

DETERMINANTS OF NET CAPITAL EXPENDITURE CASH OUTFLOWS: EVIDENCE FROM THE PHARMACEUTICAL SECTOR OF BANGLADESH

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Abstract

This study attempts to identify the key determinants of net capital expenditure outflows for a panel of 14 listed pharmaceutical companies. The study has used data from 2003-2015 for each company. The study finds that previous year net capital expenditure outflows, the age of the company, size of the company, leverage of the company, business risk of the company, and independent directors on the board of directors' panel are the key determinants of net capital expenditure outflows. The study uses Panel GMM approach along with Fixed Effect OLS and PCSE OLS. Age of the company, size of the company, and percentage of independent directors have a significant positive impact on net capital expenditure outflows unlike business risk and leverage of the company.

Keywords: Pharmaceutical Sector, Net Capital Expenditure Outflows, Business Risk
JEL Classification: C33, E22, L65

1. Introduction

In the presence of the competitive environment in the business world, the survivability of a company depends on the long-run focus. The concept of excessive focus on short-run earnings at the expense of long-run focus, which makes the company vulnerable to sustain, has been intensely discussed in the financial and accounting literature (Cheng, Subramanyam, & Zhang, 2007; Bhojraj, Hribar, & Picconi, 2009). To strengthen the sustainability position of the company, the long-run investment, growth, and expansion of concerns are mandatory. Occasionally, a company has to change its major ongoing concerns to ensure acceptability of the company's products or services in line with the demand of the consumers. Therefore, the gradual capital expenditures such as research and development, property, plant, and equipment, intangible assets and

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so on should be given priority to retain the stream of sustained growth and wealth maximization of the company. For example, capital expenditures have long been shown to significantly affect the intrinsic value and very survival of a company (Tobin, 1969; Yoshikawa, 1980; Hayashi, 1982; Abel, 1983). Griner and Gordon (1995) have explained capital expenditure as being the amount of funds disbursed by management to acquire property, plant, and equipment. Furthermore, Sartono (2001) has stated that capital expenditure is the difference between total fixed assets in the current period and total fixed assets in the previous period.

This study has considered the net capital expenditures cash outflows to identify each company year's cash investment in capital. The net capital cash expenditure outflows have not considered the sale proceeds from existing assets. In this regard, the net capital expenditure cash outflows can deduct sale proceeds from existing assets not the cash outflows of a company in capital expenditures from operating activities, leverage, and share issue. For example, Pinegar and Wilbricht (1989) have shown that 84.3per cent of corporate managers are willing to use internal cash to fund new investment rather than external sources. Vogt (1994) has analysed Jensen's theory of cash flow (1986) and shown that cash flow will intensely affect the capital expenditure cash outflows. With no cash in hand, it is not possible to invent or develop new products, pay dividends, and minimize debt (Saffarizadeh, 2014). Moreover, Myers and Majluf (1984) have assumed that companies seek to maintain financial slack to avoid the need for external funds. Thus, the net capital expenditure cash outflows are more representative of the scenario of a company than capital expenditures.

Capital expenditures have a significant impact on the share market movement depending on the motive of the shareholders. For example, Bhana (2008) has examined capital expenditure decisions made by South African companies over the 1995-2004 period and their impact on shareholders' wealth. His study has revealed that the share market responds significantly and positively to capital expenditure announcements by focused companies. On the other hand, Jensen (1986) has shown the negative impact of capital expenditure on the market because managers try to raise the assets of the company rather than giving them to shareholders. Strong and Meyers (1990) have described that discretionary investment and share price are negatively related. Thus, the impact of capital expenditures on the market depends on the motive (long-run or short-run gain) of the shareholders of that particular company. Furthermore, capital expenditures cash outflows can be affected by the leverage of the companies. For example, Meyers (1997) has made an extremely compelling case concerning how leverage could negatively impact on the company growth and investment in long-term assets. Cantor (1996) has suggested an explanation for the greater average volatility of highly leveraged companies: heightened sensitivity to fluctuations in cash flow. The potential effect of leverage has been assessed in this article by comparing the capital expenditure of the companies with different average levels of indebtedness. Lastly, independent directors focus on the long-term performance of the companies (Davidson et al., 2005). Since long-term

persistence in growth and the performance of a company largely depend on the capital expenditures, the concentration of power of independent directors stimulates adequate capital expenditures. For instance, Patton and Baker (1987) have argued that independent directors will encourage management to focus more on the long-term performance and business expansion of the company rather than to take short-term actions intended to have a quick payoff in the stock market.

The main objective of this study is to identify the determinants of net capital expenditure cash outflows of the pharmaceutical sector in Bangladesh. These influencing factors mainly stimulate the cash outflows in capital expenditure regarding adaptability, sustainability, and profitability. Since capital expenditures are a sign of companies' long-term growth and expansion potentiality, in this regard, this study will help the investors to take their investment decisions about investment in pharmaceutical companies by analysing the influencing factors. It is notable that net capital expenditure outflows drive the wealth maximization objective of companies. Therefore, the investors will get a hyperopic idea about the determinants of net capital expenditure cash outflows.

The first section of the study presents the introduction, context of the study, literature review, and underlying theories of the study. The second section of the study presents the data sources and descriptive statistics, the definitions of the key variables, and the logic behind the selection of the explanatory variables. The third section presents the econometric methodology, discussion, and findings. The final section presents the conclusion and policy implications and end notes. All the econometric analyses have been conducted by STATA and EViews.

