

How Does Cash Holding Affect the Firm's Investment Decisions? Evidence from Jordan

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Examining 80 non-financial firms listed on the Amman stock exchange during the period 2001-2011, this research investigated investment decisions by including important factors that have been ignored by many researchers. The results showed that, for financially constrained firms in a market such as Jordan, cash flow is not the only factor that affects the firm's investments; cash holding also plays an important role in explaining the firm's investments. The result also showed that new debt and equity financing contribute to the firm's investment decisions significantly.

Field of Research: Finance

Keywords: Cash Holding, Firm's Investment, Amman Stock Exchange

1. Introduction

According to Modigliani and Miller (1958), in a perfect market with no taxes or transaction costs, and where access to external funds is available and unlimited, a firm's investment decisions are irrelevant to its capital structure, as internal and external financing become perfect substitutes for each other. However, as markets are imperfect, a firm's investment decisions depend on its capital structure, as different sources of financing have their own benefits and costs. Firms follow a specific order to choose from among the different sources of financing, as suggested by the Pecking Order Theory. They will start with their internal source as this source has the advantage of low cost compared to external sources; then firms will use debt financing since debt financing has tax advantages, resulting in lower costs than equity financing, which is the final source of financing because of the relatively higher cost.

Firms that face difficulties or limited access to finance limit themselves to essential investments, while firms that are less financially constrained are more likely to show greater sensitivity between investment and cash flow (Allayannis and Mozumdar 2004). Many other researchers have studied the sensitivity between cash flow and investments for both financially constrained and unconstrained firms (such as Fazzari et al. 1988, Cleary 1999, Altı 2003, Allayannis and Mozumdar 2004, Wei and Zhang 2008, and many others), but none have focused on how cash holding itself affects the firm's investments.

Cash holding represents an important source of internal financing beside a firm's cash flow. Moreover, cash flow is generated by the firm's operations, which depend on the economic conditions. Cash holding, on the other hand, is a managerial decision, just like investment decisions, which means that cash holding is expected to have more influence on the firm's

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investments compared to cash flow, especially if the firm faces difficulties or limited access to external sources of finance, difficult economic conditions, or both.

The results of this paper show that it is not only firm's cash flow and growth opportunities are the main drivers for investment decisions, as the literature suggested, but also cash held by the firm has a positive and significant effect on the firm's investment decisions.

This paper contributes to the literature by providing evidence on how the cash held by the firm is contributing to their investment decision. Previous papers only focused on the cash flow internally generated by the firm and the growth opportunities as the driver of the firm's investment decisions.

As Jordan is a Muslim country, the financial market in Jordan has been affected by Islamic rules. According to these Islamic rules, dealing with interest is forbidden, which makes debt financing less attractive to firms as it is against Islamic rules. As a result, firms depend mainly on internal and equity financing to provide the funds needed for their investment. Table 1 shows the value of traded bonds and stock for the period 2000-2012 along with some other statistical information.

From Table 1, we can clearly see that debt financing in Jordan represents a very small portion of less than 0.06% of the total securities traded in this market. As debt financing is very limited and equity financing is relatively expensive, firms in Jordan are considered to be financially constrained and they must depend on their internal sources of funds (i.e. cash flow generated by the firm's operations and cash stock held by the firm) to finance their investments.

Therefore, it is important to study how those sources affect the investment decisions separately, since the first source (cash flow) is affected by the economic conditions, while the second source (cash stock) is a managerial decision.

This research, will examine the determinants of the firm's investments not only by including the firm's cash flow but also by including the stock of cash available inside the firm. The researcher will also control for other important variables that might affect the firm's decisions to invest, such as growth opportunities, external financing, economic conditions, and any other variables that might affect the investment decisions.

The rest of this paper will be organised as follows; section 2, will provide the literature about the topic. Then, the data and methodology will be presented in section 3. After that section 4, will discuss the results and findings of this paper. Subsequently, the conclusion of this paper will be presented in section 5.

