THE EFFECT OF MANAGERIAL OVERCONFIDENCE ON CORPORATE INVESTMENT

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ABSTRACT

The research aims to analyze the impact of managerial overconfidence on corporate investment (investment scale, overinvestment and underinvestment) using companies listed in Indonesia's Stock Exchange in 2012-2018 as a sample. The analysis method used Ordinary Least Square and robustness test used Maximum Likelihood Estimation. The result shows that managerial overconfidence has a significantly positive impact on the corporate investment scale. It means that managerial overconfidence makes overinvestment problem more severe (more inefficient) and underinvestment problem less severe (more efficient).

Keywords: *Managerial Overconfidence, Overinvestment, Underinvestment*

INTRODUCTION

Management policies in determining investment decisions are considered to have an impact on the company's value. Investment plays an important role in the development of companies in market competition and creates value for shareholders. The company's investment policy is determined by various factors, including overall financial policy, macroeconomic policy, capital markets, and company operations (Richardson, 2006). According to Sudana (2015: 3) management decisions can be separated by three groups, namely: (1) investment decision, (2) financing decision, and (3) dividend decision or dividend policy.

A company's investment decision is a decision to allocate a certain amount of funds to a real asset in the hope of getting a return in the future and be willing to bear certain risks. Real assets can be tangible and intangible assets (Sudana, 2015: 3). In general, financial decisions based on the assumption of rationality. Rationality is a rational attitude so that every decision taken can be justified rationally. It can be interpreted that all decisions are based on careful consideration of various information relating to risk and return expectations.

In decision making, behavioral aspects play an important role in the decision making process. But management tends to be irrational, this behavior is called cognitive bias. Cognitive bias is a thought process that is not based on rational considerations and not accompanied by a good reason (Asri, 2013: 119-120).

Asri (2013: 120-121) states that several variables cause cognitive bias classified into three main

groups. The first group is behavior simplifying the decision-making process (heuristic) consists of availability, hindsight, and representativeness. The second group is the reaction bias to information consists of overreaction, conservatism, confirmation bias, anchoring and adjustment. The third group is the understanding bias of information and adjustment consists of excessive optimism, overconfidence, framing effects, disposition effects, and mental accounting.

The phenomenon of overconfidence is the tendency of unconscious decision-making by giving excessive weight to the knowledge and accuracy of the information held by the managers and ignoring available information in public. In decision making, overconfidence behavior is based on excessive optimism. Excessive optimism is the behavior of managers who have excessive confidence in making decisions. Managers tend to overestimate the frequency of successes and underestimate the frequency of failures (Asri, 2013: 143)..

Managerial overconfidence can influence corporate investment decisions, it is an important issue and interesting discussion in the financial literature. Overconfidence usually exists and is generally owned by everyone. In previous studies states that people tend to have too much confidence in the accuracy of their judgments. As people find out more about a situation, the accuracy of their judgments is not likely to increase, but their confidence does increase, as they fallaciously equate the quantity of information with its quality (Pompian, 2012: 201). Roll (2014) proposed that overconfidence is typical irrational behavior and company managers tend to show that behavior when they make business decisions.

Previous researches show that overconfidence tend to increase financial problems and management decisions become bias. (Heaton, 2002). However, previous studies have focused more on the impact of managerial overconfidence on the company's capital structure, external financing (equity financing and debt financing), debt maturity, and other corporate financial problems (Ayres *et al.*, 2007; Park dan Korea, 2009; Ron, Antonczyk dan Juliane, 2013; Marwan, 2018). In this study, we not only examine the effect of managerial overconfidence on investment scale, but also investment inefficiency (overinvestment and underinvestment problem).

Based on the description above about the effect of managerial overconfidence on corporate investment decisions, the problem of this research is "does managerial overconfidence has a significant effect on corporate investment (overinvestment and underinvestment) ?"