1.1. Context of the Study

The pharmaceutical sector is the third largest industry sector in Bangladesh in terms of foreign currency earnings. In the financial year 2014-2015, the total exports of the pharmaceutical sector amounted to BDT 5369 million or about USD 67.11 million while, in financial year 2015-2016, the total exports of the pharmaceutical sector were BDT 5779 million or about USD 72.24 million (Bangladesh Bank data, 2016). This sector has the largest stock market capitalization, which is 16.49 per cent whereas nearby sectors such as bank hold 14.48 per cent, telecommunications hold 14.32 per cent and fuel and power hold 14.16 per cent of total stock market capitalization (CPD, 2016). It has become one of the fastest growing sectors in Bangladesh. The growth rate of this sector was 13.85 per cent in 2015 and 38.91 per cent in 2016, 3rd quarter (BDMedicines.com, 2016^a). There are about 200 active companies (including 6 MNCs) of which 28 companies are listed on the Dhaka Stock Exchange, Bangladesh. Local companies hold about 80 per cent of the market share whereas the multinational companies (MNCs) hold around 20 per cent of the market share. Moreover, the top 20 companies cover 85 per cent of the market share (Saad, 2012) whereas the top 10 companies cover 66.67 per cent and the

top 15 companies cover 77 per cent of the total market share (BDMedicines.com, 2016^b). This sector in Bangladesh currently produces 450 generic drugs for 5300 enlisted brands, which have 8500 multiple forms of dosages and powers. The total market size of this sector is about USD 1.6 billion (IMS Health Data). This sector fulfils about 98 per cent of local drug demands and exports to more than 85 countries. The sales in the local market of this sector may reach BDT 160 billion by 2018 (IMS Health Data). The pharmaceutical companies are making high capital expenditures to update their production system. Some companies have already obtained certifications from Australia, the European Union, the United States, Canada and many companies are making high capital expenditures to update their manufacturing plants to sustain in competition in some areas with Indian companies (export.gov., 2017).

The directorate general of drug administration (DGDA) works under the Ministry of Health and Family Welfare and the Pharmacy Council of Bangladesh (PCB) run by the Pharmacy Ordinance in 1976 is the regulatory authorities of Bangladesh drugs. The Bangladesh Association of Pharmaceutical Industries (BAPI) is the sole foundation which was established in 1972 by members from more than 144 companies. The sector is globally accredited with USFDA, Therapeutic Goods Administration, Australia, ANVISA, Brazil, EMA, UK MHRA, Health Canada, and TFDA, Taiwan (BDMedicines.com, 2016^a). The global clients of this sector worldwide are UNICEF, KK Women's and Children's Hospitals in Singapore, ADF France, Save the Children, DKT, and CENABLAST in Chile etc. (DGDA).

2. Literature Review and Hypothesis Development

A number of studies (e.g. Eisner, 1956; Matchett, 1956; Bennett, 1966; Subrahmanyam et al., 2013; Dalbor & Jiang, 2013; Petunin, 2015; Hamidi, 2015) have analysed the influencing factors of the capital expenditures of a company. Laverty (1996) has studied the stimulators of short-term decision-making, which can be generated from the share market pressures and have less impact on the value maximization in the long-run. The long-run focus in decision-making stimulates the investment decisions in respect of the sustainability of a company (Bhojraj & Libby, 2005). Moreover, McConnell and Muscarella (1985) have found that a positive market response to increasing the capital expenditures in US companies circulates information about the future growth opportunities. Thus, the markets give significant positive feedback to the capital investments decision disclosure (Chan et al., 1990; Bhana, 2008). Griner and Gordon (1995), and Sartono (2001) have defined that the capital expenditures are the changes between the total fixed assets at the end of the operating cycle and the total fixed assets at the beginning of the operating cycle. The negative value of capital expenditures has arisen in their study due to decline in the total fixed assets. The numerous influencing factors that have been used in the existing literatures to identify the impact on the capital expenditures are given below.

2.1. Size (sales) and Capital Expenditure Outflows

Haller and Murphy (2012) have found that company size is the core determinant of the capital expenditures in which company size is measured by taking consideration of the total revenues (see Griner & Gordon, 1995). Furthermore, considering sales volume as a measure of company size, larger companies have better access to external funds and have a significant positive influence on the capital investment (Byoun, 2008). Internal cash flow has been given priority by the studies for example, Lehn and Poulsen (1989), and Lang et al. (1991) to consider internal cash flow as a determinant of the capital expenditures. For instance, Hamidi (2015) has found that internal cash flow has a significant positive impact on capital expenditures. However, the high correlation between internal cash flow and sales revenue (Myers & Majluf, 1984; Sartono, 2001) can generate a multicollinearity problem, resulting in a biased estimation.

H1: It is expected that size has a significant positive impact on the net capital expenditure cash outflows.

2.2. Degree of Operating Leverage (DOL) and Capital Expenditures

Berk et al. (1999) have argued that the future growth, risk, and size have a significant impact on the capital expenditures of a company (see Sunder, 1980). Using multivariate analysis, Reilly and Bent (1974) have found that operating leverage is more important than sales volatility in explaining industry business risk. In addition, Wheeler and Smith (1988) have stated that the two components of risk- systematic risks and unsystematic risks - together form the business risk and significantly influence the capital expenditures of a company. Moreover, the relevance of the degree of operating leverage in terms of a company's risk complexion has been identified by Bierman and Hass (1975). Hsiao and Li (2012) have found that business risk has significant negative impact on capital expenditures. In addition, Sunder (1980) has found that business risk has also a significant negative impact on the capital expenditures due to uncertainty in the future growth and expansion in future.

H2: It is expected that DOL has a significant negative impact on the net capital expenditure cash outflows.

2.3. Leverage (LEV) and Capital Expenditures

DeMarzo and Fishman (2007) have concluded that the more leverage in a company, the larger the investment as a result of outward pressures from debt holders. Beatty et al. (1997) have investigated the determinants of future net capital expenditures for a broad section of companies in the US and found that the liquidity position and a lower debt level generates easier opportunity to raise the level of funds, thereby leading to an increase in future investments. In contrast, Aivazian et al. (2005) have found that leverage is negatively related to

investment for Canadian companies (see Lang et al., 1996), and Myers (1977) has found that debt overhang gives managers incentives for underinvestment, which, in turn, generates a negative impact of leverage on capital investment (see McConnell and Servaes, 1995).

H3: It is expected that Leverage has a significant positive or negative impact on the net capital expenditure cash outflows.

2.4. Percentage of Independent Directors (IDIR) and Capital Expenditures

Dube and Pakhira (2013) have argued that fair corporate governance policy and effective board activities are more likely to be fulfilled through the presence of independent directors on the board. Thus, the governance theory suggests that independent directors may work as supervisors to the decision-making of the management and thus can address any short-sightedness in the decision-making. For instance, Bushee (1998) has found that managers are likely to lessen the capital investment (R&D) to boost the earnings of the company from level of the previous year. Independent directors may perform a significant role in the cut of R&D expenditures (Osma, 2008; Markarian et al., 2008; Affes & Romdhane, 2011). Moreover, Alexander and Cohen (1999) have discovered that the likely sub-optimization by managers is significantly weaker if a board is composed of more independent directors. Therefore, important investment proposals are approved by a corporate board of directors. If independent directors were not fail to address their roles and performance, the corporate failure cases such as Enron, WorldCom, Parmalat, and Satyam etc. could be averted (Dube & Pakhira, 2013).

