

# Relationship between Manufacturer Product Strategies and Supply Chain Inventory

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**ABSTRACT:** This paper empirically investigates the relationship between financial constraints, investment policy and product market competition on the Amount of Cash holding. For this purpose, a sample of 65 Iranian listed firms that active in three industry (food, Automotive and pharmaceutical industry) for a period of 10 years (from 2002-2011) by purposeful randomly was selected. The E-views 7 is used for analyze Data and Generalized least squares regression (GLS) is used to test the hypothesis. The results show that there is significant and positive relationship between financial constraint, Cash flow uncertainty and size with Cash holding. Also, there is significant and Negative relationship between financial leverage and product market competition with Cash holding. Finally, the results show that there is not relationship between growth opportunities with cash holding in the Iranian listed firm.

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## INTRODUCTION

Empirical studies about the determinants of corporate cash holdings have occupied a central place in corporate finance literature. Cash holding, according to Gill and Shah (2012) is defined as cash in hand or readily available for investment in physical assets and to distribute to investors. Cash holding is therefore viewed as cash or cash equivalent that can be easily converted into cash. In this context, cash holding will include cash in hand and bank, short time investment in money market instrument such as treasury bills. Owing to the significance of cash and its importance in working capital management, different approaches are being used to determine factors that influence it. Holding cash is at a cost, which is the opportunity cost of the capital invested in liquid assets. The potential profit forgone on holding large cash balance is an opportunity cost to the firm. Adetifa (2005) observes that the costs of cash holding are of two categories: cost of excessive cash holding such as opportunity cost of interest foregone, costs of purchasing power among others and cost of inadequate cash holding including cost of corporate image, loss of cash discount on purchases and loss of business opportunities. The corporate cash holding determinants have since been a subject of explanation in the framework of three theories, namely: the Trade-off Model, Pecking Order Theory and Free Cash Flow Theory. According to tradeoff theory, they set their optimal level of cash holding by weighing the marginal costs and marginal benefits of holding cash (Afza & Adnan, 2007). The main advantages associated with cash holding include reduction in the likelihood of financial distress, pursuance of the optimal investment policy even when financial constraints are met, and its contribution to minimize the costs of raising external funds or liquidating existing assets.

According to Ferreira and Vilela (2004) the benefits of cash holding are: I) reduction in the likelihood of financial distress, ii) allowing the pursuance of investment policy when financial constraints are met and iii) minimizing the costs of raising external funds or liquidating existing assets. While marginal cost of holding cash is associated with the opportunity cost of the capital due to the low return on liquid assets. As per the pecking order theory, Myers (1984) opines that firms finance investments firstly with retaining earnings, then with safe debt and risky debt, and finally with equity. When current operational cash flows are sufficient enough to finance new investments, firms repay debt and accumulate cash. When retained earnings are not enough to finance current investments, firms use the accumulated cash holdings and, if needed, issue debt while free cash flow theory as explained by Jensen (1986) that managers have an incentive to hoard cash to increase the amount of assets under their control and to gain discretionary power over the firm investment decision. With the cash holding, they do not need to raise external funds and could undertake investments that have a negative impact on shareholders' wealth (Ogundipe et al, 2012).



### **Literature review**

Opler et al. (1999) examine the determinants and implications of cash holdings and cash equivalents based on data from 1048 publicly traded US firms during the period 1971–1994. Their findings show that the level of corporate cash holdings is positively correlated with future investment opportunities, cash-flow-to assets ratios, capital investment, industry volatility and investments in fixed assets and is negatively correlated with firm size, leverage, and networking capital and dividend payments. Faulkender and Wang (2006) extend this line of research by analyzing the value that shareholders placed on the cash held by a firm these authors argue that the value of one additional dollar of cash reserves should decline with larger cash holdings, higher leverage and better access to capital markets. Their empirical findings support all of these arguments, including the idea that excess cash holdings are more valuable for shareholders in financially constrained firms. Pinkowitz and Williamson (2004) examine the value placed on a firm's cash holdings under different growth scenarios. These authors find that investors placed a higher value on cash holdings of firms that had higher growth opportunities. In the Iran, Yahyazadeh Far, et.al (2013) examines the relationship between excess cash holdings and future performance in 188 active accepted firms of Tehran Stock Exchange (TSE) during 2002-2011. Their research results show that there is a negative and significant relationship between excess cash holdings and future performance.

