경영학석사 학위논문

The Effect of Peer Information on Investment Decision

동종기업의 정보가 기업의 투자의사결정에 미치는 영향

2016년 2월

서울대학교 대학원

경영학과 회계학 전공

정 태 진

The Effect of Peer Information on Investment Decision

Jung, Taejin

College of Business Administration

The Graduate School

Seoul National University

ABSTRACT: Recent researches on many areas of economics and finance focus on peer effects. By testing the peer effect in investment field, I find that peer firms' real operational decisions play an important role in determining own firms' real investment decisions (e.g., Investment). Prior evidence that firms are affected by industry peers leaves an unaddressed question whether this peer effect makes a firms' investment more effective. I show that highly sensitive firms that react more to peer firms are likely to underinvest or overinvest. In addition, I also find that accounting quality can play a moderating role in the sensitivity of mimicking action through the shareholders' monitoring effect.

Keywords: *peer effect, spillover effect, mimicking action, accounting information sharing, investment decision, investment, corporate governance, accounting quality*

Student Number: 2013-20533

Table of Contents

List of Tables

1. INTRODUCTION

Recent literatures show evidence that firms are affected by other firms' characteristics or decisions, which is called the peer effect or spillover effect (hereafter "peer effect"). Prior to these recent literatures were published, most researches assumed that firms' decisions were independent from their peers' characteristics or decisions. In other words, firms were regarded to behave according to their innate attributes(LEARY and ROBERTS, 2014). Researchers have largely ignored or assumed that the effects of peer firm characteristics or behavior had minimal effect on the firm level.

However, a growing body of recent literature has shown that indeed firms are affected by each other. For example, peer firms play an important role in determining corporate capital structure and financial policies (Leary and Roberts, 2014). Also, firms are more likely to split their stock if their peer firms have recently done so (Kaustia and Rantala, 2015).

As for corporate investments, there has been little research on how one firm's accounting information affects other firms' real investment behavior. Beatty et al.(2013) does demonstrate "the adverse effect of bad accounting" by examining the spillover effect of fraudulent financial reporting information on peer firms' investments. Furthermore, Kumar and Langberg(2010) develop a rational expectations model where peers increase investments as an equilibrium response to the industry leader's inflated productivity report. Another research looking into the peer firm effect in investment decisions, Badertscher et al.(2013) show that greater public firm presence within an industry reduces uncertainty of the industry. Thus, private firms are more responsive to

their investment opportunities when they operate in industries with greater public firm presence. Firms are constantly searching for new investment opportunities to sustain its growth. Securing profits from these investment opportunities is crucial in enhancing firm value. Therefore, the peer effect should be a key factor in investment decisions.

But there is little systematic evidence on how peer firms' investment affects other firms' real investment behavior directly. In this study, I extend the literature by directly showing the effect of peer firms' investment on the focal firm's investment decisions. Through various analyses, I try to find the evidence of peer effects in the investment field.

Based on prior literature, I hypothesize that investment decisions made by industry peers affect the investment decision of industry firms. To test this hypothesis, I examine the effect of peer firms' investment on firms' investment after 1964 for each Fama-French industry classification. I find significantly positive effect of peer firms' investment on the focal firms' investment decisions.

But as investment decision is key decision and made internally by management and its complicated characteristics, it is difficult to directly measure the effect of peers on the focal firms' investment. So, I supplement the main test with several additional tests to mitigate issues such as measurement error, reverse causality and omitted variable concerns. First, I add some macro variables as control variables of firms' own investment decisions. After controlling these macro variables, I still find a significantly positive association between the peer firms' investment and the focal firms' investment, especially for capital expenditure. Second, I changed the dependent variable from capital

expenditure to R&D expenditure, acquisitions, and sum of these expenditures to find robust results of peer firms' investment on the focal firms' investment. The peer firms' investment effect remain significant with all dependent variable. Further, to mitigate concerns that an unobserved time-invariant characteristics confounds the main results, I re-examine with change variables but results are same. Third, to address the concern that results indicate mere association but not causation, I additionally analyze the lead-lag analysis between peer firms' investment and focal firms' investment. By showing that peer firms' investment decisions have less impact as the time difference between peer firms' investment and focal firms' investment increases, I find that there is a causal relationship between peer firms' investments and own firm's investments. Lastly, since firms are likely to have more limited resources and be more timid about investing in a recession period, I try to find the evidence for my hypothesis by singling out the non-recession period. Results remain similar in the non-recession period.

After documenting that peer firms' investment affect the own firms' investment, I then consider cross-sectional variations in peer effect. By examining which firms within an industry are more or less sensitive to their peers' investment decisions, I find that firms with smaller size, higher leverage, less growth opportunities, and lower cash balances are likely to be more sensitive to their peers. Prior literature also shows that smaller, less successful (e.g., lower profitability), and more financially constrained firms are sensitive to their peers' financial policy (LEARY and ROBERTS, 2014).

Based on the herding effect theory, I further examine whether the peer effects are more prominent in industry followers. Results indicate decisive differences between

leader and followers which are classified according to the sales portion in the industry. Followers are more sensitive to leader firms' investment than leader firms' sensitivity to the follower firms. Additionally, I look into the investment efficiency of follower firms and find that mimicking sensitivity to the follower firms is negatively associated with investment efficiency. This investment efficiency model used in Biddle et al.(2009) shows that firms with higher mimicking sensitivity are more prone to over- or under-investment. This is evidence that managers make inefficient investment decisions when they merely react to peer firms' investment. Shedding light on the underlying mechanism behind the visible peer effect, I find some evidence that peer effects are originating from the herding effect related to the managers' incentives.

Finally, as a way to mitigate the inefficient investment decisions of managers, I examine the effect of corporate governance mechanisms and accounting quality to mimicking sensitivity of firms. I find little evidence of the impact of corporate governance in reducing the mimicking sensitivity of firms when using Gompers et al. (2003)'s G-score, a widely used measure of corporate governance. This is consistent with prior literature finding that Gompers et al. (2003) G-Score does not influence investment efficiency (Biddle et al, 2009). On the other hand, accounting quality, measured by the modified Jones model (1995) and the Performance-matched modified Jones model, has a negative effect on the mimicking sensitivity, thereby possibly alleviating managers' inefficient decisions.

This study has a number of important contributions. First, the results shed light on the direct association between peer firms' investment and own firms' investment. Second, I

provide evidence that these mimicking behaviors are more sensitive when the firms are follower firms in the industry. Furthermore, I also find that investment decisions sensitive to peer firms' investment are likely to be inefficient investments. Finally, I suggest a possible mechanism of mitigating this inefficient investment with accounting quality.

Through these various analyses, I expand prior studies by illustrating the integrated effect of peers' operational decisions to the focal firm's investment and also accounting quality, thereby expanding existing literature in this area. In this sense, I expect this study to provide valuable insight for academics and managers about the importance of peer effect.

2. HYPOTHESES DEVELOPMENT

In this section, I develop empirical hypotheses regarding the effect of peer firms' investment on own firms' investment decisions. According to the classical investment framework, firms invest until the marginal benefits of investment equals the marginal cost (Yoshikawa, 1980; Hayashi, 1985; Abel, 1983). Thus managers try to finance all positive net present value projects with debt or equity. However, the literature also recognizes the possibility that firms may depart from the optimal level of investment and either over- or under- invest. Well-known factors such as moral hazard and adverse selection, caused by the existence of information asymmetry between managers and outside suppliers of capital, can affect the efficiency of capital investment (Biddle et al., 2009). But there is also the inherent uncertainty surrounding management investment

decisions, and due to information asymmetry, investors cannot be fully knowledgeable of the managers' decision process. Thus inevitably, managers will be attentive to peer firms' investments in order to reduce the market uncertainty of their investment and to distinguish between favorable and unfavorable investments. So, I hypothesize that peer firms' investment decision in prior years will affect managers' investment decisions in the current year and will increase or decrease the managers' investment in the current year.

H1. Peers' Investment in the previous year is positively related to investment in the current year.

Assuming that managers do indeed consider peers' investment information when deciding the level of investment, the ensuing investments could be either efficient or inefficient. If the peer firms' investment is a proxy for growth opportunity within the industry and managers correctly capitalize on these opportunities, then the investment decisions will not negatively impact the investment efficiency through under or overinvestments. However, if the manager's investment decisions are blindly following peers' decisions due to information asymmetry or the lack of better judgement or innovative ideas, the subsequent investments would be suboptimal. With general information asymmetry theory, managers maximizing their personal welfare are inclined to make investments that are not in the best interests of shareholders (Jensen and Meckling, 1976). So, I hypothesize that higher sensitivity firms to the peer firms'

investment decisions are likely to lead to more inefficient investment decisions.

H2. Mimicking sensitivity of firm's investment to the peer firms' investment is more likely to be associated with over- or under- investment.

According to Biddle et al.. (2009), financial reporting quality has a positive effect on investment efficiency. Firms with higher financial reporting quality are also found to deviate less from predicted investment levels and show less sensitivity to macro-economic conditions. I apply this connection to the mimicking sensitivity of peer firms' investment and hypothesize that higher financial reporting quality mitigate the mimicking sensitivity to peer firms' investment.

H3. Higher financial reporting quality reduces the mimicking sensitivity of peer firms' investment decisions.

3. RESEARCH DESIGN

3.1 Sample construction and definition of peer firms

To test whether peer firms' investment affect focal firm managers' investment decisions, I use 125,154 firm-year observations extracted from the Compustat database for the year 1964 to 2014. All data definitions are presented in the Appendix A. Specifically, I define peer firms as firms within the same Fama-French industry category for industry classification in each year. I delete firm-year observations missing data for

any of the variables used in the estimation process. I also exclude financial institutions (SIC code 6000~6999) because financial institutions' investment behaviors are different from other industries (Beatty et al.,2013).

All variables used throughout this study are presented after winsorizing all variables at 1st and 99th percentiles. I winsorize to mitigate the influence of extreme observations and eliminate any data coding errors.

3.2 Peer effect model

To test my hypotheses that peer firms' investment affect the focal firm's investment decisions, I run the following OLS regression model.

$$Capex_{i,t} = \beta_0 + \beta_1 Capex_{i,t-1} + \beta_2 Capex_{-i,t-1} + Controls + \varepsilon_{i,t}, \quad (1)$$

$Capex_{i,t}$ is the capital expenditures for firm *i* for year *t*, divided by the total asset at the beginning of the year and $Capex_{i,t-1}$ is the capital expenditures for firm *i* for year *t-1* reflecting the effect of lagged year's capital expenditures. $Capex_{-i,t-1}$ is the peers' average capital expenditures defined by the Fama-French 48 industry categories except for firm *i* of year *t-1*, and *Controls* is the set of control variables.

I estimate equation (1) using ordinary least squares (OLS). I adjust the standard errors for heteroscedasticity, serial-, and cross-sectional correlation using two-dimensional clusters at the firm and year level. This technique is proposed by Peterson (2009) as the preferred method for estimating standard errors in corporate finance applications using

panel data (Biddle et al.,2009). I also include industry fixed-effects using the Fama and French (1997) 48-industy classification to control for industry-specific shocks to investment. I also check the sensitivity of my results to clustering by firm. I find that one-way clustering does not change the results.

