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Determinants of cooperate investment decision: Evidence from quoted manufacturing firms in Nigeria

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Abstract
This study examines the determinants of investment decision of quoted manufacturing firms' in Nigeria. The study is motivated by the fact that establishing the link between cash flow, firm size and capital structure will provide an insight into the activity of manufacturing firms in Nigeria. The study collected data from thirteen (13) manufacturing firms' annual financial statements. The data collected were analyzed using ordinary least square regression. In all the sub sector analysis, it was found that cash flow and firm size are the major determinants of investment decision by manufacturing firms in Nigeria. It is therefore recommended that while cash flow can affect the investment decision of firms, it is also important that firms in this sector take into consideration the type of capital structure they have before embarking on investment. A firm that is largely financed by debt capital will need to borrow more to carry out further investments which could consequently result in total control by outsiders.

Keywords: international trade, exchange rate, market forces

1. Introduction

Firm investment decisions are shown to be directly related to financial factors. The investment decisions of firms with high creditworthiness (according to traditional financial ratios) are extremely sensitive to the availability of internal funds; less creditworthy firms are much less sensitive to internal fund availability. This large sample evidence is based on an objective sorting mechanism and supports the results of Kaplan and Zingales (1997) who also found that investment outlays of the least constrained firms are the most sensitive to internal cash flow. Early applied research stressed the significance of financing constraints in business investment. Since the mid-1960's, however, most applied work isolated real firm decisions from purely financial factors. This shift in approach can be attributed to the seminal work of Modigliani and Miller in 1958. This demonstrated the irrelevance of financial structure and financial policy for real investment decisions under certain conditions. Thus, a firm's financial structure would not affect its market value in frictionless capital markets. If their assumptions were satisfied, "real" firm decisions (e.g. fixed investment) motivated by maximization of shareholders' claims would be independent of financial factors such as liquidity, leverage, or dividend payments. Applied to capital investment, this boils down to the neoclassical theory of investment in which the firm's choice of optimal capital stock could be determined irrespective of financial factors. The q-theory approach pioneered by Tobin (1969) [10] and extended to models of investment, assuming convex costs of adjusting the capital by Hayashi (1982) offered another formulation of the neoclassical model. Investment opportunities could be summarized by the market valuation of the firm's capital stock, and, under certain assumptions, the ratio of the market value of the capital stock to its replacement cost is the basic variable explaining investment demand.

Investment decisions, though mainly taken at the Board level, this has been influenced by financial performance, financing pattern and economic conditions prevailing in the country and also the global developments to some extent. In the past few years there has been an increasing interest in the role that firm specific factors play in corporate investment decisions along with the economic conditions. Recent theoretical developments have also shown that cash flows and the structure of a firm's balance sheet may have an important influence on investment decisions. Mathias and Ibrahim (2001) carried out a study on the impact of cash flow on corporate investment in Trinidad and Tobago, their result showed a positive relationship between investment and internally generated funds (cash flow). The potential link between investment and financial performance implies that some of the changes in the performance indicators of the private corporate sector in the past decade could have altered the dynamics of the investment cycle in Nigeria. Establishing a link between cash flows, leverage and investment may also provide insights into the way in which monetary policy and cyclical factors more generally influence the corporate sector. This work is anchored on two main work viz; the work of Fazari, Hubard and Petrson (1988) [6] whose work studied the impact of financing constraints on the sensitivity of investment to cash flow. This work therefore followed the pattern of their work using the manufacturing sector in Nigeria. This is by way of relating it to Nigerian contest since there is relatively no similar work conducted to show the relationship. This is the research gap which this study seeks to fill.

This research will contribute to the literature by identifying the determinants of investment decisions of quoted manufacturing firms in Nigeria. The specific objectives are to:

- Examine the effect of cash flow on corporate investment decision of quoted manufacturing firm in Nigeria.
- Examine the effect of capital structure on corporate investment decision of quoted manufacturing firms in Nigeria.
- Determine the effect of firm's size on corporate investment decision of quoted manufacturing firms in Nigeria.
- Determine the effect of dividend payout on corporate investment decision of quoted manufacturing firm in Nigeria.