2. Literature Review

The literature on Investment-Cash was limited to the investment-cash flow relationship, with no focus on cash stock itself and its effect on the firm's investment decisions. Fazzari et al. (1988) were the first researchers to study the Investment-Cashflow sensitivity, and they discussed two research agendas. Firstly, the financial structure of the firm is irrelevant to the investment decisions when firms have the same access to the capital market, responses to changes in the cost of capital or tax-based investment. In other words, if the market is perfect, the investment decision is independent of the firm's financial condition. This agenda is consistent with Modigliani and Miller's (1958) view of the irrelevance of the relationship

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between the firm's financial structure and its financial policy. The second research agenda suggests that financial conditions may affect investment decisions. They started their analysis by testing how cash flow and Q ratio affect the firm's investment. The results show that cash flow is statistically important, since the explanatory power of the model increased with the introduction of cash flow to the model as R^2 increases. They found that investment is affected by financial factors. The sensitivity of investment-cash flow and liquidity is higher in firms with higher retention ratios.

Similar methodologies and tests have been conducted by many other researchers such as Devereux and Schisntarelli (1990), Hoshi et al. (1991), Lamant (1996), Alti (2003), Carpenter and Guariglia (2007), Wei and Zhang (2008), and many others.

On the other hand, a different result was achieved by Kaplan and Zingales (1997) when they investigated the relationship between the firm's investment and its cash flow. They challenged the work of Fazzari et al. (1988) and other researchers who followed the same methodology by questioning whether the high sensitivity between a firm's investment and cash flow is due to financial problems and, if so, in what way. Their main concern was that "there is no test of the fundamental assumption – implicit in all these tests – that investment-cash flow sensitivities increase monotonically with the degree of financing constraints". In particular, they felt that there is no strong theoretical support for this monotonic relationship. Using a small sample of 49 low-dividend firms, considered financially constrained firms based on the investment-cash flow criterion, for the period 1970-1984, they found that the investment-cash flow sensitivity is no greater for financially constrained firms. They also found no evidence to suggest that financially constrained firms have more investment-cash flow sensitivity.

The result of Kaplan and Zingales (1997) has been confirmed by Cleary (1999), Allayannis and Mozumdar (2004) and other researchers.

The vast majority of the research conducted on firms' investment focuses on the effect of the firm's cash on its investment decisions; only a few researchers have studied the effect of the cash held by the firm on its investment decisions. Kadapakkam et al. (1998) examine how cash flow influences a firm's investments. They analysed the relationship between the firm's investment level and internal funds by using both the firm's flow, which measures the funds generated by the firm during the year, and the cash assets available at the beginning of the year. They also included two other variables in their analysis model - Tobin's q (market to book value ratio) and the lagged value of the sales - to control for the investment opportunities. They found that the availability of internal funds as generated cash flow and cash assets has a positive and significant effect on the investment level.

As we can clearly see, the cash balance has been ignored by many researchers when they investigated investment decisions, and they only considered the cash flow generated by the firm. In this research, the researcher will include the cash stock available for the firm as one of the explanatory variables to understand how this variable contributes to the firm's investment decisions, especially in countries such as Jordan where debt financing is limited and firms must depend more on their internal sources of financing, as equity financing has a relatively higher cost.

Based on the previous discussion, we can build up the research hypotheses. As debt financing is limited in Jordan, firms must depend more on their internal sources of financing.

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H₁: Cash held by the firm has a positive effect on the firm's investment decisions.

Firms' investment decisions do not depend solely on their internal sources of financing, as many of their investment decisions require long-term financing, or they may have a shortage in their internal sources of financing.

H₂: Other variables, besides the firm's cash stock and cash flow, contribute to the firm's investment decisions.

