital budgeting, such as to develop, to replace, or to renew various fixed assets or to gain more intangible benefit over a long-term period; to launch new products; to build new factories; to establish a new subsidiary; to open new branches; to acquire other companies; to make strategic alliances etc (Megginson, 1997).

Cash flows often become one of major considerations in investment. The more cash flows available, the more investment opportunities can be funded. In other words, the investment became dependent on how much cash available to be invested (Agca & Mozumdar, 2008; Ağca & Mozumdar, 2017; Alti, 2003; Fazzari & Athey, 1987; Fazzari, Hubbard, & Petersen, 1988, 2000; Hubbard, 1998; Kadapakkam, Kumar, & Riddick, 1998). There are two main theories that try to explain this investment - cash flows sensitivity. Agency theory and the pecking order theory has long been used as the mainstream explanations of the phenomenon of underinvestment, overinvestment, and sensitivity of investment to cash flows. It is mentioned in the arguments of agency theory that because there maybe some unaligned interest between agents (managers) and the principal (shareholders), then the agent becomes more likely to make investment decisions for their self-interest purposes, for example, to build a business empire or to enlarge the company's growth. The high cost of external fund tends to limit the level of investment taken by the manager while the presence of free cash flow allows them to invest more (over-invest) or less (under-invest) (Jensen, 1986). Meanwhile, in the pecking order theory argument mentioned that on behalf of shareholders interests, managers limit the use of external funds in order to avoid dilution of the value of existing shares (Myers and Majluf, 1984). In a state of asymmetric information, the existence of free cash flow may increase the rate of investment and decrease the likelihood of distortion of investment decisions. Both the agency theory and the pecking order theory has the same assumption that the manager and the investors are rational decision-makers who are trying to maximize their utility functions.

However, decisions in the business world, in fact, are very often far from the rational economic framework. Behavioral bias led the decision to be not optimal. One of the very common biases is overconfidence. Several studies in the field of psychology found that individuals tend to believe that his ability is higher than average (Fischhoff et al., 1977; Weinstein, 1980). Furthermore, the prevalence of overconfidence among top managers is very high. Manager overconfidence also affects the behavior of investment companies (Malmendier and Tate, 2005a, b; 2008). Several empirical studies revealed that overconfidence bias is found among managers (Ben-David et al., 2007; 2010; Ishikawa and Takahashi, 2010; Landier and Thesmar, 2009; Lin et al., 2005; Malmendier and Tate, 2005a, 2005b; 2008; Malmendier et al., 2011). Researchers have included the literature of psychology of cognition into the literature of behavioral corporate finance and found that managers, as the particular, are more likely to show excessive optimism compared to the common people for example for the profit, investment, customer satisfaction and organizational growth (Cooper et al., 1988; Heaton, 2002; Landier and Thesmar, 2009; Aldaihani & Ali, 2018). Overconfident managers can not make judgments or decisions as rationally as assumed. Therefore, it is interesting to examine how overconfidence affects corporate investment decisions made by managers. This study examined the impact of CEO overconfidence on corporate investment decisions.

Basically, the company's decision of investing in a new investment project should be based on the principle of whether the project creates shareholder wealth or not. Indeed, some of the objective criteria are used in the assessment of investment projects, such as Net Present Value (NPV), Internal Rate of Return (IRR), or Payback Period (PP). However, those criteria still involve a subjective process, for example, in determining the projected expected future cash flows and in determining how an appropriate discount rate should be. Because the determination of expected future cash flows and an appropriate discount rate still include a subjective process, then we could expect that the behavioral traits of CEOs who make the investment decisions would affect this process.

CEOs play an important role in determining the various corporate policies and it is reasonable to say that they represent the company in front of investors. Shareholders appoint a board of commissioners in an effort to protect the value of their investment within the company and to monitor

top executives of the company. CEOs are expected to create policies that increase the value of the company. However, the existence of the manager's behavioral bias can distort the company's decisions. This research more specifically discusses overconfidence bias among top managers and examines its impact on corporate investment decisions and the role of the board of commissioners in moderating the effect of overconfidence bias on corporate investment. Previous studies investigated several corporate mechanisms that can be used to limit the effect of overconfidence bias, such as single family governance structure, co-governance mechanism, and expert management governance structure (Hsu & Chen, 2017), but the role of board of commissioners mechanism in limiting the effect of overconfidence bias has not been studied yet. Indonesia follows a dual board or two-tier system that consists of two separate boards (namely Board of Directors and Board of Commissioners). This study contributed in giving evidence on the role of board of commissioner to limit the effect of overconfidence bias.

Previous studies show that overconfidence bias is common among managers (Ben-David, Graham, & Harvey, 2010; Landier & Thesmar, 2009; Lin, Hu, & Chen, 2005; Malmendier & Tate, 2005a, b, 2008; Malmendier, Tate, & Yan, 2011). Researchers have incorporated the cognitive psychology literature into the corporate finance literature and found that managers, as a special group, were more likely to show over-optimism and overconfidence than the average people (Cooper, Woo, & Dunkelberg, 1988; Heaton, 2002; Landier & Thesmar, 2009). Overconfident CEOs can not make rational judgments or decisions as assumed. Therefore, it is interesting to examine how CEO overconfidence affects the corporate investment decision.

Previous studies have conducted to explain the investment-cash flow sensitivity puzzle by adding managerial overconfidence bias as one of the explanatory variables. It has been found that managerial overconfidence bias can lead to distortions of corporate investment decisions in the US (Malmendier & Tate, 2005a, b), in Taiwan (Lin et al., 2005), and in Australia (Brown & Sarma, 2007). This study is directed to test the effect of overconfidence on investment decision and to test if the corporate governance mechanism (namely the board of commissioners size (COM) and the number of independent commissioners (COMIND) can reduce the effect CEO overconfidence bias on the corporate investment and on the investment-cash flow sensitivity. This study found that; (1) Cash flow (C) has positive effect on investment (I); (2) Overconfidence (O) has positive effect on investment (I), in other words, overconfident CEO make more investment than non-overconfident CEO; (3) Investment decisions of overconfident CEO are more sensitive to cash flow than those of non-overconfident CEO or overconfidence strengthens the sensitivity of investment to cash flow; (4) Board of commissioner size (COM) can reduce the overconfidence effect on investment-cash flow sensitivity.

Literature Review and Hypothesis Development

Overconfidence

In the economics literature, overconfidence can be defined in several ways. Some studies have interpreted overconfidence as "*above average*" perception (Malmendier & Tate, 2005a, b). Other studies have conceptualized overconfidence as calibration bias, which is having overly confidence in having the correct information (Ben-David, Graham, & Harvey, 2007; Ben-David et al., 2010; Daniel, Hitshleifer, & Subrahmanyan, 1998; Gervais, Heaton, & Odean, 2006, 2011; Lichtenstein & Fischhoff, 1980). Calibration bias is one of overconfidence bias aspects. Calibration bias occurs when people overestimate their approximate accuracy or underestimate the variance of risky processes, in other words, their subjective probability distribution is too narrow.

