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Identifying the Investment Status of Non-Financial Firms in Vietnam

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Abstract: The aim of this study was to identifythe investment status of non-financial firms in Vietnam. A panel data of 184 non-financial companies listed on Hochiminh Stock Exchange was collected over the period from the year 2013 to the year 2017. With the aim of assessing investment status, Richardson's theoretical model of investment was adopted to separate irrational investment into over-investment and under-investment. This studyemployedpanel data regression with the fixed effects model to find investment residual. Then, the study combined the investment residual estimated from the research model and the Tobin's Q index to classify firm investments into three groups as over-investment, under-investment and normal investment. Based on the empirical findings, the study provided some policy implications for the corporate governance.

Keywords: Over-investment, Under-investment, Non-financial Firm, Fixed effect model, Vietnam
JEL Classification Code:L25, D25, G11

I. Introduction

The development and expansion of domestic companies plays an important role in the economy, which strongly impacts the development of national economy. In recent decades, firm performance has become a topic of broad public interest. Managers always concern about how to improve the profitability and the operating efficiency of the company. This issue is of greater concern in the era of globalization, international economic integration, trade liberalization and stock market development.

Companies always have the desire to maximize profits and enterprise value. Regardless of the field of operation, firms are subject to one of two investment states, including rational investment and irrational investment. Rational investment is always the best investment status for the company, while irrational investment in the form of over-investment or under-investment often negatively affects firm performance. The concept of irrational investment in form of under-investment was initiated by Myers (1977). This athorstated that the conflict between the principal and the agent constitutes a lever that includes capital structure. Managers tend to ignore investing in profitable projects since from the shareholders' point of view, after paying debts to bondholders, profitable projects will not bring much benefit to shareholders. As a consequence, managers will ignore such projects and this decision is interpreted as irrational investment in the form of under-investment. In 1986, Jensen was the pioneer to introduce the concept of irrational investment in terms of over-investment. Jensen (1986) argued that the conflict of interest among managers and shareholders may occur when the enterprise has large amount of free cash flow, which negatively impactsthe performance of firm. When companies generate large free cash flows but do not have profitable investment opportunities, managers tend to use available cash flow to invest in low profitable projects or in non-profitable projects which may cause losses to the companies. The act of investing in these projects is called irrational investment in the form of over-investment.

In Vietnam, empirical studies on examining the investment status of firms are quite limited. Analyzing investment activities of enterprises is not only important for investors, but also meaningful for firm managers and shareholders as it can provide useful information to help firm administrators make more effective management policies in the future. Thus, the study investigates the investment state of non-financial firms listed

on Ho Chi Minh Stock Exchange, in order to thoroughly understandthe investment activity of non-financial companies in Vietnam. Specifically, through the analysis of panel data of non-financial joint stock companies listed on Ho Chi Minh Stock Exchange during the period from the year 2013 to the year 2017, the study aims toidentify the state of investment of Vietnam's non-financial firms. Research results of the study will contribute to supplement the theoretical basis and provide empirical evidence for future studies.

II. Literature Review

Financial and non-financial companies have understood that the right investment at the right time always brings great benefits, helping firms achieve their goals. The ultimate goal of these companies is to maximize shareholder benefits since shareholders are the owners of these companies. Managers and executives are actually just representatives of the shareholders and act on behalf of the shareholders to implement investment policies or manage the company to achieve the highest efficiency. The relationship between these parties is called an agency relationship. Jensen and Mecklings (1976) argued that agency relationship exists when the real owner of the company who is a shareholder authorizes a manager to act on his/her behalf. In fact, even if both parties have the main goal of maximizing the company's profits, there will be differences in the benefits received by these parties. Shareholders always want tomaximize profit, and managers sometimes implement investment projects that do not bring optimal results for the company. Agency theory suggests that managers tend to invest irrationally in the form of over-investment for personal gain. Hence, managerssometimes make investment decision based on the company's excess cash. However, these investment projects may not profitable and may reduce the firm efficiency. This problem is known as the issue of over-investment.