As the basis for generating future cash flow for the firm, investment decisions are one of the most important decisions of the firm. I included additional control variables to control the factors that are already known to be related to investment. First, I include control variables that are used in the regression model of Beatty et al.(2013), which are firm size, the market-to-book ratio, firm leverage, and existence of S&P ratings, leverage, sales growth and operating cash flow. Following prior literature (e.g., Biddle and Hilary (2006), Biddle et al.(2009), and Beatty et al.(2010)), I additionally control for factors found to be related to capital investments such as profitability(ROA), cash, bankruptcy risk(Altman Z-Score(1968)), tangibility, dividend payout ratio, and whether firms are loss firms.

Additionally, I included average sales growth of industry excluding the focal firm's own sales growth as an additional control variable, since peer growth affects the focal firm's growth. Despite the fact that corporate finance literature often uses Tobin's Q as a proxy for industry growth (Hubbard, 1998), I used sales growth as the proxy for peers' growth because the panel data used in this paper is not classified into public or private firms.

Finally, in order to control for macro-economic factors which could affect the overall investment decision, I add the 90-day T-bill rate, Inflation, and GDP growth as control

variables to control for the overall economic environment (Baghai et al., 2013).

[Insert Table 1 about here]

4. MAIN EMPIRICAL RESULTS

4.1 Descriptive statistics

Table 1 presents descriptive statistics. The sample include 125,124 firm-year observations. The summary statistics resemble those reported in related studies. The average rate of capital expenditures (capital expenditures divided by lagged total asset) is 7.6%. The average rate of R&D expenditures is 4.5% and the average rate of Acquisition is 2.3%. The non-capex expenditures consist of R&D expenditures and acquisitions placed in the Cash-Flow Statement. Peer Firms' capital expenditure or non-capex expenditures are slightly larger than focal firms' capital expenditures and non-capital expenditures.

[Insert Table 2 about here]

4.2 Main empirical results.

Table 2 shows the regression results after adding the different groups of control variables. With any control variable set, the regression results are not greatly different.

With table 2 result, I estimate main regression model. Table 3 reports the main regression model results. Consistent with H1, the first model in Table 3 shows that industry peers' capital expenditure is positively related to the own firms' capital expenditure. β_2 , which shows the association between industry peers' capital expenditure of the previous year and focal firm's capital expenditure of the current year

is positive and significant (t-statistic of 3.952). Moreover, compared with the relationship to the firms' own investment level in the prior year, the sensitivity of a firm's current investment to its peers' past investment is about one third of its own past investment. Therefore, this is strong evidence that supports the positive and significant impact of peers' investment decisions.

In the remaining columns of Table 3, I check the robustness of these findings to changes in the initial specifications. In column 2 and column 3, I change the dependent variable from capital expenditures to non-capital expenditures such as R&D and acquisitions, following the work by Richardson (2006). Additionally, I use the sum variable of these capital expenditures and non-capital expenditures as a robustness measure of investment. I re-estimate the main model using these three alternative measures. The β_2 estimate of each alternative variable shows the positive and significant association between peer firms' investment and focal firm's investment. When I use acquisition expenditure as the dependent variable, the coefficient estimates are larger than when using capital expenditure. Moreover, compared with the sensitivity to the firms' own acquisition expenditure level of the previous year, the sensitivity of a firm's current acquisition expenditure to its peers' past acquisition expenditure is more important than its own past acquisition expenditure.

Overall, the results in Table 3 highlight that the investment of a firm is positively and significantly correlated with the peer firms' investment.

[Insert Table 3 about here]

4.3 Change analysis

Although main results shows the positive and significant association between peers' investment and own firm's investment, a more cautious approach is needed because of complicated managerial decisions such as investment usually affected by many other factors. So, to address this concern, I examine several tests to show that the association between peers' investment and a firms' investment is robust.

First, I re-examine main results using a changes specification to mitigate concerns that an unobserved time-invariant characteristics confounds the main results. Moreover, managers' sensitivity to the peers' investment is more visible when variables used based on change specification because sensitivity implicitly means the reaction to the changes of peers. For the changes specification, I compute the change in investment measures, peer firms' investment, and control variables from 1964 to 2014 and re-estimate the main regressions. Since I use the change in variables of interest over the entire period rather than using annual changes, sample size drops to 116,187 observations, where each observation represents a unique firm.

Table 4 presents the results for the change specification. The result indicates the coefficient for the peers' investment is positive and significant across three investment proxy variables except for R&D expenditure. When a dependent variable is the change in capital expenditure, the change in the acquisition expenditure, and sum of capital and non-capital expenditures, the coefficient for the peers' investment is significant at 1% level, but insignificant when the dependent variable is R&D expenditure. Interestingly, the coefficient of a firms' investment of the previous year have significant and negative

association with a firm's investment. I interpret this result as the limited investment resource capacity of firms. Investment often fluctuates as a firm may increase investment and then decrease investment subsequently. Thus, the negative significant coefficient of β_1 reflects the realistic investment behavior of firms. Taken together, these results indicate that a change in peers' investment is positively associated with the change in the responsiveness of a focal firm's investment.

[Insert Table 4 about here]

4.4 Lead-lag results

Another analysis that used to mitigate reverse causality or omitted variables concerns is lead-lag analysis. Since investment is relatively long decision-making compared to other operational decisions, the effect of peer's investment likely to go to the long period rather than just one year after the peer's investment. In Table 5, I report the results of the investment models where I set the dependent variable as capital expenditure, R&D expenditure, and acquisition expenditure two years after the peers' investment and three years after the peer's investment. Interestingly, the coefficient on $Investment_{-i,t-1}$, which captures the effect of peers' investment two years before firms' investment or three year before firms' investment is not significant when the dependent variable is capital expenditure. In addition, the coefficient become smaller as timing differences between peers' capital expenditure and a firm's capital expenditure become longer. This suggest that the effect of peer firms' capital expenditure become weaker as time goes by. So only one year after peer firms' capital expenditure, firms react to this investment

more significantly.

In the perspective of R&D expenditure, situation is somewhat different. The coefficient on $Investment_{-i,t-1}$ is positive and significant for all period. It means that R&D expenditure have long term effect compared to capital expenditure. When the dependent variable is acquisition, the coefficient on $Investment_{-i,t-1}$ is positive and significant in t+1 year, but the significance disappeared in t+2 year.

Overall, the result in table 5 shows that peer effect of peers' investment exists depends on the type of investment and investment period. This suggest that firms are react to peers but the effect of react is decreased as the timing differences between peer firms' investment and own firm's investment getting longer.

[Insert Table 5 about here]

4.5 The effect of Recession period

As mentioned above, investment is the most important decision that managers should consider for the future performance. Since managers have limited resources to put on, they should increase caution about growth opportunities. So, in the recession period, managers have limited resources and don't have room for peer effect which means they should be more careful about investment opportunities and peer effects of investment decision would be decrease. So, I re-examine results using the sub-sample analysis. I recognize the recession period based on WorldBank data. Table 6 shows the results.

When the dependent variable is capital expenditure, recession period make peer effects disappeared. It means that in the recession period, firms don't have any room for

capital expenditure and their first priority is survive, not future profitability. The coefficient on $Investment_{-i,t-1}$ is insignificant (t-stat=-0.803). But in non-recession period, the coefficient on $Investment_{-i,t-1}$ is positive and significant which means that in the non-recession period, managers or firms have a lot of resources and try to find the growth or investment opportunities from their peers. To the methodological strength, I test the coefficient equality on $Investment_{-i,t-1}$ and they are significantly different.

In the case of R&D expenditure, the effect of recession period is not as much like capital expenditure. But recession period coefficient on $Investment_{-i,t-1}$ is smaller than non-recession period coefficient although it still remain significant. I test the coefficient equality on $Investment_{-i,t-1}$ and find that they are significantly different (p-value=0.0241).

For the acquisition variable, situation is similar to the R&D expenditure. Recession period coefficient on $Investment_{-i,t-1}$ is positive and significant (t-stat=4.464) and non-recession period coefficient on $Investment_{-i,t-1}$ is positive and significant also (t-stat=10.838). But the coefficient of $Investment_{-i,t-1}$ is significantly different between recession period and non-recession period (p-value<0.0001).

Taken together, the results in table 6 shows that according to the economic condition, there are some different trend in the peer effect between recession period and non-recession period. It is the evidence that in the recession period, managers don't see peers investment as a growth opportunities. But in the non-recession period, managers see peers' investment as a growth opportunities and try to invest to capture the growth

opportunity they think.

Overall, I tried to show the association between peers' investment and own firm's investment. Since investment is very critical and salient decision for a firm, managers try to capture the growth opportunities by industry peer firms' investment. Nevertheless, to show a relation or association between own investment and peer firms investment is somewhat hard to control. With various analysis, from use of control variable to the lag-lead analysis or change analysis, I try to shed light on the causality and control variables.

From now on, I turn to the other perspective that mimicking behavior of investment decision or managerial decision.

[Insert Table 6 about here]

5. WHY FIRMS MIMIC ONE ANOTHER?

Given the importance of peer firm behavior for firm's investment decision, I now turn to why firms mimic one another. I begin with a brief discussion of the potential mechanisms behind the estimated peer effects, which I use to guild the subsequent empirical analysis.

5.1 Theoretical Motivation

Motivation for mimicking behavior in capital structure comes from rational herding model (Devenow and Welch, 1996). According to Zeckhauser et al. (1991), managers' tendency of free-riding information or relative performance evaluation may lead to heard behavior in capital structure policies (LEARY and ROBERTS, 2014). As shown

by Banerjee (1992) and others, when a firm's own signal is noisy and optimization is costly or time-consuming (Conlisk, 1980), managers may rationally put more weight on the decisions of others than on their own information. This is especially likely when other firms in the industry are perceived as having greater expertise (Bikchandani, Hirshleifer, and Welch, 1998). Indeed, Devenow and Welch (1996) note that informational cascades may explain the decisions of managers to assume debt because, without a good model of why firms do so, managers may infer the best choice from peer companies. In addition, managers need not completely ignore their own information, as occur in the limit in sequential informational cascade models. As a result, their decision will be pulled toward those of their peers, relative to what it would be if they relied solely on their own information.

Above discussion could be applied to investment decision. Managers have limited information so they try to free-ride in information acquisition or relative performance evaluation for managers may lead to herd behavior in investment decision.

Managers may also mimic other firms' policies to influence their perceived relative quality in the labor market. In the model of Scharfstein and Stein (1990), higher quality investment managers receive correlated signals about investment opportunities, while lower quality managers receive independent signals. Managers therefore mimic the investment choice of others in order to increase their perceived type. In this environment herding is more important than making efficient investment choices because blame is shared in the event of a bad outcome. Zwiebel (1995) shows that corporate managers' type are inferred from their relative performance. Because managers perceive to be

below a cutoff type are fired, they prefer to mimic the investment choices of others to minimize the volatility of their relative performance.