Moore and Healy (2008) reveal that overconfidence can be defined and measured in three different ways and failure to consider these differences can lead to consistency in the results of overconfidence effects research. They use three ways, namely overestimation, overprecision, and overplacement in describing the concept of overconfidence. In overestimation, people tend to overestimate their abilities, performance, level of control, and chances of success. Overprecision causes people to tend to demonstrate excessive certainty over the accuracy of their beliefs.

Overplacement shows that people tend to believe that they are better than others. This study uses overplacement in defining overconfidence.

In the financial literature, it appears that researchers often rely on different terms of overconfidence. For instance, Ben-David et al. (2007, 2010) define overconfidence as overprecision. Meanwhile, Malmendier and Tate (2005a, b) emphasize overplacement in describing the concept of overconfidence, and other research conducted by Malmendier and Tate (2008) emphasizes overestimation in defining the concept of overconfidence. The lack of clarity in referring to which definition of overconfidence is used will make it very difficult for us to compare between studies and to make sure that the results obtained are based on identical concepts.

The studies of overconfidence with more emphasis on overplacement are related to several branches of experimental literature and self-enhancement literature. Much experimental literature record the tendency of individuals to consider themselves as 'better than average' (BTA) in a variety of positive characteristics (Alicke, Klotz, Breitenbecher, Yurak, & Vredenburg, 1995). For example, when subjects of entrepreneurs are questioned about their chances of success, Cooper et al. (1988) found that 81% of subjects answered between 0 and 30% (with 33% stating exactly zero failure probability). However, when asked about the possibility of any business like them failing, only 39% of them answered between 0 and 30%. Previously, Larwood and Whittaker (1977) found that corporate executives (and management students) are very vulnerable to this self-serving bias.

BTA effects also affect the attribution of causality. In self-attribution theory, it is described that because individuals expect their behavior to produce success, then when success becomes outcomes, they will attribute the success gained to their actions; and when it fails, they will attribute it to bad luck (Miller & Ross, 1975). This attribution strengthens overconfidence bias.

BTA effects are very likely to be found in company executives for a number of reasons. First, Camerer and Lovallo (1999) show that the BTA effect is very strong among highly skilled individuals, perhaps because the individual gives less weight to the comparison group (base rate neglect). If CEOs compare themselves with the average manager instead of other CEOs, they might conclude they are better than average in the ability to choose an investment project or merger target. Second, the BTA effect tends to be very strong for outcomes that are more abstract in the definition or not in the comparison of one-to-one with others (Moore & Kim, 2003). CEO rarely has direct comparisons, for example, large-scale investments decisions are naturally complex and difficult to compare between or within companies, making it difficult to detect over-estimation.

It is noted in self-enhancement literature that there are tendencies for individuals to be overly optimistic about future prospects (Weinstein, 1980). Individuals are more optimistic about outcomes that they believe are under their control (Langer, 1975); and individuals are more vulnerable to overestimating outcomes that they are highly committed to (Weinstein, 1980). The company's top executives tend to fulfill both pre-conditions. First, a person in the CEO position holds great control over the company's strategic decisions and decides whether the company will invest in large-scale or not in the future. Such a position can cause the CEO to believe that he can also control the outcomes his decisions and therefore underestimate the possibility of failure (March & Shapira, 1987). Second, most CEO compensation (including stocks and options) depends on how well the company performs. Likewise, a CEO's human capital values (including the possibility of being fired, the choice to work outside) are closely related to company performance. So, for the compensation and career reasons, it is reasonable to say that the CEOs are very committed to the outcome of their decisions.

Furthermore, the higher managers step in the career paths in the company the less likely they are to face a similar decision-making environment which is the overconfidence bias tends to persist. It is reasonable enough since the top level decision-making environment tends to have a low frequency of feedback and full of noise. Top-level executive decisions such as large-scale of investments, merger agreements, or capital restructuring are relatively rare events in the life of a company, and each project has many different features or characteristics which made comparing the past experiences with the present situation becomes difficult.

In short, there is strong support for the hypothesis that corporate top executives persistently overestimate their own abilities relative to others and, as a result, are overly optimistic about their

decisions. This study assumes that overconfident managers overestimate the return of their decision. This assumption is similar to the concept of 'hubris' (Roll, 1986). It also exists in Heaton (2002) and Landier and Thesmar (2009); both modeled managers overestimate the likelihood of their project success.

In financial literature, overconfidence is also often described as a form of calibration bias. However, this study will not use this approach. This research approach differs from some financial literature, especially in the stock trading literature, which models overconfidence as an underestimation of variance (usually of a firm's value). This assumption refers to the calibration literature, which shows that individuals tend to overestimate the accuracy of their information. There is indeed some research evidence that managers are vulnerable to this calibration bias (Moore, 1977). In the corporate finance literature, calibration bias has been applied to studies of managers compensation contracts (Gervais et al., 2011) and succession tournaments (Goel & Thakor, 2006).

Investment Decision

The company invests basically in maintaining existing assets (the asset in place, AIP) and in new assets. In carrying out investments, of course, funding is needed. The greater the available cash flow, the more new investment opportunities are expected to be realized. Thus we expect there is a positive relationship between cash flows and the level of investment.

H1: Cash flows have a positive effect on investment.

There are two interpretations of this positive relationship according to traditional theory. First, the positive relationship is a manifestation of agency problems which lead to over-investment problems, where managers in the rich free-cash flow companies tend to over-invest (Jensen, 1986). Free cash can be an incentive for a manager to enlarge the company's business empire. The manager has an incentive to over-invest due to the monetary or non-monetary benefits associated with the size of the company. Second, this positive relationship reflects capital market imperfections namely information asymmetry between corporate insiders and the capital market which lead to under-investment problems, where expensive external funding creates the potential for internal cash flow to expand the set of investment opportunities that could be funded (Fazzari et al., 1988; Myers & Majluf, 1984).

The Effect of CEO Overconfidence on Investment Decision

There is an alternative explanation for the investments – cash flow sensitivity and suboptimal investment behavior, namely linking investment decisions with personal characteristics of the investment decision makers (in this case the company's top executives). This study follows an alternative explanation for investment sensitivity to the existence of cash flows and suboptimal investment behavior of companies. Rather than focusing on the characteristics of the company, this research will focus more on the interrelationship of the company's investment decisions with the personal characteristics of the company's top executives, namely on overconfidence bias.