The concept of irational investment in form of over-investment was developed by Jensen (1986) in his study of the US oil industry which always had large amount of free cash flow in the 1970s and 1980s. Jensen (1986) stated instead of returning this excess cash flow to shareholders, managers invested heavily in mining operations, even though the average return of this investment was less than the cost of capital. Additionally, Jensen (1986) concluded that when a company has great amount of free cash flow but few investment opportunities, managers are more inclined to invest in low profitable projects or even in projects with negative NPVs. This may lead to a decline infirm performance. The act of investing in such kinds of projects is called irrational investment in form of over-investment. The concept of over-investment was also explained by Brealey et al. (2008) which stressed that thisover-investment behavior comes from the company's managers who want to have more power.More specifically, these managers invest recklessly into non-profitable projects since they wish to expand the scale of the company to increase their position of power. Shleifer and Vishny (1989) discussed the managers' investment approach to over-investment. Managers tend to make investment decision based on their technical skills, instead of measuring the NPV of the projects. However, not all managers have the ability to precisely evaluate the profitability of a certain projects. Hence, making investment decision by relying solely on the technical skills of a manager can lead to irrational investment in form of over-investment, which may not bring great benefits to firm. Conyon and Murphy (2000)argued thatwhenfirms expand theiroperation scale, the salary of managers also increases. This may lead to an issue that managers tend to over-invest in new projects to increase the size of the company.

However, Lyandres and Zhdanov (2005) developed a new hypothesis of irrational investment in the form of over-investment which is completely different from the concept of over-investment that Jensen (1986) mentioned in his famous hypothesis of free cash flow. Lyandres and Zhdanov (2005) called this type of investment as "debt over-investment". These authors predicted that over-investment will occur when there is a positive correlation between investment level and debt level. The motive behind over-investment is debt, which is based on the principle of a trade-off between the cash flows received through an investment and the loss on the future option. Sincethe level of debt increases, the value of the option decreases. Therefore, manager decides to exercise the option by making investment decisions that lead to irrational investment in the form of over-investment.

Joint stock companies often deal with the issue of over-investment as these firms are often not obligated to pay dividends. Dividend payments significantly reduce the amount of free cash flow, while a reduction in free cash flow can prevent managers from investing in non-profitable projects. Based on these arguments, over-investment is recognized as a sign of the agency problem since it is completely against managers' desire to strengthen their power while shareholders expect to receive positive return on investment. Debts are beneficial as debts help reduce agency costs that arise from over-investment (Jensen, 1986). When issuing debt, firms must commit to paying interest and principal after a fixed period of time. Firms are also obligated to repay their debt regardless of their financial ability, as opposed to paying dividends when companies are not bound to pay them. The trade-off theory of capital structure suggests that the risk of bankruptcy is related to the issuing of debt of the company. Bankruptcy risk makes managers more cautious in their investment decisions. Issuing debt makes the lender's supervision more stringent, especially when the lenders are banks. Hence, debts can reduce the

agency problem arising from over-investment (Jensen, 1986). Over-investment causes much more damage to firm than under-investment as over-invested firms face higher bankruptcy risk (Degryse and De Jong, 2006). Because of the defense mechanism of debt, there exists a negative relationship between debt level and investment level. Heaton (2002); Malmendier and Tate (2005) proposed the analysis of corporate investment based on the confidence in management. Accordingly, optimistic managers often over-estimate the return on investment or the profitability of a successful project. Besides that, managers think that their company shares are under-valued. So, they are likely to invest irrationally in the form of over-investment.

Another form of irrational investment is under-investment. Under-investment occurs when projectsare profitable but managers do not invest in these projects. Brealey et al. (2008) argued that passive managers lacks efforts to find opportunities and deploy investments for their companies, they do not want to take high risk when investing in projects, so the investment level is lower than necessary, thereby leading to a problem of under-investment. Myers (1977) fully explained the theory of irrational investment in the form of under-investment. He stated that the conflict between agent and principal constitutes a lever that includes capital structure. Managers tend to skip investing in projects with positive NPVs because the creditors will have the right to be the first party to receive the loans and get an additional part of the benefits from investing in these projects. Thus, based on the shareholders' point of view, projects with positive NPVs are considered as having negative NPVs. The decision to not invest these projects is considered as under-investment. Myers and Majluf (1984) stated that information asymmetry also leads to under-investment. Managers know more about the company's status and investment opportunities while shareholders and bondholders have little information. Managers may ignore investment projects with positive NPVs that have been financed by the issuance of shares. Voicu (2013) affirmed that a passive manager who does not actively work to identify valuable investment opportunities and worthless investment opportunities will go against an active manager. These passive managers avoid making mistakes in making investment decisions. When the interests of managers do not match the interests of shareholders and when they feel that they are not trusted as insiders, managers will not invest in high-risk projects that have positive NPVs as they will lose their jobs if the investment projects fail (Brealey et al., 2008). The fact that the company has an investment opportunity but does not take these opportunites also eliminates some of the benefits that the company could receive if it invested in these projects. This also represents irrational investment in the form of under-investment, which mainly occurs in firms with high growth opportunities (McConnell and Muscarella, 1985).