Chan et.al (2013) investigates the value shareholders place on excess cash holdings and how shareholders' valuation of cash holdings is associated with financial constraints, firm growth, cash-flow uncertainty and product market competition for Australian firms from 1990 to 2007. Their research results indicate that the marginal Value of cash holdings to shareholders declines with larger cash holdings and higher leverage. However, firms that are more financially constrained, that have higher growth rates and that face greater uncertainty exhibit a higher marginal value of cash holdings. These findings are consistent with the explanation that excess cash holdings are not necessarily detrimental to firm value. Firms with costly external financing and that also save more cash for current operating and future investing needs find that the market values these cash hoarding policies favorably. Finally, there is limited evidence of an association between various corporate governance measures and the value of cash holdings for a shorter sample period. Megginson and Wei (2010) studied the determinants of cash holdings and the value of cash in China's share-issue privatized firms from 1993 to 2007. Through regression analysis, they found that smaller, more profitable and high growth firms hold more cash. Debt and net working capital are negatively related to cash holdings, while cash holdings decline as state ownership increases.

The Free Cash Flow Theory (Jensen, 1986) explains that managers have an incentive to hoard cash to increase the amount of assets under their control and to gain discretionary power over the firm investment decision. With the cash holding, they do not need to raise external funds and could undertake investments that have a negative impact on shareholders' wealth. Thus, management may hold excess cash simply because it is risk averse. The possibility that management could be using cash for its own objectives raises the costs of outside funds, because outsiders do not know whether management is raising cash to increase firm value or to pursue its own objectives. Finally, management may accumulate cash because it does not want to make payouts to shareholders, and wants to keep funds within the firm. Having the cash, however, management must find ways to spend it, and hence chooses poor projects when good projects are not available (Opler, 1999). Ferreira & Vilela (2004) examine the determinants of corporate cash holdings in EMU countries. Our results suggest that cash holdings are positively affected by the Investment opportunity set and cash flows and negatively affected by asset's liquidity, leverage and size. Bank debt and cash holdings are negatively related, which supports that a close relationship with banks allows the firm to hold less cash for precautionary reasons. Firms in countries with superior investor protection and concentrated ownership holds less cash, supporting the role of managerial discretion Agency costs in explaining cash levels. Capital markets development has a negative Impact on cash levels, contrary to the agency view.

## **MATERIAL AND METHODS**

### **Theory and empirical hypotheses**

This section discusses three theoretical models that can help identify which firm characteristics determine cash holdings decisions. It turns out that the way the firm characteristics influence cash holdings is not a consensual matter among these models.

### **The Firm characteristics that affecting cash holdings decisions from the perspective Trade-off model**

The trade-off argument postulates that firms set their optimal level of cash holdings by weighting the marginal costs and marginal benefits of holding cash. There are several benefits related with holding cash. First, cash holdings reduce the likelihood of financial distress as it acts as a safety reserve to face unexpected losses or external fund raising constrains. Second, cash holdings allow the pursuance of the optimal investment policy even when financial constraints are met. Otherwise, external fund raising constrains would force the firm to forgo investment projects with positive net present value (NPV). Finally, cash holdings contribute to minimize the costs of raising external funds or liquidating existing assets as it acts like a buffer between the firm sources and uses of funds. The traditional marginal cost of holding cash is the opportunity cost of the capital due to the low return on liquid assets. Below we provide a brief review of the firm characteristics that, according to trade-off theory, are relevant to firm cash holdings decisions.

**Dividend payments:** A firm that currently pays dividends can raise funds at low cost by reducing its dividend payments, in contrast to a firm that does not pay dividends which has to use the capital markets to raise funds. Thus, it is expected that firms that pay dividends hold less cash than firms that do not pay dividends. Investment opportunity set. The cost of incurring in a cash shortage is higher for firms with a larger investment opportunity set due to the expected losses that result from giving up valuable investment opportunities. Therefore, it is expected a positive relation between investment opportunity and cash holdings. Theory also predicts that firms with better investment opportunities have greater financial distress costs because the positive NPV of these investments disappears (almost entirely) in case of bankruptcy. In this case, firms with better investment opportunities will keep higher levels of cash to avoid financial distress.

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**Liquid asset substitutes:** To the extent that liquid assets other than cash can be liquidated in the event of a cash shortage, they can be seen as substitutes for cash holdings. Consequently, firms with more liquid asset substitutes are expected to hold less cash.