From the behavioral finance theory point of view, the investment-cash flow sensitivity (or the positive influence of cash flows on a company's investment) arises because of the effects of the personal characteristics of top executives (in this case the CEOs overconfidence) who make these investment decisions. This relationship can be seen in the conceptual framework in Figure 1.
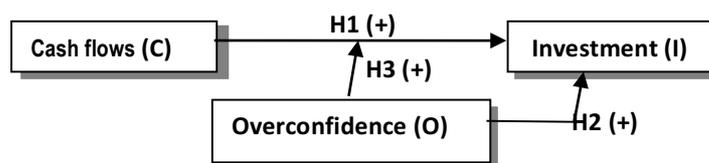

Figure 1. Conceptual Framework for the Relationship of Overconfidence, Cash flows, and Investment

In Figure 1, overconfidence may have a direct positive effect on corporate investment. Overconfident CEOs have a tendency to overestimate corporate investment opportunities and investment returns, and hence they tend to invest (Malmendier & Tate, 2005a, b). They also tend not to delay much in investing and be more willing to take risky investment (Hackbarth, 2009). Thus the following hypothesis can be formulated:

H2: Overconfidence has a positive effect on investment.

Both overconfidence and low-risk aversion can lead to increased risk-taking courage, but for different reasons. The difference between overconfidence and lower risk aversion is very well explained in the Gervais et al. (2011). A rational manager tends to accurately estimate residual risk from the risky project but may not invest because of risk aversion. The lower the level of risk aversion manager, the more likely he will take the risky project. Conversely, overconfident managers are more likely to underestimate residual risk from the risky project, and therefore more likely to invest in it.

Overconfident CEOs tend to overestimate the future investment returns that can be obtained during their leadership (Malmendier & Tate, 2005a, b). Overconfident CEO behavior differs from rational CEO behavior in two ways. First, overconfident CEOs over-estimate the potential synergies that can be obtained from proposed acquisitions because they believe that their leadership skills are better than average. They also overestimate the potential synergies that can be achieved and underestimate some of the risks involved in the acquisition due to illusion of control over the acquisition outcomes. Second, overconfident CEOs mistakenly believe that the company's equity is undervalued by the market. This false belief arises because overconfident CEOs overestimate the future returns that can be obtained during their leadership. Overconfident CEOs also tend not to delay making investment decisions. Hackbarth (2009) revealed that overconfident managers invest earlier than rational managers do, thus lowering the underinvestment problem.

The Effect of Overconfidence on the Investment-Cash Flows Sensitivity
Based on Roll's study (1986), the model developed by Heaton (2002), and several empirical studies on the effect of CEO overconfidence on corporate investment decisions (2005a, b), it is expected that the relationship between the level of investment and cash flow is driven by overconfidence, with this overconfidence there will appear the belief difference between CEOs and market about the firm's value. The overconfident CEOs systematically overestimate the return of their investment projects. If they have adequate internal funds for investment and are not disciplined through market mechanisms or corporate governance, then they tend to overinvest relative to best investment level that should be taken. However, if they do not have adequate internal funds, they are reluctant to issue new equity because they feel the company's stock is undervalued by the market. As a result, they will withhold their investment. Additional cash flow provides an opportunity to invest near the level of investment they want. Thus, the following hypothesis can be proposed:

H3: Overconfidence strengthens the effect of cash flows on investment.

The notion that investments made by overconfident CEOs are more sensitive to cash flows or internal funding than investments made by rational (non-overconfident) CEOs is based on the following two conditions. First, the overconfident CEOs overestimate the return of their investment project. Second, the overconfident CEOs wrongly believed that the market undervalued their company's risky securities so that they preferred to use internal funds to finance their firm's investments and they will show the funding preferences similar to the pecking order pattern. As a result of this second argument, investments made by overconfident CEOs are more sensitive to the availability of internal funds. It is reasonable to expect that overconfident CEO follows the pecking order pattern in financing, but what constitutes the pecking order pattern is important. Is the pecking order pattern caused by information asymmetry or due to other factors (manager's overconfidence and optimism for example)?

From the results of Graham and Harvey (2001) survey on 392 CFOs, it revealed that 59% of respondents mention that financial flexibility was important or very important. Meanwhile, Graham

(2000) mentioned that companies use financial flexibility (reserved debt capacity) to anticipate future expansion and acquisitions, but it seems that the company still maintains its debt capacity even after expanding. Furthermore, the survey results of Graham and Harvey (2001) revealed that the importance of financial flexibility is not related to information asymmetry (size or dividend payout) or growth options as the basis in the pecking order theory. In fact, financial flexibility is statistically more important in groups of companies that pay dividends which is clearly contrary to the predictions of pecking order theory (if we assume that groups of companies that pay dividends to fall into the category of companies with relatively low information asymmetry). Furthermore, Graham and Harvey (2001) indicated that funding preferences that follow the pecking order pattern may be driven by managerial optimism (p. 219).

The implication of overconfidence, however, is more subtle than over-investment. Overconfident CEOs persistently feel the market is undervalued their companies securities and are therefore reluctant to issue risky securities to finance their projects (Heaton, 2002). This effect is like a reinterpretation of the Myers-Majluf model (1984) with the assumption of asymmetric information, where the market cannot distinguish good borrowers and bad borrowers so that the market imposes the same risk premium for both. In the Myers-Majluf model, managers have information as insiders, and "good companies" feel that they are charged a risk premium that is greater than they should be so they are reluctant to issue equity because they will be considered the same as "bad companies". In the overconfidence model, the overconfident manager thinks that he has insider information (positive), with the same effect on equity issuance. Overconfidence is "perceived asymmetric information". The perceived undervaluation encourages the CEO to distance himself from the project (and even underinvest) when the investment project cannot be funded by internal funds. In this case, the availability of cash will allow the overconfident CEOs to carry out these projects. The overconfidence hypothesis predicts investment to be more sensitive to the existence of cash flows. In addition, investment- cash flows sensitivity will be strongest for companies with few internal resources.

Heaton (2002) develops predictions that overconfidence managers will increase the investment-cash flows sensitivity because the manager believes that the market underestimates the company's projects and thus external funding costs are perceived to be too high. Overly optimistic managers also have an upward bias estimate of cash flows and therefore they often assess more the investment opportunities of their company. Consistent with Heaton's (2002) prediction, some researchers have found that personal manager characteristics, especially overconfidence, can distort corporate investment decisions and that overconfident managers show significantly higher investment sensitivity to free cash flow, especially for companies that depend on equity financing (Malmendier & Tate, 2005a, b), or for companies that are financially constrained (Lin et al., 2005). Still related to investment decisions, overconfident CEOs often take value-destroying mergers or pay too much for the acquired company (Brown & Sarma, 2007; Lin, Michayluk, Oppenheimer, & Reid, 2008; Malmendier & Tate, 2008).