H4: It is expected that IDIR has a significant positive impact on the net capital expenditure cash outflows.

2.5. Age and Capital Expenditures

Coad et al. (2016) have found that companies tend to make more capital expenditures with an increase in maturity. Dunne et al. (1989) have stated that younger companies try to build their product position in the market by product differentiation. Occasionally, the younger companies go for big capital expenditures to increase production and to keep economies of scale in the production. In contrast, mature companies invest less in product development. This leads young companies to grow faster than mature companies. This has been described in the literature (see Dunne et al., 1989; Haltiwanger et al., 2013).

H5: It is expected that age has a significant positive impact on the net capital expenditure cash outflows.

From the literature mentioned above, it can be concluded that most of the studies have considered the capital expenditures of a company. However, this study has considered the net capital expenditure cash outflows since the managers are more likely to take capital investment decisions based on the internal cash flow (Wilbricht, 1989). There is a dearth of studies that identify what factors affect the net capital expenditure cash outflows. It is also notable that no one in Bangladesh has conducted a study to identify the determinants of capital expenditures and net capital expenditure cash outflows. Therefore, this study attempts to discover the key determinants of net capital expenditure cash outflows in the pharmaceutical sector of Bangladesh. Moreover, by addressing the determinants of net capital expenditures cash outflows, the study will fill the gap in the existing literature.

3. Underlying Theories of This Study

3.1. Agency Costs Based Theory

The segregation between ownership and the control of business can create agency costs in the corporation. Jensen and Mackling (1976) have defined agency cost in the companies in the form of the divergent goal of benefits for managers rather than benefits for shareholders or value maximization of the company. They also included expensive travel, epicurean offices and cars, and exorbitant benefits of the managers in the list of agency costs. The agency costs have a negative and significant impact on company value (Classens et al., 2002; Lemmon & Lins, 2003). Capital expenditures have a significant impact on the company value (Tobin, 1969; Hayashi, 1982), since the agency costs decrease company's value by procurements and capital expenditures, bringing less shareholder value (Masulis et al., 2008). The agency costs affect company performance through earnings management and income management (Fan & Wong, 2002; Haw et al., 2004). Income management and earnings management show the disguised amount of free cash flow, whereas the free cash flow of the company has an intense effect on the capital expenditures (Vogt, 1994). The "tunnelling" concept given by the Johnson et al. (2000) is the shifting of the company's resources out of the company to compensate over the top official remuneration, loan repayment, and to its controlling shareholders. Xiao (2009) has found that some tunnelling exercises are mingled with the agency costs, which remain veiled until those illicit activities are prosecuted. In this study, we have deducted the sale proceeds of property, plant, and equipment to determine the net capital expenditure outflows so that the tunnelling of resources can be identified separately, and the determinants of the net capital expenditure outflows can be analysed correctly.

3.2. Dividend Policy Related Theories

Kalyebera and Islam (2014) have found that without considering the capital market collaboration, settling on capital expenditures decisions disregards a central point. The dividend policy of a company has a significant influence on

the capital market (Hashemijo et al., 2012). According to the transactions costs theory, the company's increased retention rate of earnings increases the growth rate of company as the dividend reduces the fund to invest in capital expenditures (Rozeff, 1982). The capital expenditures negatively affect the dividend policy because the lower the cash dividend, the more funds available for capital expenditures (Lloyd et al., 1985). Smith and Watts (1992) have concluded that large companies with a new expansion capability have a lower proportion of dividend. The listed pharmaceutical companies in Bangladesh have a large extent growth opportunity due to cumulative increase in exports and invention. The companies may follow a higher retention policy.

3.3. Pecking Order Theory

Myers (1984) has developed the pecking order model and first gave the concept of no optimal capital structure. In his study, he has mentioned a restricted hierarchy of financing sources that a company should prefer chronologically. In the hierarchy of financing sources, the companies should firstly prefer the internally generated funds. This study has tried to identify the determinants of net capital expenditure outflows in which the internally generated cash flow has been prioritized to finance for capital expenditures (see Myers & Majluf, 1984; Pinegar & Willbricht, 1989; Saffarizadeh, 2014). The pharmaceutical sector in Bangladesh is following the pecking order theory to select the financing sources for investment. The amount of leverage of this sector's company is low and has been so for many years with the new share issue being insignificant.

4. Data source and Descriptive Statistics

The study has used data from 2003 to 2015 for 14 listed pharmaceutical companies in Bangladesh. Newly established companies have been avoided to form a balanced panel. Furthermore, companies with unavailable data have been averted in this study. Dealing with an unbalanced panel leads to biased and wrong estimation with the given estimation techniques. Therefore, only 14 companies have been considered in this study. All data have been collected from the annual reports of the companies listed on the Dhaka Stock Exchange Limited. Net capital expenditure cash outflows (*CAPXOF*), leverage (*LEV*), and sales volume (*SIZE*) are expressed in million BDT. The definition of all explanatory variables and their expected sign of impact on the dependent variables is explained in detail in the variables' definition section. All the annual reports of the companies have been collected from the Dhaka Stock Exchange Limited Library. The descriptive statistics of the variables are provided in Table 1. To find the determinants of net capital expenditure cash outflows, a panel of 182 company year observations has been chosen from the pharmaceutical sector of Bangladesh. The net capital expenditure cash outflows of two company year observations are negative due to excess cash proceeds from the disposal of fixed assets (see Griner and Gordon, 1995; Sartono, 2001). To find the effective result, the companies selected are a mix of young and mature companies. The degree of

operating leverage is positive in the case of 80per cent of the company years. The minimum leverage of the companies is zero in the case of unlevered companies. The regulation of the independent directors has been effective in Bangladesh since 2012. The percentage of independent directors (*IDIR*) was zero before the regulation.