**Leverage:** It is generally accepted that leverage increases the probability of bankruptcy due to the pressure that rigid amortization plans put on the firm treasury management. To reduce the probability of experiencing financial distress, firms with higher leverage are expected to hold more cash. On the other hand, to the extent that

Leverage ratio acts as a proxy for the ability of the firms to issue debt it would be expected that firms with higher leverage (higher ability to raise debt) hold less cash. Thus, the predicted relationship between cash holdings and leverage is ambiguous.

**Size:** Miller and Orr (1966) model of demand for money by firms suggests that there

Are economies of scale in cash management? This would lead larger firms to hold less cash than smaller firms. Also, it is argued that the fees incurred in obtaining funds through borrowing are uncorrelated with the size of the loan, indicating that such fees are a fixed amount (see Peterson and Rajan, 2003). Thus, raising funds is relatively more expensive to smaller firms encouraging them to hold more cash than larger firms. Furthermore, it is generally accepted that larger firms, because of diversification, have lower probability of being in financial distress (see Rajan and Zingales, 1995). These arguments suggest a negative relation between size and cash holdings.

**Cash flow:** In the sense that cash flow provides a ready source of liquidity (see Kim et al. 1998) it can be seen as a cash substitute. Thus, we expect a negative relation between cash flow and cash holdings.

**Cash flow uncertainty:** Firms with more volatile cash flows face a higher probability of experiencing cash shortages due to unexpected cash flow deterioration. Thus, cash flow uncertainty should be positively related with cash holdings.

**Debt maturity:** The influence of debt maturity on cash holdings is not clear. Firms that rely on short-term debt must renegotiate periodically their credit terms, and are subject to the risk of experiencing financial distress if constraints are met to the renewal of credit lines. Thus, controlling for other variables, one would expect debt maturity to be negatively related to cash holdings. However, Barclay and Smith (1995) provide evidence that firms with the highest and lowest credit risk issue more short term debt while intermediate credit risk firms issue long-term debt. If we consider that firms with the highest credit rating have better access to borrowing, it is expected that these firms will hold less cash for precautionary reasons, which would cause debt maturity to be positively related to cash holdings (Ferreira and Vilela, 2004).

#### **The Firm characteristics that affecting cash holdings decisions from the perspective Pecking order theory**

**Investment opportunity set.** A large investment opportunity set creates a demand for large stock of cash, because cash shortfalls imply that unless a company engages in costly external financing it must forego profitable investment opportunities. Therefore, a positive relation between the investment opportunity set and cash holdings is expected.

**Leverage:** In a pecking order world, debt typically grows when investment exceeds retained earnings and falls when investment is less than retained earnings. Consequently, cash holdings follow an inverse pattern of evolution, i.e., cash holdings fall when investment exceeds retained earnings and grow when investment is less than retained earnings. This relationship between cash holdings, debt and investments suggests that there is a negative relation between leverage and cash holdings.

**Size:** Firms that are larger presumably have been more successful, and hence should have more cash, after controlling for investment (Opler et al. 1999).

**Cash flow:** Controlling for other variables, it is expected that firms with high cash flow will have more cash.

#### **The Firm characteristics that affecting cash holdings decisions from the perspective Free cash flow theory**

Investment opportunity set. Managers of firms with poor investment opportunities are expected to hold more cash to ensure the availability of funds to invest in growth projects, even if the NPV of these projects is negative. This would lead to

destruction of shareholder value and, even if the firm has a large investment program, to a low market-to-book ratio. Thus, using the market-to-book ratio as a proxy, it is likely that the relation between investment opportunity set and cash holdings will be negative.

**Leverage:** Low leverage firms are less subject to monitoring, allowing for superior managerial discretion. Thus, we expect that less levered firms hold more cash.

**Size:** Larger firms tend to have larger shareholder dispersion, which gives rise to superior managerial discretion. Moreover, larger companies are not likely to be the target of a takeover due to the amount of financial resources needed by the bidder. Thus, it is expected that managers of large firms have more discretionary power over the firm investment and financial policies, leading to a greater amount of cash holdings (Ferreira and Vilela, 2004).