Other studies try to link managerial overconfidence variable with variables other than investment decisions. For example, several recent studies note that overconfident managers prefer internal funding to debt and equity (Lin, Hu, & Chen, 2008; Malmendier, Tate, & Yan, 2007); Firms with overconfident CFOs use lower discount rates to assess cash flows and invest more, use more debt, are less likely to pay dividends, are more likely to repurchase shares and use more long-term debt than short-term debt (Ben-David et al., 2007); Firms with overconfident CEOs tend to pay lower dividend (Deshmukh, Goel, & Howe, 2009) or pay fewer cash dividends (Ben-David et al., 2007); Overconfident CEOs are more likely to be fired or forced turnover (Campbell et al., 2011); Overconfident CEOs tend to issue earnings forecasts in the form of points forecast rather than range forecasts and more likely to involved in earnings management (Hribar & Yang, 2011); and overconfident executives tend to show optimistic bias and are therefore more likely to involved in financial statements misstatements (Schrand & Zechman, 2012).

Malmendier and Tate (2005a) revealed that managerial overconfidence can explain the distortion of corporate investment decisions. Overconfident managers overestimate their investment

project returns and see external capital as unduly expensive. Therefore, they tend to over-invest when there is a lot of internal capital available, but withhold investment if the investment project requires external fund. By using personal CEO portfolio data as a measurement of overconfidence, they classify CEOs as overconfident when they persistently do not reduce their personal portfolio exposure to company-specific risks or persistently increase their company's stock ownership in their personal portfolios. Malmandeir and Tate (2005a) found that companies that have overconfident CEOs significantly show investment sensitivity to the cash flow, especially if the company capital is mainly equity. As an additional empirical evidence, Malmandier and Tate (2005b) use a different measure of overconfidence which emphasizes on how the outside (mass media) perceive the CEO and show that overconfidence has the ability to predict investment-cash flows sensitivity; and the investment-cash flows sensitivity are stronger in companies with less internal capital.

Meanwhile, Wang, Zhang, and Yu (2009) found slightly different results from Malmandier and (2005a, b). Wang, Zhang, and Yu study (2009) also found the relationship between managerial overconfidence and companies over-investment behavior in China. Wang, Zhang, and Yu (2009) found that overconfident managers tend to over-invest and their over-investment behavior is very sensitive to cash flows from financing activities. When a company gets a lot of cash from financing activities, the overconfident manager will over-invest, but a bit different from the results of previous studies, they found that the sensitivity between excessive investment and free cash flow had nothing to do with managerial overconfidence.

The Role of Board of Commissioner in limiting the Effect of Overconfidence Bias on the Investment

A board of commissioner (BOC) represents shareholders and has obligation to oversight the board of directors in order to reach the most important firm's objective, i.e the firm value or shareholder's wealth maximization. The board of directors (BOD) are appointed by the board of commissioners. Overconfidence bias has a negative impact on a firm's value. Previous studies such as Malmendier and Tate (2005a; b) have documented that overconfident CEOs tend to invest more than non-overconfident CEOs do. Furthermore, Malmendier and Tate (2008) found that overconfident CEOs overestimate their ability to generate the return, and therefore they are more likely to overpay for target companies and undertake value-destroying mergers. Therefore, we need corporate governance mechanism to minimize and to control the effect of overconfidence bias on investment and the firm's value.

Investment and financing activities at the company level that are used as a measurement for overconfidence can also be associated with weak corporate governance. It is indeed very difficult to separate the effects of overconfidence from the effects of governance on the relationship between investment and cash flow. However, an overconfidence bias combined with weak corporate governance is a necessary condition for the occurrence of bias in investment decisions. Weak corporate governance enables overconfident managers to more easily create and influence suboptimal investment decisions.

Previous studies mention some corporate governance mechanism that can be used to limit the effect of behavioural bias. Hsu and Chen (2017) report that co-governance and expert management governance mechanisms able to mitigate managers' illusion of control, weakening the investment cash flow sensitivity. Furthermore, they found that government control models did not show a significant impact and there was no significant adjustment effect on the investment cash flow sensitivity. Single-family governance may strengthen the investment cash flow sensitivity.

Other corporate mechanism that can be used to mitigate the overconfidence bias effect is board of commissioners. Board of commissioners in Indonesia plays both supervisory role and advisory role. We expect that as the board of commissioner number increase, the investment-cash flow sensitivity of overconfident CEO will decrease. The board of commissioner should have one or more independent commissioner members.

H4: The board of commissioner can minimize the effect of CEOs overconfidence bias on investment-cash flow sensitivity.

Research Method

Data and Sample

The main data sources used in this study are the company's annual report and company financial statements. The study period was 1999-2013. The research population is non-financial companies in Indonesia listed on the Indonesia Stock Exchange (IDX), and the research sample is a non-financial public company in Indonesia since 1999. The number of companies listed on the IDX based on data from IDX Fact-Book 2013 is 464 companies where 74 companies are included in financial companies and the remaining 390 companies are non-financial companies. The number of sample companies in this study is 115 companies (which are spread in six industries).

Table 1. The Sample of Study

Symbol	Industry	Number of sample firm
Ind12	*Plantation*	11
Ind21	*Coal Mining*	19
Ind33	*Metal & Allied products*	16
Ind43	*Textile, garment*	22
Ind51	*Food & beverage*	17
Ind91	*Wholesales (durable & nondurable goods)*	30
Total		115

Measurement of Overconfidence Variable

Overconfidence is generally manifested in three general forms: individual tendency to make a narrow confidence interval in judgments made or tendency to overestimate the accuracy of their knowledge or skills, perception or feeling of better than average and the illusion of control. There are several ways to measure the top manager's overconfidence. Several previous studies used data on company stock option ownership by the CEOs (Malmendier & Tate, 2005a, 2008), media *coverage* (Brown & Sarma, 2007; Hribar & Yang, 2011; Malmendier & Tate, 2008), bias between manager's earnings forecast and the actual earnings (Huang, Jiang, Liu, & Zhang, 2011; Lin et al., 2005), frequency of M&A initiated by the CEO (Malmendier & Tate, 2008), CEO relative salary (Hayward & Hambrick, 1997), and current performance of the company (Cooper et al., 1988; Hayward & Hambrick, 1997), and the overconfidence index (Schrand & Zechman, 2012).