Table 1: Statistical Information for the Period 2000-2012

Year	Number of listed firms	Market Cap *	Market Cap. to the GDP	Traded Stock*	Traded Bonds*
2000	163	3,509.6	58.4%	334.7	7.2
2001	161	4,476.4	71.5%	668.7	7.2
2002	158	5,029.3	80.4%	950.3	9.7
2003	161	7,772.8	116.8%	1,855.2	11.4
2004	192	13,033.8	184.7%	3,793.2	6.0
2005	201	26,667.1	326.6%	16,871.0	3.1
2006	227	21,078.2	233.9%	14,209.9	1.9
2007	245	29,214.2	289.0%	12,348.1	3.8
2008	262	25,406.3	226.3%	20,406.3	0.6
2009	272	22,526.9	149.6%	9,665.3	2.5
2010	277	21,858.2	122.7%	6,690.0	0.1
2011	247	19,272.8	102.7%	2,850.3	0.6
2012	243	19,141.5	93.5%	1,978.8	0.0

* Numbers in millions JD¹

Source: Amman Stock Exchange Annual Reports

3. Data and Methodology

Using panel data analysis, the researcher will investigate the influence of the cash held by the firm on its investment decisions. The researcher will start with a basic model on how growth opportunities affect the firm's investments and will then introduce more variables to that model to understand the effect of the firm's cash stock on the investment.

The first model (equation 1) considers how the firm's investments are affected by the firm's growth opportunities. It uses the firm's investment (I), which is measured by the firm's fixed assets divided by the firm's capital stock at the beginning of the period (E_{t-1}), as the dependent variable, while the independent variable is the firm's growth opportunities (GO), measured by market to book ratio.

$$I_{it}/E_{it-1} = GO_{it} + \varepsilon_{i,t} \quad (1)$$

In the second model (equation 2), the new independent variable, which is the firm's cash flow (CF), measured by the firm's net income after tax plus any non-cash items divided by the firm's capital stock at the beginning of the period, will be added to the model to reflect the effect of the firm's ability to generate cash internally on its investments.

$$I_{it}/E_{it-1} = GO_{it} + CF_{it} + \varepsilon_{i,t} \quad (2)$$

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This model has been adopted by the vast majority of researchers who studied this topic. Thus, as explained in the introduction, many researchers did not include cash stock in their model and they did not control for other issues, such as new financing or economic conditions, in their models. In the third model (equation 3), new variables will be added as follows: cash holding (CASH), measured as cash and cash equivalents divided by the firm's capital stock at the beginning of the period, to study the effect on the firm's investments of the other sources of internal financing that have been ignored by some researchers; new financing (NFIN), measured by the increases in the firm's equity or debt financing divided by the firm's capital stock at the beginning of the period, to control for the effect of external financing on the firm's investment; and net working capital (NWC), measured by the difference between the current assets and the current liabilities divided by the firm's capital stock at the beginning of the period, to control for the economic conditions and internal funds substitutes, since the new working capital can be used as an internal short-term fund substitute.

The first 2 models have been adopted by the vast majority of researchers, the third model in this paper represents an improvement to previous models, by expanding these models to include the cash itself beside cash generated by the firm to explain and understand the factors affecting the firm's investment decisions.

The third model also includes two control variables, which are; new finance (NFIN) and net working capital (NWC). Previous papers did not control for such variables, as these two control variables are important to capture the effect on the firm's investment decisions by having funds raised from external sources (NFIN) and substitute for internal fund (NWC).

$$I_{it}/E_{it-1} = GO_{it} + CF_{it} + CASH_{it} + NFIN_{it} + NWC_{it} + \varepsilon_{i,t} \quad (3)$$

Where;

I/E: is the firm's Investments divided by the firm's Equity at the beginning of the period, to measure the extent of the firm's investment.

GO: is the Growth Opportunities, measured by the Market to book ratio. Firms with more opportunities to grow tend to have more investments.

CASH: is Cash divided by equity. As cash available to the firm have an effect on their investment decision.

NFIN: is the New Finance, measured by new debt and equity issued divided by equity. This variable is used to control new fund raised externally.

NWC: is the Net Working Capital, measured as current assets minus current liabilities divided by equity. This variable is used to control substitute internal funds.

