Determinants of firm's capital expenditure: Empirical evidence from Vietnam

Huu Anh Nguyen[a*] and Thanh Hieu Nguyen[a]

[a]National Economics University, Vietnam

CHRONICLE	ABSTRACT
	This research was conducted to investigate the factors affecting the company's capital expenditure. Data were collected from the firms listed on Ho Chi Minh Stock Exchange (HOSE) over the period of nine years from 2010 to 2018, including the sample of 192 non-financial listed companies. Three statistical approaches were employed to address econometrics issues and to improve the accuracy of the regression coefficients: Random Effects Model (REM), Fixed Effects Model (FEM) and Generalized Method of Moments (GMM). The results show that free cash flows and firm size influenced positively on capital expenditure. By contrast, other factors such as dividend, interest expenses, depreciation and working capital had negative effects on capital expenditure. Based on the research results, some key intuitive recommendations were proposed for managers and investors in order to help them in making decisions.

1. Introduction

Capital expenditures largely affect business performance in particular, and the economy as a whole. Therefore, the study of determinants on capital expenditure is meaningful from both practical and scientific perspectives. In practical terms, Fazzari and Athey (1987) found the effects of capital expenditure on gross national product and economic growth of a country. In addition, this type of spending, which is large in terms of value with a long recovery period, influences production decisions and strategic planning of businesses. Theoretically, the determinants of capital expenditure are interested by various Vietnamese and foreign researchers. Typical studies on determinants of capital expenditures include Nair (1979), Berndt et al. (1980), Fazzari and Athey (1987), Fazzari et al. (1988), Gaver (1992), Kuh & Meyer (1957), Qandhari et al. (2016), Becker and Sivadasan (2010), Dalbor and Jiang (2013), Ninh (2007), and Trang & Quyen (2013). The studies diverse in terms of determinants, research context and research period. However, most of them only emphasize the relationship between capital expenditure and free cash flows without an adequately and systematically consideration of other important factors. Besides, although the authors agreed on the list of determinants, their results are inconsistent in the sign of effects, which require additional evidence-based examinations. Becker and Sivadasan (2006) suggested that there is no linkage between free cash flows and capital expenditure while Dalbor and Jiang (2013) pointed out a positive relationship between free cash flows and capital expenditures on fixed assets such as free cash flows and capital expenditure move in the opposite directions. Moreover, studies are mainly conducted in developed countries such as the United States (Dalbor & Jiang, 2013) with few researches in developing countries.

Most studies employed research data prior to 2010, while few of them have been accomplished in recent years. Therefore, it is important to update the studies with more recent data. This article aims to provide relevant information to business managers and potential investors in understanding factors influenced on capital expenditures in decision-making process. Besides, this paper also adds more evidences to the research of this topic in the context of Vietnam.

The remainder of the paper is structured as follows: In Section 2, theoretical basic, literature review, the research questions and hypotheses are presented; Section 3 presents the research methodology; results and discussion about the factors affecting firm's capital expenditure are presented in Section 4. Finally, the conclusion and recommendations are explained in Section 5.

2. Theoretical Basic and Literature Review

2.1. Theoretical Basic

To study the influence of different factors on capital expenditure, the paper is based on three following theories:

Firstly, Pecking order theory

Pecking order theory explains financing decisions of business managers. Given the need for capital, businesses put an order of priority for their funds: they first use internal capital (e.g., internal funds, retained earnings), followed by loans (e.g., debt securities), and finally, new equity. Modigliani and Miller (1961) was the first studied on this theory, resulting from the information asymmetry between company owners and external investors. While owners are fully aware of the firm's financial situation, external investors are poorly informed, and therefore, they are always skeptical about completeness and truthfulness of the information provided by the company owners. Therefore, companies often have to pay higher costs for external finance. The pecking order theory states that internal capital will always be preferred to loans and the use of internal funds will reduce the dependence of enterprises on external parties, increase financial autonomy and reduce the leakage of internal information.

Secondly, Dividend policy theory

This theory also partly helps us understand the relationship between dividend policy and investment of the business. Modigliani and Miller (1961) gave theorems and they are the basis of modern business finance theory. Two main conclusions are drawn from the theorems: (1) the value of an enterprise depends on its present and future free cash flow, (2) dividend policy does not affect the value of the business. Companies carry out all positive net present value (NPV) projects. However, the problem is that if the management focuses so much on dividend policy that the NPV projects or projects that create corporate value will be cancelled or delayed in the future because of the company's money have been used to pay dividends. Due to cancels or delays on positive NPV projects; this will have an adverse impact on the company's future profits.