**Table 1.** Summary of model predictions (Ferreira and Vilela, 2004)

Variable	Trade-off Theory	Pecking Order Theory	Free Cash Flow Theory
Dividend payments	Negative		
Investment opportunity set	Positive	Positive	Negative
Liquid asset substitutes	Negative		
Leverage	Unknown	Negative	Negative
Real size	Negative	Positive	Positive
Cash flow uncertainty	Positive		
Cash flow	Negative	Positive	
Debt maturity	Unknown		

In this research there are other variables that effect on cash holding, they are product market competition, financial constraints.

**Data Collection**

In this research we use a sample of 78 firms from the Iranian listed firms that active in the three industry (food, Automotive and pharmaceutical industry) from 2002-2011 (10 years) obtained from Tehran stock exchange information database. The sample that we use includes the following features: the fiscal year of sample firms is 20<sup>th</sup> march. 2) Data for this firms are available, 3) are not from financial firms. Our final sample includes 65 firms. The model and measurements of the independent and dependent variables are as follows:

$$Cash_{it} = \beta_0 + \beta_1FC_{it} + \beta_2GO_{it} + \beta_3CFU_{it} + \beta_4FL_{it} + \beta_5PMC_{it} + \beta_6Size_{it} + \varepsilon_{it}$$

**Cash holding**

Cash= Corporate cash holdings for firm i in time t. It is cash plus short term investment divided book value of total assets.

FC= DPS-To-EPS ratio is taken as a proxy for the firm’s financial constraints.

GO= we use Q-Tobin Index as proxy of growth opportunities. Q-Tobin Index is calculated by market value of equity plus total debts divided book value of total assets.

CFU= we use the standard deviation of earnings ratios (as measured by EBIT/total book assets) for the past 5 years to proxy for uncertainty in cash flows (H. W. H. Chan et al, 2013).

FL= is financial leverage that measured as ratio of total debts to total assets.

PMC= we use the Herfindahl–Hirschman index (HHI) as a proxy for product market competition. HHI is calculated by summing up the squares of the individual market shares by sales for firms in a specific industry (H. W. H. Chan et al, 2013).

Size= taken as a proxy for the real size (SIZE) of firms. It is calculated as the natural logarithm of total assets.

$\beta_0$ = is the intercept

$\beta_1 - \beta_2$  =Are the independent variable coefficients

$\varepsilon_{it}$  =is the error term

**Research Hypotheses**

1. There is significant relationship between financial constraint and amount of cash holding in the sample firms.
2. There is significant relationship between growth opportunities and amount of cash holding in the sample firms.
3. There is significant relationship between cash flow uncertainty and amount of cash holding in the sample firms.
4. There is significant relationship between financial leverage and amount of cash holding in the sample firms.
5. There is significant relationship between product market competition and amount of cash holding in the sample firms.
6. There is significant relationship between firm size and amount of cash holding in the sample firms.

## RESULTS AND DISCUSSION

### Testing for Pool ability

In this section we use the chow test (F Leamer) to choose the estimation model of our research. This test assumes that:

1.  $U1t \sim N(0, \sigma^2)$  and  $u2t \sim N(0, \sigma^2)$ . That is, the error terms in the sub period regressions are normally distributed with the same (homoscedastic) variance  $\sigma^2$ .

2. The two error terms  $u1t$  and  $u2t$  are independently distributed (Gujarati, 2004, p 275-276). In this test the null hypothesis refers to pooling data and the  $H_1$  based on panel data. If  $p > 0.05$  we must be use the pooling data but, if  $p$ -value  $< 0.05$  we use the panel data model to analyze the data. Thus, we use the ordinary least square (OLS) estimator for estimate the model of research. Table 2 shows results of chow test.

**Table 1:** Chow test (F leamer)

Chow test (F-Leamer)			
Redundant Fixed Effects Tests			
Pool: Sample			
Test cross-section fixed effects			
Effects Test	Statistic	df	Prob.
Cross-section F	0	-64,537	1.000
Cross-section Chi-square	0	6	1.000

Thus, According to results of the chow test in 1 table, we conclude that our data is pooling data.

### Heteroscedasticity test

One of the important assumptions of the classical linear regression model is that the variance of each disturbance term  $u_i$ , conditional on the chosen values of the explanatory variables, is some constant number equal to  $\sigma^2$ . This is the assumption of homoscedasticity, or *equal (homo) spread* (scedasticity), that is, *equal variance*.

$$E(u_i^2) = \sigma^2 \quad i = 1, 2, \dots, N$$

In this test the null hypothesis is there are no Heteroscedasticity and  $H_1$  Implies that there is Heteroscedasticity in the each disturbance term  $u_i$ . We use the Geljser test to test Heteroscedasticity. The results of the Geljser test shows in the 2 Table.