LITERATURE REVIEW

Managerial overconfidence is a management bias behavior that refers to over-estimating the ability of individual management. This bias arises because of psychological phenomena where expectancy of manager success probability inappropriately higher than the objective probability would warrant. It was predicted that factors from skill situations (competition, choice, familiarity, involvement) introduced into chance situations cause individuals to feel overconfident (Langer, 1975). Managers feel that their ability above the average ability of other managers, so corporate executives generally tend to be overconfident and overestimate their abilities, because they think that they have a strong commitment to their company. The performance of these executives is difficult to evaluate and they tend to believe that the company's performance within their control (Malmendier and Tate, 2005).

Overconfident managers systematically estimate excessive returns on company projects or estimate excess corporate profit income and predict cash flows that too optimistic or underestimate the possibility of corporate losses (Heaton, 2002; Malmendier and Tate, 2005).

Managers have discretion in determining the company's financial policies. This becomes important to examine the effect of overconfidence on company policies because overconfidence causes decisions that can ruin the value of the company (Heaton, 2002). Overconfident managers will

usually overestimate the company's future earnings (ROI) (Ahmed and Duellman, 2012).

So it can be concluded that managerial overconfidence is the attitude of managers in looking at a prospect with great confidence by overestimating the company's future earning and underestimate the company's risks. By the definitions explained earlier, managerial overconfidence can be measured using CEO's share holdings (Malmendier and Tate, 2005); Frequency of mergers and acquisitions (Doukas, 2007); Mass-media comments on managers (Brown and Sarma, 2007; Malmendier and Tate, 2008); Corporate earning forecast bias (Xia, Min dan Fusheng, 2009; Hribar dan Yang, 2016; He, Chen dan Hu, 2019); Executive compensations (Hayward and Hambrick, 1997) ; and Business survey index (Park dan Korea, 2009; Oliver, 2010).

Because of the many measurement options as well as the consideration of the availability of accurate data, researchers believe that the bias in estimating manager's earnings can be a proxy for managerial overconfidence. Overconfident managers tend to overestimate earnings estimates and company performance in the future. If the company's actual income in the current period is lower than the estimated revenue, the researcher categorizes it as an overconfident manager, with a dummy variable of 1, and 0 otherwise.

Corporate investment is the amount of money invested by companies to obtain future returns (Asri, 2015: 7). Meanwhile, according to Sudana (2013: 3), the investment decision of a company is the decision to allocate a certain amount of funds to a real asset in the hope of getting a return and be willing to bear certain risks.

Investment, when viewed in terms of efficiency, is divided into two, namely efficient investment and inefficient investment. According to Asri (2015: 8-9) proper or efficient investment is an investment that generates a positive net present value, in other words, the amount of cash inflows exceeds the number of cash outflows. Investment efficiency is related to how efficient investment management is carried out by managers. Two general models are used to measure investment efficiency. One of them was proposed by Vogt (1994), use the interactive term cash flow and investment opportunity (Tobin's Q). The second was proposed by Richardson (2006), which divides the company's total investment into expected investments and unexpected investments. Determinants of investment include investment growth opportunities, leverage, company age, company size, cash balance, industry fixed effects, and annual fixed effects. Unexpected investment is measured by the difference between the total investment and the expected investment. In this study, the Richardson model is used and develops the expected investment as follows:

$$INV_t = \alpha_0 + \beta_1 Q_{t-1} + \beta_2 Cash_{t-1} + \beta_3 Age_{t-1} + \beta_4 Size_{t-1} + \beta_5 Lev_{t-1} + \beta_6 Ret_{t-1} + \beta_7 INV_{t-1} + \varepsilon \qquad (1)$$

Where *INV* is total investment expenditure in current year t, calculated as the sum of fixed assets and long-term investments, all deflated by total assets; Q_{t-1} is growth opportunities in the previous year, represented by Tobin's Q; $Cash_{t-1}$ is the balance of cash and short-term investment divided by total assets measured at the beginning of the year; Age_{t-1} is the company's age since being established; $Size_{t-1}$ is the size of the company, measured by natural logarithm of total assets at the start of the year; Lev_{t-1} is the financial leverage in the previous year, expressed by total debt ratio; Ret_{t-1} is the rate of stock return for the year before investment year; and INV_{t-1} is total investment expenditure scaled by total assets in previous year.