Thirdly, Agency cost-based theory

The owner of the company and the person who manages the company on behalf of the owners (the manager) always has a conflict of interest (Jensen & Meckling, 1976). The owners hire managers to run their businesses and efficiently use of company's resource to increase the equity value. The managers may behave in ways that will benefit their interests rather than owners' interests. Managers may prefer to invest in less risky investment projects, lower profits and less debt to reduce the likelihood of bankruptcy as this affects their reputation. The agency cost-based theory helps us understand that, in some cases, the managers make a decision to new fixed assets expenditure due to their own commission from the equipment supplier, regardless of the effectiveness of the capital expenditure to the owners.

2.2. Literature Review, Research Questions and Hypotheses

Previous researchers have indicated influencing factors on capital expenditure as follows:
First, the effects of free cash flow on capital expenditure.

Kuh and Meyer (1957), Fazzari et al. (1988), Gilchrist and Himmelberg (1995), Schaller (1993), Chirinko and Schaller (1995), Kaplan and Zingales (1997), Vogt (1997) and George et al. (2011) argued that free cash flow positively influences on capital expenditure. However, other authors such as Dalbor and Jiang (2013) believed that the effects are negative.

Kuh and Meyer (1957) studied 600 U.S. companies and showed that the companies often prioritize fixed asset spending by using cash flows, and more spending is made when internal funds are available. Following Kuh and Meyer (1957), Fazzari et al. (1988) triggered discussions and controversies with regards to the link between capital expenditure and

free cash flows. The authors employed data from 421 manufacturing companies in the United States from 1969 to 1984, and found capital expenditures in companies with financial distress are heavily dependent on their internal cash flows. Other authors, including Gilchrist and Himmelberg (1995), used dividend pay-out rate to categorize businesses into financially distressed companies and those in financial soundness and came to the same conclusion.

Schaller (1993) also investigated the relationship between capital expenditure and cash flows of Canadian companies at different stages of development, consisting of start-up companies and long-lasting businesses. Newly established companies face more financial distress and their investment decisions are affected by internal cash flows at a larger extent than the latter. Then Chirinko and Schaller (1995), who categorized Canadian companies by development stage, ownership and business lines, concluded that the relationship between cash flow and fixed assets spending was significant in financially distressed companies, while insignificant in companies with financial soundness.

Kaplan and Zingales (1997) employed the research model initiated by Fazzari et al. (1988) and noticed a weak linkage between fixed asset investments and cash flows in firms with less financial constraints. On the contrary, the more financially constrained companies are, the stronger linkage between free cash flows and capital expenditure they have.

Vogt (1997) examined the relationship between free cash flows and fixed asset spending in a sample of 421 companies in the United States. In his study, the value of free cash flows is determined as follows:

Free cash flows = Operating income + Depreciation - Interest expenses – Corporate income taxes - Preferred and common dividends.

The research results of Vogt (1997) confirmed that capital expenditure is positively associated to free cash flows. Sharing the same conclusion with Vogt (1997), Alti (2003) pointed out a positive linkage between cash flow and capital expenditure. In his study, Alti (2003) also discovered a strong relationship in small and newly established businesses, which are in the early development stage with low dividend payout rate and financial difficulties, because they have to consider capital expenditure and investment returns.

Similarly, George et al. (2011) examined Indian firms and confirmed the positive effects of cash flows on investment decisions. However, the sensitivity of investment cash flow is not significantly different between companies belonging to economic groups and businesses outside economic groups.

More recently, Dalbor and Jiang (2013) investigated the relationship between free cash flow and fixed assets expenditure between 2009 and 2013 in Kenyan companies listed in the Nairobi stock market. The authors reviewed the impacts on capital expenditure from free cash flow, dividend payout rate and depreciation. The research resulted in a positive relationship between free cash flows and capital expenditure (i.e., the more free cash flows a firm has, the more expenditures it involves in).