Table 1. Descriptive statistics

CPAXOF (in million BDT)					
Range	Mean	Max	Min	Std. Dev.	No. of Obs.
(-2000,0)	-68.387	-57.15	-79.624	15.89	2
(0, 2000)	229.81	1,759.52	.014	423.01	169
(2000, 4000)	2,763.19	3,507.03	2,565.43	274.08	10
(4000, 6000)	5,294.42	5,294.42	5,294.42	NA	1
All	393.56	5,294.42	-79.62	800.09	182
AGE					
Range	Mean	Max	Min	Std. Dev.	No. of Obs.
(0, 20)	15.48	19.5	9.5	2.78	25
(20, 40)	30.05	39	20	5.41	101
(40, 60)	50.27	59.5	40	4.93	43
(60, 80)	69	75	63	3.89	13
All	35.61	75	9.5	15.1	182
LEV (in million BDT)					
Range	Mean	Max	Min	Std. Dev	No. of Obs.
(0,1000)	167.26	916.93	0	241.17	154
(1000, 2000)	1,529.66	1,996.91	1,051.59	340.59	21
(2000, 3000)	2,639.77	2,988.59	2,107.31	397.24	5
(3000, 4000)	3,209.02	3,335.32	3,082.71	178.63	2
All	425.81	3,335.32	0	696.34	182
SIZE (in million BDT)					
Range	Mean	Max	Min	Std. Dev	No. of Obs.
(0,10000)	1,787.98	9,957.95	25.78	2,200.81	161
(10000, 20000)	13,681.15	19,798.08	10,341.43	2,811.98	14
(20000, 30000)	23,353.45	26,684.57	20,202.01	2,467.06	6
(30000, 40000)	31,383.44	31,383.44	31,383.44	NA	1
All	3,576.40	31,383.44	25.78	5,744.39	182
DOL					
Range	Mean	Max	Min	Std. Dev	No. of Obs.
(-200, -150)	-166.77	-16.77	-166.77	NA	1
(-100, -50)	-50.576	-50.576	-50.576	NA	1
(-50, 0)	-4.341	-.037	-34.106	6.89	31
(0, 50)	3.223	42.95	.001	6.09	149
All	.408	42.95	-166.77	14.851	182
IDIR					
Range	Mean	Max	Min	Std. Dev	No. of Obs.
All	10.61per cent	30per cent	.00per cent	8.82per cent	182

4.1. Definition of the Key Variables

4.1.1. Degree of Operating Leverage (DOL)

Weston and Brigham (2008) have derived a measure of a company's operating leverage for any activity called the degree of operating leverage (*DOL*). It shows the percentage change in operating profit resulting from a percentage change in output sold given a change in fixed cost. Van Horne (2002) has defined operating leverage as “*the employment of an asset with fixed cost in the hope that sufficient revenue will be generated to cover all fixed and variable costs*”. Olowe (2009) has not only related operating leverage to the use of fixed costs but also pointed out the implication for managers of high operating leverage, mentioning that, firstly, a high degree of operating leverage is a symbol of a protracted break-even point, and, secondly, high leverage makes the company's profit more volatile to a small change in sales after the breakeven point. The value of *DOL* has been described by Gritta *et.al* (2006). They have pointed out that a positive *DOL* indicates that, as sales increases, operating profit will increase and vice versa. A small positive value of *DOL* represents a low risk, that is, low variability in operating profits. The value of *DOL* can be negative or positive. They also mentioned that large negative values could be considered as less risky than a very small negative number, since large absolute values indicate that current losses are relatively small in which a small increase in operating revenues could be expected to cut deeply into operating losses. The *DOL* can be calculated as follows:

$$\text{Degree of operating leverage (DOL)} = \frac{\% \text{ change in EBIT}}{\% \text{ change in Sales}}$$

4.1.2. Leverage (LEV)

According to Miller (1991), leverage denotes any financial technique aiming at increasing the size of assets under control, either buying more assets or buying more financial assets to ensure a partial participation in the underlying asset price development, without increasing the initial amount of the share capital employment. So, the creation of exposure is greater in magnitude than the initial amount of cash investment in which the leverage is created through long-term borrowing, lease financing, and debenture issue. Jensen (1986; 1989) has argued that leverage limits managerial discretion over free cash flow and lowers the likelihood that resources are expended for negative net present value investments.

4.1.3. Net Capital Expenditure Cash Outflows (CAPXOF)

According to Jacobs (2009), capital expenditure is generally about physical assets with a useful life of more than one year, including capital improvements or the rehabilitation of physical assets that extend the useful life of the asset and excluding repair and maintenance expenses, which assure capability of the

function for their planned life. Net capital expenditure cash outflows are calculated in the following way:

$$\begin{aligned} \text{Net Capital Expenditure Cash Outflows} = & \text{Acquisitions of PPE in Cash} + \\ & \text{Cash Outflow for Capital Work in Progress} + \\ & \text{Product Development Cash Out Flow} + \\ & \text{Cash outflow for Acquisitions of Subsidiary} - \\ & \text{Sale Proceeds from PPE} \end{aligned}$$

For a growing company, it is expected that the net capital expenditures will always be greater than zero.

4.1.4. Percentage of Independent Directors (IDIR)

According to the Bangladesh Securities and Exchange Commission (Notification No. SEC/CMRRCD/2006-158/Admin/02-08 dated 20th February 2006), an independent director either does not hold any shares in the company or holds less than 1 per cent of the total paid-up shares of the company. The notification has also mentioned other terms and conditions. According to the Securities and Exchange Board of India (vide circular dated 26th August 2003, revised clause 49), the expression “independent director” refers to a non –executive director of a company who excludes from receiving the director’s remuneration and does not have any material pecuniary relationships or transactions with the company, its promoters, directors, senior management, holding company or its subsidiaries and associates, which may impact his/her independence.

$$IDIR = \frac{\text{Total Independent Directors}}{\text{Board Size}} \times 100$$

4.2. Logic behind the Selection of Explanatory Variables

4.2.1. Degree of Operating Leverage (DOL)

Financial economists and practitioners have long recognized that capital expenditures affect future company growth, risk, and size (Sunder, 1980; Berk et al., 1999). The relevance of the degree of operating leverage in terms of a company’s risk complexion has been explained by the study (Bierman & Hass, 1975). Reilly and Bent (1974), in their multivariate analysis, have indicated that operating leverage is more important than sales volatility in explaining industry business risk. Wheeler and Smith (1988) have mentioned that systematic risks and unsystematic risks together form the business risk associated with capital expenditures. Hsiao and Li (2012) have shown a negative correlation between capital expenditures and business risk.