Taking into account the data availability of companies listed in the Indonesia Stock Exchange (IDX), this study uses an overconfidence index (Schrand & Zechman, 2012) to measure the overconfidence of top managers. Assuming that a CEO's overconfidence will be reflected in the actions or decisions that he takes for his company, an index of corporate CEO overconfidence (OC_FIRM) is formed. Schrand and Zechman (2012), made two managerial overconfidence proxies from company-specific scores (i.e. OC_FIRM4 and OC_FIRM5). Overconfidence indexes are constructed from five components of investment activity, funding activities and dividend policy at the company level. From several previous studies, it is found that an executive's overconfidence can be indicated by their investment decisions, funding decisions, and dividend decisions. Through this proxy, it is assumed that overconfident executives are consistently optimistic in all contexts of company decisions. If at least two of the four components as a measurement input indicate that the company has an overconfident top executive, the OC_FIRM4 dummy variable is rated 1. Meanwhile, OC_FIRM5 is a dummy variable which value is 1 if the company meets at least three of the five components of the overconfidence score, and is 0 if otherwise.

The first component of the overconfidence score (OC_FIRM4) is the industry-adjusted excess investment, namely the difference between the residual of the regression of total asset growth on the company's sales growth and a median of industrial residuals. Ben-David, Graham, and Harvey (2007) recorded average excess investment by overconfident executives consistent with the prediction that

overconfident managers overestimate cash flows from investment projects and/or underestimate the risk of the payoff. Malmendier and Tate (2005a) found that overconfident CEOs will over-invest when internal funds were sufficiently available, but then will limit the investment when external funds were needed to finance the investment. Excess investment greater than the industry median (ie more than zero) for the year concerned indicates that the executive is overconfident.

The second component of the OC_FIRM4 score is industry-adjusted net dollars from acquisitions made by the company, the data can be obtained from the company's cash flow statement. If the number is greater than zero then for the year concerned indicates that the executive is overconfident. Related to M&A activities, Malmendier and Tate (2008) found that overconfident CEOs tend to overpay target companies and engage in acquisitions that destroy corporate value. The acquisition value carried out by the company exceeds the industry median for the year indicated that the company's top executive is overconfident.

The third component of the OC_FIRM4 score is the industry-adjusted DER ratio (DER_INDADJ equals the long-term debt scaled by the company's market value minus the median debt-to-equity ratio of the industry for each year). Heaton (2002) made predictions of pecking-order standard preferences by overconfident managers. Hackbarth (2008) produces almost similar predictions that overconfidence causes an optimistic assessment of investment pay off, but pecking order preferences are reversed if overconfidence causes an optimistic assessment of the cost of capital used to fund investments. A higher Debt-to-equity ratio than the industry median indicates overconfidence (Ben-David et al., 2007; Malmendier et al., 2011).

The fourth component of the OC_FIRM4 score is an indicator variable that equal to one if the company uses either convertible bonds or preferred shares, and zero if not. Ben-David, et al. (2007) predicted that overconfident executives would choose risky debt, and found evidence that companies with overconfident executives had longer debt duration as a measure of risky debt.

Finally, the fifth component, OC_FIRM5 was formed by adding one more component in OC_FIRM4, which is related to the company's dividend policy. Ben-David et al. (2007) found that overconfident executives were less likely to pay dividends so they could add cash reserves to finance anticipated investment opportunities. The industry adjusted dividend payout ratio (DPR_INDADJ = DPR companies - Median industrial DPR in the year) which is greater than zero indicates that companies are more likely to have overconfident executives.

Model
To test the hypotheses H1, H2, H3, and H4, this study uses panel data regression as the following equations:

(1) $I_{it} = \mu + \alpha_i + \beta_1 C_{it} + \beta_2 O_{it} + \beta_3 C_{it}O_{it} + \beta_4 Q_{it} + \beta_5 Q_{it}{}^*C_{it} + \sum_{j=1}\beta_j X'_{jit} + \varepsilon_{it},$

(2) $I_{it} = \mu + \delta_i + \delta_1 C_{it} + \delta_2 O_{it} + \delta_3 C_{it}O_{it} + \delta_4 Q_{it} + \delta_5 Q_{it}{}^*C_{it} + \delta_6 COM_{it} + \delta_7 COMIND_{it} + \delta_8 COM_{it}{}^*C_{it}$
$\qquad + \delta_9 COMIND_{it}{}^*O_{it} + \delta_{10} COM_{it}{}^*O_{it}{}^*C_{it} + \delta_{11} SIZE_{it} + \delta_{12} COWN + \varepsilon_{it},$

where I is an investment defined as capital expenditures (i.e. the amount of fixed assets changes, construction in progress and construction materials) scaled with capital at the beginning of the year; C is a cash flow that is defined as EBIT plus depreciation and amortization and scaled with total capital at the beginning of the year; O is a measure of CEO overconfidence; Q is a growth opportunity proxied by approximate Q (Chung & Pruitt, 1994) (the formula to calculate approximate Q = (market value of equity + preferred stock + (short-term liabilities - short-term assets + long-term debt) ÷ total assets); X_{ij} is the control variables such as (a) size (*SIZE*) of the company, namely log total assets, and (b) share ownership by CEO (*COWN*), namely the percentage of shares owned by the CEO of the total outstanding shares. Variables that reflect corporate governance, namely the number of personnel on the board of commissioners (*COM*) and the number of independent commissioners (*COMIND*); α_i is a firm-fixed effect, and ε_{it} is an error-term, i = company from 1 to 115, and t = the year from 1999 to 2013.

Result and Discussion

Descriptive statistics

Table 2 contains an overview of the data distribution of variables. During the sample period the average investment (I) carried out by a company is 0.34 means that in every Rp.1.00 the total capital, Rp.0.34 is used for fixed assets purchases. The average cash flow (C) is 0.18. The average company growth opportunity (Q) is 1.56; the company's market value is still above the book value. The average percentage of share ownership by the CEO is still very small, which is under one percent. Meanwhile, the average percentage of insider share ownership is very high at 68.79%, this means that the company's shareholdings in Indonesia are still very concentrated. The average number of personnel in the company's board of directors is 4 people and the average number of independent commissioners is 1 person. For an overview of the number of observations classified as overconfident can be seen in Table 3. The total observations classified overconfident through OC_FIRM4 index size and OC_FIRM5 index are 664 and 509 observations respectively.

Table 2. Descriptive statistics, 1999-2013

Variables	Mean	Max	Min	Std Dev	N
I	0.34	360.10	-82.37	9.91	1403
C	0.18	28.26	-119.63	3.56	1402
Q	1.56	607.45	-0.91	17.28	1454
O1	0.38	1.00	0.00	0.49	1725
O2	0.30	1.00	0.00	0.46	1725
SIZE	5.82	7.91	2.74	0.75	1454
COWN	0.94	90.00	0.00	4.46	1359
INSIDER	68.79	100.00	0.00	20.48	1330
COM	4	11	1	1.63	1402
COMIND	1	5	0	0.82	1402

I is investment = capital expenditure ÷ total capital at the beginning of the year; C is cash-flow = EBITDA ÷ total capital at the beginning of the year; Q is a growth opportunity = (market value of equity + preferred stock + short-term liabilities - short-term assets + long-term debt) ÷ total assets; O1 is a dummy overconfidence variable as measured by the OC_FIRM4 index which has value of 1 if the CEO in that year is categorized as overconfident and 0 if otherwise; O2 is a dummy overconfidence variable that is measured by the OC_FIRM5 index which has value of 1 if the CEO in that year is categorized as overconfident and 0 if otherwise; SIZE is the size of the company = Log (total assets); COWN is the percentage of common stock ownership by the CEO; INSIDER is the percentage of common stock ownership by insider which shows the level of concentration of ownership of the company; COM is the number of personnel on the board of commissioners; and COMIND is the number of independent commissioners on the board of commissioners.