Tobin (1969) attempted to explain firm investment based on Tobin’s Q index. Tobin's idea was that if the stock market values a company above its book value, then it is a market signal that this company has growth prospects. To quantify this idea, Tobin proposed dividing a firm's market value by its replacement cost of its assets and calling this ratio as Q. If Q is greater than 1, the firm will boost investment to grow; conversely, if Q is less than 1, the company will reduce investment. Inheriting the significance of Tobin’s Q indexin Tobin's investment theory, many empirical studies such as the study of Lang et al. (1989); Brush et al. (2000)usedthis index to measure investment opportunities of enterprises. However, the limitations of Tobin’s Q as an indicator of a firm's investment opportunities should be recognized. Theoretically, Tobin's Q index depends on the market's expectations for the company in the future, in other words, it is the ratio of the market value of an additional unit of capital invested in the future relative to its replacement cost (marginal value of Q). However, due to the fact that it depends on market expectations, in reality, the marginal value of Q is difficult to determine precisely. Most of the empirical studies mentioned above can only determine the value of Tobin’s Q based on the market value of the current amount of capital in the firm divided by its replacement cost (Hayashi, 1982).

Richardson (2006) was the first researcher to classify irrational investment in form of over-investment and under-investment. Richardson (2006) applied an accounting method to measure the level of over-investment and the amount of free cash flow. The research results of Richardson (2006) have reinforced the agency theory. Irrational investment in the form of over-investment frequently occurs in firms with abundant free cash flow. This investment not only does not generate more profits, but also reduces the return on assets, which proves that over-investment could lead to poorer business performance. Richardson (2006) defined over-investment as an investment cost that exceeds the need to maintain existing assets in place and to finance expected investment in new projects with positive NPVs. Figure 1 shown below illustrates the model proposed by Richardson (2006) to classify the investment of the enterprise:

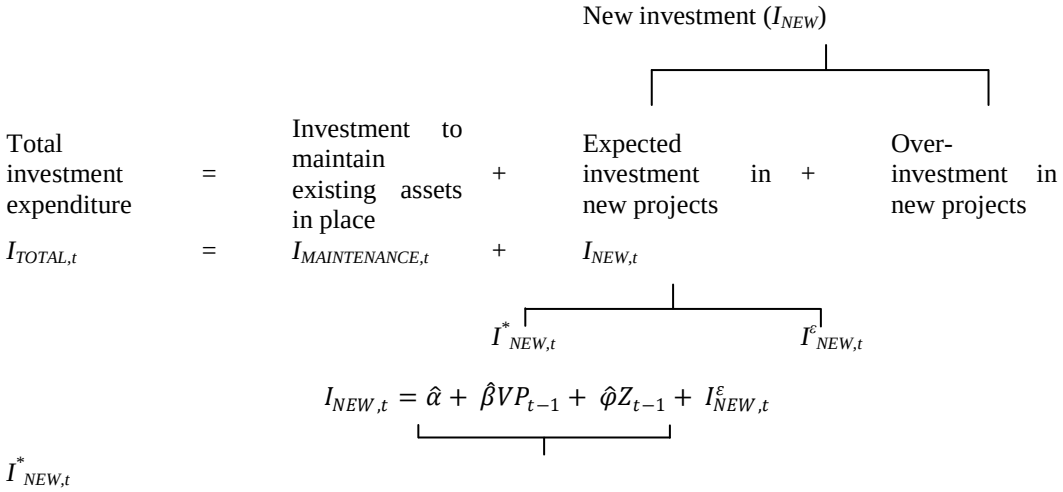

Figure 1. Over-investment and under-investment (Richardson, 2006)

Richardson (2006) argued that expected investment in new projects is normal investment expenditure of a company depending on growth opportunities, financial institutions. Richardson (2006) used Tobin's Q index, financial leverage, cash flow, firm size, stock returns as the independent variables and new investment as the dependent variable in the research model. The author argued that based on the regression line showing the expected investment and the actual investment of the company, the residual is the difference between the estimated investment and the actual investment. If this residual has a positive value, there exists a problem of irrational investment in the form of over-investment, and if it has a negative value, there exists an issue of irrational investment in the form of under-investment. If the forecast value is equal to the actual value, this is called a normal investment. By analyzing the data of 58,053 US companies, Richardson (2006) found that over-investment is a common issue in these companies and on average these companies are overinvesting 20% of their cash flow.