4.2.2 Percentage of Independent Directors (IDIR)

The separation between ownership and management in corporations stimulates agency conflict, which has been extensively discussed in the literature (Berle & Means, 1932; Jensen & Meckling, 1976; Fama & Jensen, 1983) and highlighted

about the role played by independent directors. Lawrence and Stapledon (1999) have provided a detailed analysis of how independent directors can add value to a company. They have studied the influence of independent directors on takeovers and new capital expenditure. Davidson et al. (2005) have found empirical support for the effective role of independent directors in providing better protection for shareholders from managerial opportunism. The focus of independent directors is on the long-term benefits and expansion of the business (Patton & Baker, 1987), and detecting and constraining hyperopic R&D cuts (Osma, 2008; Affes & Romdhane, 2011). Lavery (1996) has shown that managers focus on the short-run incentive from the pressure of the share market. The presence of independent directors on the board reduces sub-optimization by managers to reduce capital expenditures and works on behalf of shareholders to enhance the long-run sustainability of the company by proper capital expenditure outflows (Alexander & Cohen, 1999; Bushee, 1998; Markarian et al., 2008).

4.2.3. Leverage (*LEV*)

The extant literature shows that debt market constraints have a negative effect on capital investment (Whited, 1992; Almeida & Campello, 2007; Nini et al., 2012). Lang et al. (1996) have studied the relationship between leverage and capital expenditures using the US data from years 1970-1989 and shown that there is a negative correlation. Whited (1992) has shown that capital investment is more sensitive to cash flow in companies with high leverage than in companies with low leverage. Cantor (1990) has provided evidence that leverage at the company level increases with volatility in capital expenditures and employment growth rates. As stated in the paper of Myers (1977), debt overhang gives managers an incentive for underinvestment. The paper of Aivazian et al. (2005) shows that leverage has a strong negative impact on capital investment decisions.

4.2.4. Size (*Sales*)

According to Griner and Gordon (1995), sales are generally used to control for company size and are measured by total revenue. Haller and Murphy (2012) have also found that company size is one of the key determinants of capital expenditures. Doshi et al. (2016) have found that price uncertainty of outputs (*sales*) has a statistically and economically significant negative effect on capital expenditures and that sales volume has a positive impact on the capital expenditures of a particular company. Hsiao and Li (2012) have shown a strong positive correlation between sales growth and capital expenditure.

4.2.5. Age

The higher rate of quality increase for young companies translates into greater capital expenditures. In comparison, mature companies invest less in product development. This leads young companies to grow faster than mature

companies. This has been described in the literature of Dunne et al. (1989), and Haltiwanger et al. (2013).

4.2.6. *Persistency of Capital Expenditure Cash Outflows (CAPXOF(-1))*

A company’s net capital expenditure cash outflows will be persistent if the previous year’s net capital expenditure cash outflows are serially correlated with the current year’s current year’s net capital expenditure cash outflows ($CAPOX_{it} = \rho_0 + \rho_1 CAPOX_{i,t-1} + \eta_{it}$). Here, ρ_1 is the persistence parameter and is expected to be positive and significant. It is also known as the auto-correlation parameter and η_{it} is normally and identically distributed with mean zero and constant variance ($\eta_{it} \sim iid(0, \sigma^2)$). The positive sign of ρ_1 also indicates that the pharmaceutical sector is dependent on capital investment (more cash is being spent on capital expenditures). Moreover, this positive sign denotes that capital expenditures are long-term in nature and usually initiated by either capital lease or other long-term contracts. Therefore, cash related with these expenditures may be outflowed for a number of years.

Table 2. Expected Sign of the Impact of Explanatory Variables

Explanatory Variables	Expected Sign	Suggested Literature
Degree of Operating Leverage (<i>DOL</i>)	-ve	Hsiao and Li (2012), Sunder (1980)
Percentage of Independent Directors (<i>IDIR</i>)	+ve	Affes and Romdhane (2011), Markarian et al. (2008), Osma (2008)
Size	+ve	Byoun (2008), Doshi et al. (2016), Griner and Gordon (1995)
Age	+ve / -ve	Dunne et al. (1989), and Haltiwanger et al. (2013).
Leverage	+ve / -ve	Lang et al. (1996), Cantor (1990), Mayers (1997), DeMarzo and Fisherman (2007), Aivazian et al. (2005)

5. Econometric Methodology, Results, and Discussion

This section covers the development of the econometric model, the estimation of the model, and the results and interpretation.

5.1. Model Development

The following econometric model has been used to identify the determinants of the net capital expenditure cash outflows:

$$CAPXOF_{i,t} = \psi' \Omega + \xi_{i,t} \tag{1}$$

$$\text{Here, } \psi = \begin{bmatrix} \psi_0 \\ \psi_1 \\ \psi_2 \\ \psi_3 \\ \psi_4 \\ \psi_5 \\ \psi_6 \end{bmatrix} \quad (2)$$

$$\Omega = \begin{bmatrix} 1 \\ CAPXOF_{i,t-1} \\ SIZE_{i,t} \\ DOL_{i,t} \\ AGE_{i,t} \\ LEV_{i,t} \\ IDR_{i,t} \end{bmatrix} \quad (3)$$

The subscript i denotes the company and t denotes the time period. ψ is the column vector of parameters to be estimated. Ω is the column vector of unity and explanatory variables used in the model and ξ is the random error term. For fixed effect OLS, the intercept of the equation varies across the companies but does not vary across time. In this case the column vector ξ will take the following form:

$$\psi = \begin{bmatrix} \psi_{0i} \\ \psi_1 \\ \psi_2 \\ \psi_3 \\ \psi_4 \\ \psi_5 \\ \psi_6 \end{bmatrix} \quad (4)$$

In the case of random effect OLS, ψ_{0i} will be a random variable where, $\psi_{0i} = \psi_0 + \mathcal{G}_i$ and $\eta_{i,t} = \mathcal{G}_i + \xi_{i,t}$. The equation (1) will take the following form:

$$CAPXOF_{i,t} = \psi' \Omega + \eta_{i,t} \quad (5)$$

The random error term in random effect OLS consists of two components: \mathcal{G}_i , which is the cross-section or individual specific error component, and $\xi_{i,t}$ which is combined time series and cross-section error component and is sometimes called the idiosyncratic term since it varies over cross section as well as time. Apart from the Fixed Effect OLS and Random effect OLS, Feasible Generalized Least Squares (FGLS) or Panel Corrected Standard Error OLS (PCSE OLS), and Generalized Method of Moments (GMM) will also be applied to estimate the model. To check the model fitness, pairwise plotting is given below along with the summary of R^2 (Table 2).