Unlike previous studies, some authors have recently stated that the relationship between free cash flows and capital expenditure is negative. Dalbor and Jiang (2013) explored the relationship between cash flows and fixed assets expenditure in German automation companies, which have been leading the automation industry in Europe since the 1960s. This industry requires a high level of capital concentration and large investments in fixed assets. The research showed a counterclockwise relationship between cash flow and capital expenditure, although the movement of this connection may divert in different development stages of an enterprise.

George et al. (2011) studied the relationship between free cash flows and capital expenditure in 90 Canadian listed companies (in ten different industries) in the period from 2010 to 2015. He measured the free cash flows similarly to Vogt (1997) and concluded that the only determinant of the capital expenditure of Canadian listed companies is free cash flow, which has a negative impact on capital expenditure. Listed companies in the research sample shrank expenditure in fixed assets even when their cash flow increased. Companies usually invest more on fixed assets from increasing cash flows, but those in the sample moved in the opposite direction. George et al. (2011) explained that Canadian companies were more cautious in spending in this period (2010 - 2015).

From literature review, we propose the first research question as follows:

Question 1: Does free cash flow have significant impact on capital expenditure in non-financial companies listed on HOSE?

Second, the impacts of dividend on capital expenditure are investigated in different studies, which did not conclude consistently on the linkage. Dalbor and Jiang (2013) indicated negative effects, while George et al. (2011) suggested a zero connection. The relationship between dividend and investments of Kenyan companies listed on the Nairobi Stock Exchange from 2009 to 2013 was examined by Haller and Murphy (2012), who discussed the negative correlation

between pay-outs to shareholders and invested capital. George et al. (2011) studied the relationship between free cash flow and capital expenditure in 90 Canadian listed companies (in ten different industries) for the period from 2010 to 2015. He did not find an association, using the Arellano-Bond linear panel-data model.

From literature review, we propose the second research question as follows:

Question 2: Does dividend have significant impact on capital expenditure in non-financial companies listed on HOSE?

Third, there have been researches to explore the impact of interest payments on capital expenditure, and a positive relationship was found. Lending interest rates largely influence free cash flows of big companies, which usually conduct different projects simultaneously and demand significant debt obligations. Once interest rates rise, the increasing interest expenses overrun the free cash flows, forcing the companies to pause some projects.

From literature review, we propose the third research question as follows:

Question 3: Does interest expense have significant impact on capital expenditure in non-financial companies listed on HOSE?

Fourth, the effects of working capital on investment decisions are investigated in selected studies, which resulted in a positive correlation using panel data of 120,000 companies in China from 2000 to 2007 to study the sensitivity of cash flow to expenditure in working and fixed capital. They documented that the firms featured by high working capital display a high sensitivity of spending in working capital to cash flow and a low sensitivity of fixed assets expenditure to cash flow. This suggests that the working capital and fixed asset expenditure move in opposite directions.

From literature review, we propose the fourth research question as follows:

Question 4: Does working capital have significant impact on capital expenditure in non-financial companies listed on HOSE?

Fifth, there were studies on the linkage of firm size on fixed asset investment, displaying inconsistency on the effects. George et al. (2011) argued that this effect is counter clockwise, while some other authors such as Haller and Murphy (2012) saw a positive relationship. George et al. (2011) found a negative linkage between firm size and capital expenditure, using a research samples from 330 companies and 9,180 observations collected from Compustat (United States) in the period 1980-2006. They concluded that small-size companies often spend more on capital expenditure than their large competitors. Similarly, Ninh (2007) studied the relationship between firm size (measured by fixed assets) and the level of spending in fixed assets based on a sample of 606 non-state enterprises in the Mekong Delta of Vietnam. It is argued that larger companies are more cautious in spending for fixed assets.

Haller and Murphy (2012) disagreed with the conclusions by George et al. (2011). He used data from 90 Canadian listed companies in the period of 2010-2015 and found a positive relationship between fixed asset expenditure and firm size. According to Haller and Murphy (2012), firm size is critical to capital expenditure. The conclusion was made from a survey of 5,864 Irish companies and 9,658 observations in 2006 and 2007, which procured equipment to control the spreading environmental pollution from industries in Ireland. It was observed that large-scale companies owned by organizations and foreign investors tend to purchase equipment at large volumes because of the cost-benefit considerations.