**Table 2.** Heteroscedasticity test

Heteroscedasticity Test: Geljser			
F-statistic	3.211809	Prob. F(6,643)	0.0041
Obs*R-squared	18.9138	Prob. Chi-Square(6)	0.0043
Scaled explained SS	31.22157	Prob. Chi-Square(6)	0.0000

The result of 2 Table shows that  $p$ -value of Geljser test is less .05 and it is implies that there is Heteroscedasticity. Thus, the OLS estimator will not be best linear unbiased estimator and it assigns equal weight or importance to each observation. But a method of estimation, known as generalized least squares (GLS), takes such information into account explicitly and is therefore capable of producing estimators that are BLUE (Gujarati, 2004, p, 395). We must be using generalized least square estimator (GLS) for fitting the model of research.

## REGRESSION TEST AND CONCLUSION

We study the determinants of cash holding using a regression of cash holding base on the variables in the section 4. We use Chow test determine the type of data whether data is pooling or panel data and we found that our data is pool. Thin, we use the Geljser test to Heteroscedasticity test. According to the results of these tests we use the GLS regression model to hypotheses test. The results of the GLS regression model show in Table 3.

The result shows that there is significant and positive relationship between the amount of Cash holding (dependent variable) and financial constraints, because  $p$ -value  $< 0.05$  and equal .0018 and  $t$  statistic is 3.133 and is not between  $1.96 > t > -1.96$  implies that two variables are not independent together, and this is in line with findings of Chan et.al (2013). This indicates that firms with high level of financial constraints hold high level of cash.

**Table 3. Regression analyses (GLS)**

Dependent Variable: CASH_HOLDING				
Method: Least Squares				
Date: 01/13/14 Time: 15:03				
Sample: 1 650				
Included observations: 650				
White heteroscedasticity-consistent standard errors & covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CASH_FLOWUNCER	0.200963	0.06413	3.133688	0.0018
FINANCIALLEVERAGE	-0.046578	0.020258	-2.29919	0.0218
FINANCIALCONSTRAINT	4.22E-05	3.65E-06	11.53681	0.0000
GROWTHOPERTIUNITES	-2.74E-06	2.49E-05	-0.11013	0.9123
PMC	-0.002057	0.00032	-6.41878	0.0000
SIZE_	0.006544	0.001004	6.51813	0.0000
R-squared	0.010731	Mean dependent var	0.05759	
Adjusted R-squared	0.00305	S.D. dependent var	0.0703	
S.E. of regression	0.070188	Akaike info criterion	-2.4661	
Sum squared resid	3.172538	Schwarz criterion	-2.42478	
Log likelihood	807.4831	Hannan-Quinn criter.	-2.45007	
Durbin-Watson stat		1.071535		

In hypothesis 2 test, since p-value is .9123>.05 and t is -0.11 this is indicate that there is no significant relationship between growth opportunities and cash holding, this result difference with findings Opler et al (1999).

in test the relationship between the cash flow uncertainty and cash holding, the result shows that p-value equal 0.000 and t = 11.563 and indicate that there is a significant and positive relationship between two variables and this is consistent with the findings of Chan et al. (2013) and Opler et al. (1999). This is implies that firms with higher level of uncertainty in cash flow, hold more level of Cash.

In the 4<sup>th</sup> hypothesis we test the relationship between financial Leverage and cash holding, the result shows (p-value=.0218<.05 and t statistic is -2.299) that there is significant and negative relationship between financial leverage and cash holding. This is consistent with predictions of pecking order theory and free cash flow theory about the relationship between financial leverage and cash holding, this means that the firms with higher level of debts, unable to hoard more cash.

To investigate the relationship between product market competition and size with cash holding the result shows that there is a negative and significant relationship between cash holding with product market competition (p-value=0.0000<.05 and t statistic is 6.418).this result different whit findings of Philips (1995), MacKay and Philips (2005) and Fresard (2010). The reason for this difference may be, this is due to there are wide International sanctions against of the Iran.

And in the size case the result shows that there is a positive and significant relationship between size and cash holding in the sample firms. This implies that the firms with larger size hold high level of cash that consistent with Theoretical Framework of the pecking order theory and free cash flow theory.

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