Table 2. Summary of R²

	<i>CAPXOF(-1)</i>	<i>AGE</i>	<i>SIZE</i>	<i>DOL</i>	<i>LEV</i>	<i>IDIR</i>
<i>CAPXOF</i>	.7411	.0559	.5928	.0005	.1336	.0826

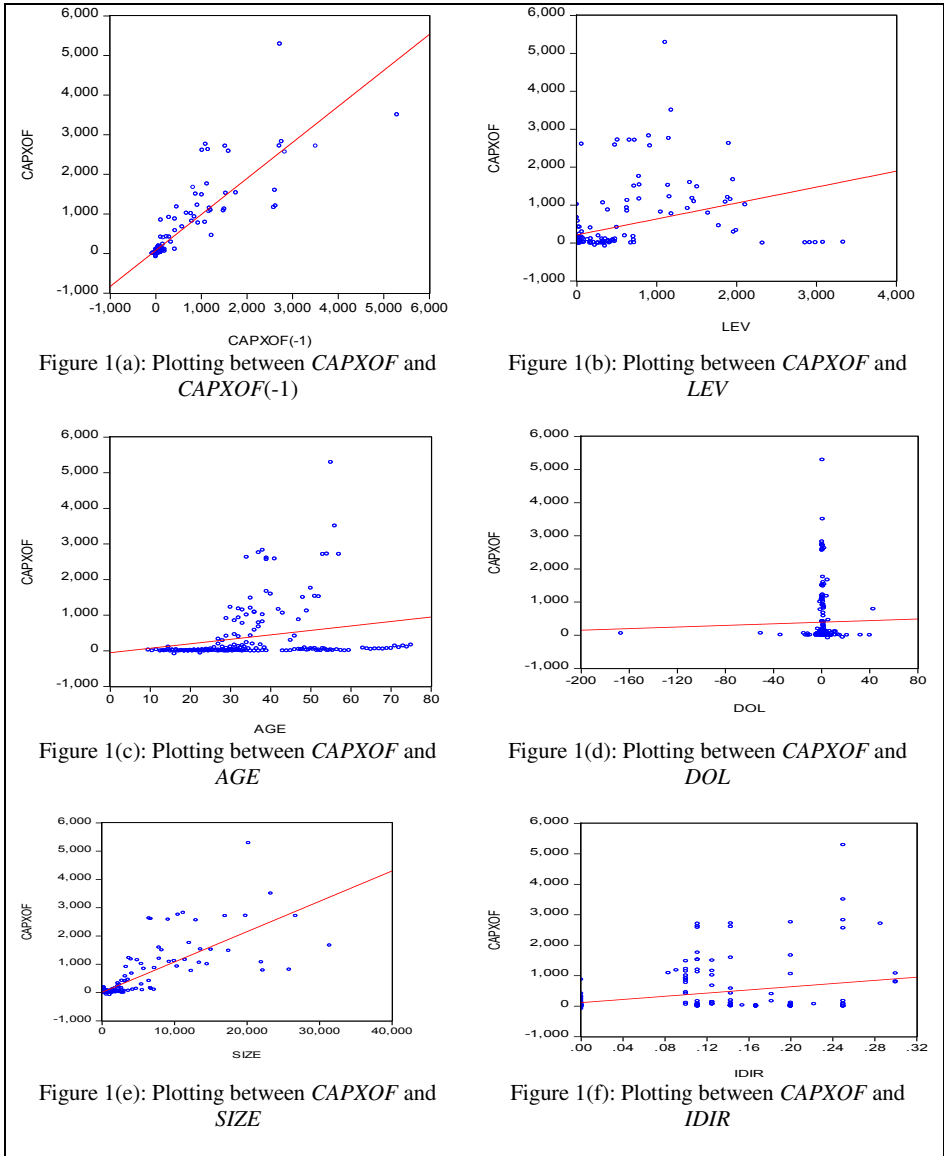


Figure 1. Fitness between the independent variables and dependent variables

From Figures 1(a)-(f), it can be said that *CAPXOF*(-1), Company size, *DOL*, *LEV*, *IDIR* are positively related with *CAPXOF*. The R^2 makes it more clear and also explains that *CAPXOF*(-1) and *SIZE* are the two key explanatory variables of *CAPXOF*.

5.2 Test of Multicollinearity

To test multicollinearity, the correlation matrix and variance inflation factor have been used. If the correlation between two explanatory variables is greater than or equal to .90 or the variance inflation factor is greater than or equal to 10, then multicollinearity will be a serious problem. The correlation matrix and variance inflation factor have been provided in Table 3 and Table 4.

Table 3. Correlation Matrix

	<i>CAPXOF</i>	<i>CAPXOF</i> (-1)	<i>DOL</i>	<i>AGE</i>	<i>LEV</i>	<i>SIZE</i>	<i>IDIR</i>
<i>CAPXOF</i>	1.0000						
<i>CAPXOF</i> (-1)	.8609	1.000					
<i>DOL</i>	.0222	.023	1.000				
<i>AGE</i>	.2364	.235	-.170	1.000			
<i>LEV</i>	.3655	.369	.069	-.090	1.000		
<i>SIZE</i>	.7699	.768	.067	.339	.408	1.000	
<i>IDIR</i>	.2874	.285	.109	.161	.192	.355	1.000

Table 4. Variance Inflation Factor

Variables	$VIF=1-R^2$	$\frac{1}{VIF} = \frac{1}{1-R^2}$
<i>CAPXOF</i> (-1)	2.4800	.4037
<i>DOL</i>	1.0700	.9387
<i>AGE</i>	1.2900	.7775
<i>LEV</i>	1.3200	.7577
<i>SIZE</i>	2.9200	.3419
<i>IDIR</i>	1.1500	.8732

From Table 3 and Table 4, it can be concluded that, there is no severe multicollinearity problem, since all pairwise correlations among the explanatory variables are less than .90 ($< .90$) and all variance inflation factors are less than 10 (< 10).