From literature review, we propose the fifth research question as follows:

Question 5: Does firm size have significant impact on capital expenditure in non-financial companies listed on HOSE?

Sixth, the effects of depreciation on capital expenditure are examined, though the sign of expected effects is not consistent among studies. Haller and Murphy (2012) argued that the correlation is negative, while George et al. (2011) pointed out a positive linkage.

From literature review, this study proposes the sixth research question as follows:

Question 6: Does depreciation expense have significant impact on capital expenditure in non-financial companies listed on HOSE?

Having discussed the literature review and the research objectives, the paper presents six hypotheses as follows:

H_1: Free cash flow has a positive impact on capital expenditure in non-financial companies listed on HOSE.

H_2: *Dividend has a positive impact on capital expenditure in non-financial companies listed on HOSE.*

H_3: *Interest expense has a positive impact on capital expenditure in non-financial companies listed on HOSE.*

H_4: *Depreciation has a positive impact on capital expenditure in non-financial companies listed on HOSE.*

H_5: *Working capital has a positive impact on capital expenditure in non-financial companies listed on HOSE.*

H_6: *Firm size has a positive impact on capital expenditure in non-financial companies listed on HOSE.*

3. Research Methodology and Models
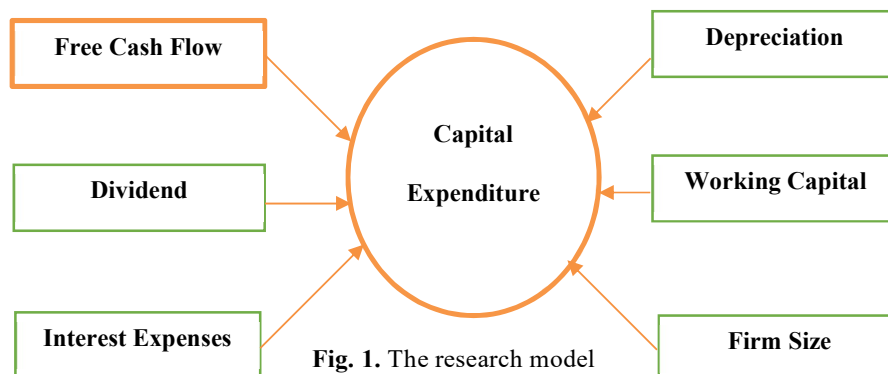
3.1. Research Methodology

Data is collected from Finin Group, one of the leading business and financial data providers in Vietnam. Accounting data, consisting of spending on fixed assets, dividend, interest expense, depreciation, total assets and short-term assets, profit before tax and corporate income tax, from audited financial statements of 214 HOSE listed companies between 2010 and 2018 is examined. However, financial firms and non-financial companies apply different accounting regimes in Vietnam, that is why only 192 non-financial companies are included in the sample for the purpose of consistency, and the remaining 22 financial firms are excluded.

Regarding the research methodology, there are three techniques to analyze panel data, which is also employed in this research, including Ordinary Least Squares (OLS), Random Effects Model (REM) and Fixed Effects Model (FEM). Following the regression of these models, the authors checked the model validity and verify the compliance with important assumptions such as: no autocorrelation, constant variance or multicollinearity. The model validity is tested by examining the F-statistic value from regressions (i.e., Prob (F-statistic) <0.1 means a valid model). The constant variance is checked by Breusch-Pagan-Godfrey test, which tests the null hypothesis that all error variances are equal versus the alternative that the error variances are a multiplicative function of one or more variables. If the Prob (F-statistic) value obtained after this test is <0.1, the research concludes that the error variances are not equal. In addition, the rule of Durbin Watson (DW) statistic is applied to test autocorrelation (i.e., if 1 <DW <3: the model has no autocorrelation, if 0 <DW < 1: the model has a positive autocorrelation, and if 3 <DW <4: the model has a negative autocorrelation).

In the field of panel data, in the traditional way, scientists use fixed effects or random effects in estimating research models. In the case of detecting bad phenomena that lead to inaccurate estimations (model defects), the causes of the defects are often: functional misalignment or omission of important variables. In case of false function, of course we have to change the function type accordingly. In the other case, if it falls into the omission of an important variable (lack of exogenous or endogenous variables). In the case of an independent variable in the old model is an endogenous variable (described through another variable) that this unrelated variable is related to the error term leading to the defect. Therefore, in order to solve the problems encountered when faced with this disability, Hansen (1982) developed and introduced additional tool variables (closely related to independent variables, dependent on the old model but without the model of adding this tool variable is called generalized method of moments (GMM). In this research, because REM and FEM models are found invalid from the regressions, the Generalized Method of Moments (GMM) is employed as suggested by Hansen (1982) to produce more accurate and reliable results.