This study is organized into five sections viz: introduction as section one, literature review as section two and other sections are methodology, presentation and discussion of result and conclusion as section three, four and five respectively.

2. Literature Review

This section consists of the review of related studies in the area of corporate investment decision.

There are vast of literatures that estimate the impact of financial constraints on the investment behavior of firms beginning with the seminal article by Fazzari, Hubbard and Petersen (1988) [6]. They classify firms according to whether they were likely to be financially constrained on the basis of their size, dividend payouts and capital structure and this characteristic determines whether they are more sensitive to the supply of internal funds measured by cash flow. The highest sensitivities to cash flow are found for firms categorized as financially constrained, and this is taken to indicate that financial constraints are binding in this case. Many further studies have followed the same methodology including Chirinko and Schaller (1995) [5], Hubbard (1995), Calomiris and Hubbard (1995). Kaplan and Zingales (1997, 2000) have argued that the classification adopted by Fazzari *et al*. (1988) [6] tends to assign firms incorrectly. They make use of more detailed information in financial statements from annual reports to classify the same firms over an identical sample period into three categories financially constrained, possibly financially constrained, and non-financial constrained. Using this classification they found that financially constrained firms have the lowest sensitivity of investment to cash flow. On a larger dataset Cleary (1999) also found that the most constrained firms have the lowest sensitivity. Recently, Allayannis and Mozumdar (2004) [3] showed that the findings of Kaplan and Zingales (1997) can be explained by a few influential observations whereas the results of Cleary (1999) can be explained by observations of firms with negative cash flows. One of the main messages of the work by Kaplan and Zingales and Clearly is that for firms under distress the cash flow sensitivity might be reduced, so that for severely constrained firms the usual relationship found in the literature might be reversed. We think that one of the more important reasons to be cautious in interpreting cash flow sensitivity as indicating financing constraints is that cash flow might forecast future profitability or sales growth.

Modigliani and Miller (1958) [8] postulated that firms' financing and real investment decisions are taken independently of each other. This theory is however hinged on perfect markets (no taxes, no transaction costs and other market frictions). This suggests that, there is no relationship between financial markets and corporate real investment decisions. Corporate finance theory suggests that market imperfections such as underdeveloped financial system may constrain firms' ability to fund investments and will invariably affect firms' investment decisions. The theory indicates that the development of financial markets and instruments result in a reduction in transaction and information costs, influencing saving rates and investment decision.

Hennessy, (2007) documented evidence that, conditional on average Q, investment is lower for equity issuers and for firms with large debt overhang. Earlier, Fazzari (1988) [6] had argued that firms facing financing constraints should exhibit high investment-to-cash flow sensitivities, reflecting the wedge between costs of external and internal funds which is consistent with Myers and Majluf (1984) [9]. But Kaplan and Zingales (1997) contradicted Fazzari (1988) [6]. Their findings rather suggested that corporate investment decisions of the least financially constrained firms are the most sensitive to the availability of cash flow (see also Cleary 1999).

The Q theory of investment was introduced by Keynes (1936) and developed by Brainerd and Tobin (1968, 1969) [10]. In this theory, a forward looking firm faced with costs in adjusting its capital stock will have its investment expenditures determined by Marginal Q, **(**the ratio of the discounted future revenue from an additional unit of capital to its purchase price). In the absence of taxes and capital market imperfections a value maximizing firm will invest as long as the shadow price of an additional unit of capital, marginal Q, exceeds unity. Since Marginal Q is unobservable, empirical studies employed Tobin's average Q, defined as the market value of the firm to the replacement cost of its existing capital stock. The difficulty in estimating the denominator given the lack of financial data motivated the formulation of the surrogate measure justified and used by Aquino (2002). Tobin's average Q therefore incorporates information about future conditions and how these are likely to affect firm's investment. In effect, average Q incorporates the capital markets evaluation of the firm's investment opportunities. Furthermore, liquidity theory of investment was also considered. Under this, the firms limit their investment activities to availability of internal funds. The outcome as predicted by this model is that, under capital market imperfection, the firms' investment behavior becomes sensitive to internal liquidity (Fazari, Hubbad & Peterson, 1988) [6].