Table 3. Frequency distribution for overconfidence variable, 1999-2013

| Industry | The frequency of observation classified as *overconfident* based on: | |
	OC_FIRM4	OC_FIRM5
ind12	66	49
ind21	91	74
ind33	75	47
ind43	167	149
ind51	95	74
ind91	170	116
Total	664	509

Table 4 provides the correlation between variables and their significance. Table 4 shows that the highest correlation number is between the variables O1 and O2 that is equal to 0.82, this shows that the measurement variable overconfidence with the OC_FIRM4 index and the measurement overconfidence with the OC_FIRM5 index is highly correlated so we can use only one of these two variables. Other variables have a correlation below 0.5 so we can conclude that there is no multicollinearity problem.

Table 4 The correlation between variables

	I	C	Q	O1	O2	SIZE	COWN	COM
C	**0.04**							
	0.08							
Q	**0.00**	**-0.01**						
	0.86	*0.74*						
O1	**0.03**	**0.04**	**0.03**					
	0.02	*0.12*	*0.20*					
O2	**0.04**	**0.03**	**0.04**	**0.82**				
	0.01	*0.20*	*0.10*	*0.00*				
SIZE	**0.02**	**0.05**	**-0.12**	**0.32**	**0.22**			
	0.05	*0.05*	*0.10*	*0.00*	*0.00*			
COWN	**0.00**	**0.00**	**-0.01**	**-0.03**	**-0.04**	**-0.07**		
	0.92	*0.97*	*0.72*	*0.33*	*0.15*	*0.02*		
COM	**-0.01**	**0.04**	**-0.01**	**0.21**	**0.16**	**0.49**	**-0.05**	
	0.66	*0.11*	*0.75*	*0.00*	*0.00*	*0.00*	*0.05*	
COM IND	**0.02**	**0.06**	**0.03**	**0.21**	**0.18**	**0.45**	**-0.07**	**0.49**
	0.51	*0.03*	*0.26*	*0.00*	*0.00*	*0.00*	*0.01*	*0.00*

The correlation coefficients for each variable are marked with bold letters and the significance is marked with italic letters. I is Investment = capital expenditure ÷ total capital at the beginning of the year; C is cash flow = EBITDA ÷ total capital at the beginning of the year; Q is growth opportunity = (market value of equity + preferred stock + short-term liabilities - short-term assets + long-term debt) ÷ total assets, O1 = overconfidence variable with OC_FIRM4 index measurement; O2 = overconfidence variable with OC_FIRM5 index measurement; SIZE = company size; COWN = percentage of share ownership by the CEO; COM = the number of personnel on the board of commissioners; COMIND = the number of independent commissioners.

Regression Result and Discussion

To obtain the final model that will be used in drawing conclusions on the hypothesis, there are several stages of regression that are passed. The first regression is the first baseline regression which is the regression between variables C and Q only to the dependent variable Investment (I). The second regression is baseline regression by including all control variables. The purpose of these two regressions is to find out whether there are facts about investment-cash flow sensitivity for Indonesian data as it was found in many previous empirical studies in other countries and give an idea of whether the role of cash flow (C) is greater) than growth opportunities (Q) in explaining investment (I).

The first baseline regression results are listed in Table 5. The regression results in Table 5 show that the cash flow variable (C) has a positive effect on the investment variable (I) and that the role of cash flow (C) is greater than the growth opportunity (Q) in explaining variables investment (I). This shows the fact that there are investment-cash flow sensitivity in Indonesian companies, as also found in US companies from previous empirical studies (Fazzari et al., 1988, 2000; Malmendier & Tate, 2005a, b). Growth opportunity variable (Q) has a positive effect on investment (I) but the effect is not significant.

Table 6 shows the results of the second baseline regression, namely the independent variables C, Q, and control variables: company size (SIZE), CEO ownership (COWN), number of people on

the board of commissioners (COM), number of independent commissioners (COMIND), and firm's fixed effect) to the dependent variable of investment (I). Regression results show that the variable cash flow (C) has a positive and significant effect on investment (I). This result is in line with previous studies, for example a study conducted by Fazzari, Hubbard, and Petersen (1988) which shows the existence and robustness of cash-flow investment sensitivity even after controlling for investment opportunities. Agca and Mozumdar (2008) and Malmendier and Tate (2005a, b) also found similar results that cash flows have a positive effect on the investment of American companies. Growth opportunity variable (Q) shows a positive but not significant effect on investment (I). SIZE shows a significant positive influence on investment, the larger the company, the greater the investment made by the company. Share ownership by the CEO (COWN) shows a significant negative effect on investment.

Table 5. The first baseline regression result

Variable	β	Std Error	t-Stat	Prob
Constant	0.08	0.00	22.48	0.00
C	0.06	0.01	10.55	0.00
Q	0.00	0.00	0.02	0.98
R^2	0.08		Mean dept var	0.55
Adj R^2	0.07		S.D. dept var	0.76
S.E. of reg	0.67		SSE	572.29
F-stat	52.78		D-W stat	1.61
Prob(F-stat)	0.00		observations	1288

Dependent Variable is I (investment) = capital expenditure ÷ total capital at the beginning of the year; C is cash-flow = EBITDA ÷ total capital at the beginning of the year. C is cash-flows = EBITDA ÷ total capital at the beginning of the year; Q is Growth opportunity = (market value of equity + preferred stock + short-term liabilities - short-term assets + long-term debt) ÷ total assets. The estimation method is pooled EGLS

Table 6. The second baseline regression result

Variable	β	Std Error	t-Stat	Prob.
constant	-0.21	0.04	-5.00	0.00
C	0.06	0.01	10.98	0.00
Q	0.00	0.00	0.83	0.41
SIZE	0.06	0.01	8.38	0.00
COWN	-0.01	0.00	-3.10	0.00
COM	-0.01	0.00	-4.86	0.00
COMIND	0.01	0.00	5.01	0.00
Effects Specification: Cross-section fixed (dummy variables)is included				
R^2	0.89		F-stat	78.72
Adj R^2	0.87		Prob(F-stat)	0.00
Observasion	1291		D-W stat	1.70

The dependent variable is investment (I) = capital expenditure ÷ total capital at the beginning of the year; C is cash-flow = EBITDA ÷ total capital at the beginning of the year. C is cash flow = EBITDA ÷ total capital at the beginning of the year; Q is Growth opportunity = (market value of equity + preferred stock + short-term liabilities - short-term assets + long-term debt) ÷ total assets; SIZE is company size = (ln Total Assets); COWN = percentage of CEO's share ownership; COM = the number of personnel on the board of commissioners; COMIND = the number of independent commissioners.