Following Richardson (2006), the predicted value in model 1 is the proxy for the expected

investment in year *t*. Positive residual represent overinvestment and negative residual represent underinvestment. In this paper uses absolute residual as the degree of underinvestment. As the larger absolute value represent more severe the underinvestment. We rank the groups of overinvestment and underinvestment from high to low and select top 75% of each group. The remaining is defined as a efficient investment sample.

Previous researches have found that companies with overconfident managers will have higher investment than companies that are not led by overconfident managers. Therefore, companies led by overconfident managers will increase overinvestment problems or reduce underinvestment problems (Heaton, 2002; Malmendier and Tate, 2005; Thi and Dong, 2013; He et al, 2019).

Based on the study of the theory above, the hypothesis in this research are :

managerial overconfidence has positive effect on investment scale, managerial overconfidence has positive effect on overinvestment, and managerial overconfidence has negative effect on underinvestment.

RESEARCH METHOD

The data used in this study are secondary data, namely data obtained from the Indonesian Capital Market Directory (ICMD), financial statements and annual reports of the company, as well as other relevant sources of information. The period of this research is 7 years consisting of the period 2012 to 2018. The sampling technique uses purposive sampling method. Companies included in the sample criteria include: non-financial companies listed in Indonesia Stock Exchange (IDX) during research period, companies that publish annual financial statements that end on 31 December 2012-2018, and companies which report earning forecast.

The data in this study are unbalanced panel data, where the number of observations in each sample is not the same (Gujarati and Porter, 2009: 25). The total samples that eligible of the criteria are 127 companies with a total of 626 observations.

The variables used in this study consist dependent, independent, and control variable. The dependent variables are investment scale, overinvestment and underinvestment; independent variable is managerial overconfidence; and control variables namely size, Tobin's Q, leverage, and earnings per share. A description of the operational variable and formula of each variable is examined in Table 1.

Table 1. Description of Variables

Variable	Symbol	Definition
Investment	INV	$\dfrac{\text{Fixed Assets}}{\text{Total Assets}}$
Overinvestment	OverINV	Top 75% positive residual of regression model that was proposed by Richardson
Underinvestment	UnderINV	Top 75% negative absolut residual of regression model that was proposed by Richardson
Managerial Overconfidence	OC	Dummy variable 1, if managers overestimates their firms' future earnings, otherwise it is 0

Tobin's Q	Q	$\dfrac{\text{Market Value of Equity} + \text{Book Value of Debt}}{\text{Book Value of Assets}}$	
Leverage	Lev	$\dfrac{\text{Total Debt}}{\text{Total Assets}}$	
Earning Per Share	EPS	$\dfrac{\text{Net Income}}{\text{Total Outstanding Shares}}$	We contruct the following equation to
Company Size	Size	Natural logarithm of total assets	

test the impact of managerial overconfidence on the corporate investment:

$$INV_{i,t} = \beta_0 + \beta_1 OC_{i,t} + \beta_2 Q_{i,t} + \beta_3 Lev_{i,t} + \beta_4 EPS_{i,t} + \beta_5 Size_{i,t} \dots \dots \dots \dots \dots \dots (2)$$
$$Over_{i,t} = \beta_0 + \beta_1 OC_{i,t} + \beta_2 Q_{i,t} + \beta_3 Lev_{i,t} + \beta_4 EPS_{i,t} + \beta_5 Size_{i,t} \dots \dots \dots \dots \dots (3)$$
$$Under_{i,t} = \beta_0 + \beta_1 OC_{i,t} + \beta_2 Q_{i,t} + \beta_3 Lev_{i,t} + \beta_4 EPS_{i,t} + \beta_5 Size_{i,t} \dots \dots \dots \dots (4)$$

This study uses the Ordinary Least Square estimation method with the statistical tool Stata version 14 with several stages. First, conducting a Hypothesis Test using the t-test (Partial Test). The T-test is intended to test whether an independent variable influences or not on the dependent variable. The t-test conducted in this study was a one-tailed t-test because the direction of the independent variable to the dependent variable is known.

