



# The Determinants of Investment Behavior of Saudi Industrial Firms

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## ABSTRACT

In this paper, we examine simultaneous relationship between respectively cash flow, dividend yield, debt, firm size and the investment. This research used 51 listed Saudi industrial firms, from 2009 to 2018. First of all, we have noticed that the CF has a statistically significant and positive effect on investment. Second, the dividend yield rate is negatively correlated with the investment. Third, debt and the firm size have a positive and significant effect on the relationship between investment and cash flow. This finding is not a sign of presence of financial constraints but it means that firms of our sample substitute the distribution of dividends by debts.

**Keywords:** Investment Behavior, Investment-cash Flow Sensitivity, Dividend Distribution, Debt, Firm Size and Financial Constraints

**JEL Classifications:** G31, G32, O16, P330

## 1. INTRODUCTION

Over the past decade, there has been renewed interest in studying the links between investment decisions and financing decisions. The fact that a company's financing conditions influence its actual behavior is an old theme. It has experienced a revival with the development of the new microeconomics and in particular with the emergence of the paradigm of information problems. Both theoretical and empirical work looks more closely at the interactions between financial conditions and the actual behavior of economic agents, whether in terms of consumption, investment, employment, pricing or storage.

The growth depends double on the investment. Indeed, the investment is, in the side of the consumption, one of the important components of the demand. A decrease of the investment is translated by a slowing down of growth. But it also plays a determining role to model the productive capacity of an economy.

This very strong link between investment and growth incites to analyze the investment behavior, to understand better which strategy of economic policy would may support a well-balanced progress of the investment.

## 2. LITTERATURE REVIEW

We will present, in Table 1, an overview of empirical studies that analyze the behavior of investment with cash flow, dividend, debt and firm size.

## 3. METHODOLOGY

The objectives of our research are to:

- Analyze the relationship between investment and cash flow;
- Verify the presence or no of financial constraints;
- Answer the following question: can debts replace the distribution of dividends?