5.3 Estimation of the Model

In the first step, either the fixed effect or the random effect OLS estimation technique is used based on the Hausman (1978) test. Based on the Hausman test an appropriate specification (Fixed Effect) is used. Later Beck and Katz (1995) heteroscedasticity, cross-sectional correlation, and auto-correlation consistent (PCSE) estimation are used for a robustness check. Arellano and Bond (1991) second step GMM (Generalized Method of Moments, GMM-1 and GMM-2) is used to address the endogeneity problem (the regressors may be correlated with the error terms) and to remove company specific unobserved (inborn) fixed effects. Moreover, due to the presence of a lagged dependent variable, the auto-correlation problem may arise. Therefore, to address the auto-correlation

problem, the first difference lagged dependent variable is also instrumented with its past levels. One key problem of second step difference GMM estimation is that the standard errors of the estimates may have a downward bias. To fix this problem, White period robust standard errors have been used. It is also notable that if the panel has a small time dimension (T) and long company dimension (N), Arellano and Bond (1991) estimation can be used even if it is not necessary (Roodman, 2006). Hayakawa (2009) has shown that Arellano and Bover (1995) orthogonal deviation (GMM-3 and GMM-4) tends to work better than the first difference GMM estimation. Only the first lag of the capital expenditure cash outflows has been used to check the persistence of capital expenditure cash outflows. A company's capital expenditure outflows will be persistent if the previous year's capital expenditure outflows are serially correlated with the current year's capital expenditure cash outflows ($CAPOX_{it} = \rho_0 + \rho_1 CAPOX_{i,t-1} + \eta_{it}$). ρ_1 is the persistence parameter and expected to be positive and significant. It is also known as auto-correlation parameter. η_{it} is normally and identically distributed with mean zero and constant variance ($\eta_{it} \sim iid(0, \sigma^2)$). The positive sign of ρ_1 also indicates that the pharmaceutical sector is dependent on capital investment (more cash is being spent on capital expenditures). Moreover, this positive sign denotes that capital expenditures are long-term in nature and usually initiated by either capital lease or other long-term contracts. Therefore, cash related with these expenditures may be outflowed for a number of years. The first lag also helps to remove the autocorrelation problem. The incorporation of one more lag destroys the economic efficiency of the model (suggested by AIC and SBIC).

5.4 Results, Interpretation, and Comparison

Previous year net capital expenditure cash outflows have a significant positive impact on the current years' net capital expenditure cash outflows (FE OLS, PCSE OLS, GMM-1, GMM-2, GMM-3, and GMM-4). Therefore, the net capital expenditure cash outflows are persistent. More specifically, the pharmaceutical sector is dependent on capital investment (more cash is being spent on capital expenditures). It can also be said that capital expenditures are long-term in nature and usually initiated by either capital lease or other long-term contracts. Therefore, cash related to these expenditures may be outflowed for a number of years.

The degree of operating leverage has a significant negative impact on the net capital expenditure cash outflows (GMM-1, GMM-2, GMM-3, and GMM-4). Therefore, it can be said that the higher the level of business risk, the lower the companies' intention to spend cash for capital expenditures. This finding is consistent with the finding of Hsiao and Li (2012) covering 161682 company years. Next, this finding is consistent with Sunder (1980), who conducted an extensive study with 273 companies and found that the degree of operating leverage had a negative impact on capital expenditure cash outflows.

Table 5. Estimation Results

Independent Variables	FE OLS	PCSE OLS	GMM-1
<i>CAPXOF</i> (-1)	.406 (.000)***	.347 (.064)	.339 (.000)***
<i>DOL</i>	-1.845 (.374)	-.607 (.528)	-1.444 (.000)***
<i>AGE</i>	7.573 (.640)	-.999 (.467)	9.720 (.003)***
<i>LEV</i>	-.042 (.547)	.004 (.945)	-.050 (.000)***
<i>SIZE</i>	.045 (.000)***	.067 (.000)***	.049 (.000)***
<i>IDIR</i>	103.817 (.872)	208.794 (.639)	207.241 (.006)***
Constant	-167.246 (.747)	38.560 (.494)	
J-statistic			8.849 (.355)

Independent Variables	GMM-2	GMM-3	GMM-4
<i>CAPXOF</i> (-1)	.340 (.000)***	.342 (.000)***	.345 (.000)***
<i>DOL</i>	-1.873 (.000)***	-2.071 (.000)***	-2.071 (.000)***
<i>AGE</i>	1.231 (.000)***	6.694 (.045)**	6.994 (.045)**
<i>LEV</i>	-.036 (.003)***	-.058 (.103)	-.058 (.105)
<i>SIZE</i>	.049 (.0000)***	.051 (.000)***	.051 (.000)***
<i>IDIR</i>	169.419 (.009)***	157.972 (.076)*	157.251 (.079)*
J-statistic	1.873 (.285)	9.734 (.284)	9.775 (.283)

Notes: *, ** and *** represent significant at 10%, 5% and 1% level. There is no existence of serial correlation in any of the four GMM techniques. The higher the p-value of the J-statistic, the stronger the model. FE (Fixed Effect) OLS has been applied based on the result of the Hausman Specification test (Rejection of Null Hypothesis). Later, by taking into account serial correlation, heteroscedasticity, and cross-sectional dependence, PCSE (Panel Corrected Standard Error) OLS have been applied ($T < N$). In GMM-1 and GMM-3 all the transformed independent variables have been used as instruments along with dynamic panel instruments of the dependent variables. In GMM-2 and GMM-4, all the transformed independent variables and first and second lag of level independent variables have been used as instruments along with the dynamic panel instruments of the dependent variables. GMM-1, GMM-2, GMM-3, and GMM-4 are reasonably good models suggested by the small J-statistic and its high p-value ($> .05$).