Liu and Bredin (2010) investigatedthe degree of over-investment of Chinese companies and further examined the impact of corporate ownership on over-investment level. Interestingly, when examining the effect of corporate ownership on over-investment, widely accepted theories of corporate finance suggest that corporate ownership provides a strong supervisory mechanism of management investment decisions. Thus, this mechanism helps firm reduce the level of over-investment and improve operational efficiency. The results of this study showed that the over-investment level of Chinese firms was not too high since its mean value was equivalent to 0.0002. Therefore, the problem of irrational investment in the form of over-investment was not too serious during the study period. In addition, 36.9% of Chinese enterprises over-invested and 63.1% of them under-invested in new projects. Contrary to theoretical evidence, these authors found that corporate ownership cannot lessen the problem of over-investment in Chinese firms.

Fu (2010) provided a new explanation for the concept of over-investment that after issuing shares, firms often undergo irrational investment in the form of over-investment. Through investment analysis and comparison between companies makingseasoned equity offering(SEO) and companies that do not issue additional shares, the study of Fu (2010)pointed out that companies making SEO have made more irrational investments. Lang et al. (1989) tested the theory of free cash flow when studying the profits of auctioneers. The article applied Tobin's Q index as an indicator to measure investment opportunities of enterprises. If the index's value is greater than 1, the market value of the company is higher than its book value, which is usually attractive to investors and has good competitiveness. The company has many investment opportunities since it can take advantage of cheap capital. If the index's value is less than 1, the company's value is under-estimated compared to its true value, the enterprise is unlikely to have positive NPV investment opportunities. The results showed that, in companies with low Tobin's Q, profitability has a negative relationship with cash flow. Besides that, this relationship depends on the company's investment opportunities.

In Vietnam, Le (2008) conducted study on the investment and the lubrication costs of 468 non-state enterprises in the Mekong Delta. The research results showed that the investment of enterprises depends on their revenue growth rate and their accumulated profit. In the same year, Pham et al. (2008) examined the determinant factors ofthe investment decisions of 294 non-state enterprises in Kien Giang province during the period from the year 2000 to the year 2005. Research results pointed out that firm's investment level depends on their retained earnings. In addition, business investment also depends on the revenue growth in previous years. Besides, firm size also affects the investment decision of firm. Tran and Truong (2018) investigated the

influence of financial leverage on the investment activities of 248 companies listed on Vietnam's stock exchange in the period between the year 2014 and the year 2017. By employing fixed effects model to analyze data,research results showed that financial leverage negativelyimpacts the investment activities of companies. Besides that, the negative effect of financial leverage on investment is stronger for companies with low growth opportunities than for companies with high growth opportunities.

III. Research Methodology

3.1. Sample Selection

Panel data is collected from audited financial statements and annual reports of non-financial joint stock companies listed on Ho Chi Minh Stock Exchange. Based on the sampling criterion that companies must have sufficient information about important business data during the period from the year 2013 to the year 2017, the number of companies obtained in this study is 184. Thus, the sample of this study consists of 920 observations.Firms in the sample are classified into three groups as follows:

Table 1: Research sample structure

Groupof Sectors	Number of Firms	Proportion(%)	Number of Observations
Energy, health care, information technology and utilities sector	31	16.85	155
Consumer goods sector	63	34.24	315
Industrials and materials sector	90	48.91	450
Total	184	100	920

Based on the results in Table 1, energy, healthcare, information technology and utilities sectors account for the lowest proportion in the sample, only 16.85%. Consumer goods sector make up 34.24%, whereas industrials and materials sectors constitute the majority of the sample with 48.91%. These results show that most of companies listed on Ho Chi Minh Stock Exchange operate in industrials and materialssectors, and then in consumer goods sector.