5.2 Empirical Results

To shed light on the potential mechanisms behind peer effects in investment decision, I examine differences in the coefficient of peer firm's investment. To see the result more visible, I focus attention on the change in investment measures as a dependent variable. Specifically, I divided the sample into three groups based on firm characteristics and compare the coefficient equalities between upper thirds of each characteristics with lower thirds of it.

I choose four different accounting information that is representative of firms' characteristics. Firm size is already known to be related characteristics to the investment. From investment efficiency literature, firms with high leverage are more likely to suffer a debt overhang problem that will force them to under-invest (Myers, 1977; Biddle et al., 2009). So I divide sample into three groups with a rank of leverage. Market-to-Book ratio is a measure that related to growth potential. And finally, firms without cash are more likely to be financially constrained. Alternatively, firms with large cash balances are more likely to face agency problems and to over-investment (Jensen, 1986; Blanchard et al., 1994; Opler et al., 1999).

In table 7, I examine whether some firms within the industry are more or less sensitive to their peers' investment. For each industry-year combination, I rank firms into three groups based on firm-specific characteristics and focus on low and high thirds

of the distribution of continuous variables. These results suggest that mimicking behavior is strongest among those firms with the greatest learning motive and perhaps the greatest need to build reputation.

I only tabulated the result when the dependent variable is capital expenditure. The results shown that small size, high levered, low market-to-book ratio, low excess cash firms have high sensitivity to their peers' investment. For sub-size sample, mimicking coefficient of large firms is 0.172 which is significantly smaller than small firms' coefficient, 0.267. For sub-leverage sample, mimicking coefficient of high-levered firm is 0.269 which is significantly higher than low-levered firm's coefficient 0.182. For sub-MTB sample, mimicking coefficient of high-MTB firm is 0.1829 which is significantly smaller than lower-MTB sample coefficient 0.291. Finally, for cash subsample, high cash balance firms' coefficient is 0.141 significantly smaller that low cash balance firms' coefficient, 0.281.

Based on above results, I find that on average, smaller, high levered, less growth-opportunity, low excess cash firms are more sensitive to the peer firms' investment change.

[Insert Table 7 about here]

5.3 Leader-follower analysis

Next question is to find that which firms are mimicked by peer firms. Although there is significant and positive association between peer firms' investment and own firm's investment, to verify following analysis more detail is important. So, I examine directly

whether peer firm relevance is driven by a leader-follower model because less successful firms are more sensitive to more successful firms. To examine this association, I classify firms within each industry-year into two groups based on sales ratio of each firm to the industry-year. And I call each group leader and follower, respectively. I define two groups by sorting firms within each industry-year into five groups based on sales ratio. Follower firms are those firms in the bottom 80% and leaders are those firms in the top 20% of the distribution.

In table 8, I use two different dependent variables which is capital expenditure and changes in capital expenditure. When dependent variable is capital expenditure, leader firms' coefficient to the follower firms' capital expenditure is 0.0673 which is significantly smaller that follower firms' coefficient to the leader firms' capital expenditure, 0.1766. And the test of coefficient equality on peers' investment is highly significant, showing that two coefficients are significantly different with each other. When the dependent variable is changes in capital expenditure, the result is not so different. Leader firms' coefficient to the changes in followers' capital expenditure is 0.1108 which is significantly smaller than follower firms' coefficient to the changes in leaders' capital expenditure, 0.309. And the test of coefficient equality on peers' investment is highly significant, showing that two coefficients are significantly different with each other. The results show that the investment of follower firms are more sensitive to the leader firms' investment compared to the leader firms' sensitivity to the follower firms.

Taken together, I find that these results do not reject a herding theory. The evidence is

consistent with theoretical base that managers follow other firms to catch growth opportunities represented by leader firms. And this is also consistent with the broad implications of reputational and learning model.

[Insert Table 8 about here]

6. MIMICKING ACTIONS AND INVESTMENT EFFICIENCY

Without information asymmetry, managers likely to invest until the marginal benefit of capital investment equals the marginal cost and only positive net present value projects would be done. However, prior literature also recognizes the possibility that firms may departs from this optimal level and either over- or under-invest. Prior literature mentioned moral hazard and adverse selection caused by the existence of information asymmetry between managers and outside capital provider as a possible reason of inefficient capital investment. Managers who trying to maximizing their personal welfares choose investments that are not in the best interest of shareholders (Jensen and Meckling, 1976).

Above issue can applied to mimicking sensitivities of peer firms. Although managers have more information about growth opportunities compared to outside shareholders, insufficient information about growth opportunities, managers have insufficient information about growth opportunities but try to maximize their personal welfares by mimicking other firms' investment and this action make firms' investment inefficient.

To test the hypothesis that highly mimicking sensitivity leads to inefficient investment, I use the Biddle et al. (2009) investment efficiency model. I proceed by first estimating a

firm-specific model of investment as a function of growth opportunities (as measured by sales growth) and use the residuals as a firm-specific proxy for deviations from expected investment. The model is described below:

$$Capex_{i,t} = \beta_0 + \beta_1 * Sales\ Growth_{i,t-1} + \varepsilon_{i,t}$$

$Capex_{i,t}$ is the total capital expenditure and $Sales\ Growth_{i,t-1}$ is the percentage change in sales from year t-2 to t-1. This model is estimated for each industry-year based on the Fama and French 48-industry classification for all industries with at least 20 observations in a given year.

I then classify firms based on the magnitude of residuals of efficiency model (i.e., deviations from predicted investment) and use these groups as the dependent variable. Specifically, I sort firms yearly based on the residuals from equation into quartiles. Firm-year observation in the bottom quartile (i.e., the most negative residuals) are classified as under-investing, observations in the top quartile (i.e., the most positive residuals) are classified as over-investing, and observations in the middle two quartiles are classified as the benchmark group. I estimate a multinomial logit model that predicts the likelihood that a firm will be in one of the extreme quartiles as opposed to the middle quartiles. If firms with highly mimicking sensitivity will more likely to be in the top or bottom quartile of unexplained investment, mimicking sensitivity have negative effect on investment efficiency. My set of control variables are same as I use in the previous regression model.

Results of this estimation are reported in Table 9. Table 9 presents the results regarding under-, over-investment. The coefficient associated with mimicking sensitivity

show positive sign which means that one unit increase in mimicking sensitivity make firm under-investing or over-investing firms, 0.249, 0.141, respectively.

Based on above results, I find that highly mimicking sensitivity firms are likely to be inefficient investment firms. That is, just follow peer firms' investment result in inefficient investment and bad profitability. So I find that highly mimicking sensitivity comes from managers' discretion and have negative effect on investment.

[Insert Table 9 about here]

7. ROLE OF CORPORATE GOVERNANCE AND ACCOUNTING QUALITY

7.1 Corporate Governance

If investment affected by peers is inefficient investment, how can we mitigate the mimicking sensitivity of managers? Usually, corporate governance and financial reporting quality play a role as a monitoring system to managers' discretionary actions.

According to prior literature, governance mechanisms could also be associated with investment efficiency. Ferreira and Matos (2008) show that firms with higher institutional ownership have lower capital expenditures and higher valuations, suggesting that institutional ownership mitigates over-investment. Chang et al. (2009) show that greater analyst coverage improves the flexibility in the financial policy, which may help to mitigate under-investment. Jensen (1986) argues that the market for corporate control can serve as a monitoring mechanism that mitigates over-investment. Consistent with this prediction, Gompers et al. (2003) show that firms with stronger

shareholder rights have higher firm value, lower capital expenditures, and make fewer corporate acquisitions.

Given the prior researches, corporate governance can play a role to mitigate the mimicking sensitivity and lead to efficient investment. Since corporate governance itself works as a mechanism to mitigate the under-, over- investment.

Among various corporate governance measure, I choose the Gompers et al. (2003) G-Score. G-Score is the anti-takeover protection index used in Gompers et al. (2003), as a proxy for the market for corporate control. Firms with large G-Scores have more anti-takeover provisions that reduce the ability of a takeover to act as a monitoring device for managers. For consistency with other measure, I multiply the score by minus one so that the measure is increasing in corporate governance. Because G-Scores are missing for more half of data, I set observations with missing G-Scores to zero. And then include an indicator variable that takes the value of one if the data is missing and zero otherwise. I add interactions between $Investment_{-i,t-1}$ and G-Score variables to test the effect of corporate governance on peer effect and under-, over-investment.

Panel A, Table 10 shows the results. Interestingly G-Score don't have any incremental effect except for changes in R&D and G-Score dummy variables. It is consistent with Biddle et al. (2009) that G-Score usually do not have significant effect on investment efficiency.

7.2 Accounting Quality

According to Biddle et al. (2009), accounting quality also related to the investment

efficiency. This study suggest that higher-quality financial reporting can enhance investment efficiency by mitigating information asymmetries that cause economic frictions such as moral hazard and adverse selection (e.g., Leuz and Verrecchia 2000; Bushman and Smith, 2001; Verrecchia, 2001). For instance, it is well established that financial reporting information is used by shareholders to monitor managers (e.g., Bushman and Smith, 2001; Lambert 2001) and constitutes an important source of firm-specific information for investors (e.g., Bushman and Indjejikian 1993; Holmstrom and Tirole 1993; Kanodia and Lee, 1998). If higher-quality financial reporting increase shareholder ability to monitor managerial investment activities, it can be associated with investment efficiency by reducing moral hazard (Biddle et al., 2009).

This relation could be applied to mimicking sensitivity. If accounting quality play a role as a monitoring system to managers, greater accounting quality affect the mimicking sensitivity to prevent the inefficient under-, over-investment.

Panel B, Table 10 shows result when accounting quality measure is modified Jones model. Especially accounting quality have significant negative effect on coefficient of $Investment_{-i,t-1}$, when the dependent variables are acquisitions and sum of each investment measures. Although coefficient of peer investment does not significant when dependent variable is capital expenditures, the predicted sign shows the same prediction as a negative sign.

Panel C, Table 10 shows result when accounting quality measure is performance-matched modified Jones model as a financial reporting quality. In the results, except for changes in R&D, financial reporting quality have negative effect on mimicking

sensitivity.

Overall, to prevent the discretion investment made by managers which likely to be inefficient, accounting quality can play a role to mitigate the mimicking sensitivity but G-Score measure does not.

[Insert Table 10 about here]

8. CONCLUSION

Nowadays, many studies try to expand the literature by not only investigate firms' own characteristics, but effect of industry peers. In line with this trend, this study examines whether peer effects are exist in investment decision. With various analyses, I first find that individual firm's investment decision is affected by industry peers' investment decision, suggesting that peer effects are exists in the investment field.

I then examine which firms mimic to peers based on firm-specific characteristics. I choose four fundamental characteristics related to investment, firm size, leverage, market-to-book ratio, and cash balance. As firms are small, high-levered, low market-to-book ratio, low cash balance, firms likely to be affected by peers' investment.

To shed light on which firms are mimicked, I try to use leader-follower analysis. There are differences between leaders' sensitivity to followers and followers' sensitivity to leaders. So based on leader-follower analysis, I can find the herding effect exists in the peer effect of investment.