3.2. Research Models

This research investigates the determinants of capital expenditures in non-financial listed companies on HOSE. The proposed model presents in Fig. 1.

Fig. 1. The research model

The following equation is employed to investigate the determinants of capital expenditures in non-financial companies listed on HOSE:

$$CE_{i,t} = \alpha_0 + \rho L.CE_{i,t} + \beta_1 FCF_{i,t} + \beta_2 DIV_{i,t} + \beta_3 IE_{i,t} + \beta_4 DPRN_{i,t} + \beta_5 WC_{i,t} + \beta_6 SIZE_{i,t} + u_{i,t} \tag{1}$$

where
$CE_{i,t}$: Dependent variable
$L.CE_{i,t}$; $FCF_{i,t}$; $DIV_{i,t}$; $IE_{i,t}$; $DPRN_{i,t}$; $WC_{i,t}$; $SIZE_{i,t}$: Independent variables
$u_{i,t}$: Random error
α_0, ρ, β_1, β_2, β_3, β_4, β_5, β_6: parameters

Regarding economic variables, they are often influenced themselves in the previous period so that capital expenditure in the current period is influenced by capital expenditure in the previous period. Therefore, in this research, putting the lag variable of the dependent variable (capital expenditure - L.CE) will help the model to explain better, so it can fix the autocorrelation.

Table 1
Presents the measurement of dependent and independent variables.

Code	Variables	Measurements
$CE_{i,t}$	Capital expenditure of company i in year t	Nepe logarithm of item coded 21 "To purchase plant, property and equipment" on Cash Flow Statement in year t
$L.CE_{i,t}$	Capital expenditure of company i in the previous year	Nepe logarithm of item coded 21 "To purchase plant, property and equipment" on Cash Flow Statement in the previous year.
$FCF_{i,t}$	Free cash flow of company i in year t	Nepe logarithm of free cash flows (FCF = Income before income tax + Depreciation - Corporate income tax – Dividend)
$DIV_{i,t}$	Dividend of company i in year t	Nepe logarithm of item coded 36 "To shareholders as dividend" on Cash Flow Statement
$IE_{i,t}$	Interest expense of company i in year t	Nepe logarithm of item coded 04 "To lenders of interest " on Cash Flow Statement.
$DPRN_{i,t}$	Depreciation of company i in year t	Nepe logarithm of item "Depreciation expense" on Notes to financial statements.
$WC_{i,t}$	Working capital of company i in year t	Nepe logarithm of difference between short-term assets and short-term liabilities. "Short-term assets" is taken from the item coded 100 on Balance Sheet, and "Short-term liabilities" is taken from the item coded 310 on Balance Sheet.
$SIZE_{i,t}$	Size of company i in year t	Nepe logarithm of total assets of company i. "Total assets" is taken from Balance Sheet.

4. Results and Discussion

4.1. Descriptive Statistics

Table 2
Descriptive statistics of research variables (*Unit: VND*)

Variables	Mean	SD	Min	Max
CE	22.4752	2.217849	14.15184	28.49323
FCF	23.32089	1.769035	14.1859	28.68528
DIV	22.35976	1.857866	12.15478	27.41882
IE	21.76937	2.407377	8.809863	27.63046
DPRN	22.39363	1.775573	12.3208	27.90481
WC	24.4027	1.327537	17.37135	29.44394
SIZE	26.2285	1.324489	22.66923	31.08692

Table 2 indicates that capital expenditure (CE) has an average value of 22.4752. However, the variation is not too large with the minimum value of 14.15184 and the maximum value of 28.49323. This shows the insignificant gap in the capital expenditure in companies listed on HOSE in the period from 2010 to 2018. Free cash flow (FCF) has an average value of 23.32089 with the minimum value of 14.1859 and the maximum value of 28.68528. Dividend (DIV) has an average value of 22.35976 with a minor difference, ranging from 12.15478 to 27.41882. Interest expense (IE) has an average value of 21.76937 with the smallest value of 8.809863 and the largest value of 27.63046. Depreciation (DPRN) has an average value of 22.39363, ranging from 12.3208 to 27.90481. Working capital (WC) is 24.4027 on average. Similar to other variables in the model, the variation is insignificant with the smallest value of 17.37135 and the largest value of VND 29.44394. This indicates the even range of working capital in Vietnamese companies. Firm size (SIZE)

has an average value of 26.2285 with the smallest value of 22.66923 and the maximum value of 31.08692.