**Table 1: Effect of cash flow, dividend, debt and firm size on the investment behavior (Hechmi, 2012)**

Author	Year	Subject of study	Results of study
Fazzari et al. (Fazzari et al., 1997)	1988	How Tobin's variable q that explains investment opportunities and the cash flow variable can explain the level of investment when there are financial constraints?	<ul style="list-style-type: none"> <li>• A strong correlation between the Cash Flow and Investment variables;</li> <li>• Tobin's q variable is no longer sufficient to determine investment in the face of financial constraints (generated by imperfections in capital markets);</li> <li>• "Most constrained" firms (paying low dividends) have more investments-cash flow sensitivity than "Least constrained" firms (paying high dividends).</li> </ul>
Deveureux and Schiantarelli	1989	<ul style="list-style-type: none"> <li>• Study the impact of financial factors as the CF, the debts and the measures of liquidity stock on the investment decisions</li> <li>• Impact of firm size on the Cash Flow</li> <li>• Investment sensitivity</li> </ul> <p>Criterion of segmentation: the real value of capital stock (English Firms)</p>	<ul style="list-style-type: none"> <li>• The authors notice that the internal sources are similar to the external sources of financing;</li> <li>• The long-term debts represent a low rate of the investment financing especially to the small firms because, it is expensive, for them to count on the markets of debts;</li> <li>• The Investment-cash flow sensitivity decreases with the size, because the small firms generate a CF equal to 18% while the big firms generate 11% only.</li> </ul>
Athey and Laumans (Kadapakkam et al., 1998)	1994	<ul style="list-style-type: none"> <li>• Impact of the firm size on the Investment-cash flow sensitivity</li> </ul> <p>Criterion of segmentation: book value of equity (Indian Firms)</p>	<ul style="list-style-type: none"> <li>• The investment-cash flow sensitivity is higher for large firms.</li> </ul>
Kaplan and Zingales	1997	Is the sensitivity of the investment to cash flow a sign of the presence of financial constraints?	<ul style="list-style-type: none"> <li>• The high sensitivities between investment and cash flow can not be explained as obvious by the fact that these firms are more financially constrained;</li> <li>• Investment-cash flow sensitivity increases in financially constrained firms, depending on the specification of their technologies and the cost of the debt.</li> </ul>
Miguel and Pindado	2001	<ul style="list-style-type: none"> <li>• Analyze the characteristics of the firm that are considered as the determinants of the capital structure according to different explanatory theories,</li> <li>• How do the institutional characteristics affect the capital structure?</li> </ul>	<ul style="list-style-type: none"> <li>• For the non-financial firms, they support costs of transaction when they decide to adjust their level of debt;</li> <li>• An opposite relationship between the costs of financial straits and debt, caused by the high premium demanded by the creditors;</li> <li>• A direct relationship between debt and investment, thus, confirms the simultaneity of the two decisions (investment and financing).</li> </ul>
Artola et al.	2002	Study the determinants of investment behaviour of French and Spanish industrial firms.	<ul style="list-style-type: none"> <li>• The result suggests that, the investment behavior of firms in the forced regime (without dividend payment) shows a strong sensitivity to the generation of internal sources.</li> </ul>
Hennessy	2004	This study removes an empirical proxy for the marginal Q lever of equity, producing a direct test for the debt and the reduction of the impact through the establishment of an additional and fixed debt.	<ul style="list-style-type: none"> <li>• The negative effect of the debt on the investment is stronger than it is going to be implied by the canal of the debt working remotely.</li> </ul>
Connolly and Hirschey	2005	Impact of the size on the effect of R&D expenses on the firm value. Criterion of Segmentation: market capitalisation.	<ul style="list-style-type: none"> <li>• The effect of the intensity of R&amp;D on market value is positively linked to the firm size.</li> </ul>
Fagiolo and Luzzi	2006	Relationship between the liquidity constraints and the firm size. Criterion of Segmentation: number of employees (Italian Industrial Firms).	<ul style="list-style-type: none"> <li>• The liquidity constraints have a negative effect on the growth, depending on the size. The small firms are growing more after controlling the liquidity constraints.</li> <li>• The negative effect of the size on the growth increases when the liquidity constraints become more difficult. More the liquidity constraints increase more the negative effect of the size on the growth increases.</li> </ul>
Savnac (Djama et al., 2014)	2006	<ul style="list-style-type: none"> <li>• Study the impact of the financial constraints on the innovation behaviour of firms.</li> <li>• The size as factor affecting the propensity of firms to innovate. (French Industrial Firms).</li> </ul>	<ul style="list-style-type: none"> <li>• Negative effect of the rate of banking debts on the probability to undertake an innovative project;</li> <li>• The probability to be confronted with constraints for the innovation decreases with the size of the firm. In addition, it is easy to finance an innovative project in the big firms which have the knowledge and can maintain better relationships with potential providers of capital.</li> </ul>
Xiong	2016	Investigate the relationship between stock liquidity, firm investment and capital allocation efficiency.	<ul style="list-style-type: none"> <li>• Firm investment is positively related to stock liquidity;</li> <li>• Firms with good liquidity can lower the investment and Tobin's Q sensitivities when there are no good investment opportunities.</li> </ul>

(Contd...)

Table 1: (Continued)

Author	Year	Subject of study	Results of study
Gebauer et al.	2017	Investigate the link between corporate debt and investment for a group of five peripheral euro area countries.	<ul style="list-style-type: none"> <li>• Authors postulate a non-linear corporate leverage-investment relationship and derive thresholds beyond which leverage has a negative and significant impact on investment;</li> <li>• The investment sensitivity of debt increased when financial distress intensified and firms had a lower capacity to finance investment from internal sources of funds;</li> <li>• Even moderate levels of debt can exert a negative influence on investment for smaller firms or when profitability is low.</li> </ul>
Abdul and Maria	2018	Examine how equity liquidity affects firms' investment decisions.	<ul style="list-style-type: none"> <li>• Free cash flows, Tobin's Q, firm size are positively related to firms' investment decisions;</li> <li>• The cash ratio, leverage, dividend ratio, Business risk, and firm age are negatively related to firm investment spending.</li> </ul>

- And study the effect the firm size on the investment-cash flow sensitivity.