3.2. Estimation Method

With panel data, this study employs random effects model (REM) and fixed effects model (FEM). Then, this study uses Hausman (1978) test to select the appropriate model between REM and FEM models. After that, the study tests the phenomenon of heteroscedasticity, autocorrelation, multicollinearity in the regression model. To evaluate the investment level of non-financial companies listed on Ho Chi Minh Stock Exchange, the study relies on the research model of Richardson (2006) to identify over-investment and under-investment. Besides that, based on the research of Farooq et al. (2015), this study proposes the regression model to estimate the level of investment as follows:

$$INEW_{i,t} = \alpha_i + \beta_1 \text{Tobin's } Q_{i,t-1} + \beta_2 LEV_{i,t-1} + \beta_3 FCFt_{i,t-1} + \beta_4 SIZE_{i,t-1} + \beta_5 SR_{i,t-1} + \beta_6 AP_{i,t-1} + \beta_7 RGR_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

Where INEW is new investment; Tobin's Q is Tobin's Q index; LEV is financial leverage; FCF is free cash flow; SIZE is firm size; SR is stock return; AP is accumulated profit; RGR is revenue growth rate; i represents companies; β are regression coefficients of the explanatory variables; t represents time; ε is error term.New investment (INEW) for a given year is the total capital expenditures and acquisitions subtracted with sale of property, plant and equipment (Richardson, 2006). New investment is the scaled with total assets at the beginning of the year.Farooq et al. (2015) calculated new investment variable as follows:

$$INEW_t = (\text{Investment in Fixed Assets}_t + \text{Investment in Intangibles}_t + \text{Acquisitions}_t + \text{Investment in Financial Assets}_t - \text{Sale of Investment}_t) / \text{Total Assets}_{t-1} \quad (2)$$

The study of Richardson (2006) ran regression to determine the value of residual which is also the estimated value of new investment. If the estimated residual takes positive value, this is a signal of over-investment, whereas if the estimated value of residual is negative, this is a signal of under-investment. However, Yang (2005) argued that it is difficult for firms to meet the expected investment level estimated by the regression model. Farooq et al. (2015) stressed that the regression model does not fully explain the change in investment level, so not all investments deviating from the expected investment levelreduce the investment value. To some extent, companies always experience irrational investment in the form of under-investment and over-investment. Therefore, the investment residuals in the regression model do not necessarily represent over-investment and under-investment due to agency problems.

Company decides the degree of investment based on growth opportunities. Tobin's Q is a proxy for measuring growth opportunities for a company and is defined as the investment opportunity that a company will

have in the near future (Aivazian et al., 2005). Tobin's Q represents the market for calculating a company's book value. Many previous studies have used Tobin's Q as a proxy for growth opportunities. Pawlina and Renneboog (2005) examined the relationship between over-investment and cash flow. These authors said that when firms have low growth opportunities at the beginning of the year andthepositive relationship between investment and cash flow exists, cash flow investment is in the direction of over-investment. In the context of high growth opportunities and the negative relationship between investment and cash flow, it represents an irrational investment in the form of under-investment. Farooq et al. (2015) conceptualized the findings of Pawlina and Renneboog (2005) and took the findings of Richardson (2006) one step further. Farooq et al. (2015) argued that when the growth opportunity at time (t-1) is low, but a company has a positive investment residual at time (t), which indicates thatthis firm has a problem of irrational investment in form of over-investment. Similarly, when the growth opportunity at time (t-1) is high, but a company has a negative investment residual at time (t), which shows that this firm has a problem of irrational investment in form of under-investment. The concept of over-investment and under-investmentare illustrated in Table 2 below:

Table2: Identifying over-investment and under-investment

Investment Residual at Time (t)	Growth Opportunity at Time (t-1)	Indication
Positive investment residual	Tobin's Q < 1	Over-investment
Negative investment residual	Tobin's Q > 1	Under-investment
Positive investment residual	Tobin's Q > 1	Normal investment
Negative investment residual	Tobin's Q < 1	Normal investment

Source: The study ofFarooq et al. (2015)

Table 3 summarizes the characteristics of the variables in the research model.

Table 3: Summary of the variables in the research model

Variable	Measurement Method	Reference
New investment(INEW)	(Investment in Fixed Assets$_t$ + Investment in Intangibles$_t$ + Acquisitions$_t$ + Investment in Financial Assets$_t$ – Sale of Investment$_t$) / Total Assets$_{t-1}$	Richardson (2006); Farooq et al. (2015)
Tobin's Q index (Tobin's Q)	(Market capitalization + Total debt) /Total assets	Liu and Bredin (2010); Le and Quach (2017); Farooq et al. (2015);Ngo and Le (2018)
Financial leverage (LEV)	Long term debt / Total Assets	Farooq et al. (2015); Heydari et al. (2014); Tran and Truong (2018)
Free cash flow (FCF)	(Net operating activities + Purchase of fixed assets + Sale of fixed assets) / Net revenue from operating activities	Le and Quach (2017); Farooq et al. (2015)
Firm size (SIZE)	Ln(Total assets)	Mai and Nguyen (2011); Vo and Doan (2014); Heydari et al. (2014); Farooq et al. (2015)
Stock return (SR)	Ln(Price$_t$) - Ln(Price$_{t-1}$)	Titman et al. (2004); Farooq et al. (2015)
Accumulated profit (AP)	Profit after tax / Total assets	Le (2008)
Revenue growth rate (RGR)	(Revenue$_t$ – Revenue$_{t-1}$) / Revenue$_{t-1}$	Pham et al. (2008); Mai and Nguyen (2011)