Table 3
Correlation Matrix

	CE	FCF	DIV	IE	DPRN	WC	SIZE
CE	1						
FCF	0.557***	1					
DIV	0.294***	0.475***	1				
IE	0.468***	0.407***	0.116***	1			
DPRN	0.650***	0.804***	0.435***	0.604***	1		
WC	0.392***	0.609***	0.454***	0.284***	0.532***	1	
SIZE	0.654***	0.738***	0.398***	0.692***	0.779***	0.700***	1

Note: *** p<0.01, ** p<0.05, * p<0.1

The correlation coefficients in Table 3 indicate that the independent variables are correlated with the dependent variable. The correlation between capital expenditure (CE) and firm size (SIZE) (0.654) is strongest against the remaining independent variables.

4.2. Empirical Results

Analyzing three regression models, which are Random Effects Model (REM), Fixed Effects Model (FEM) and Generalized method of moments (GMM) results are shown in Tables 4 as following.

Table 4
Results from REM, FEM and GMM

No.	Variables	Coefficients		
		REM	FEM	GMM
1	L.CE	0.277***	0.0392	0.379***
2	FCF	0.158**	-0.0504	0.199***
3	DIV	0.00285	0.0223	-0.0391*
4	IE	-0.114**	-0.0219	-0.227***
5	DPRN	0.0814	-0.177	-0.222***
6	WC	-0.138**	-0.185**	-0.292***
7	SIZE	0.884***	1.660***	1.496***

Note: ***p<0.01, **p<0.05, *p<0.1

Using CE as the dependent variable and L.CE, FCF, DIV, IE, DPRN, WC and SIZE as the independent variables, GMM is finally selected from three regression models (REM, FEM, GMM) because GMM may fix the common defects in the conventional model such as multicollinearity, autocorrelation and heteroscedasticity. The absence of defects in the model will make the research results strong, unbiased, normally distributive and effective. The results from GMM as follows:

First, capital expenditure in the previous year (L.CE) is positively correlated with capital expenditure (CE) in the current year at a significant level of 1%. The coefficient $\rho = 0.379$ means that one dollar increase in capital expenditure last year gives a rise of 0.379 dollars in the capital expenditure of the current year.

Second, free cash flow (FCF) has a positive impact on capital expenditure at 1% significance level. In the model, the coefficient between the FCF and CE is 0.119 ($\beta_1 = 0.119$), meaning that one dollar increase of FCF expands the capital expenditure by 0.119 dollars.

Third, at the significance level of 10%, dividend (DIV) is statistically significant and has a negative effect on CE with a coefficient of $\beta_2 = -0.0391$. This shows that fixed asset spending increases by 0.0391 dollars when DIV decreases by one dollar.

Fourth, interest expense (IE) is negatively affected by capital expenditure at a significant level of 1%. The regression coefficient $\beta_3 = -0.227$ shows the relationship between IE and CE, indicating that invested capital decreases by 0.227 dollars if IE increases by one dollar.

Fifth, the relationship between depreciation expense (DPRN) and capital expenditure at 1% significance level is negative with the regression coefficient of $\beta_4 = -0.222$. This means 1 dollar, increase of depreciation deflates capital expenditure by 0.222 dollars.

Sixth, the impact of working capital (WC) on capital expenditures at 1% significance level is negative. The regression coefficient $\beta_5 = -0.292$ indicates that CE declines by 0.292 dollars when WC escalates by one dollar.

Seventh, firm size (SIZE) is positively correlated with capital expenditures at a significance level of 1% with the regression coefficient $\beta_6 = 1.496$. When the company size (SIZE) increases by 1 dollar, its capital expenditure augments by 1.496 dollars.