### 3.1. To Reach the First Two Goals, We Will Use the Following Linear Regression

$$I_{it} = a_0 + a_1 * CF_{it} + a_2 * \text{Dividend Yield}_{it} + \varepsilon_{it}$$

With;

$I_{it}$ : The investment of the firm  $i$  during the year  $t$ ,

$$I_{it} = \Delta FA + DA_{it}$$

$\Delta FA$ : The variation of fixed assets =  $FA_{it} - FA_{it-1}$ .

$DA_{it}$ : Depreciations and amortizations of the firm  $i$  during the year  $t$ .

These two variables are collected from financial statements.

The  $I_{it}$  is the dependent variable. For the independent variables, they are among two.

- $CF$ : The cash flow which is calculated by adding to the net profit depreciations and amortizations ( $CF_{it} = NP_{it} + DA_{it}$ )
- $\text{Dividend Yield}_{it}$ : This variable is collected from the following web site: [www.gaam.com](http://www.gaam.com)

### 3.2. To Achieve the Third Goal, We Will Use the Following Linear Regression

$$I_{it} = a_0 + a_1 * CF_{it} + a_2 * \text{Dividend Yield}_{it} + a_3 * LTD_{it} + \varepsilon_{it}$$

With;

$LTD$ : The long and medium-term debts which are calculated from financial statements.

### 3.3. To Achieve the Fourth and Last Goal, We Will Use the Following Linear Regression

$$I_{it} = a_0 + a_1 * CF_{it} + a_2 * \text{Dividend Yield}_{it} + a_3 * LTD_{it} + a_4 * SIZE_{it} + \varepsilon_{it}$$

With;

$SIZE$ : The size of the firm measured by Log (Total Assets).

The sample of our study is constituted by all the Saudi industrials firms quoted in the Saudi Stock Exchange (TADAWUL) and which are introduced before 2009 (companies introduced in 1999 and later are not included in our sample). For lack of unavailability of the data, the definitive sample consists of 51 firms.

The period of study spreads out over 10 years: from 2009 to 2018.

## 4. RESULTS AND INTERPRETATIONS

Results will be summarized in the Table 2:

We find that adjusted  $R^2$  is in the order of 42.95%. Fisher's  $F$ , which measures the overall significance of the model, is 192.58 and statistically significant at the 1% level.

The  $CF$  has a statistically significant and positive effect on investment. In other words, goes hand in hand with investment. Saudi manufacturing firms use internal financing to finance their investments.

We can explain the positive relationship between  $CF$  and investment that internal financing is a preferred source of funding by the Saudi industrial companies.

The pecking order theory states that a company should prefer to finance itself first internally through retained earnings. If this source of financing is unavailable, a company should then finance itself through debt. Finally, and as a last resort, a company should finance itself through the issuing of new equity.

The internal financing is the process which consists to finance the needs with the resources taken from the activity of the firm. Thus, it avoids the use of external funding. There are two reasons that underlie this choice. On one hand, the risk of the firm does not increase contrary to the debt. On the other hand, we avoid creating conflicts of interests between shareholders and creditors. Beside, contrary to the capital increase, the internal financing is not accompanied by a dilution effect. It has, finally, the advantage of avoiding the firm to disclose information to investors in case of external financing.

The dividend yield rate is negatively correlated with the investment. This means that for Saudi industrial companies dividend distribution is synonymous with investing less.

According to various previous studies, the  $CF$  has significant explanatory power on investment. Fazzari et al. (1988) (Fazzari et al., 1997) focus, in their study, on the positive relationship between the  $CF$  generated by firms and their investment expenditures. They showed that this relationship is due to the existence of financial constraints. They consider that firms that distribute low dividends are identified as financially constrained and argue that the more a firm is financially constrained, the more it has a high investment- $CF$  sensitivity.