Table 7 shows the summary of the regression results for equation 1. Table 7 is divided into two panels, Panel A and Panel B. The difference between Panel A and Panel B lays in the measurement of overconfidence (O) variables, in Panel A the overconfidence variable was measured using

OC_FIRM4 scores while in Panel B overconfidence variables was measured using OC_FIRM5 scores. Regression coefficients in both panels did not show significant differences, meaning that the two measurements of overconfidence did not give conflicting results.

Table 7. Regression Results of Equation 1

Panel A: *Overconfidence (O)* is measured by **OC_FIRM4**			Panel B: *Overconfidence* (O) is measured by **OC_FIRM5**		
Variable	B	Prob.	Variable	β	Prob.
constant	-0.23	0.00	constant	-0.23	0.00
C	0.07	0.08	C	0.08	0.08
Q	0.00	0.74	Q	0.00	0.78
O	0.02	0.00	O	0.03	0.00
C*O	0.04	0.00	C*O	0.03	0.00
C*Q	0.00	0.33	C*Q	0.00	0.28
SIZE	0.06	0.00	SIZE	0.06	0.00
SIZE*C	-0.01	0.03	SIZE*C	-0.01	0.03
COWN	0.00	0.15	COWN	0.00	0.13
COM	-0.00	0.12	COM	-0.00	0.11
COMIND	-0.00	0.39	COMIND	-0.00	0.32
COMIND*C	-0.04	0.00	COMIND*C	-0.05	0.00
Effects Specification: Cross-section fixed (dummy variables)					
Weighted Statistics			*Weighted Statistics*		
R^2	0.66		R^2	0.62	
Adj R^2	0.62		Adj R^2	0.58	
F-stat	18.47		F-stat	15.71	
Prob(F-stat)	0.00		Prob(F-stat)	0.00	

The dependent variable is investment (I) = capital expenditure ÷ total capital at the beginning of the year; C is cash-flow = EBITDA ÷ total capital at the beginning of the year. C is cash flow = EBITDA ÷ total capital at the beginning of the year; O is overconfidence dummy variable which takes value of 1 if the firm has overconfident CEO and 0 if the firm has non-overconfident CEO; Q is Growth opportunity = (market value of equity + preferred stock + short-term liabilities - short-term assets + long-term debt) ÷ total assets; SIZE is company size = (ln Total Assets); COWN = percentage of CEO's share ownership; COM = the number of personnel on the board of commissioners; COMIND = the number of independent commissioners. The number of observations 1331, number of firms is 115, observation period 1999-2013. Regression method: Pooled EGLS (Cross-section weights).

From the regression results as shown in Table 7 the cash flow coefficient (C) in Panels A and Panel B is positive and significant at the 10% level, so hypothesis 1 is supported. The overconfidence (O) variable in Panel A is 0.02 and significant, and in Panel B it is 0.03 and significant. These results indicate support for hypothesis 2. A CEO's overconfidence has a direct positive influence on the company's investment. Overconfident CEOs have a tendency to over-estimate corporate returns and investment opportunities and hence they tend to invest more (Malmendier & Tate, 2005a, b). Hackbarth (2009) revealed that overconfident CEOs tend not to delay much in investing and are more willing to take risky investment.

The regression results in Table 7 show the interaction coefficients between cash flows and the overconfidence variable (ie the coefficients C*O) In Panel A is 0.04 and in Panel B is 0.03 and both are significant. These results indicate that the data provide support for hypothesis 3 that CEO overconfidence strengthens the effect of cash flows on investment. For companies that have overconfident CEOs, the coefficient of investment-cash flow sensitivity in Panel A is 0.11 (= 0.07 + 0.04) and in Panel B is 0.11 as well (= 0.08 + 0.03) Meanwhile, if the CEO of the company is non-overconfident, the sensitivity coefficient of the cash-flow investment is only 0.07 (see Panel A) and 0.08 (see Panel B). These findings indicate that the data of this study confirm the predictions that overconfident CEOs are more sensitive to cash flows in making the company's investment decisions.

Thus these findings add to the explanation of the cash investment sensitivity puzzle in the corporate finance literature. The finding of the role of overconfidence CEO in explaining the sensitivity of cash-flow investments is in line with the findings of Malmandier and Tate (2005a, b) that CEOs classified as overconfident show higher cash-flow investment sensitivity and especially when internal funding sources are scarce. This finding is also in line with Heaton (2002) predictions. Based on Roll's (1986) study, Heaton (2002) developed a model on the effect of CEO overconfidence on corporate investment decisions, wherein Heaton's model a prediction emerged that the relationship between the level of investment and cash flow was driven by overconfidence manager, with this overconfidence there will be differences between CEO's beliefs and market beliefs about the value of the company. The overconfident CEO systematically overestimates the return of his investment projects. If they have adequate internal funds for investment and are not disciplined through market mechanisms or corporate governance, then they tend to overinvest the relative best investment that should be done. However, if they do not have adequate internal funds, they are reluctant to issue new equity because they feel the company's stock is considered too low by the market. As a result, they withhold their investment. Additional cash flow provides an opportunity to invest near the level of investment they want.

From the regression results as listed in Table 7, variable SIZE as expected has a positive and significant influence on investment. The bigger the company, the higher investment will be. The interaction variable between SIZE and cash-flow (C) in Table 5 is negative and significant, both in Panel A and in Panel B. These results indicate that the greater the company, the lower the investment-cash flow will be. Similar results were also found by Malmendier and Tate (2005a). These results can be interpreted as size capturing effects that are traditionally attributed to financial constraints as listed in various literature of the investment-cash flow sensitivity. The coefficient of CEO ownership (COWN) variable is positive and significant but only in Panel B. From the results of the Malmendier and Tate's study (2005a), it is known that CEOs who own shares or options from companies that they manage show smaller investment-cash flow sensitivity than CEOs who does not own shares from their company. Thus, according to them, CEO's higher ownership can overcome agency problems, especially among successful company sub-samples which are shown by higher stock price appreciation.

Regression results in Table 7 also show that the coefficient of the variable Q is positive but insignificant. The coefficient of the interaction variable between Q and cash flow (C) is positive but not significant too. This result is not different from the findings of Malmendier and Tate (2005a). They found that Q had a greater impact on investment for companies with higher cash flow rates (although they found that this effect was not consistently significant). They argue that if current cash flow is a measure of past investment decision success, these results indicate that the more successful companies are, the more responsive to investment opportunities in determining the level of investment.