IV. Results and Discussion

4.1. Empirical Results

Table 4 illustrates the descriptive statistics of the variables used in the regression model.The statistical results in Table 4 showsthe descriptive statistics of all variables used in the study with a sample size of 184 non-financial companies listed on Ho Chi Minh Stock Exchange. Descriptive statistics indicate that on average the level of new investments of non-financial companies makes up only 1.4% of the total assets. Besides that, there is a big difference between the maximum and the minimum investment values. Meanwhile, the average value of Tobin's Q is 1.179. The values of Tobin Q represent the growth opportunities of companies. Most companies have average growth opportunities around a value of 1. However, a few companies in the sample have extremely high growth opportunities which is up to 9.043. Companies with high Tobin's Q value constitute small proportion of the sample. The results in Table 4 also point out that on average, non-financial companies have 10.1 cents of long-term debt for each dollar they have in assets. Additionally, some firms in the sample do not issue long-term

debt, so the long-term debt-to-total-assets ratio is equal to 0. Several firms issue large amount of long-term debt to finance their operation. The maximum value of this ratio is 0.683, which means that highly leveraged firm has 68.3 cents of long-term debt for each dollar it has in assets.The empirical finding in this studyconfirms that during the study period, non-financial companies in the sampleissue low amount of long-term debt to finance their assets relative to their total assets.From the results in Table 4, it is clearly shown that the average free cash flow is only 1.4% compared to net sales from operating activities, this figure is actually insignificant compared to the maximum free cash flow value of 823%. However, only few companies have high free cash flow. This finding also shows that the amount of free cash flow in non-financial companies is not large.

Table 4: Descriptive statistics of the variables in the regression model (Obs. = 920)

Variable	Mean	Standard Deviation	Minimum	Maximum
INEW	0.014	0.110	-1.095	1.137
Tobin's Q	1.179	0.640	0.160	9.043
LEV	0.101	0.140	0	0.683
FCF	0.014	0.403	-2.630	8.230
SIZE	20.892	1.160	18.661	25.014
SR	0.090	0.391	-1.682	1.729
AP	0.072	0.083	-0.624	0.721
RGR	0.123	0.461	-0.931	7.919

The average size of non-financial firms in Vietnam, according to the analysis results, is 20.892, with the lowest amplitude of 18.661 and the highest of 25.014. The results demonstrate that the difference between the sizes of the firms in the data sample is quite large. Turning to stock return variable, the statistical results in Table 4 shows that non-financial companies averagely receive 9% of stock return compared to the average annual return, while the highest value of stock return is 172.9%. There is a group of companies with average earnings from stocks, but there is also a group of companies with exceptionally high profits. These findings have shown that there are very large disparitiesamong the companies in the observed sample.Moving to accumulated profit variable, the results show that on average the ratio of profit after tax to total assetsof non-financial firms is 7.2%. There is a big difference between the maximum value and the minimum value of this ratio. In other words, several firms suffer losses while some firms have very high profitability.Referring to revenue growth rate variable, non-financial firms in the sample have average revenue growth rate of 12.3%. Besides that, in the sample, there are a few companies with extremely favorable revenue growth. The highest value of revenue growth rate reaches 791.9%. However, some firms have negative revenue growth rate, the lowest value of this variable is -93.1%.