With above analysis, I additionally test the investment efficiency by their investment

residual and find that highly mimicking sensitivity firms' investment likely to be inefficiency, that is, more probability of over-, under-investment.

To mitigate the herding effect of investment, I find that accounting quality can play a role. With high accounting quality, firms can mitigate mimicking sensitivity which lead to more efficient investment.

Although this study have various contributions, there are some limitation. First, each investment measures have different characteristics. For example, capital expenditure and R&D expenditure shows different trend with peers' capital expenditure or R&D expenditure. So how to differentiate between these two investment measures is important.

Second, I assume that same firm-observations have same mimicking sensitivity but it is not realistic. Since each firm in the different year may be have different characteristics, so reflect this kind of year effect is limitation, though I put many control variables and year-fixed effect in the regression.

REFERENCES

Abel, A. B. 1983. Optimal investment under uncertainty. *The American Economic Review* 73 (1): 228–233.

Altman, E. 1968. Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. Journal of Finance 23: 589-609

Aslan, H., and P. Kumar. 2013. The Product Market Effects of Hedge Fund Activism. *Journal of Financial Economics* 119 (January): 226–248.

Badertscher, B., N. Shroff, and H. D. White. 2013. Externalities of public firm presence: Evidence from private firms' investment decisions. *Journal of Financial Economics* 109 (3): 682–706.

Baghai, R. P., H. Servaes, and A. Tamayo. 2013. Have Rating Agencies Become More Conservative? Implications for Capital Structure and Debt Pricing. *Journal of Finance* 69 (5): 1961–2005.

Banerjee, Abhijit V. 1992. A Simple Model of Herd Behavior. THE QUARTERLY August 1992 107 (3): 797–817.

Beatty, A., S. Liao, and J. J. Yu. 2013. The spillover effect of fraudulent financial reporting on peer firms' investments. *Journal of Accounting and Economics* 55 (2-3): 183–205.

Beatty, A., W. Scott Liao, and J. Weber. 2010. The effect of private information and monitoring on the role of accounting quality in investment decisions. *Contemporary Accounting Research* 27 (1): 17–47.

Biddle, G. C., and G. Hilary. 2006. and Firm-Level Investment Capital. *the Accounting Review* 81 (5): 963–982.

Biddle, G. C., G. Hilary, and R. S. Verdi. 2009. How does financial reporting quality relate to investment efficiency? *Journal of Accounting and Economics* 48 (2-3): 112–131.

Bikhchandani, S., D. Hirshleifer, and I. Welch. 1998. Learning from the Behavior of Others: Conformity, Fads, and Informational Cascades. *Journal of Economic Perspectives* 12 (3): 151–170.

Blanchard, O. J., F. Lopez-de-Silanes, and A. Shleifer. 1994. What do firms do with cash windfalls? *Journal of Financial Economics* 36 (3): 337-360

Bushman, R. M., and R. J. Indjejikian. 1993. Accounting income, stock price, and managerial compensation. *Journal of Accounting and Economics* 16 (1-3): 3–23.

Bushman, R. M., J. D. Piotroski, and A. J. Smith. 2011. Capital Allocation and Timely Accounting Recognition of Economic Losses. *Journal of Business Finance & Accounting* 38 (1-2): 1–33.

Chang, X., S. Dasgupta, and G. Hikiry. 2009. The effect of auditor quality on financing decisions. *Accounting Review* 84 (4): 1085–1117.

Chay, J. B., and J. Suh. 2009. Payout policy and cash-flow uncertainty. *Journal of Financial Economics* 93 (1): 88–107.

Chen, Q., I. Goldstein, and W. Jiang. 2007. Price Informativeness and Investment Sensitivity to Stock Price. *Review of Financial Studies* 20 (3): 619–650.

Conlisk, J. 1980. Costly optimizers versus cheap imitators. *Journal of Economic Behavior & Organization* 1 (3): 275–293.

Dechow, P., and I. D. Dichev. 2002. The quality of accruals and earnings: the role of accrual estimation errors. *The Accounting Review* 77: 35–59.

Devenow, A., and I. Welch. 1996. Rational herding in financial economics. *European Economic Review* 40: 603–615.

Dougal, C., C. A. Parsons, and S. Titman. 2015. Urban Vibrancy and Corporate Growth. *Journal of Finance* LXX (1): 163–210.

Duflo, E., and E. Saez. 2002. Participation and investment decisions in a retirement plan: The influence of colleagues' choices. *Journal of Public Economics* 85 (1): 121–148.

FAIRFIELD, P. M., S. RAMNATH, and T. L. YOHN. 2009. Do Industry-Level Analyses Improve Forecasts of Financial Performance? *Journal of Accounting Research* 47 (1): 147–178.

Fama, E. F., and K. R. French. 1997. Industry costs of equity. *Journal of Financial Economics* 43 (2): 153–193.

Fama, E. F., and K. R. French. 2006. Profitability, investment and average returns. *Journal of Financial Economics* 82 (3): 491–518.

Ferreira, M. a., and P. Matos. 2008. The colors of investors' money: The role of institutional investors around the world. *Journal of Financial Economics* 88 (3): 499–533.

Foucault, T., and L. Fresard. 2014. Learning from peers' stock prices and corporate investment. *Journal of Financial Economics* 111 (3): 554–577.

Francis, J. R., and X. Martin. 2010. Acquisition profitability and timely loss recognition. *Journal of Accounting and Economics* 49 (1-2): 161–178.

Fresard, L. 2010. Financial strength and product market behavior: The real effects of corporate cash holdings. *Journal of Finance* 65 (3): 1097–1122.

Gompers, P., P. Gompers, J. Ishii, J. Ishii, A. Metrick, and A. Metrick. 2003. Corporate Governance and Equity Prices. *Quarterly Journal of Economics* 118 (February): 107–155.

Hayashi, F. 1985. Corporate finance side of the Q theory of investment. *Journal of Public Economics* 27: 261–280.

Hayashii, F. 1982. TOBIN'S MARGINAL q AND AVERAGE q: A NEOCLASSICAL INTERPRETATION BY 50 (1): 223–224.

Holmstrom, B., and J. Tirole. 1993. Market Liquidity and Performance Monitoring. *Journal of Political Economy* 101 (4): 678.

Hovakimian, A., and G. Hovakimian. 2009. Cash flow sensitivity of investment. *European Financial Management* 15 (1): 47–65.

Hubbard, R. G. 1998. Capital_Market Imperfections and Investment. *Journal of Economic Literature* 36 (1): 193–225.

Jensen, M. C. 1986. Agency costs of free cash flow, corporate finance, and takeovers. *The American Economic Review.*

Jensen, M. C., and W. H. Meckling. 1976. Theory of the Firm : Managerial Behavior , Agency Costs and Ownership Structure Theory of the Firm : Managerial Behavior , Agency Costs and Ownership Structure. *Journal of Financial Economics* 3 (4): 305–360.

Jones, J. J. 1991. Earnings Management During Import Relief Investigations. *Journal of Accounting Research* 29 (2): 193–228.

Kanodia, C., and D. Lee. 1998. Investment and disclosure: The disciplinary role of periodic performance reports. *Journal of Accounting Research* 36 (1): 33–55.

Kaustia, M., and V. Rantala. 2015. Social learning and corporate peer effects. *Journal of Financial Economics* 117 (3): 653–669.

Kothari, S. P., T. Laguerre, and A. Leone. 2002. Capitalization versus expensing: Evidence on the uncertainty of future earnings from capital expenditures versus R&D outlays. *Review of Accounting Studies* 7 (4): 355–382.

Kothari, S. P., A. J. Leone, and C. E. Wasley. 2005. Performance matched discretionary accrual measures. *Journal of Accounting and Economics* 39 (1): 163–197.

Kubick, T. R., D. P. Lynch, M. A. Mayberry, and T. C. Omer. 2015. Product Market Power and Tax Avoidance: Market Leaders, Mimicking Strategies, and Stock Returns. *The Accounting Review* 90 (2): 675–702.

Kumar, P., Langberg N. 2010. Innovation and Investment Bubbles. *Working Paper*. University of Houston.

LEARY, M. T., and M. R. ROBERTS. 2014. Do Peer Firms Affect Corporate Financial Policy? *The Journal of Finance* 69 (1): 139–178.

Leuz, C., and R. E. Verrecchia. 2000. The Economic Consequences of Increased Disclosure. *Journal of Accounting Research* 38 (2000): 91–124.

Magee, R. P. 2001. Discussion of "Contracting theory and accounting." *Journal of Accounting and Economics* 32 (1-3): 89–96.

Myers, S. 1977. Determinants of corporate borrowing. *Journal of financial economics* 5: 147-175.

Opler, T. 1999. The determinants and implications of corporate cash holdings. *Journal of Financial Economics* 52 (1): 3–46.

Petersen, M. A. 2009. Estimating Standard Errors in Finance Panel Data Sets: Comparing Approaches. *Review of Financial Studies* 22 (1): 435–480.

Richardson, S. 2006. Over-investment of free cash flow. *Review of Accounting Studies* 11 (2-3): 159–189.

Scharfstein, David S., and Jeremy C. Stein. 1990. Herd behavior and investment. *The American Economic Review* 80: 465–479.

Verrecchia, R. E. 2001. Essays on disclosure. *Journal of Accounting and Economics* 32 (1-3): 97–180.

Yoshikawa, H. 1980. On the " q" Theory of Investment. *The American Economic Review* 70 (4): 739–743.

ZECKHAUSER, R., J. PATEL, and D. HENDRICKS. 1991. Nonrational Actors and Financial Market Behavior. *Theory and Decision* 31 (2-3): 257–287.

Zwiebel, J. 1995. Corporate Conservatism and Relative Compensation. *Journal of Political Economy* 103 (1): 1.

