

ARTICLE

REVIEW THE EFFECT OF CASH FLOW VOLATILITY ON CASH HOLDINGS IN COMPANIES LISTED ON TEHRAN STOCK EXCHANGE

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ABSTRACT

In this study, the effect of cash flows and cash flows volatility on cash holdings and cash flow sensitivity has been studied. Thus, 127 companies listed on Tehran Stock Exchange were selected during 2011 to 2014. To test the hypothesis of this study, a multivariate regression model of panel and combined data has been used. This research shows that there is a positive and significant relationship between cash flow and cash holdings which indicates that companies with more cash flow hold more cash. Also, cash flow volatility has a negative impact on cash holdings, that is, companies with higher cash flow volatility hold lower cash. Finally, there was a direct and significant relationship between cash flow volatility and its sensitivity which indicates that companies with higher cash volatility have more sensitivity (are more sensitive). Overall findings showed that double - row planting pattern had better performance compare to single row. Double - row planting arrangement where on double - row raised bed with 95000 plants per hectare is the best choice for Faba Bean and forage production, because with changing arrangement from single row to double row the inter plant competition was decreased and we could get high yield.

INTRODUCTION

Cash flows were one of the most important financial statement items that are among the most efficient reports to reflect the performance of business unit in terms of cash and states the required information about creation and use of cash to the users of financial statements. Cash is of the important resources in any economic unit and balancing the available cash and cash needs is the most important factor of economic health in any business unit. Cash enters the business unit through normal operations and other sources of financing, and used for operation, interest payments, debt repayments and extending the business unit. Inflow and outflow of cash in each business unit is the reflection of management decisions about short-term and long-term operational programs and investment and financing projects. Information obtained from that constitute the foundation and basis of many decisions and judgements of major user groups of financial information of business units [1].

Two prevailing theories on discussion about cash holdings, are the theory of transaction costs (tot) and hierarchical theory (pot). According to "tot", companies determine the desired level of cash holdings based on balancing the benefits and costs of cash holdings. Based on this theory, three incentives for holding cash can be the trading, precautionary and speculative incentives [2].

According to the trading incentive, companies that encountered by reduced internal resources can provide it by selling assets, issuing new shares, loans or reducing the dividends. But all of these strategies entail costs that have both fixed and variable costs elements. As a result, companies that faced high transactional costs for their payments hold a lot of cash assets [3].

Based on the precautionary incentive, companies hold the cash to reduce the likelihood of financial crisis in hard times and ultimately based on the speculative incentive, companies hold the cash assets in order to speculate and exploit the future unexpected investment opportunities when the external financing is costly [4].

On the other hand, the agency problems are one of the most important determinants of cash holdings in companies. Research results have shown that in countries in which the rights of shareholders are not protected well, companies hold more cash compared to the countries in which the shareholders have good support. Also, conflict of interests between shareholders and management can be related to the cash holdings in companies. Based on the viewpoint of agency cost by Jensen and Meckling [5], managers have incentives for further investment and thus, most likely they hold some projects with negative current value to maximize their personal interests and show no desire to terminate them. Also, information asymmetry plays an important role in maintaining the liquidity. Harford and others believe when there is information asymmetry (ibid. 2010), the company is likely to maintain high liquidity to prevent the agency cost of external financing. But the important point is that the cash flow volatility has a major impact on the lack of liquidity and sensitivity of cash-investment factor. Companies with high cash flow volatility, in the case of liquidity shortage, hold higher cash flow compared to companies with low cash flow volatility and the amount of investments by these companies is more sensitive compared to companies that are internally financed. The impact of cash flow volatility on the company's liquidity is also associated with status of financial constraints in the company. Companies that are financially limited, hold more cash in response to the increased cash flows volatility. In contrast, companies that are not financially limited are not sensitive to the cash flows volatility (Bao et al, 2012).