3. Methodology

The study used data from Annual Report of companies quoted in the Nigeria stock exchange. This is because the estimation of the model to be employed in the study requires the use of data in the form of financial information. These data was obtained from the annual reports and accounts of the companies for the period 2005 to 2014.

The variables used to determine investment are cash flow, capital structure, firm size and dividend payout with three control variables which are firm growth, Firm age and effective tax rate. The data presented were analyzed using descriptive statistic and regression analysis. The result of the analysis are presented in chapter four.

The statistical application that was utilized in this study is the Ordinary Least Squares (OLS) method. A linear relationship between corporate investment decision and its determinants is assumed, therefore, a model of the following form is formulated.

$$\mathbf{INV= +CF\beta_1+CS\beta_2+FS\beta_3+DPR\beta_4+GR\pi_1+AG\pi_2+ETR\pi_{3+}\ \varepsilon}$$

Where:

$INV = Investment$
$CF = Cash\ Flow$
$CS = Capital\ Structure$
$FS = Firm\ Size$
$DPR = dividend\ payout\ ratio$
GR = Growth
AG = Firm Age
ETR = Effective Tax Rate
$a\varepsilon = error\ term$

The variables used in the regression models are defined as follows:

Investment

$$inv = \frac{1_t}{K_{t-1}} = \frac{K_t - K_{t-1}}{K_{t-1}}$$

1_t = gross fixed investment of a firm during the year
K_t = *Fixed Assets + Other Long-term Assets = Total Assets – Current Assets*
In the absence of data on annual investment, the change in the firms' capital stock was used.

$$Q = \frac{TD + SE}{TD + MC}$$

TD = Total Debt = Short-term debt + Long-term debt
SE = Total Shareholders' Equity
MC = Total Market Capitalization
This proxy for q was formulated and used by Aquino (2002).

Cash Flow

$$\mathbf{CF} = \frac{CF_t}{K_{t-1}}$$

CF_t = *After Tax Net Income + Depreciation & Amortization*

Capital Structure

$$\mathbf{CS} = \frac{TD}{SE}$$

TD = Total Debt = Short-term debt + Long-term debt
SE = Total Shareholders' Equity

Firm Size
FS = *Log of Total Asset*

Dividend Payout Ratio

$$\mathbf{DPR} = \frac{DP}{PAT}$$

DP = Total Dividend Paid
PAT = Profit After Tax

Firm Growth
GR = Change in Turn Over

Firm Age
AG = year of Incorporation

Effective Tax Rate

$$\mathbf{ETR} = \frac{\text{Income Tax Expense}}{PBT}$$

3.1 Measurement of Variables
In line with the existing empirical research, the level of *investment* is considered as endogenous variable. Investment is normalized by the level of gross fixed assets to account for differences across firms. Therefore it is measured as the ratio of gross fixed investment of a firm during the year to the gross fixed assets at the beginning of the year. *Cash flow* is measured as the total earnings before extraordinary items, interest and depreciation. Cash flow of firms is an important determinant for growth opportunities. If firms have enough cash inflows it can be utilized in investment activities. It also provides evidence that investment is related to the availability of internal funds. Cash flow may be termed as the amount of money in excess of that needed to finance all positive net present value projects. The purpose of allocating money to projects is to generate a cash flow in the future, significantly greater than the amount invested.
Capital Structure is measured as the ratio of total debt to total shareholders' equity. Total debt is measured as short term and long term debt while total equity is measured as ordinary share, preference share and share premium.
Firm size is measured by the natural logarithm of total assets.
Dividend payout ratio, which is measured as the dividends paid as a percentage of profits after tax which can be used as a proxy for the severity of external financing constraints (Fazzari Hubard & peterson 1998). A multiple regression model was structured using the ordinary least squares (OLS) method. The model used a single dependent variable (Tobin's Equity Q) and seven explanatory variables– cash flow, capital structure, Firm size, dividend payout, firm growth, firm age and effective tax rate. The model is estimated using the coefficients of the independent variables and their level of significance. The coefficient of determination (R^2) was used to assess the significance of the model. The F test was also employed to determine the predictive ability of the model while the standard error test and t values was used to determine the significance of the explanatory variables.