These models will be applied on a sample of 80 non-financial firms listed in the Amman Stock Exchange, for the period 2000-2011; financial firms have been excluded from the sample, as financial firms are required to hold a certain level of cash as part of their business. New firms with no data at the beginning of the analysis period also have been excluded, as for these firms the cash level does not reflect managerial decisions, their cash level represents the proceeds from raising fund to start their business. Firms with missing data at the end of the analysis period also have been excluded as these firms are under liquidation and their cash level does not reflect managerial decisions as well. The researcher started from the year 2000 because this was when the Amman Stock Exchange started to provide detailed data. Before that year, the data were limited to just a few items from the balance sheet and the income statement, which were insufficient to measure the research variables. The data for the year 2011 were the most recently available data from the Amman Stock Exchange.

4. Results and Analysis

4.1 Descriptive Analysis

Table 2 shows the descriptive analysis of the research variables.

Table 2: Descriptive Analysis

The dependent variable is the firms' investments to their capital invested in the previous year (I/E_{t-1}); we used the capital invested in the previous year because that previous capital is what generates the investment in the current year. The independent variables are as follows: growth opportunities (GO); firm's cash flow (CF); firm's cash stock (CASH); new financing by the firm including both equity and debt financing (NFIN); and net working capital (NWC). All are divided by the equity in the previous year (E_{t-1}) for the period 2001-2011.

	Mean	Median	Maximum	Minimum	Standard Dev.
I/E_{t-1}	86.22%	64.26%	1,736.75%	0.67%	127.51%
GO	152.50%	135.15%	611.62%	-541.42%	40.60%
CF	11.14%	10.42%	130.03%	-108.92%	18.89%
CASH	15.23%	8.85%	206.58%	0.00%	20.10%
NFIN	11.82%	3.11%	1,530.74%	-1,314.95%	94.27%
NWC	29.20%	30.92%	269.15%	-502.98%	46.27%

Source: Companies' guides for several years, Amman Stock Exchange

From Table 2, we can clearly see an important point, which is that cash to total equity is higher than both cash flow and new finance to total equity; this means that cash held by the firm represents a very important source for the firm's investment that cannot be ignored when studying the firm's investments. Moreover, there are other sources for the firm's investment besides the firm's cash flow, including the new financing and the net working capital.

Table 3: Correlation Matrix

The dependent variable is the firm's investments to its capital invested in the previous year (I/E_{t-1}); we used the capital invested in the previous year because that previous capital is what generates the investment in the current year. The independent variables are as follows: growth opportunities (GO); firm's cash flow (CF); firm's cash stock (CASH); new financing by the firm including both equity and debt financing (NFIN); and net working capital (NWC). All are divided by the equity in the previous year (E_{t-1}) for the period 2001-2011.

	I	GO	CF	CASH	NFIN	NWC
I	1.0000					
GO	-0.1167	1.0000				
CF	0.1939	0.4089	1.0000			
CASH	-0.0137	0.2375	0.2600	1.0000		
NFIN	0.1889	0.0335	0.1802	0.2277	1.0000	
NWC	-0.3553	0.2162	0.2811	0.3999	0.0519	1.0000

Source: Companies' guides for several years, Amman Stock Exchange

Table 3 shows the correlation matrix of the research variables. All of these variables have low correlations, which means that there is no multicollinearity between the research variables.

4.2 Model Analysis

Table 4 shows the results of our models. In the first column, we can see the results for model 1, while columns 2 and 3 show the results from models 2 and 3 respectively. The results from the first model indicate that growth opportunities are not the main reason for the firm's investment, as growth opportunities have no significant effect on the firm's investment. A possible reason for this result is the fact that Jordan is a small developing market in which small firms need to grow for many reasons besides the actual available growth opportunities, such as to reduce their marginal costs. This result indicates that there are other reasons for the firm's investment apart from growth opportunities.

The results from the second model show that a firm's investment is sensitive to its cash flow. This result supports the expectation about Jordan: as debt financing is limited in Jordan, financially constrained Jordanian firms must depend more on their internal funds. This result also support those of Fazzari et al. (1988) and many others such as Carpenter and Guariglia (2007) and Wei and Zhang (2008).