The study also carries out descriptive statistics of variables for each group of sector (see Table 5)

Table 5: Descriptive statistics of the variables in the regression model according to group of sector

Variable	Mean	Standard Deviation	Minimum	Maximum
Panel A: Energy, health care, information technology and utilities sector				
INEW	0.001	0.081	-0.419	0.304
Tobin's Q	1.246	0.561	0.408	4.003
LEV	0.118	0.138	0	0.569
FCF	0.036	0.334	-2.338	0.729
SIZE	21.177	1.032	19.623	24.118
SR	0.087	0.323	-1.147	0.862
AP	0.077	0.083	-0.624	0.242
RGR	0.111	0.283	-0.628	1.441
Panel B: Consumer goods sector				
INEW	0.019	0.076	-0.205	0.629
Tobin's Q	1.348	0.874	0.269	9.043
LEV	0.066	0.110	0	0.623
FCF	0.022	0.153	-1.380	0.487
SIZE	20.861	1.237	18.661	25.014
SR	0.088	0.428	-1.682	1.729
AP	0.079	0.093	-0.191	0.721
RGR	0.135	0.378	-0.767	2.739
Panel C: Industrials and materials sector				
INEW	0.014	0.136	-1.095	1.137
Tobin's Q	1.036	0.395	0.160	3.337
LEV	0.119	0.154	0	0.683
FCF	0.001	0.527	-2.630	8.230

Variable	Mean	Standard Deviation	Minimum	Maximum
SIZE	20.816	1.133	18.673	24.693
SR	0.092	0.387	-1.052	1.497
AP	0.065	0.075	-0.339	0.413
RGR	0.119	0.555	-0.931	7.919

Based on the descriptive statistics for each sector group in Table 5, on average the level of new investments of companies operating in energy, health care, information technology and utilities sector makes up only 0.1% of the total assets, while firms operating in consumer goods sector and in industrials and materials sector have much higher level of new investment, with the figures being 1.9% and 1.4% respectively.All groups of companies in the sample have average Tobin's Q values being greater than 1. This result proves that non-financial firms listed on Ho Chi Minh Stock Exchange have high growth opportunities. In the group of energy, health care, information technology and utilities sector, the average growth opportunity is 1.246 and the average financial leverage is 11.8%. Additionally,this group has the highest ratio of cash flow to net revenue from operating activities,at 3.6%. In consumer goods sector, these companies has the highest Tobin's Q index and the second highest debt usage, with the figures being 1.348 and 6.6% respectively. The average free cash flow of companies in this group is 2.2%. Turning to industrials and materials sector, firms in this group have lower growth opportunity and free cash flow than firms operating in the other groups. This is clearly shown through the research results in Panel C in Table 5 that the value of Tobin's Q and the value of free cash floware only 1.036 and 0.1%, respectively. However, firms in this sector has the highest long-term debt utilization at 11.9%. The figures of size, stock return, accumulated profit, and revenue growth rate of all three groups do not have significant differences.

In general, in the group of energy, health care, information technology and utilities sector, although there are good growth opportunities and free cash flow is also positive, new investment level is very low. The reason is that the competition among companies in this group is not tough and companies take distinct positions in their fields.For consumer goods sector, this group has the highest level of new investment, the best growth opportunities, but has low financial leverage and moderate free cash flow. In fact, firms in consumer goods industry always have to invest more in new projects, expand the scale, and improve products to meet the needs of consumers. Companies in industrials and materials sectorhas medium investment level and lower growth opportunity, but has the highest debt utilization and the lowest free cash flow. This finding is completely consistent with the actual situation of companies in Vietnam operating in the field of industrials and materials that when there are good growth opportunities, these companies will issue more debt to finance new investment projects.

Based on the results of the correlation matrix in Table 6, it can be seen that all the pairs of correlation coefficients among the variables in the model are less than 0.8 (Farrar and Glauber, 1967). Hence, it can be concluded that there is no serious multicollinearity phenomenon.

Table 6: Correlation matrix among the variables in the model (Obs. = 920)

	INEW	Tobin's Q	LEV	FCF	SIZE	SR	AP	RGR
INEW	1.0000							
Tobin's Q	0.0695**	1.0000						
LEV	0.1358***	-0.1264***	1.0000					
FCF	-0.1664***	0.0503	-0.1648***	1.0000				
SIZE	0.0891***	0.1486***	0.2680***	-0.1256***	1.0000			
SR	0.0040	0.1703***	-0.0015	-0.0079	-0.0211	1.0000		
AP	0.0433	0.6195***	-0.1865***	0.1262***	-0.0286	0.1968***	1.0000	
RGR	0.1022***	0.0127	0.0141	-0.0483	0.0603*	0.1618***	0.0596*	1.0000

Note: *, ** and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

Table 7 illustrates variance inflation factor (VIF). The VIF values for all independent variables noted in the model are below 10.0. Thereby, it can be concluded that multicollinearity is considered as not serious in our current model.