4.3. Discussions

First, the regression results show that free cash flow has a positive impact on capital expenditure of non-financial companies listed on HOSE. This observation is similar to Haller and Murphy (2012). It indicated that non-financial companies listed on HOSE tends to prioritize free cash flow to fixed asset purchase like those in Pakistan, Malaysia, Kenya and Europe. Hypothesis H_1 is accepted.

Second, dividend is statistically significant at 10% level of significance and negatively correlated with capital expenditure. Non-financial companies listed on HOSE likely pay fewer dividends to shareholders to escalate capital expenditure and vice versa. This result is same from some previous researches that found a positive sign in the linkage between dividend and fixed asset expenditure. Hypothesis H_2 is rejected.

Third, the study found evidences of negative impact from interest expense on capital expenditure. This is justified by the fact that higher interest expense (resulting from larger credit size or higher interest rate) discourages enterprises from spending on new fixed assets after considering the cost-benefit analysis. Hypothesis H_3 is not accepted.

Fourth, the empirical results show the negative relationship between depreciation and capital expenditure in non-financial companies listed on HOSE. The enterprises possessing a large volume of fixed assets that reflected by large depreciation did not use much cash to finance more fixed assets in the research period. Alternatively, they may spend cash mostly on operating or financial activities. Hypothesis H_4 is not accepted.

Fifth, working capital and capital expenditure are negatively correlated in this study. Working capital represents difference between short-term assets and short-term liabilities. When the company has short-term assets decreased or (and) short-term liabilities increased, the working capital will decrease. Short-term assets and long-term assets are the two components that make up the total assets of the enterprise. In most businesses, fixed assets are one of the main items in long- term assets. With a certain amount of capital, the manager will decide to allocate to two types of assets: short-term assets or long-term assets. In a given time, increasing the size of long-term assets must reduce the size of short-term assets and vice versa. In other words, in enterprises those prioritize increasing spending on fixed assets, reducing spending on short-term assets and reducing working capital. Therefore, it is perfectly reasonable to have a negative relationship between working capital and fixed assets expenditure. Although this conclusion is consistent with Qandhari et al. (2016) discussed a positive linkage between these two variables. Hypothesis H_5 is not accepted.

Sixth, firm size has a positive effect on invested capital in businesses. This is explained by the need of non-financial companies listed on HOSE to expand their business scale by procuring more fixed assets. This result is consistent with the studies by Haller and Murphy (2012). Hypothesis H_6 is accepted.

5. Conclusion and Recommendations

5.1 Conclusion

This study has evaluated the impact of factors on capital expenditure of firms listed on the Ho Chi Minh Stock Exchange over the period from 2010 to 2018 through the regression of sample data with Generalized Method of Moments (GMM) estimation. The results have shown that all independent variables had a certain influence on the dependent variable (capital expenditure), in which the sensitivity of capital expenditure to firm size was quite high. In addition, decisions on fixed asset spending in companies listed on HOSE often depended greatly on the availability of free cash flow within the company. With the obtained results, the research helps to provide useful information to companies operating in Vietnam market, investors and economists with an overview of the factors impact on fixed assets spending of the enterprise. Thereby, businesses and economists can consider applying this research results to make the most appropriate planning, investment or development decisions for each enterprise in the Vietnamese market.

5.2. Recommendations

Based on the empirical research results, the paper proposed some recommendations to the Vietnam as follows:

To businesses, analyzing the sample of 192 companies listed on HOSE, the determinants on capital expenditure have

been examined in this research. As shown by findings in the paper, large-scale companies have more funds to finance fixed assets. To promote business development, companies are recommended to focus on building their business facilities. The research also found less capital expenditure in companies with higher dividend, and vice versa. Therefore, business owners are suggested to consider the tradeoff between higher dividend to satisfy shareholders and larger capital expenditures to have new equipment required by business development. To investors, rationally, most investors are interested in profitability while making investment decisions. In this research, free cash flow is identified as a useful predictor of capital expenditures, in addition to profit returns. Free cash flow has a positive effect on long-term investments. Larger cash flows may trigger more spending in fixed assets to improve production capacity, creating high-tech and quality products, and thereby generating larger and sustainable profits for businesses. Thus, investors should take into account not only profitability, but also free cash flow in their decisions on capital expenditure. To state management agencies, firstly, this paper has found a strong relationship between free cash flow and capital expenditure. Currently, listed companies in Vietnam are not required to disclose their free cash flows. Therefore, the Ministry of Finance, which is the regulator of firm-level accounting data, should require enterprises to publish free cash flows in their financial statements to enable to access to financial information of investors, who need to forecast capital expenditure in their potential invested businesses. Free cash flow is measured by taking before-tax profit, adding depreciation and subtracting corporate income tax and dividends. Secondly, research results show a negative relationship between capital expenditure and interest expenses, implying less capital expenditure if borrowing costs increase. Therefore, the State Bank of Vietnam and commercial banks are suggested to lower lending interest rates to facilitate the procurement of new and modern fixed assets in businesses.