KEY WORDS

cash flow, holdings of cash flow, cash flow volatility

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Since this issue is in a theoretical and empirical literature that seem conflicting, the aim of this paper is to develop the theoretical and empirical literature on the impact of cash flow volatility on sensitivity factor of cash flow. Therefore, the aim of this research is to evaluate the impact of cash flows volatility on the sensitivity of cash flows in the companies listed on Tehran Stock Exchange.

Theoretical essentials and experimental background of the research

There is no doubt that the cash holdings of a company must be determined proportionate to the cash flows obtained from operating activities. The cumulative amount of cash flows that is referred as the cash flows sensitivity, is influenced by other company features but in general, it can be expected that the amount of cash holding moves in one direction with the amount of operating cash flows. Cash flow is generally considered as an indicator of the financial health of the company [6]. Cash flows of each business unit provide information about the financial situation of the company for all shareholders so that they can assess the ability of company to make cash and cash equivalents in the future and the necessary conditions for application of these cash flows. Volatility measures the changes in the value of financial tool at specific time horizon and states the risk of that tool in the desired period. When there are volatilities in cash flow, the company is likely not only will need to use the capital markets and external resources to meet the liquidity problems but also due to the notoriety of volatilities, will increase the cost of this use. Therefore, cash flow volatility reflects the potential risk of future operations, investment and financial activities (Jing, 2005). Investment opportunities are also factors affecting the cash flow. According to the studies conducted by Duchin [2], there is an inverse relationship between precautionary demand and investment. Holding the cash for a precautionary incentive provides liquidity for companies to help the investors in dealing with unexpected opportunities in the future.

Almeida et al. [7] in a research as the cash flow sensitivity examined the relationship between operating cash flow and cash reserves. Their main purpose was to compare the measure of cash flow sensitivity with the sensitivity of investment cash flow. They extended the Opler liquidity model using theoretical and empirical analysis that, using the data of 29954 companies from 1971 to 2000 in the New York Stock Exchange market, they have demonstrated that the sensitivity of cash flows is a more appropriate measure for identifying the financial constraints.

Han and Qiu (2006) showed that companies with financial constraints increase their cash holdings in response to the increased the cash flows volatility, because financial constraint created a kind of competition and conflict between current and future investments, despite the risk of future cash flows makes incentives for precautionary savings.

Faulkender et al. [8] in research as transaction costs and adjustments of financial leverage found that the adjustments of financial leverage have both fixed costs and variable transactions costs. Company's cash flow and its deviation from the target leverage will affect the decisions made on how to access the capital markets. When the fixed costs of accessing the foreign markets were covered, companies are quickly (but incomplete) adjust to the target financial leverage. Ultra-leveraged and under-leveraged companies have different advantages in moving towards their target leverage ratio. Finally, they showed that the adjustment decisions depend on market conditions and financial constraints of the company. Their results, in general, defend the relationship between balance costs and target leverage in decisions of company leverage.

Goldman and Viswanath [9] in a study examined the relationship between cash flow volatility and dividend policy in exporter and non-exporter Indian companies. They used the logarithm of 5-year variance of cash flow to calculate the volatilities of cash flow. Their research results show that there is a significant relationship between cash flow volatility and dividend policy. In this study, severity of exports, age and size indicators have been used as the representatives of cash flow volatility.

Kangarluei et al. [10] analyzed the impact of operating cash flow on the adjustments of financial leverage in companies listed on Tehran Stock Exchange. The results show that the operating cash flow has a negative and significant impact on the adjustments of financial leverage and financial leverage; while it has a positive and significant effect on the speed of financial leverage adjustment. The negative relationship between leverage and liquidity suggests that companies with high liquidity assets prefer to finance the cash for their investment activities. Also, the research results show that the operating cash flow can help the companies in reaching the target leverage and optimal capital structure. Kamyabi et al. (2014) examined the relationship between cash flow volatility and cash flow sensitivity with dividend policy in Tehran Stock Exchange. The results of this study indicate that there is no significant relationship between cash flow volatility and dividend policy and also, research results showed no relationship between cash flow sensitivity and dividend policy.