From Table 7, it can be seen that the coefficient of the percentage control variable of share ownership by the CEO (COWN) both in Panel A and in Panel B is positive but not significant. The first corporate governance control variable coefficient, namely COM, is negative but not significant both in Panel A and Panel B. The second corporate governance control variable, COMIND also shows a negative but insignificant sign both in Panel A and Panel B. This is because the appropriate proxy for corporate governance may be not COM or COMIND, but other variables such as professional quality of the board of commissioners (for example tenure of commissioners, formal education, professional experience, etc.) but this study cannot use those measurements due to limited data availability.

From Table 7, the result shows that the interaction coefficient between COMIND variables and cash flow variables (COMIND*C) has a positive and significant sign both in Panel A and in Panel B. This means that the greater the number of independent commissioners in the board of commissioners, the smaller the sensitivity of investment to cash flows will be. This result is slightly different from the results of Malmendier and Tate's (2005a) study. Using data from public companies in America, they found that corporate governance control variables, which they measured by the

outside CEO's presence on the board, slightly increased the sensitivity of cash-flow investments. This effect they found in a successful company sub-sample; however, in all samples, this effect was found to be weak. The board system in Indonesia differs from the board system in America. In Indonesia, the system is two-tier where there is a separation between the board of commissioners and the board of directors, while in America the system is one-tier where there is no separation between the board of directors and the board of commissioners.

Table 8. Regression Results to Test the Role of Corporate Governance Mechanisms in Reducing the Effect of Overconfidence on Investment Decisions

Panel A: *Overconfidence* measured by **OC_FIRM4**			Panel B: *Overconfidence* measured by **OC_FIRM5**		
Variable	**δ**	**Prob.**	**Variable**	**δ**	**Prob.**
Constant	-0.20	0.00	Constant	-0.24	0.00
C	0.04	0.26	C	0.03	0.53
Q	0.00	0.58	Q	0.00	0.72
O	**0.07**	**0.00**	**O**	**0.07**	**0.00**
O*C	0.08	0.00	O*C	0.14	0.00
C*Q	0.00	0.55	C*Q	0.00	0.38
SIZE	0.05	0.00	SIZE	0.06	0.00
SIZE*C	-0.01	0.12	SIZE*C	-0.01	0.33
COWN	0.00	0.07	COWN	0.00	0.06
COM	0.00	0.32	COM	0.00	0.34
COMIND	-0.01	0.19	COMIND	-0.01	0.09
COMIND*C	0.04	0.00	COMIND*C	0.05	0.00
COM*O	**-0.01**	**0.01**	**COM*O**	**-0.01**	**0.02**
COM*O*C	**-0.01**	**0.04**	**COM*O*C**	**-0.03**	**0.00**
Effects Specification: Cross-section fixed (dummy variables)					
Weighted Statistics			*Weighted Statistics*		
R^2	0.65		R^2	0.58	
Adj R^2	0.61		Adj R^2	0.53	
F-stat	17.53		F-stat	13.03	
Prob(F-stat)	0.00		Prob(F-stat)	0.00	
D_W Stat	1.75		D-W Stat	1.72	

The dependent variable is investment (I) = capital expenditure ÷ total capital at the beginning of the year; C is cash-flow = EBITDA ÷ total capital at the beginning of the year. C is cash flow = EBITDA ÷ total capital at the beginning of the year; O is overconfidence dummy variable which takes value of 1 if the firm has overconfident CEO and 0 if the firm has non-overconfident CEO; Q is Growth opportunity = (market value of equity + preferred stock + short-term liabilities - short-term assets + long-term debt) ÷ total assets; SIZE is company size = (ln Total Assets); COWN = percentage of CEO's share ownership; COM = the number of personnel on the board of commissioners; COMIND = the number of independent commissioners. The number of observations 1331, number of firms is 115, observation period 1999-2013.

Table 9. The Omitted Variable Test Result

Panel A: *Overconfidence* is measured by **OC_FIRM4**			
Omitted Variables: COMIND*O and COMIND*O*C			
F-statistic:	1.46	Prob. (2;1201):	0.23

Panel B: *Overconfidence* is measured by **OC_FIRM5**			
Omitted Variables: COMIND*O and COMIND*O*C			
F-statistic:	0.45	Prob.F(2;1201):	0.64

COMIND = The number of independent commissioners; O = overconfidence; C = cash flow.

The next analysis is the role of corporate governance (which in this study is proxied by COM and COMIND) in limiting the influence of overconfidence (O) variables on investment decisions. The regression results in Table 8 show that the data of this study only confirm that the COM mechanism can reduce the influence of overconfidence on corporate investment. This can be seen from the interaction coefficients of the variables COM and O (COM*O) which have a negative and significant sign both in Panel A and Panel B. This research data has not been able to provide support for the role of the mechanism of independent commissioners (COMIND) in reducing the investment – cash flow sensitivity of overconfident CEOs. The results of omitted variables for interaction variables between COMIND and overconfidence (COMIND*O) indicate insignificant F-stat value, meaning that the interactions variable (COMIND*O) are not relevant to be included in the model (the test results presented in Table 9).

Conclusions

This study examines CEO overconfidence measurements, namely OC_FIRM4 index, and OC_FIRM5 index. The results show that there is a strong and significant correlation (ie 0.82) between the two measurements. This study found a phenomenon of cash-flow investment sensitivity in Indonesian companies. This can be seen from the positive influence of the company's cash flow variables on investment variables. This investment - cash flow sensitivity phenomenon confirms the findings of the phenomenon of investment - cash flow sensitivity from previous studies. This study found that overconfidence variable has a positive effect on investment decisions. CEO overconfidence strengthens the effect of cash flows on investments. That is, the investment made by overconfident CEOs is more sensitive to the availability of cash flow than the investment made by non-overconfident CEOs. This result is additional evidence of the role of overconfidence in explaining the phenomenon of investment – cash flow sensitivity. Regarding the practical contribution of the mechanism of good corporate governance namely how to reduce the effect of CEO overconfidence, this study only found evidence that the effect of overconfidence can be reduced by increasing the board of commissioner's size. Meanwhile, the mechanism of increasing the number of independent commissioners (COMIND) has not been able to reduce the influence of overconfidence on investment. Given that an overconfident CEO feels that he took the best decision for the company even though the decision is not optimal and even could destroy the value of the company, so the CEO needs to be more monitored and reminded. The mechanism to increase the number of board of commissioners (COM) is quite capable to reduce the effect of overconfidence on investment. We can conclude that this corporate governance mechanism can play substantial role in limiting the distortion of corporate investment decisions due to this overconfidence bias.

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