The next step is to calculate the coefficient of determination (R^2). The coefficient of determination (R^2) shows a proportion of the variance that can be explained by the regression equation for the total variance. This is intended to see how the goodness of fit in this model is formed (Gujarati and Porter, 2009: 201).

The final step is to conduct a robustness test with the Maximum Likelihood estimation method. Robustness test is used to see the consistency or resilience of the results of research with the same number of observations and variables, but with different estimation methods.

RESULTS AND DISCUSSION

Table 2. Descriptiveve Statistics Panel A (*Full Sample*)

Variable	Observations	Mean	Standard Deviation	Minimal	Maximal
INV	626	0,517	0,227	0,0005	0,9581
OC	626	-	-	0	1
Q	626	1,527	1,575	0,1098	18,167
Lev	626	0,505	0,297	0,0074	3,029
EPS	626	170,685	437,18	-705,412	3697,46
Size	626	28,689	1,624	25,042	32,376

Source: STATA output data that has been processed

Table 3. Descriptive Statistics Panel B *Investment Inefficiency*

Variable	OverINV		UnderINV		OverINV		UnderINV	
					OC = 1	OC = 0	OC = 1	OC = 0
	Mean	Std	Mean	Std	Mean	Mean	Mean	Mean
INV	0,78	0,83	0,65	0,75	0,09	0,05	0,06	0,07
Q	1,41	1,27	1,73	2,04	1,40	1,42	1,78	1,69
Lev	0,48	0,27	0,52	0,33	0,46	0,51	0,53	0,50
EPS	144,2	434,9	186,3	414,4	120,55	181,58	94,99	278,97
Size	28,73	1,59	28,36	1,60	28,58	28,97	28,11	28,62
N	212	-	256	-	130	82	129	127

Source: STATA output data that has been processed

Table 2 & 3 reports descriptive statistics of the main variables in all research samples. Panel A shows that there were 626 observations from 2012 to 2018. Panel B shows 75% of the sample is an inefficient investment. There are 468 inefficient investment samples include 212 samples are classified as overinvestment and 256 samples are underinvestment. In overinvestment samples, there are 130 companies with overconfident managers. The percentage of managerial overconfidence (OC = 1) is 61,3% (130/212) and 38,7% (82/212) in the others. In underinvestment samples, there are 129 companies with overconfident managers. The percentage of managerial overconfidence (OC = 1) is 50,4% (129/256) and 49,6% (127/256) in the others. Regression results from the t-test (partial) in Table 4 shows that the managerial overconfidence coefficient is 0.0377 and t value is 2.16 in all samples. Managerial overconfidence has a positive effect on investment scale on the significance level at 5%.This indicates that overconfident manager on average have a higher investment of 0.0377 than managers who are not overconfident. This result supports hypothesis1. Control variables include Tobin's Q,leverage, and earnings per share have a significant negative effect on investment. While the size of the company has a significant positive effect.

Tabel 4. Estimation Result Using Ordinary Least Square

Variable	INV		OverINV		UnderINV	
	β	T	B	T	B	T
OC	0,03772**	2,16	0,0335***	2,96	-0,0212**	-2,22
Q	-0,0121**	-2,22	-0,0009	-0,23	0,0033	1,43
Lev	-0,0714**	-2,44	-0,0618***	-2,82	-0,0245*	-1,73
EPS	-0,0001***	-3,06	-0,0000	-0,50	-0,0000	-1,02
Size	0,4747***	8,63	-0,0031	0,41	-0,0048	-1,57
R^2	0,1251		0,1027		0,0468	
N	626		212		256	

Note : "***","**","*", indicate the value is significant at 1%, 5%, 10% level
Source: STATA output data that has been processed