Haghighat and Zargar Fiuji [11] explored the impact of financial constraints and hold cash on the sensitivity of investment to cash flow. Their statistical population were consisted of the companies listed on Tehran Stock Exchange during [12] to 2011. In this study, Whiteduv Kaplan-Zinglez and dividends ratio were used as measures of financial constraints. The results of hypotheses testing show that there is a positive relationship between capital expenditures and cash flow and, companies without financial constraints compared to the companies with financial constraints have more investment sensitivity to cash flow. Also, other finding of this study indicate that the interaction of cash holdings with investment sensitivity to cash flow is negative and this association is stronger in companies with financial constraints.

Valipour [13] examined the association of cash flow volatility to predict the stock return. Statistical population of the study was the companies listed on Tehran Stock Exchange, that according to the considered terms, 50 companies were selected during 2002 to 2008. The study results indicate that short-term volatilities of operating cash flows were the related data to predict the stock returns, while the long-term volatilities of operating cash flows have no significant relationship on stock return. Pouyanfar et al. [14] explored the relationship between accounting and economic measures of valuable performance of companies in the cement and petrochemical industries of Tehran Stock Exchange. The results indicated the superiority of economic measures in comparison with accounting standards and inadequacy of accounting measures in evaluating the performance of companies.

MATERIALS AND METHODS

Research hypothesis

According to the theoretical essentials and research background, this study aims to examine the effect of cash flows volatility on the sensitivity coefficient of cash flow-cash in listed companies, so the main hypotheses of the research are explained as below.

First hypothesis; there is a significant relationship between the company's cash flow and cash holdings in the companies listed on Tehran Stock Exchange.

Second hypothesis; cash flows volatility has a significant impact on cash holdings in companies listed on Tehran Stock Exchange.

Third hypothesis; of cash flows volatility has a significant impact on cash flow sensitivity in companies listed on Tehran Stock Exchange.

Method

The research data were collected from financial statements of companies listed on the Tehran Stock Exchange, exchange data banks and "Rahavard Novin" software. The collected data was prepared using Excel software and then the final analyze was conducted by "Eviews" and "Stata" softwares. The research time span of the research was a 10-year period based on the financial statements of the companies from 2011 to 2014.

The research sample includes those companies listed on Tehran Stock Exchange which have the following features:

Companies whose fiscal year end in March.

The acceptance date of companies in Tehran Stock Exchange are prior to the fiscal year 2009.

Companies which have no changed fiscal year between "2011" to "2014".

Due to the different nature, they are not a part of financial, investment institutions and banks.

They have fully presented the financial information required for conducting this research during the studied time period.

According to the conducted surveys, 127 companies during 2011 to "2014" were qualified for the above terms and selected for the statistical sample.

Research variables

Operational definition of research variables is as follows:

The independent variable of this research was the volatility of cash flow and, cash holdings and cash flows sensitivity were considered as the dependent variable. In the following, each one and how to measure them will be discussed.

Independent Variable

To measure the long-term cash flow volatility, a six-year period was considered. To measure the long-term volatility the variance of operating cash flow is used and to neutralize the effect of difference in the company sizes and Iran, the operating cash flows of each period were divided by the assets of each company in the same period [9].

Dependent Variable

Dependent variable of the research is the level of cash holdings. To calculate the dependent variable of cash balances, the total cash and cash equivalents, including short-term investments, relative to the total assets ratio was used.

Another dependent variable of this research is the cash flow sensitivity. To measure the cash flows of a company, following the Martin and Pereira in 2006, an indicator of cash flows sensitivity called annual changes in total cash is used.

Control Variables of the research

Financial leverage: obtained through dividing the debts by assets.