APPENDIX
DETAILED VARIABLE DEFINITIONS

Capital expenditure (*Capex)*	=	CAPX, scaled by lagged total assets
R&D expenditure (*R&D)*	=	XRD, scaled by lagged total assets
AcquisitionAcquisition	=	AQC, scaled by lagged total assets.
Investment (*Investment*)	=	Sum of Capex, R&D, and Acquisition, scaled by lagged total assets
SIZE (*SIZE*)	=	logarithm of lagged total assets
M/B Ratio (*MTB*)	=	(Lagged total asset-lagged CEQ + lagged Market Value), scaled by lagged total assets
Leverage (*Leverage*)	=	Lagged DLTT, scaled by lagged total assets
CashFlow (*CFO*)	=	OANCF, scaled by lagged total assetss
Sales Growth (*SG*)	=	(REVT-lagged REVT), scaled by lagged total assets
Credit ratings (*Ratings*)	=	1 if exist credit rating, 0 otherwise
Profitability *(ROA)*	=	NI, scaled by lagged total assets
Cash balance *(CASH)*	=	Cash and cash equivalent, scaled by lagged total assets
Z-Score *(Z_Score)*	=	(3.3*(PI+DP)+SALE+0.25*RE+0.5*(ACT-LCT))
Tangibility *(Tang)*	=	PPENT, scaled by lagged total assets
Dividend *(Dividend)*	=	1 if firms pay dividend in year t, 0 otherwise

Loss dummy (*LOSS*)	=	1 if IB is negative, 0 otherwise
Peer Sales Growh (*Peer_sg)*	=	Annual average sales growth of peers within each FF 48 industry classification
90-days T-bill rate	=	90-days T-bill rate from CRSP
Inflation	=	CPI index from CRSP
GDP Grwoth	=	Percentage change of annual GDP

TABLE 1
Descriptive statistics

Variable	N	Mean	Std. Dev.	Q1	Median	Q3
Capex	125,154	0.076	0.092	0.023	0.049	0.093
Capex-peer	125,154	0.083	0.052	0.051	0.069	0.093
R&D	125,154	0.045	0.116	0	0	0.042
R&D-peer	125,154	0.053	0.073	0.005	0.019	0.082
Acquisition	125,154	0.023	0.086	0	0	0.001
Acquisition-peer	125,154	0.024	0.018	0.010	0.019	0.033
Sum of Investment	125,154	0.148	0.202	0.046	0.095	0.175
Sum of Investment_Peer	125,154	0.169	0.087	0.107	0.151	0.209
SIZE	125,154	4.928	2.287	3.284	4.764	6.467
M/B ratio	125,154	2.097	4.408	1.003	1.333	2.030
Leverage	125,154	0.175	0.186	0.016	0.137	0.266
CFO	125,154	0.052	0.302	0.030	0.091	0.146
Sales Growth	125,154	0.142	0.383	-0.016	0.089	0.248
ROA	125,154	-0.027	0.602	-0.009	0.048	0.095
Cash	125,154	0.174	0.280	0.029	0.082	0.211
Rating	125,154	0.164	0.369	0	0	0
Z-Score	125,154	1.186	6.258	1.003	1.714	2.375
Tangibility	125,154	0.308	0.222	0.133	0.259	0.435
Dividend	125,154	0.499	0.500	0	0	1
Loss	125,154	0.264	0.441	0	0	1
Sales Growth_peer	125,154	0.144	0.115	0.071	0.137	0.213
3-Month T-bill rate	125,154	0.054	0.035	0.031	0.053	0.069
Inflation	125,154	0.039	0.028	0.024	0.033	0.044
GDP Growth	125,154	-0.071	2.613	-1.7	-0.4	1.9

Table 1 presents descriptive statistics of 125,154 sample firm-year observations.

Table 2
Changes in control variables and Regression results

Variable	Predicted sign	Dependent variable=$Capex_{(t)}$			
		Model 1	Model 2	Model 3	Model 4
Intercept		0.0425***	0.0270***	0.0262***	0.0086*
		(7.215)	(4.883)	(4.734)	(1.700)
$Capex_{(t-1)}$	+	0.4900***	0.4364***	0.4366***	0.4365***
		(30.265)	(26.810)	(26.829)	(26.604)
$Capex\text{-}peer_{(t-1)}$	+	0.1472***	0.1516***	0.1309***	0.1345***
		(3.908)	(4.210)	(3.718)	(3.952)
SIZE	?	-0.0012***	-0.0022***	-0.0022***	-0.0024***
		(-4.767)	(-9.161)	(-9.148)	(-9.247)
Mkt-to-Book	+	0.0008***	0.0004***	0.0004***	0.0003**
		(4.967)	(2.754)	(2.778)	(2.368)
Leverage	-	0.0057***	-0.0040*	-0.0040*	-0.0038*
		(2.634)	(-1.911)	(-1.930)	(-1.753)
CFO	+	0.0208***	0.0194***	0.0195***	0.0192***
		(6.512)	(5.290)	(5.318)	(5.279)
Sales Growth	+	-0.0005	0.0011	0.0006	0.0007
		(-0.328)	(0.861)	(0.502)	(0.552)
Ratings	?	-0.0019*	-0.0005	-0.0006	-0.0005
		(-1.951)	(-0.556)	(-0.618)	(-0.520)
ROA	+		-0.0027	-0.0028	-0.0028
			(-1.105)	(-1.114)	(-1.123)
Cash	+		0.0054*	0.0055*	0.0056*
			(1.866)	(1.908)	(1.776)
Z-Score	-		-0.0005***	-0.0005***	-0.0005***
			(-3.296)	(-3.282)	(-3.209)
Tangibility	+		0.0652***	0.0654***	0.0666***
			(15.832)	(15.798)	(15.627)
Dividend	-		-0.0035***	-0.0034***	-0.0029***
			(-4.367)	(-4.356)	(-3.080)
Loss	-		-0.0144***	-0.0143***	-0.0145***
			(-12.436)	(-12.542)	(-12.672)
Sales Growth-peer	+			0.0240***	0.0291***
				(3.480)	(4.822)
3-month T-bill rate	?				-0.0374
					(-1.043)
Inflation	?				0.0685
					(1.357)
GDP growth	?				0.0015***
					(4.426)

Observations	125,154	125,154	125,154	125,154
Year fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes
Clustering by	Firm and Year	Firm and Year	Firm and Year	Firm and Year
Adj.R^2	0.410	0.423	0.424	0.420

This table reports the regression results of the relation between capex and peer firms' capex of last year when control variables are changed. Coefficient estimates are presented in cells, and t-statistics are reported in parentheses. *, **, and *** denote two-tailed significance at the 10%, 5% and 1% level, respectively. Refer to Appendix A for the variable definitions.

TABLE 3
The effect of Investment on peers' investment

Variable	Dependent variable= $Capex_{(t)}$	Dependent variable= $R\&D_{(t)}$	Dependent variable= $Acquisition_{(t)}$	Dependent variable= Sum of Capex and $Non\text{-}capex_{(t)}$
Intercept	0.0086*	0.0235***	0.0191**	0.0521***
	(1.700)	(5.747)	(2.052)	(3.049)
$Investment_{(t-1)}$	0.4365***	0.8039***	0.1076***	0.3523***
	(26.604)	(26.837)	(9.493)	(15.856)
$Investment\text{-}peer_{(t-1)}$	0.1345***	0.0844***	0.4308***	0.2156***
	(3.952)	(3.354)	(7.531)	(5.996)
SIZE	-0.0024***	-0.0011***	0.0008***	-0.0043***
	(-9.247)	(-4.710)	(3.516)	(-6.067)
MTB	0.0003**	-0.0001	-0.0001	0.0007
	(2.368)	(-0.320)	(-0.978)	(0.935)
Leverage	-0.0038*	-0.0180***	0.0099***	-0.0259***
	(-1.753)	(-5.860)	(3.994)	(-4.287)
CFO	0.0192***	-0.0096	0.0067***	-0.0388**
	(5.279)	(-1.261)	(3.775)	(-2.457)
Sales Growth	0.0007	-0.0067***	0.0026*	-0.0081**
	(0.552)	(-4.427)	(1.921)	(-2.365)
Ratings	-0.0005	-0.0012*	0.0011	-0.0029
	(-0.520)	(-1.882)	(0.782)	(-1.230)
ROA	-0.0028	0.0142***	-0.0013*	0.0149
	(-1.123)	(2.908)	(-1.873)	(1.614)
Cash	0.0056*	-0.0413***	0.0074***	0.0152
	(1.776)	(-8.753)	(3.387)	(1.594)
Z-Score	-0.0005***	-0.0022***	-0.0000	-0.0044***
	(-3.209)	(-5.950)	(-0.256)	(-4.928)
Tangibility	0.0666***	-0.0119***	-0.0206***	0.0638***
	(15.627)	(-5.277)	(-8.460)	(7.936)
Dividend	-0.0029***	-0.0022***	-0.0024***	-0.0105***
	(-3.080)	(-4.147)	(-2.661)	(-6.144)
Loss	-0.0145***	0.0036***	-0.0145***	-0.0230***
	(-12.672)	(3.219)	(-11.401)	(-8.449)
Sales Growth-peer	0.0291***	0.0020	-0.0035	0.0320**
	(4.822)	(0.834)	(-0.540)	(2.310)
3-month T-bill rate	-0.0374	-0.0129	0.0068	-0.0465
	(-1.043)	(-0.714)	(0.256)	(-0.767)
Inflation	0.0685	-0.0012	-0.0978**	-0.0115
	(1.357)	(-0.100)	(-2.120)	(-0.115)

GDP growth	0.0015*** (4.426)	0.0002* (1.795)	0.0003 (0.715)	0.0021** (2.504)
Observations	125,154	125,154	125,154	125,154
Year fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes
Clustering by	Firm and Year	Firm and Year	Firm and Year	Firm and Year
Adj.R^2	0.420	0.718	0.042	0.252

This table reports the regression results of the relation between investment and peer firms' investment of last year when change the variable of investment. Coefficient estimates are presented in cells, and t-statistics are reported in parentheses. *, **, And *** denote two-tailed significance at the 10%, 5% and 1% level, respectively. Refer to Appendix A for the variable definitions.

TABLE 4
Change analysis of each investment measure

Variable	Dependent variable= △Capex$_{(t)}$	Dependent variable= △R&D$_{(t)}$	Dependent variable= △Acquisition$_{(t)}$	Dependent variable= △Sum of Capex and Non-Capex$_{(t)}$
Intercept	0.0024 (0.631)	0.0007* (1.951)	0.0123 (1.604)	0.0225** (2.005)
△Investment$_{(t-1)}$	-0.3251*** (-18.188)	-0.3092*** (-7.405)	-0.5122*** (-19.538)	-0.4994*** (-19.162)
△Investment-peer$_{(t-1)}$	0.2411*** (3.602)	-0.0007 (-0.006)	0.2704*** (3.621)	0.2006*** (3.331)
△SIZE	-0.0376*** (-16.508)	-0.0179*** (-5.224)	-0.0403*** (-9.495)	-0.1437*** (-15.233)
△MTB	0.0000 (0.478)	-0.0001 (-1.351)	-0.0001*** (-6.905)	-0.0002 (-1.135)
△Leverage	-0.0006 (-0.924)	-0.0005 (-0.743)	-0.0023* (-1.789)	-0.0032 (-1.133)
△CFO	-0.0015* (-1.792)	-0.0008** (-1.978)	0.0003* (1.703)	-0.0049*** (-3.033)
△Sales Growth	0.0000 (0.292)	0.0001 (1.566)	-0.0001*** (-5.082)	0.0000 (0.000)
△Ratings	-0.0092*** (-4.020)	-0.0017** (-2.095)	-0.0135* (-1.703)	-0.0315*** (-2.643)
△ROA	0.0001 (0.447)	-0.0009 (-0.346)	0.0045 (0.765)	0.0005 (0.999)
△Cash	-0.0002 (-0.923)	-0.0001 (-1.185)	-0.0000** (-2.084)	-0.0012 (-1.094)
△Z-Score	-0.0000 (-1.067)	-0.0009** (-2.163)	0.0002 (1.123)	-0.0002 (-1.093)
△Tangibility	-0.0856*** (-8.337)	-0.0001 (-1.445)	-0.0000*** (-3.750)	0.0478* (1.936)
△Dividend	0.0029** (2.216)	0.0764*** (7.324)	-0.0052 (-0.686)	0.0116*** (3.827)
△Loss	-0.0072*** (-7.747)	0.0003 (0.525)	0.0057*** (3.965)	-0.0119*** (-6.833)
△Sales Growth-peer	0.0181*** (3.150)	0.0007 (1.393)	-0.0063*** (-8.134)	0.0257** (2.281)
△3-month T-bill	-0.0421	0.0098	0.0598	0.1251

rate	(-0.554)	(0.444)	(0.877)	(0.876)
△Inflation	0.0837	0.0136	-0.0408	0.0561
	(1.429)	(0.887)	(-0.829)	(0.580)
△GDP growth	0.0005*	0.0001	0.0001	0.0006
	(1.824)	(1.600)	(0.333)	(1.139)
Observations	116,187	116,187	116,187	116,187
Year fixed effect	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes
Clustering by	Firm and Year	Firm and Year	Firm and Year	Firm and Year
Adj.R^2	0.138	0.097	0.250	0.222

This table reports the regression results of the relation between investment and peer firms' investment of last year when the variables of interest is change variables. Coefficient estimates are presented in cells, and t-statistics are reported in parentheses. *, **, And *** denote two-tailed significance at the 10%, 5% and 1% level, respectively. Refer to Appendix A for the variable definitions.