In overinvestment companies, overconfident managers have a significant positive effect. The coefficient of overconfidence on investment scale is 0.335 and t value is 2.96. This indicates that overconfident managers tend to invest more than not overconfident managers. This result also supports hypothesis 1a. Furthermore, the regression results on the underinvestment company, overconfident manager variable show a negative effect on investment scale with a coefficient -0.219 and an absolute value of t is 2.22. This indicates that overconfident managers will encourage efficient investment in underinvestment companies. Overconfident managers tend to increase their

investment so that the underinvestment problem will decrease. This result also supports hypothesis 1b. Control variables include Tobin's Q, earnings per share, and size have no significant effect on overinvestment and underinvestment, while the leverage variable consistently has a significant negative effect. These results indicate that debt has a controlling function. Debt holders or banks can influence companies to reduce investment with projects that have a negative NPV and will encourage companies to invest in projects that have a positive NPV, in other words, debt can encourage companies to invest efficiently.

Tabel 5. Estimation Result Using Maximum Likelihood

Variable	INV		OverINV		UnderINV	
	β	Z	B	z	B	Z
OC	0,03772**	2,17	0,0335***	3,01	-0,0212**	-2,24
Q	-0,0121**	-2,23	-0,0010	-0,23	0,0033	1,45
Lev	-0,0714**	-2,45	-0,0618***	-2,86	-0,0245*	-1,75
EPS	-0,0001***	-3,08	-0,0000	-0,69	-0,0000	-1,03
Size	0,4747***	8,67	-0,0032	0,40	-0,0048	-1,59
R^2	0,1251		0,1027		0,0468	
N	626		212		256	

Note : "***","**","*", indicate the value is significant at 1%, 5%, 10% level
Source: STATA output data that has been processed

Based on the results of regression calculations, the R square value in all company samples is 0.125. This can be interpreted that as much as 12.5% change from investment variables can be explained by managerial variables overconfidence, leverage, size, Tobin's Q, and earnings per share, while the remaining 87.5% is explained by other variables outside the research model. R square value in the sample of overinvestment companies is 0.103. This can be interpreted that as much as 10.3% change from overinvestment variables can be explained by managerial overconfidence, leverage, size, Tobin's Q, and earnings per share variables, while the remaining 89.7% is explained by other variables outside the research model.

Furthermore, the R-square value in the underinvestment company sample is 0.047. This means that a 4.7% change from the underinvestment variable can be explained by managerial overconfidence, leverage, size, Tobin's Q, and earnings per share variables, while the rest is explained by other variables outside the research model. The next step, we will conduct a robustness test with the Maximum Likelihood Estimation model. Testing is done with the same number of variables and observations. The purpose of the robustness test in this study is to obtain strong and consistent results. Based on the results of the robustness test in table 5 indicates that all research variables are valid and provide consistent results whether tested using the Ordinary Least Square (OLS) model or the Maximum Likelihood Estimation (MLE).

The results of this study support our hypothesis that managerial overconfidence causes more investment scale, increases overinvestment and reduces underinvestment problem. Managers who overconfident will expand their business scale because they strongly believe that company have a good prospect in a future and ignore the probability of failure. This result aslo supoort previous

studies which found that overconfident managers tend to overestimate return on investment. These effects will encourage companies to make more investments without careful consideration, which will increase overinvestment and will reduce underinvestment (He et al, 2019).

CONCLUSION

Based on the discussion above, it can be concluded that overconfident managers will influence investment decisions and investment efficiency. Overconfident managers will expand business investment, reduces underinvestment, and thus improves investment efficiency. However, it can also lead to overinvestment. These results support the perspective of behavioral finance that suggests that decisions are taken to become cognitive biases when managers are irrational.

These findings help us to understand the mechanism of managerial overconfidence and corporate investment. These results not only enrich the literature and empirical research, this provide practical policy implications for enterprises to improve investment efficiency and address the importance of supervision of managerial behaviors, property-rights systems, and corporate governance. A manager whose incentives are perfectly aligned with shareholders and who does not face any informational asymmetries may still overinvest or underinvest if he/she is overconfident. The manager believes that he/her is acting in the best interest of shareholders. Thus, refined corporate governance structures, use of external financing or involving a more active board of commissioner may be necessary to achieve efficient investment levels.

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