Company size: natural logarithm of assets

Research model

To test the research hypotheses the following models are used respectively:

$$\text{Cash} = \beta_0 + \beta_1 \text{cfo} + \beta_2 \text{LEV} + \beta_3 \text{SIZE} + \epsilon$$

$$\text{Cash} = \beta_0 + \beta_1 \text{cfvol} + \beta_2 \text{LEV} + \beta_3 \text{SIZE} + \epsilon$$

$$\text{Changes in cash} = \beta_0 + \beta_1 \text{cfvol} + \beta_2 \text{LEV} + \beta_3 \text{SIZE} + \epsilon$$

Results

Descriptive statistics

The results of the descriptive analysis of the data are presented in [Table 1]. As can be seen, the mean, standard deviation and the number of observations of research variables are presented in the table below. According to the obtained values, it can be said that the second column shows the number of available variables, which the number of all variables over 5 years is equal to 635. The third and fourth columns show the mean and standard deviation of each variable, respectively. For example, the mean for the financial leverage variable is equal to 58 percent which shows that most of the data are concentrated around this point. Or in other words, the amount of the debts of the studied companies to their assets is equal to 58% on average. In general, the dispersion parameters are the measures for determining the amount of dispersion from each other or the dispersion relative to the average. Of the most important dispersion parameters is the standard deviation. The value of this parameter for the variable "cfvol" is (0.04447) and for the variable "size" is equal to (1/57), which shows that among the research variables, these two variables have the highest and lowest dispersion, respectively.

Table 1: Descriptive Statistics of research variables

Standard deviation	Mean	Number of observations	Variable
-0790	-0668	635	cash
-1454	-1463	635	cfo
-1802	-5849	635	lev
1.57	13.93	635	size
-0447	-0319	635	cfvol

Inferential statistics

Durability test of variables

If in a regression analysis the data are not durable, while the determination coefficient is great the statistics values of "t" coefficients may be high which may cause false inferences about the relationship between variables. In this case, a false or dummy regression has been created. To avoid this situation, the desired data must be made static. For investigating the presence of a unit root in the panel patterns, we can use tests like Lyon, Lin and Chu and Harris.

One way to make the variables durable is differentiation, but due to the data loss in this method, we examine the disturbing elements of the implemented model in terms of being durable. As we can see, the disturbing elements are durable, there will no need to the durability of each variable anymore and we acknowledge that the model is also durable as a co-integration. So we have:

Table 2: Durability test of residuals of research mathematical models

Variable	Model	Probability level
Model error elements (residuals)	First	0.000
Model error elements (residuals)	Second	0.000
Model error elements (residuals)	Third	0.000

As already explained, this model is durable as co-integration. Considering that the probability level of the test is lower than 5%, it indicates the durability of disturbing elements of implemented models.

Table 3: Results of F Limer Test (Chow) and Hausman Test

Research Hypotheses	F Limer Test (chow)		Hausman Test	
	F	p-value	F	p-value
First Model	3.78	0.000	9.66	-021
Second Model	4.52	0.000	103.7	0.025
Third Model	-792	0.9423	Non-panel data	

According to [Table 3] the significance level (p-value) of F-Limer test is less than 5% for the first and second models and represents the confirmed panel data. Also, the significance level for Hausman test is less than 5% for the first to second models that represents the constant effects of intercept. The significance level of F Limer test for the third model is more than 5% and panel data were not approved and there is no need to run the Hausman test.

Table 4: Results of variance dissimilarity

Research Hypotheses	Significance level and test statistic	
	F	p-value
First Model	8.05	0.000
Second Model	7.05	0.000
Third Model	31.057	0.000

The results in [Table 4] show that the significance level of this test is less than 5% which represents variance dissimilarity in residuals. It should be noted that this problem has been met in final estimation of models.

Table 5: Results of series auto-correlation test

Research Hypotheses	Significance level and test statistic	
	F	p-value
First Model	27.71	0.000
Second Model	29.36	0.000
Third Model	38.74	0.000

As can be seen in [Table 5], the significance level of this test for all models is less than 5% and represents a series auto-correlation between the residuals that has been resolved in the final estimation of models.