Table 7: Results of VIF test (Obs. = 920)

Variable	VIF
Tobin's Q	1.73
LEV	1.16
FCF	1.07
SIZE	1.15
SR	1.08
AP	1.73
RGR	1.05

The Hausman test gives P-value of 0.0001 with 99% confidence. Therefore, using FEM is more appropriate than using REM. This study employs FEM to estimate the investment residual in order to classify the investment level of companies. Estimated results of the research model using FEM are presented in Table 8.

Table 8: Estimated results of the model using FEM(Obs. = 920)

Variable	Estimated Coefficient
Tobin's Q	0.0235*
LEV	0.1133
FCF	-0.0180*
SIZE	0.0496***
SR	-0.0038
AP	0.0227
RGR	0.0109
Constant	-1.0652***
Rho = 0.3309	
R^2 = 4.67%	
F = 5.10	
Prob > F = 0.0000	

Note: * and *** indicate statistical significance at the 10% and 1% level, respectively.

4.2. Discussion

The estimated results presented in Table 8 show that Tobin's Qindex (Tobin's Q), free cashflow (FCF) and firm size (SIZE)have a statistically significant effect on the newinvestmentlevel of non-financial firms. However, the study has not found the impacts of financial leverage (LEV), stock return (SR), accumulated profit (AP), and revenue growth rate (RGR) on the investment status of non-financial firms in the study area. The significant impacts of Tobin's Q index (Tobin's Q), free cash flow (FCF) and firm size (SIZE) on firm investment status can be explained as follows.

From the estimated results in Table 8, it is clearly shown that Tobin's Q index (Tobin's Q) has a positive correlation with firm investment level with the positive estimated coefficient (β1=0.0235) at the significance level of 10 percent. This result is similar to prior studies such as Pawlina and Renneboog (2005). This finding indicates that when firms have high investment opportunities at the beginning of the year, firms invest more to generate more profit from these new investment.The negative relationship between free cash flow (FCF) and firm investment exists, which is clearly shown through the research results in Table 8 that the estimated coefficient is negative (β3=-0.0180) at the significance level of 10 percent. This finding proves that an increase in free cash flow tends to reduce firm investment level. Firm size (SIZE) has a positive impact on firm investment level. This can be seen from the results in Table 8 that firm size has a positive correlation at the significance level of 1 percent (β4=0.0496). This result is consistent with the previous study of Conyon and Murphy (2000); Pham et al. (2008). In fact, since large companies have more competitive advantages, not only in terms of assets and market segments, but also in terms of distribution network and banking relationships. Hence, these companies have more chance to make new investment.

V. Conclusions

This study employs panel data regression with the fixed effects model to investigate the status of investment of non-financial firms in Vietnam. With the aim of assessing investment status, Richardson's theoretical model of investment is adopted to separate irrational investment into over-investment and under-investment. A panel data of 184 non-financial companies listed on Ho Chi Minh Stock Exchange is collected

over the period from the year 2013 to the year 2017. In general, the research results clearly show the investment status of non-financial companies in Vietnam. New investment of firms is strongly influenced by factors including investment opportunities as measured by Tobin's Q index, free cash flow, size of the company. More specifically, investment opportunities and firm size positively affect new investment level of the company, whereas free cash flow negatively affects the investment status of the company.

In Vietnam, during the period from the year 2013 to the year 2017, the economy has had a significant recovery from economic shock since the year 2013 but it is still not really stable. However, by the year 2017, the economy has recovered significantly, creating a premise for companies to operate more smoothly. During this time,companies caneasily access loans, expand production scale, andincrease investment in new projects when there are favorable investment opportunities. The stable economic environment and many investment opportunities give companies more chances to operate efficiently. However, Vietnamese companies have to carefully choose investment projects regarding to the company's capacity in order to boost the profitability of the firms. Therefore, the control of investment activities is always one of the important issues to which companies should pay more attention.

The study proposes several solutions for managers and board of directors of joint-stock companies to better control firm investment. Companies should increase the ownership ratio of the board of directors and chief accountants in the company by implementing the stock bonus policy and encouraging them to buy more shares in the additional issuance. Large-sized companies should establish a system of corporate control to closely monitor the investment activities of managers at all levels to eliminate the agency problem. In addition, foreign investors can act as a controller in the company, which helps reduce the agency problem. Therefore, firms should have policies to attract foreign investment capital to improve management efficiency. Besides that, making investment to expand the scale of business should be carefully considered and firms should not invest in non-specialized fields.

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