The most interesting result is that from the third model. The studies conducted in the last three decades related the firm's investment to its cash flow as the main or only factor that affected the firm's investment. The results from model 3 show that there are indeed other factors that influence the firm's investments, including the firm's cash stock and the new financing; this is indicated by the significant increase in the adjusted R^2 value, as this value increased from 60.85% in model 2 to 65.81% in model 3. On the other hand, net working capital has a significant negative relationship with the firm's investments; the most likely reason for this negative relationship is the difference in the time horizon, since investment decisions are long-term decisions while net working capital is related to short-term decisions.

Table 4: Regression Results

$$I_{it}/E_{it-1} = GO_{it} + \varepsilon_{i,t} \quad (1)$$

$$I_{it}/E_{it-1} = GO_{it} + CF_{it} + \varepsilon_{i,t} \quad (2)$$

$$I_{it}/E_{it-1} = GO_{it} + CF_{it} + CASH_{it} + NFIN_{it} + NWC_{it} + \varepsilon_{i,t} \quad (3)$$

The dependent variable is the firm’s investments to its capital invested in the previous year (I/E_{t-1}). We used the capital invested in the previous year because that previous capital is what generates the investment in the current year. The independent variables are as follows: growth opportunities (GO); firm’s cash flow (CF); firm’s cash stock (CASH); new financing by the firm, including both equity and debt financing (NFIN); and net working capital (NWC). All are divided by the equity in the previous year (E_{t-1}) for the period 2001-2011. ***, **, * indicate that coefficients are significant at the 1%, 5% and 10% levels respectively. t-statistics are in brackets.

Variable	Model 1	Model 2	Model 3
GO	-0.0227 (-0.4151)	-0.0980* (-1.7340)	-0.0946* (-1.7897)
CF	-	0.9542*** (4.5803)	1.5132*** (7.1553)
CASH	-	-	0.5218*** (2.8544)
NFIN	-	-	0.1073*** (3.6786)
NWC	-	-	-0.9053*** (-10.1773)
Observations	880	880	880
Adj. R square	59.86%	60.85%	65.81%
F statistic	15.5628***	16.0121***	22.5627***
Likelihood ratio test	886.1687***	844.4176***	759.1589***
Hausman test	21.9247***	13.4596***	29.2485***

The results of this paper contribute to the literature by showing that the cash held by the firm has a positive and significant effect on the firm’s investment decisions as well as cash flow generated internally. They also show that new financing and new working capital contribute to the firm’s investment decisions.

5. Conclusion

In the last three decades, many researchers have investigated the firm investment-cash flow sensitivity. Their focus was on the relationship between the investments and the firm’s cash flow, for financially constrained firms. Their investigations ignored an important source of internal financing, focusing only on the firm’s cash flow. In this research, the researcher included the cash held by the firm as another source of internal financing to understand the investment decisions of financially constrained firms.

Based on a sample of 80 non-financial firms listed in the Amman Stock Exchange for the period 2001-2011, the results showed that cash held by the firm plays an important role in

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explaining the investment decision, as R^2 for the new model increased significantly compared to the original model, which only included cash flow.

The results of this paper support previous findings showed the firm's investment decisions are sensitive to cash flow. They also add that cash held by the firm has a significant effect on the firm's investment decisions.

The results also showed that there are other factors affecting the firm's investment, such as new equity and debt financing, which contribute positively to the firm's investments. Net working capital, on the other hand, has a significant negative effect on the firm's investment; this negative relationship is caused by the mismatching in the time horizon, as the investment decision is a long-term decision, while the net working capital decision is a short-term matter.

The main limitation for this research is the small size of the sample; Amman Stock Exchange is a relatively small market especially if we compare it with the US market. The researcher suggests testing the model on other samples from different markets to confirm the results from this paper.

End Notes

Each Jordanian Dinar (JD) equals 1.41 US Dollars; the exchange rate between the Jordanian Dinar and the US Dollar is fixed.

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