Table 5
Horizon analysis of peers' investment and own firms' investme

Variable	Two year after peer firms' investment (n=1)			Three year after peer firms	
	$Capex_{(t+n)}$	$R\&D_{(t+n)}$	$Acquisition_{(t+n)}$	$Capex_{(t+n)}$	$R\&D_{(t+n}$
Intercept	0.0183***	0.0217***	0.0249**	0.0212***	0.0200**
	(2.822)	(4.017)	(2.301)	(3.151)	(3.866)
$Investment_{(t-1)}$	0.2507***	0.6854***	0.0881***	0.1797***	0.6060**
	(14.975)	(22.814)	(7.016)	(12.920)	(22.393)
Investment-$peer_{(t-1)}$	0.0710	0.0903***	0.2539***	0.0120	0.1231**
	(1.219)	(2.911)	(2.630)	(0.208)	(4.265)
SIZE	-0.0026	-0.0013***	0.0010***	-0.0032***	-0.0014**
	(-1.327)	(-3.913)	(3.747)	(-8.833)	(-3.603)
Mkt-to-Book	0.0065**	0.0002	-0.0000	0.0003	-0.0000
	(2.257)	(0.479)	(-0.150)	(1.193)	(-0.008)
Leverage	-0.0005***	-0.0124***	0.0104***	0.0000	-0.0106**
	(-2.596)	(-3.228)	(4.462)	(0.001)	(-2.401)
CFO	0.0911***	-0.0063	0.0069***	0.0191***	-0.0125
	(19.475)	(-0.891)	(4.404)	(5.004)	(-1.501)
Sales Growth	-0.0011	-0.0110***	0.0023**	0.0003	-0.0115**
	(-0.962)	(-6.592)	(2.037)	(0.318)	(-6.332)
Ratings	-0.0120***	-0.0017**	-0.0018	-0.0030**	-0.0019*
	(-10.388)	(-2.040)	(-1.491)	(-2.095)	(-1.881)
ROA	-0.0026	0.0118**	-0.0007	-0.0035	0.0158**
	(-1.327)	(2.436)	(-1.102)	(-1.346)	(2.695)
Cash	0.0065**	-0.0206***	-0.0011	0.0022	-0.0104**

	(2.257)	(-3.621)	(-0.769)	(0.952)	(-2.139)
Z-Score	-0.0005***	-0.0019***	-0.0000	-0.0001	-0.0022**
	(-2.596)	(-4.870)	(-0.320)	(-0.663)	(-5.010)
Tangibility	0.0911***	-0.0159***	-0.0177***	0.0990***	-0.0156**
	(19.475)	(-5.443)	(-7.767)	(20.137)	(-5.473)
Dividend	-0.0011	-0.0019***	-0.0023**	-0.0007	-0.0019**
	(-0.962)	(-3.002)	(-2.342)	(-0.588)	(-2.770)
Loss	-0.0120***	0.0081***	-0.0105***	-0.0083***	0.0099**
	(-10.388)	(5.615)	(-10.393)	(-7.542)	(6.481)
Sales Growth-peer	0.0191*	0.0051	-0.0105	0.0091	0.0069
	(1.815)	(1.429)	(-1.184)	(0.881)	(1.608)
3-month T-bill rate	-0.0499	-0.0268	-0.0229	-0.0375	-0.0362*
	(-0.918)	(-1.182)	(-0.593)	(-0.814)	(-1.705)
Inflation	0.0914	-0.0026	-0.1109*	0.1369**	0.0263
	(1.417)	(-0.139)	(-1.939)	(2.207)	(1.367)
GDP growth	0.0015***	-0.0000	0.0004	0.0012**	0.0001
	(3.573)	(-0.005)	(1.100)	(2.404)	(0.667)
Observations	118,573	118,573	118,573	111,863	111,863
Year fiexd effect	Yes	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes	Yes
Clustering by	Firm and Year	Firm and Year	Firm and Year	Firm and Year	Firm and Y
Adj.R^2	0.318	0.613	0.030	0.291	0.558

This table reports the regression results of the relation between investment and peer firms' investment o
estimates are presented in cells, and t-statistics are reported in parentheses. *, **, And *** denote two-taile
5% and 1% level, respectively. Refer to Appendix A for the variable definitions.

Table 6
The effect of peer firms' investment on firms' investment of recession and non-r

Variable	Dependent variable=Capex$_{(t)}$		Dependent variable=R&D$_{(t)}$		Dependent
	Recession	Non-recession	Recession	Non-recession	Recessior
Intercept	0.0197***	0.0045	0.0245***	0.0210***	0.0074
	(2.882)	(0.967)	(3.624)	(8.049)	(1.353)
Investment$_{(t-1)}$	0.3566***	0.4560***	0.6645***	0.8391***	0.0427***
	(11.502)	(26.560)	(8.822)	(40.919)	(4.072)
Investment-peer$_{(t-1)}$	-0.0518	0.1802***	0.0657**	0.1117***	0.2538***
	(-0.803)	(4.933)	(1.987)	(7.421)	(4.464)
SIZE	-0.0015***	-0.0024***	-0.0010***	-0.0010***	0.0010***
	(-4.049)	(-9.471)	(-3.750)	(-4.298)	(2.949)
Mkt-to-Book	0.0003*	0.0004**	0.0007	-0.0003	-0.0000
	(1.917)	(2.506)	(1.337)	(-0.827)	(-0.171)
Leverage	-0.0062	-0.0029	-0.0185***	-0.0173***	0.0011
	(-1.423)	(-1.222)	(-7.778)	(-4.912)	(0.481)
CFO	0.0264***	0.0175***	-0.0089	-0.0071	0.0067***
	(5.325)	(5.389)	(-0.879)	(-0.820)	(5.018)
Sales Growth	-0.0004	0.0008	-0.0080**	-0.0064***	0.0024**
	(-0.108)	(0.613)	(-2.197)	(-4.036)	(2.228)
Ratings	0.0011	-0.0007	-0.0035**	-0.0008	0.0020
	(0.624)	(-0.785)	(-2.226)	(-1.347)	(0.977)
ROA	-0.0030	-0.0023	0.0219***	0.0103**	-0.0004
	(-0.689)	(-0.966)	(11.962)	(1.986)	(-0.564)
Cash	-0.0004	0.0082***	-0.0477***	-0.0382***	0.0036***
	(-0.088)	(3.613)	(-8.098)	(-9.596)	(2.743)
Z-Score	-0.0008**	-0.0004***	-0.0026***	-0.0021***	-0.0001***
	(-1.969)	(-2.898)	(-4.353)	(-5.660)	(-4.772)
Tangibility	0.0715***	0.0647***	-0.0115***	-0.0114***	-0.0108***

	(7.164)	(14.850)	(-4.948)	(-4.799)	(-3.477)
Dividend	-0.0021	-0.0035***	-0.0031***	-0.0020***	-0.0030*
	(-1.282)	(-3.694)	(-3.532)	(-3.810)	(-1.655)
Loss	-0.0150***	-0.0139***	0.0048*	0.0031***	-0.0109***
	(-8.519)	(-10.837)	(1.774)	(2.745)	(-4.354)
Sales Growth-peer	0.0129	0.0275***	-0.0158***	0.0041**	-0.0158*
	(1.134)	(5.073)	(-3.461)	(2.110)	(-1.681)
3-month T-bill rate	-0.0893*	-0.0194	-0.0303	0.0083	-0.0487
	(-1.695)	(-0.711)	(-0.691)	(0.908)	(-1.318)
Inflation	0.3382***	0.0320	0.0369	-0.0085	0.0557
	(5.158)	(0.562)	(0.692)	(-0.693)	(1.105)
GDP growth	0.0011***	0.0014***	0.0003	0.0001	0.0013**
	(2.797)	(4.531)	(0.523)	(0.670)	(2.420)
Observations	21,009	104,145	21,009	104,145	21,009
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Clustering by	Firm and Year	Firm and Year	Firm and Year	Firm and Year	Firm and Ye
Adj.R^2	0.467	0.418	0.715	0.725	0.038
	Test of coefficient equality on Investment-peer:		Test of coefficient equality on Investment-peer:		Test of coeffic
	χ^2=51.15 p-value<0.0001		χ^2=5.09 p-value=0.0241		χ^2=26

This table reports the regression results of the relation between investment and peer firms' investment wh
are partitioned by recession period and non-recession period. Coefficient estimates are presented in cells, a
in parentheses. *, **, And *** denote two-tailed significance at the 10%, 5% and 1% level, respectively. Re
variable definitions.

Table 7
Which Firms Mimic?