Age has a significant positive impact on net capital expenditure cash outflows (GMM-1, GMM-2, GMM-3, and GMM-4). Therefore, it can be said that the more mature the company, the higher the intention that the company has to spend cash for capital expenditures. It can also be said that the more adapted the company is with the competitive environment or in line with the increase in competitiveness, the greater the intention the company has to further expand via investment in capital expenditures. This result is consistent with the study of Coad et al. (2016). They have found that Spanish Manufacturing Companies tend to make more capital expenditures with an increase in maturity. The result is also consistent with Dunne et al. (1989) in US Manufacturing companies, and Haltiwanger et al. (2013) in US start-ups and young business companies.

Leverage has a significant negative impact on capital expenditure cash outflows (GMM-1 and GMM-2). It can be said that companies are not using leverage to finance their capital expenditures and companies are using current leverage to settle the previous leverage. This finding is consistent with Cantor (1990) and Aivazian et al. (2005). Cantor (1990) has conducted a study on 778 nonfinancial US companies and Aivazian et al. (2005) have conducted a study on Canadian companies.

Size has a significant positive impact on the net capital expenditure cash outflows (FE OLS, PCSE OLS, GMM-1, GMM-2, GMM-3, and GMM-4). Therefore, the higher the sales turnover, the higher the intention of the company

has to spend on capital expenditures to facilitate a spurt in sales volume or sudden increase in demand. This finding is consistent with the Malaysian manufacturing companies (Hamidi, 2005). In addition, the results are also consistent with Griner and Gordon (1995), Byoun (2008), and Doshi et al. (2016).

Percentage of independent directors has a significant positive impact on net capital expenditure cash outflows (GMM-1, GMM-2, GMM-3, and GMM-4). Therefore, it can be said that independent directors usually focus on the long-term growth, expansion, and wealth maximization of the company. This result is consistent with the study of Affes and Romdhane (2011), Markarian et al. (2008), and Osma (2008). Osma (2008) has conducted a study using a sample of UK nonfinancial companies from 1989 to 2002. Affes and Romdhane (2011) have conducted a study in Tunisia from 2003 to 2007. Markarian et al. (2008) have conducted a study on Italian companies. Therefore, the findings of this study can be used in the generalized form.

6. Conclusion and Policy Implications

Companies reserve funds for capital expenditures because of their integral role in the long-term health and viability of an organization. Capital expenditure is the amount of money that a business or other organization has tagged to spending on a long-term asset. This contrasts with revenue expenditures, which are expenses that are devoted to short-term needs. This study attempts to identify the key determinants of net capital expenditure cash outflows of a panel of 14 listed pharmaceutical companies. The study has used data from 2003-2015 for each pharmaceutical company. The existing studies have focused on the determinants of capital expenditures. Therefore, this study contributes to the scarce literature concerning the determinants of net capital expenditure cash outflows, an area that has not been given the attention it needs.

It is found that different company characteristics make it necessary for companies to determine the level of net capital expenditure cash outflows. Hence, potential investors can take decisions on investments in pharmaceutical companies considering whether or not pharmaceutical companies have future growth opportunities. Usually, companies with future growth opportunities invest more in capital and pay less or no dividend. The study has found that leverage and the degree of operating leverage has a significant negative impact on net capital expenditure outflows. Therefore, before investing in pharmaceutical companies, investors should carefully observe the trend of leverage and degree of operating leverage. The increase in leverage and business risk will squeeze the long-term growth and expansion of the companies. It can also be noted that highly levered pharmaceutical companies are not suitable for investment. Age, sales volume, and the percentage of independent directors have significant positive impact on net capital expenditure cash outflows. Therefore, before investment in pharmaceutical companies, investors should carefully observe the board of directors' panel as board independence can increase

companies' expansion and work for wealth maximization. Moreover, investors should investigate whether or not companies are becoming accustomed to the competitive environment, and whether or not companies have an increasing trend in sales volume.

Whether companies are considering efficiency issues can be justified by the further research. For example, companies can start to replace current equipment with more efficient ones in order to gain efficiency over time (age) by reducing manpower (by automating processes), waste, and energy. The efficiency can be more important with the expansion of company size. Moreover, board size, asymmetric information, immediate growth opportunities, capital market access, and revenue volatility may also influence the capital expenditure cash outflows, which are ignored in this study. From the macroeconomic point of view, economic growth, money supply, and private sector credit may also affect the capital expenditure cash outflows, which are outside the scope of this study. Therefore, this study has ignored a few control variables. Incorporating these variables along with the existing explanatory variables in future studies may make the conclusion more robust and valid. The major strengths of this study are the use of sound econometric techniques. Most of the previous studies have used OLS, which suffers from major limitations. Therefore, the conclusions drawn from the previous studies may be biased and misleading. Another issue can be affecting most of the previous studies is that they have neglected multicollinearity and endogeneity problems. This study has successfully addressed the multicollinearity problem and handled the endogeneity problem by using the GMM technique. GMM also works to eliminate the inborn fixed effect in the panel. It should be kept in mind that the use of more explanatory variables may create a multicollinearity problem which can subsequently give rise to biased estimation. Researchers and academicians need to be very careful and vigilant in using more control variables along with their interaction effects. Most researchers are used to incorporating more explanatory variables just to have good model fitness. It is notable that using irrelevant explanatory variables may scale up the goodness of fit but, ultimately, it does not ensure unbiased estimation results.

Endnotes

1. GMM refers to Generalized Method of Moments
2. FE OLS refers to Fixed Effect Ordinary Least Squares
3. PCSE OLS refers to Panel Corrected Standard Error Ordinary Least Squares
4. To make a balanced panel, we have avoided the newly listed companies and companies with unavailable data. Dealing with an unbalanced panel leads to a biased and wrong estimation given the estimation techniques. Therefore, only 14 companies have been considered in this study.
5. Pairwise correlation has been used to check the multicollinearity problem. High correlation among the independent variables indicates biased estimation and spurious results.
6. We have tried to build up a good econometric model with relatively better fitness. Therefore, the model fitness has been checked using a separate scatter plot.

7. To emphasise the cash outflows in capital expenditures and the not overall capital expenditures in a company, and to omit the sale proceeds of existing assets, CAPXOF has been used.

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