**Table 2: Linear regression of the investment–cash flow sensitivity with financial constraints**

Variables	Coefficients	T for $H_0$ : Parameter=0	Prob >  T
Constant	-6.47E+08 (2.60E+09)	3.206156*	0.0014
CF	0.512942 (0.026266)	19.52841*	0.0000
Dividend yield	-62591357 (30509552)	-2.05133**	0.0407
DW	1.677		
R <sup>2</sup>	43.17%		
Adjusted R <sup>2</sup>	42.95%		
F-statistic	192.577*		
Prob (F-statistic)	0.000000		

\*Significant at the 1% level; \*\*Significant at the 5% level. The values between parentheses are the standard errors

#### 4.1. Does This Mean That the Firms in Our Sample Are Financially Constrained?

The result of the study of Kaplan et al. gives us the answer. According to Kaplan and Zingales (1997, 2000) (Kaplan and Zingales, 2000), the relationship between investment and CF is also important and positive, but they have shown that the sensitivity of the investment to the CF cannot systematically result from the presence of financial constraints. In other words, for them, this positive relationship is stronger in the case of companies that, theoretically, are not likely to be subject to financial constraints. They explain this result by excessively conservative behavior of managers who often prefer internal financing to external financing.

In addition, surveys of managers confirm the importance of investment opportunities to justify the absence or low payments of dividends. This means that managers prefer to use excess cash to finance profitable investments and therefore increase the firm value more than distribute dividends.

As long as the company is faced with investment opportunities whose profitability exceeds the weighted average cost of capital, it will use internal funds, and the additional debt that it authorizes within the framework of the respect of the structure to finance its investments.

As a result, the company will only pay a dividend if all the profitable investments made and have unused profits. Otherwise, there will be no distribution.

According to Jensen (1986), “*Conflicts of interest between shareholders and managers over payout policies are especially severe when the organization generates substantial free cash flow. The problem is how to motivate managers to disgorge the cash rather than investing it at below the cost of capital or wasting it on organization inefficiencies.*”

Managers are not obliged to pay dividends against they are in repayment of loans (payment of principal and interests). In other words, debts can substitute the dividend payments.

To see if this finding can be valid for the Saudi industrial firms, the long-term debt variable (LTD) has been incorporated in the previous model.

The results are summarized in the Table 3:

We find that adjusted R<sup>2</sup> is in the order of 49.41%. Fisher’s F, which measures the overall significance of the model, is 166.73 and statistically significant at the 1% level.

By adding the LTD variable in the model, the variable “dividend yield” became statistically insignificant. This confirms that Saudi industrial firms are not financially constrained but they substitute the distribution of dividends by debts. So in the presence of debts, the distribution of dividends has no effect on investment.

We notice that the LTD have a positive and significant effect on the cash flow Investment sensitivity.

If the debt increases, it will have a positive effect on the relationship between investment and the cash flow.

Debts have a positive effect on the investment; this means that companies of our sample can bear the financial charges of the obtaining of credits.

Saudi industrial firms seem to prioritize their financing resources as POT, they prefer internal funds and then debt in the financing of investment. The validation of the theory of hierarchical financing is based on the existence of asymmetric information likely to lead to problems of adverse selection on the part of external investors. The role of asymmetric information in the choice of financing of Saudi companies is confirmed.

Finally, firms have an interest in going into debt to take advantage of the leverage effect, and the tax advantage linked to the debt (the interest is deductible from the corporate tax). But the growth of borrowing carries a risk of increased bankruptcy. The company has to arbitrate between the benefits of borrowing, and the cost of bankruptcy risk.

Now, we will try to see if the previous results can change with the size effect. To do so, we will add the variable “size” in the last model (the variable “dividend yield” was removed from the model since its effect was statistically insignificant) and analyze the effect of its introduction.