4. Results presentation and Discussion
The result presents the various data on the determinants of investment in quoted manufacturing firms in Nigeria. The variables used to determine investment are cash flow, capital structure, firm size, dividend payout and the control variables are firm growth, firm age and effective tax rate.
The data presented are analyzed using descriptive statistic and regression analysis.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Q	130	.5917733	.5999738	.0001889	3.097403
Cf	130	25.17071	77.71737	-2.120513	443.4186
Cs	130	.8527623	1.244917	.0306122	9.032053
Fs	130	3.758696	.7949628	1.892095	4.883599
Dpr	130	3.708917	27.17211	-54.66667	258
Gr	130	2.790423	15.98512	0	181.8253
Ag	130	39.03846	17.27229	14	82
Etr	130	.4786561	2.683858	-1.611272	30.2658

***Source*:** computed by researcher using Stata 12.0

From table 4.1 above, the mean Q for the sampled manufacturing companies in Nigeria is 0. 59 which means that the unit of investment in the manufacturing companies in Nigeria is N0.59k. This indicates an element of low investment in the manufacturing companies in Nigeria with a minimum investment level of N0.00K and maximum investment level of N3.01K. The standard deviation of 0.60 indicates that there is no significant variation in investment between manufacturing companies in Nigeria during the study period. The mean CF for the sampled manufacturing companies in Nigeria is 25.17. This means that a unit of cash flow in the manufacturing companies in Nigeria is N25.17k. This indicate a positive cash

flow in the manufacturing companies in Nigeria with a minimum cash flow level of N-2.12K and maximum cash flow level of N443.42K. The standard deviation of 77.71, which indicates that there is significant variation in cash flow between the manufacturing companies in Nigeria during the study period. The mean CS for the sampled manufacturing companies in Nigeria is 0.85. This means that a unit of capital structure in the manufacturing companies in Nigeria is N0.85k which indicate a positive capital structure in the manufacturing companies in Nigeria with a minimum cash flow level of N0.31K and maximum cash flow level of N9.03K. The standard deviation of 1.24 indicates that there is no significant variation in cash flow between the manufacturing companies in Nigeria during the study period. The average FS and DPR are 3.75 and 3.71 with standard deviation of 0.79 and 27.17 respectively. Gr, Age and Effective Tax Rate have average of 2.79, 39.04 and 0.47 with standard deviation of 15.98, 17.27 and 2.68 respectively.

Table 2: Correlation Matrix

sktest q cf cs fs dpr gr ag etr								
Skewness/Kurtosis tests for Normality								
Variable	**Obs**	**Pr(Skewness)**	**Pr(Kurtosis)**	**adj chi2(2)**	**Prob>chi2**			
Q	130	0.0000	0.0000	44.10	0.0000			
Cf	130	0.0000	0.0000	.	0.0000			
Cs	130	0.0000	0.0000	.	0.0000			
Fs	130	0.0005	0.2810	11.35	0.0034			
dpr	130	0.0000	0.0000	.	0.0000			
Gr	130	0.0000	0.0000	.	0.0000			
Ag	130	0.0000	0.5292	14.90	0.0006			
Etr	130	0.0000	0.0000	.	0.0000			
spearman q cf cs fs dpr gr ag etr								
(obs=130)								
	q	**cf**	**cs**	**fs**	**dpr**	**gr**	**ag**	**etr**
q	1.0000							
cf	-0.2986	1.0000						
cs	0.2006	-0.1622	1.0000					
fs	0.2927	-0.6846	0.2589	1.0000				
dpr	-0.2358	-0.0724	0.0066	0.2399	1.0000			
gr	0.0715	0.0496	-0.1447	0.0146	0.0247	1.0000		
ag	0.2360	-0.1836	-0.0629	0.3142	0.1542	0.1128	1.0000	
etr	-0.1409	0.1038	-0.0986	-0.0054	0.2111	0.0162	0.3549	1.0000

***Source*:** computed by researcher using Stata 12.0

The result presented in table 4.2 shows that there is significant relationship between the variables in the study. Cash flow, dividend payout ratio and effective tax rate have significant negative correlation at -0.30, 0.29 and 0.14 respectively with Q. while capital structure, firm size, Growth and Age with coefficient of 0.20, 0.29, 0.07 and 0.24respectively have significant positive relationship with Q.