References

Alti, A. (2003). How sensitive is investment to cash flow when financing is frictionless? *The Journal of Finance, 58*(2), 707-722.

Berndt, E. R., Fuss M. & Waverman L. (1980). Empirical analysis of dynamic adjustment models of the demand for energy in US manufacturing industries. Final Report (Electric Power Research Institute, Palo Alto), 1947-1974.

Becker, B., & Sivadasan, J. (2010). The effect of financial development on the investment-cash flow relationship: cross-country evidence from Europe. *The BE Journal of Economic Analysis & Policy*, *10*(1).

Chirinko, R. S. & H. Schaller. (1995). Why does liquidity matter in investment equations?. *Journal of Money, Credit and Banking, 27*, 527 - 548.

Dalbor, M. & Jiang, L. (2013). Determinants of capital expenditures in the U.S. restaurant industry. *The Journal of Hospitality Financial Management, 21*(2), 77-86

Fazzari, S.M. & Athey, M.J. (1987). Asymmetric information, financing constraints, and investment. *The Review of Economics and Statistics, 69*(3), 481-487.

Fazzari, S.M., Hubbard, R.G & Petersen, B.C. (1988). Financing constraints and corporate investment. *Brookings Papers on Economic Activity*, 183-188.

Gaver, J. J. (1992). Incentive effects and managerial compensation contracts. *Journal of Accounting, Auditing, and Finance, 7* (spring), 137-156.

George, R., Kabir, R. & Qian, J. (2011). Investment-cash flow sensitivity and financing constraints: New evidence from Indian business group firms. *Journal of Multinational Financial Management, 21*, 69-88.

Gilchrist, S. & Himmelberg, P. (1995). Evidence on the role of cash flow for investment. *Journal of Monetary Economics, 36*, 541-572.

Haller, S., & Murphy, L. (2012). Corporate expenditure on environmental protection. *Environmental and Resource Economics, 51*(2), 277-296.

Hansen, L.P. (1982). Large sample properties of generalized methods of moments estimators. *Econometrica, 50*, 1029-1054.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305-360.

Kaplan, S. N., & Zingales, L. (1997). Do investment-cash flow sensitivities provide useful measures of financing constraints?. *The quarterly journal of economics*, *112*(1), 169-215.

Kuh, E., & Meyer, J. R. (1957). The investment decision. Harvard University Press: Cambridge. Jensen, M.C & Meckling, W.H., (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305-360.

Miller, M. H., & Modigliani, F. (1961). Dividend policy, growth, and the valuation of shares. *the Journal of Business*, *34*(4), 411-433.

Ninh, L.K (2007). Determinants of capital expenditures decision of non-stated enterprises in Mekong Delta Area. *Journal of Economics, 4*, 3-15

Nair, R. D. (1979). Economic analyses and accounting techniques: an empirical study. *Journal of Accounting Research, 17* (spring), 225-242.

Qandhari, S. G. A. & Khan, M. M. S. & Rizvi, W. (2016). The relationship between cash flow and capital expenditure in the sugar industry of Pakistan. *The Journal of Developing Areas, 50*(6), 341-353.

Schaller, H., (1993). Asymmetric Information, Liquidity Constraints, and Canadian Investment. *Canadian Journal of*

Economics, 26, 552-574.

Trang, N.T.N & Quyen, T.T (2013). Relationship between leverage and investment decision. *Journal of Development and Integration, 9*, 10-5.

Vogt, S. (1997). Cash flow and capital spending: evidence from capital expenditure announcements. *Financial management, 26*(2), 44-57.