The results can be found in the Table 4:

We find that adjusted R<sup>2</sup> is in the order of 50.08%. Fisher’s F, which measures the overall significance of the model, is 171.19 and statistically significant at the 1% level.

**Table 3: Effect of LTD on the investment–cash flow sensitivity**

Variables	Coefficients	T for H <sub>0</sub> : Parameter=0	Prob >  T
Constant	2.64+08 (1.96E+08)	1.349695	0.1777
CF	0.251029 (0.040673)	6.171931*	0.0000
Dividend yield	-13270937 (29365186)	-0.451928	0.6515
LTD	0.156954 (0.019349)	8.11687*	0.0000
DW	1.815		
R <sup>2</sup>	49.71%		
Adjusted R <sup>2</sup>	49.41%		
F-statistic	166.727*		
Prob (F-statistic)	0.000000		

\*Significant at the 1% level. The values between parentheses are the standard errors

**Table 4: Effect of SIZE on the investment–cash flow sensitivity**

Variables	Coefficients	T for H <sub>0</sub> : Parameter=0	Prob >  T
Constant	-6.62E+09 (2.60E+09)	-2.549793**	0.0111
CF	0.037719 (0.040023)	5.939519*	0.0000
LTD	0.134475 (0.020946)	6.420062*	0.0000
SIZE	3.20E+08 (1.21E+08)	2.633044*	0.0087
DW	1.835		
R <sup>2</sup>	50.37%		
Adjusted R <sup>2</sup>	50.08%		
F-statistic	171.185*		
Prob (F-statistic)	0.000000		

\*Significant at the 1% level; \*\*Significant at the 5% level. The values between parentheses are the standard errors

We notice that the coefficients of both variables (CF and SIZE) are significant. As a result, we can say that the size has a positive effect on the investment-cash flow sensitivity.

In the Saudi industrial firms, more the size increases, more the investment will be sensitive to variations of cash flow. For a large firm, if the cash flow increases, the investment increases.

Several studies have investigated the effect of size on the sensitivity investment - cash flow. They were unanimous on the significance of this effect but not on its sign (positive or negative)

Deveureux and Schiantarelli (1989) concluded in their studies, that the cash flow-investment sensitivity becomes more important with increasing size, since the small firms generate a CF equal to 18% while the large firms generate only 11%.

While Athey et al. (1994) (Kadapakkam et al, 1998) and Kadapakkam et al. (1998) noticed that the investment-cash flow sensitivity is more important in the group of large firms than in the group of small firms independently of the size chosen measure.

Kadapakkam et al. (1998) explained this result. First, large companies have much flexibility in choosing the time to invest and may delay the investments until internal sources would be available. Competitive pressures may be more intense for the small companies, which may face the situation of “do or die.” So, small companies may be forced to undertake investments even if they have to increase more the expensive external financing. Such forces will weaken the link between the investment and cash flow for the small companies (Hechmi, 2012).

Another explanation is that the agency problems may be more pronounced for the majority of large companies because of the dispersion of capital ownership. The managers in these companies face less to the market discipline and may tend to increase the size of the firm whenever the internal funds are available.

Since Kadapakkam et al. (1998) concluded that the small companies have a sensitivity to cash flow less than for those large companies, it is evident for them that the small companies in developing economies may depend more on external financing (may be the bank).

## 5. CONCLUSION

The investment-cash flow sensitivity has been the main point of several empirical studies, whereof the majority has proved the existence of such relationship, both, significant and positive between the investment and the cash flow, but the unanimity was not made on the explanation of this positive relationship.

For our own results, The CF has a statistically significant and positive effect on investment. In other words, internal financing is a preferred source of funding by the Saudi industrial companies. Also, the dividend yield rate is negatively correlated with the investment.

This finding is not a sign of presence of financial constraints but it means that firms of our sample substitute the distribution of dividends by debts.

Finally, the firm size has a positive and significant effect on the relationship between investment and cash flow.

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