Table 3: Regression Result

Q	**Coef.**	**Std. Err.**	**T**	**P>|t|**	**[95% Conf.**	**Interval]**
Cf	-.0020807	.0008967	-2.32	0.022	-.0038557	-.0003056
Cs	.0137634	.0399197	0.34	0.731	-.0652617	.0927884
Fs	.0161925	.0810709	0.20	0.842	-.1442955	.1766804
Dpr	-.0001556	.0019754	-0.08	0.937	-.0040662	.003755
Gr	-.0009936	.003159	-0.31	0.754	-.0072471	.00526
Ag	-.000982	.0030787	-0.32	0.750	-.0070766	.0051126
Etr	.0714129	.0184023	3.88	0.000	.0349837	.1078421
Cons	.5790494	.3248968	1.78	0.077	-.0641163	1.222215
Obs		130				
R^2		0.1894				
Adj R^2		0.1429.				
Pr (F-Statistics)		0.0005				

***Source*:** computed by researcher using Stata 12.

The result as presented in table 4.3 shows the regression analysis of the dependent variable and the independent variables in the study. The R^2 of 18% means that the relationship between Q and CF, CS, DPR, FS, Gr, Ag and ETR has a weak but positive correlation. Adjusted R^2 of 0.14 shows that about 14% of the total variation in Q could be explained by the explanatory variables CF, CS, DPR, FS, Gr, Ag and ETR. The remaining 86% of the total variation in the Q and CF, CS, DPR, FS, Gr, Ag and ETR are caused by factors not captured in the model. The Prob. (F-Statistics) equal 0.0005 clearly indicates that all the variables under consideration has a significant difference in their mean at 5% significance level. This indicate model fitness and appropriate selection of the variables under control

The result of both OLS shows that cash flow and effective tax rate significant at 5% and 1% level respectively. This shows a positive relationship of the explanatory variables with investment of manufacturing companies in Nigeria. This indicates that CF and ETR impacted on investment. This result provides evidence for the rejection of null hypothesis which state that cash flow does not determine investment decision of manufacturing firms in Nigeria. The null hypothesis is therefore rejected. The results is in line with the result and finding of Ramesh (2010), Adelegan and Ariyo (2008) [1], Mathias and Ibrahim (2001) and Kaplan and Zingales (1997). Hence cash flow and effective tax rate are strong determinants of manufacturing companies in Nigeria

This result implies that every N1 increase in cash flow causes a naira increase in investment as measured by Q of manufacturing companies in Nigeria.

However, CS, DPR, FS, GR, and AG was found to be insignificant by taking them individually and therefore, do not determine investment decision of manufacturing firm in Nigeria.

5. Conclusion and recommendations

The result of analysis has shown that the overall power of the explanatory variables is significant in explaining investment decision of manufacturing firms in Nigeria. However, one variable that stands out among the others is cash flow. Cash flow has statistical significance for all the sub-sectors and also in the overall pool result. The reason for this is that firms cannot naturally invest when there is no stream of income. The result is in line with the earlier finding of Ramesh (2010), Adelegan and Ariyo (2008) [1], Mathias and Ibrahim (2001) and Kaplan and Zingales (1997).

Based on the analysis done in this study, it was found out that the major determinants of investment decision by manufacturing firms in Nigeria are cash flow and effective tax rate. A firm needs to generate enough cash to enable it channel some into investment, thus the finding is in line with a priori expectation. It is also through effective tax rate that a company determines its investment decisions. This result indicates that effective tax rate is also a major determinant of investment decision. It is therefore recommended that while cash flow can affect the investment decision of firms, it is also important that firms in this sector take into consideration the type of capital structure they have before embarking on investment. A firm that is largely financed by debt capital will need to borrow more to carry out further investments which could consequently result in total control by outsiders.

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