Variable	Dependent variable=△Capex$_{(t)}$					
	SIZE		Leverage		Market-to-Book ratio	
	Large	Small	High	Low	High	Low
Intercept	-0.0009	0.0037	-0.0033	0.0176**	0.0056	-0.0047
	(-0.235)	(1.076)	(-0.659)	(2.215)	(1.186)	(-1.111)
△Capex$_{(t-1)}$	-0.2295***	-0.3550***	-0.3388***	-0.3165***	-0.3428***	-0.2905***
	(-14.585)	(-16.783)	(-21.152)	(-10.263)	(-15.807)	(-13.091)
△Capex-peer$_{(t-1)}$	0.1727***	0.2677***	0.2695***	0.1820***	0.1829*	0.2911***
	(12.530)	(10.980)	(2.773)	(2.926)	(1.811)	(4.915)
△SIZE	-0.0312***	-0.0350***	-0.0487***	-0.0296***	-0.0409***	-0.0336***
	(-8.513)	(-12.266)	(-12.015)	(-9.458)	(-12.911)	(-11.888)
△MTB	-0.0007	0.0000	-0.0000	0.0000	0.0000	0.0004
	(-1.398)	(1.257)	(-0.550)	(0.089)	(0.343)	(0.437)
△Leverage	-0.0350***	-0.0000	-0.0016***	-0.0000	-0.0002	-0.0360***
	(-5.214)	(-0.041)	(-2.601)	(-0.009)	(-0.195)	(-6.078)
△CFO	0.1292***	-0.0016*	-0.0048	-0.0014*	-0.0016**	0.0103***
	(9.643)	(-1.883)	(-1.345)	(-1.768)	(-2.169)	(5.564)
△Sales Growth	-0.0068***	0.0000	-0.0001	0.0000	-0.0000	0.0001
	(-5.529)	(0.233)	(-0.122)	(0.506)	(-0.201)	(0.434)
△Ratings	-0.0049**	0.0031	-0.0104***	0.0022	-0.0091***	-0.0115**
	(-2.504)	(0.294)	(-3.543)	(0.577)	(-2.836)	(-2.548)
△ROA	0.0306***	0.0001	0.0003	0.0002	0.0002	-0.0025***
	(5.054)	(0.510)	(0.586)	(0.612)	(0.688)	(-2.742)
△Cash	-0.0008	-0.0001	0.0011	-0.0002	-0.0001	-0.0008
	(-0.132)	(-0.437)	(0.382)	(-0.734)	(-0.439)	(-0.557)

ΔZ-Score	0.0152***	-0.0000	-0.0001*	-0.0000	-0.0000	0.0002	
	(5.904)	(-0.891)	(-1.798)	(-0.509)	(-0.577)	(0.366)	
ΔTangibility	-0.0948***	-0.0638***	-0.1034***	-0.0544***	-0.0567***	-0.1224***	
	(-6.109)	(-4.562)	(-6.552)	(-2.852)	(-4.486)	(-10.632)	
ΔDividend	0.0034**	0.0017	0.0006	0.0030*	0.0009	0.0022	
	(2.365)	(0.714)	(0.305)	(1.735)	(0.324)	(1.398)	
ΔLoss	-0.0044***	-0.0055***	-0.0098***	-0.0039***	-0.0050**	-0.0068***	
	(-4.092)	(-3.992)	(-7.019)	(-3.205)	(-2.404)	(-8.360)	
ΔSG-peer	0.0170***	0.0166**	0.0238***	0.0166***	0.0312***	0.0069	
	(3.394)	(1.968)	(2.639)	(2.830)	(3.185)	(1.502)	
Δ3-month T-bill rate	-0.0258	-0.0593	-0.1187	0.0027	-0.0778	-0.0365	
	(-0.375)	(-0.733)	(-0.925)	(0.046)	(-0.705)	(-0.646)	
ΔInflation	0.1408**	0.0021	0.1295	0.0164	0.0953	0.0418	
	(2.359)	(0.031)	(1.325)	(0.331)	(1.015)	(0.902)	
ΔGDP growth	0.0004*	0.0006**	0.0006	0.0003	0.0002	0.0006***	
	(1.866)	(1.991)	(1.481)	(1.631)	(0.764)	(2.607)	
Observations	39,749	37,433	39,004	38,990	37,772	39,300	
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	
Clustering by	Firm and Year	Firm and Year	Firm and Year	Firm and Year	Firm and Year	Firm and Year	Fir
Adj.R^2	0.163	0.148	0.176	0.110	0.142	0.158	
	Test of coefficient equality on Investment-peer:		Test of coefficient equality on Investment-peer:		Test of coefficient equality on Investment-peer:		T
	χ^2=3.09 p-value=0.0788		χ^2=2.71 p-value=0.0995		χ^2=4.61 p-value=0.0318		

This table reports the regression results of the relation between investment and peer firms' investment when firm-year
by median of their firm characteristics. Coefficient estimates are presented in cells, and t-statistics are reported in
denote two-tailed significance at the 10%, 5% and 1% level, respectively. Refer to Appendix A for the variable definiti

Table 8
Which Firms are mimicked?

Variable	Dependent variable=$Capex_{(t)}$		Dependent variabl
	Leader firms	Follower firms	Leader firms
Intercept	-0.0099* (-1.903)	0.0072 (1.051)	-0.0017 (-0.500)
$Capex_{(t-1)}$($\Delta Capex_{(t-1)}$)	0.5404*** (29.291)	0.4105*** (24.110)	-0.1735*** (-6.990)
Capex-$peer_{(t-1)}$ (ΔCapex-$peer_{(t-1)}$)	0.0673*** (4.660)	0.1766*** (3.823)	0.1108*** (4.837)
SIZE	-0.0010** (-2.271)	-0.0028*** (-7.747)	-0.0162*** (-7.026)
MTB	-0.0010*** (-5.388)	0.0003** (2.029)	0.0007** (1.977)
Leverage	-0.0001 (-0.032)	-0.0026 (-1.054)	-0.0280*** (-6.256)
CFO	0.0610*** (9.223)	0.0164*** (4.622)	0.0938*** (7.980)
Sales Growth	-0.0085*** (-4.580)	0.0021 (1.581)	-0.0051*** (-5.012)
Ratings	-0.0001 (-0.165)	-0.0016 (-1.109)	-0.0039** (-2.025)
ROA	0.0022 (0.503)	-0.0025 (-1.009)	0.0351*** (7.150)
Cash	0.0083** (2.346)	0.0054* (1.717)	0.0031 (0.692)
Z-Score	0.0047*** (7.195)	-0.0004*** (-3.193)	0.0083*** (5.218)

Tangibility	0.0591***	0.0661***	-0.0871***
	(15.209)	(13.291)	(-5.927)
Dividend	-0.0029***	-0.0028***	0.0015
	(-3.316)	(-2.625)	(1.270)
Loss	-0.0047***	-0.0153***	-0.0048***
	(-3.811)	(-12.434)	(-4.705)
Sales Growth-peer	0.0366***	0.0234***	0.0171***
	(7.061)	(3.356)	(3.665)
3-month T-bill rate	-0.0265	-0.0501	-0.0035
	(-0.980)	(-1.224)	(-0.068)
Inflation	0.0495	0.0692	0.0817*
	(1.348)	(1.244)	(1.825)
GDP growth	0.0013***	0.0016***	0.0003*
	(4.995)	(4.224)	(1.886)
Observations	31,651	89,902	28,530
Year fixed effect	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes
Clustering by	Firm and Year	Firm and Year	Firm and Year
Adj.R^2	0.614	0.396	0.128
	Test of coefficient equality on Investment-peer:		Test of coefficient equality
	χ^2=20.39 p-value<0.0001		χ^2=33.15 p-valu

This table reports the regression results of the relation between investment and peer firms' investment wh
are partitioned by their sales ratio to the industy. Firm-year observations are ranked to five by their sals rat
year. The higher groups are defined as "Leader" and others are defined as "follower". Coefficient estima
and t-statistics are reported in parentheses. *, **, And *** denote two-tailed significance at the 10%, 5% a
Refer to Appendix A for the variable definitions.

Table 9
Mimicking sensitivity of peers' investment and deviations from expected investment

Variable	Under-investment versus normal investment	Over-investment versus normal investment
	Investment proxy: Capex	Investment proxy: Capex
Intercept	-0.6815***	-1.6470***
	(-4.570)	(-13.260)
Mimicking sensitivity	0.2497***	0.1408***
	(14.457)	(10.296)
SIZE	-0.0292	-0.1103***
	(-1.322)	(-7.077)
Mkt-to-Book	0.0169	0.0621***
	(1.424)	(4.549)
Leverage	0.4157***	-0.3490***
	(3.116)	(-2.643)
CFO	-0.0596	0.7905***
	(-0.499)	(4.492)
Sales Growth	0.4072***	0.0981**
	(7.157)	(2.075)
Ratings	0.0850	0.0074
	(0.830)	(0.086)
ROA	0.0560	-0.1315
	(0.759)	(-1.134)
Cash	-0.0511	0.3741***
	(-0.451)	(4.148)
Z-Score	-0.0079*	0.0159
	(-1.701)	(1.094)
Tangibility	1.7962***	2.8710***
	(8.827)	(19.612)
Dividend	-0.1548***	-0.1820***
	(-2.704)	(-4.051)
Loss	0.3295***	-0.4144***
	(6.373)	(-7.478)
Sales growth-peer	-0.2174	0.3717**
	(-1.196)	(2.088)
3-month T-bill rate	-3.2238***	-2.0918***
	(-4.503)	(-3.073)

Inflation	2.8497***	0.4793
	(3.407)	(0.582)
GDP growth	-0.0061	0.0069
	(-1.046)	(1.192)
Observations	29,071	
Year fiexd effect	Yes	
Industry fixed effect	Yes	
Clustering by	Firm	
Pseudo R^2(%)	8.65	

This table presents results from multinomial logit pooled regression. The dependent variables is based on the level of unexplained investment. Firm-year observations in the bottom quartile of unpredicted investment are classified as under-investing('Low'), observations in the top quartile are classified as over-investing('High'), and observations in the middle two quatiles are classified as the benchmark group('Mid'). Coefficient estimates are presented in cells, and t-statistics are reported in parentheses. *, **, And *** denote two-tailed significance at the 10%, 5% and 1% level, respectively. Refer to Appendix A for the variable definitions.

Table 10
Effect of corporate governance and financial reporting quality on managers' decision to follow peers' investment

Panel A: Corporate Governance

Variable	△Capex$_{(t)}$	△R&D$_{(t)}$	△Acquisition$_{(t)}$	△Sum of Capex and Non-capex$_{(t)}$
Intercept	0.0058	0.0027	0.0260**	0.0503*
	(0.494)	(1.424)	(2.096)	(1.885)
Investment	-0.3566***	-0.3018***	-0.5221***	-0.5146***
	(-14.269)	(-4.637)	(-16.138)	(-18.823)
Investment-peer	0.2174*	0.0212	0.2131***	0.1533
	(1.700)	(0.121)	(2.850)	(1.639)
G-Score	0.0000	-0.0000	0.0001	0.0002
	(0.270)	(-0.339)	(0.349)	(0.506)
G-Score dummy	-0.0008	-0.0001	-0.0043***	-0.0069*
	(-0.557)	(-0.036)	(-2.954)	(-1.697)
Investment-peer x G-Score	-0.0258	0.0023	0.0142	-0.0138
	(-1.465)	(0.135)	(1.098)	(-0.994)
Investment-peer x G-Score dummy	0.1706	0.1293***	0.0816	0.0622
	(1.469)	(2.919)	(0.762)	(0.386)
SIZE	-0.0416***	-0.0298***	-0.0504***	-0.1605***
	(-8.101)	(-3.675)	(-6.341)	(-8.726)
Mkt-to-Book	0.0001	-0.0005	-0.0006***	0.0007
	(0.377)	(.)	(-2.820)	(.)
Leverage	-0.0215***	-0.0017	-0.0332***	-0.0886***
	(-2.835)	(-0.305)	(-3.788)	(-3.285)
CFO	0.0036	0.0027	0.0062***	0.0167
	(1.156)	(0.493)	(2.748)	(1.247)
Sales Growth	0.0008	-0.0012	-0.0029**	-0.0003
	(0.698)	(-0.807)	(-2.459)	(-0.057)
Ratings	-0.0055	0.0021	-0.0187*	-0.0219
	(-1.115)	(1.458)	(-1.780)	(-1.433)
ROA	-0.0007	-0.0050**	-0.0024***	-0.0115*
	(-0.600)	(-2.344)	(-2.879)	(-1.743)
Cash	-0.0077	-0.0118*	-0.0002	-0.0156
	(-1.269)	(-1.931)	(-0.071)	(-1.058)
Z-Score	-0.0003*	-0.0009***	-0.0004***	-0.0022***
	(-1.775)	(-2.666)	(-3.829)	(-3.337)
Tangibility	-0.0962***	0.0818***	-0.0215**	0.0340

	(-6.402)	(4.371)	(-2.054)	(1.158)
Dividend	0.0023	0.0001	0.0031	0.0073
	(0.923)	(0.061)	(0.903)	(1.113)
Loss	-0.0079***	0.0009	-0.0061***	-0.0107***
	(-4.925)	(0.943)	(-3.714)	(-2.993)
Sales Growth-peer	0.0197*	0.0036	0.0277**	0.0612***
	(1.755)	(0.523)	(2.362)	(3.542)
3-month T-bill rate	0.0596	0.0636	0.0867	0.3809
	(0.650)	(1.003)	(0.768)	(1.557)
Inflation	-0.0833	0.0134	-0.3256**	-0.4377***
	(-0.703)	(0.230)	(-2.322)	(-2.788)
GDP growth	0.0003	0.0002	-0.0006	-0.0000
	(0.758)	(0.529)	(-1.181)	(-0.020)
Observations	23,080	23,080	23,080	23,080
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Clustering by	Firm and Year	Firm and Year	Firm and Year	Firm and Year
Adj.R^2	0.152	0.126	0.251	0.226

This table reports the regression results of the relation between investment and peer firms' investment of last year when add the corporate governance variable as a interaction variable with investment. Coefficient estimates are presented in cells, and t-statistics are reported in parentheses. *, **, And *** denote two-tailed significance at the 10%, 5% and 1% level, respectively. Refer to Appendix A for the variable definitions.

Panel B: Financial reporting quality – Modified Jones Model

Variable	Modified Jones Model			
	△Capex	△R&D	△Acquisition	△Sum of Capex and Non-capex$_{(t)}$
Intercept	0.0015	0.0007	0.0447**	0.0770**
	(0.231)	(0.495)	(2.043)	(2.073)
△Investment	-0.3444***	-0.3166***	-0.5178***	-0.5113***
	(-16.688)	(-5.863)	(-22.000)	(-25.973)
△Investment-peer	0.2334***	-0.1341	-0.0058	0.0147
	(2.903)	(-0.635)	(-0.058)	(0.229)
Accounting quality measure	-0.0013***	-0.0001	-0.0033**	-0.0063***
	(-2.811)	(-0.320)	(-2.386)	(-2.752)
△Investment-peer x AQ	-0.2349	-0.8245	-0.8346***	-0.6813***
	(-1.406)	(-1.310)	(-2.754)	(-3.760)
SIZE	-0.0437***	-0.0229***	-0.0472***	-0.1536***
	(-13.207)	(-4.740)	(-8.304)	(-17.243)
Mkt-to-Book	-0.0004	0.0001	-0.0004**	0.0006
	(-1.575)	(0.213)	(-2.063)	(0.491)
Leverage	-0.0301***	0.0094	-0.0429***	-0.0987***
	(-3.860)	(1.265)	(-5.233)	(-3.623)
CFO	0.0112***	0.0097*	0.0097***	0.0402***
	(3.454)	(1.662)	(3.214)	(4.857)
Sales Growth	0.0001	0.0001	0.0000	-0.0004
	(1.597)	(0.399)	(0.470)	(-1.490)
Ratings	-0.0088**	-0.0003	-0.0146*	-0.0259**
	(-1.990)	(-0.328)	(-1.691)	(-1.978)
ROA	-0.0075***	-0.0086**	-0.0067***	-0.0293***
	(-3.234)	(-2.308)	(-2.805)	(-4.899)
Cash	-0.0041	-0.0063**	-0.0015	-0.0050
	(-1.055)	(-2.200)	(-0.963)	(-0.668)
Z-Score	-0.0006	-0.0049***	-0.0002	-0.0076***
	(-1.523)	(-6.882)	(-0.753)	(-6.961)
Tangibility	-0.1072***	0.0619***	-0.0221**	0.0095
	(-6.971)	(4.929)	(-2.170)	(0.370)
Dividend	0.0052**	0.0017**	0.0048**	0.0152***
	(2.476)	(2.575)	(2.199)	(3.666)
Loss	-0.0074***	-0.0022***	-0.0045***	-0.0138***
	(-5.940)	(-2.908)	(-3.364)	(-5.581)
Sales Growth-peer	0.0167**	0.0006	0.0057	0.0354***
	(2.508)	(0.224)	(0.948)	(3.456)
3-month T-bill rate	-0.0253	0.0145	0.0415	0.1390
	(-0.283)	(0.778)	(0.691)	(0.986)
Inflation	0.0540	0.0052	-0.0663	-0.0116
	(0.746)	(0.359)	(-1.643)	(-0.113)
GDP growth	0.0006**	0.0001	-0.0000	0.0006
	(2.289)	(1.164)	(-0.181)	(1.364)

Observations	43,822	43,822	43,822	43,822
Year fiexd effect	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes
Clustering by	Firm and Year	Firm and Year	Firm and Year	Firm and Year
Adj.R^2	0.157	0.162	0.255	0.256

This table reports the regression results of the relation between investment and peer firms' investment of last year when add the financial reporting quality as an interaction variable with investment. Coefficient estimates are presented in cells, and t-statistics are reported in parentheses. *, **, And *** denote two-tailed significance at the 10%, 5% and 1% level, respectively. Refer to Appendix A for the variable definitions.

Panel C: Financial reporting quality – Performance-Matched Modified Jones Model

Variable	Performance-Matched Modified Jones Model			
	△Capex	△R&D	△Acquisition	△Sum of Capex and Non-capex$_{(t)}$
Intercept	0.0020	0.0010	0.0457**	0.0800**
	(0.324)	(0.676)	(2.091)	(2.141)
△Investment	-0.3438***	0.0469	-0.5178***	-0.5109***
	(-16.779)	(0.325)	(-21.963)	(-26.064)
△Investment-peer	0.2982***	-0.0449	0.1868***	0.1998***
	(3.820)	(-1.205)	(2.599)	(3.315)
Accounting quality measure	-0.0000	0.0000	-0.0001**	-0.0002
	(-0.704)	(0.148)	(-2.072)	(-1.480)
△Investment-peer x AQ	-0.0108*	-0.0449	-0.0593*	-0.0256**
	(-1.783)	(-1.205)	(-1.705)	(-1.965)
SIZE	-0.0437***	-0.0229***	-0.0475***	-0.1537***
	(-13.200)	(-4.699)	(-8.334)	(-17.080)
Mkt-to-Book	-0.0004	0.0001	-0.0004**	0.0006
	(-1.575)	(0.219)	(-2.091)	(0.477)
Leverage	-0.0299***	0.0099	-0.0425***	-0.0977***
	(-3.835)	(1.299)	(-5.238)	(-3.582)
CFO	0.0111***	0.0095	0.0099***	0.0402***
	(3.377)	(1.627)	(3.298)	(4.904)
Sales Growth	0.0001	0.0001	0.0000	-0.0004
	(1.620)	(0.406)	(0.488)	(-1.446)
Ratings	-0.0087**	-0.0004	-0.0143*	-0.0252*
	(-1.979)	(-0.435)	(-1.652)	(-1.934)
ROA	-0.0073***	-0.0085**	-0.0070***	-0.0292***
	(-3.145)	(-2.242)	(-2.928)	(-4.885)
Cash	-0.0041	-0.0064**	-0.0015	-0.0050
	(-1.057)	(-2.185)	(-0.967)	(-0.669)
Z-Score	-0.0006	-0.0049***	-0.0002	-0.0077***
	(-1.537)	(-6.904)	(-0.806)	(-6.955)
Tangibility	-0.1075***	0.0616***	-0.0224**	0.0090
	(-6.964)	(4.909)	(-2.219)	(0.346)
Dividend	0.0052**	0.0016**	0.0048**	0.0151***
	(2.453)	(2.564)	(2.178)	(3.642)
Loss	-0.0074***	-0.0022***	-0.0046***	-0.0142***
	(-5.963)	(-2.960)	(-3.412)	(-5.656)
Sales Growth-peer	0.0162**	0.0006	0.0058	0.0332***
	(2.437)	(0.212)	(0.956)	(3.145)
3-month T-bill rate	-0.0258	0.0159	0.0486	0.1439
	(-0.289)	(0.866)	(0.811)	(1.016)
Inflation	0.0516	0.0072	-0.0641	-0.0105
	(0.714)	(0.485)	(-1.528)	(-0.101)

GDP growth	0.0006** (2.304)	0.0001 (1.257)	-0.0000 (-0.116)	0.0006 (1.421)
Observations	43,822	43,822	43,822	43,822
Year fiexd effect	Yes	Yes	Yes	Yes
Industry fixed effect	Yes	Yes	Yes	Yes
Clustering by	Firm and Year	Firm and Year	Firm and Year	Firm and Year
Adj.R^2	0.157	0.160	0.253	0.253

This table reports the regression results of the relation between investment and peer firms' investment of last year when add the financial reporting quality as an interaction variable with investment. Coefficient estimates are presented in cells, and t-statistics are reported in parentheses. *, **, And *** denote two-tailed significance at the 10%, 5% and 1% level, respectively. Refer to Appendix A for the variable definitions.

국문초록

최근의 재무 및 회계연구에서는 기업간의 동조효과에 대해 활발히 연구하고 있다. 기업의 투자와 관련하여 동조효과를 나타내는 문헌들이 존재하지만, 산업 내 다른 기업의 투자가 기업의 투자에 어떻게 직접적으로 영향을 미치는지에 대해서는 아직 명확히 알려진 바가 없다. 나는 다양한 분석방법을 통해 산업 내 다른 기업의 투자가 기업의 투자에 직접적으로 영향을 준다는 것을 발견하였다. 또한 나는 어떤 기업들이 특별히 이러한 동조효과를 더 두드러지게 나타내는지 파악하고, 이를 바탕으로 동조효과를 바탕으로 이루어진 기업의 투자가 효율적인지 여부에 관하여 분석하였다. 뿐만 아니라, 이러한 동조효과를 완화할 수 있는 방안으로 투명한 기업지배구조와 이익의 질을 제시하여 그 중 이익의 질이 투자의 동조효과를 완화하는데 기여한다는 것을 확인하였다

주요어: 동조효과, 회계정보전달, 투자의사결정, 투자, 기업지배구조, 이익의질

학번: 2013-20533