Table 6: Estimation of first model of research

Cash = $\beta_0 + \beta_1 cfo + \beta_2 LEV + \beta_3 SIZE + \epsilon$				Mathematical model
81%	Determination coefficient		635	Number of panel observation
74%	Adjusted determination coefficient		127	Sections number
-000	Significance level of whole model (F)		5	Periods number
Significance level	"t" statistic	Standard error	coefficients	variables
-000	6.014	-0091	-0553	cfo
-000	-6.75	-0099	-.0669	Lev
-046	-2.00	-0022	-.044	Size
-000	5.17	-0310	-1606	C
0.2119			Jarque-bera (residuals)	
2.3			Durbin-Watson	

DISCUSSION

Analysis and test of research hypotheses

The significance level of F statistic is equal to 0.000 which is less than 5%. Therefore, one can say with 95% confidence that the above mathematical model is significant and acceptable generally. The independent variable (cash flows) has a positive coefficient which is significant at the 5% level. Therefore, one can say with 95% confidence that there is a direct and significant relationship between cash flows and cash holdings. Therefore, the first hypothesis is accepted. Financial leverage and firm size variables have also negative coefficients that at 5% level and 95% confidence have a significant relationship with the dependent variable. Also, the significance level of jarque-bera is more than 5% and represents the normal distribution of residuals. Also, the value of Durbin-Watson is equal to 2.3 and between the ranges of 1.5 to 2.5 which indicates the lack of auto-correlation in the final estimation model.

Table 7: Estimation of second model of research

Cash = $\beta_0 + \beta_1 \text{cfovol} + \beta_2 \text{LEV} + \beta_3 \text{SIZE} + \epsilon$				Mathematical Model
83%	Determination coefficient	635		Observations number
78%	Adjusted determination coefficient	127		Sections number
0.000	Significance level of "t" statistic	5		Period numbers
Significance level	"t" statistic	Standard Error	coefficients	Variables
.000	-9.47	.0844	-.8379	cfovol
.000	-10.51	.0066	-.0694	Lev
.000	-9.44	.0270	-.0146	Size
.000	12.47	.061	.3377	C
0.1034	Jarque-bera (residuals)			
3.2	Durbin-Watson			

The significance level of F statistic is 0.000 which is less than 5%. Therefore, one can say with 95% confidence that the above statistical model is significant and acceptable generally. The dependent variable (cash flow volatility) has a negative coefficient which is significant at the 5% level. Therefore, one can say with 95% confidence that there is an inverse and significant relationship between cash flow volatility and cash holdings. Thus, the second hypothesis is also accepted. Financial leverage and firm size variables have also negative coefficients that at 5% level and with 95% confidence has a significant relationship with the dependent variable. Also, the significance level of jarque-bera is more than 5% and represents the normal distribution of residuals. Also, the value of Durbin-Watson is equal to 2.3 and between the ranges of 1.5 to 2.5 which indicates the lack of auto-correlation in the final estimation model.

Table 8: Estimation of third model of research

Changes in cash= $\beta_0 + \beta_1 \text{cfovol} + \beta_2 \text{LEV} + \beta_3 \text{SIZE} + \epsilon$				Mathematical model
13%	Determination coefficient	635		Observations number
12%	Adjusted determination coefficient	127		Sections number
0.000	Significance level of parent statistic	5		Period numbers
Significance level	"t" statistic	Standard Error	coefficients	Variables
.000	13.82	.0199	.2761	cfovol
.3428	-.9492	.0085	-.0081	Lev
.3093	1.017	.0006	.0006	Size
.5479	-.6012	.0088	-.0056	C
.0654	Jarque-bera (residuals)			
2.09	Durbin-Watson			

The significance level of F statistic is 0.000 which is less than 5%. Therefore, one can say with 95% confidence the above statistical model is significant and acceptable generally. The independent variable (cash flow volatility) has a positive coefficient which is significant at the 5% level. Therefore, one can say with 95% confidence that there is a direct and significant relationship between cash flow volatility and cash flows sensitivity. Thus, the third hypothesis is also accepted. Financial leverage and firm size variables have also negative coefficients that at 5% level and with 95% confidence have a significant relationship with the independent variable. Also, the significance level of jarque-bera is more than 5% and represents the normal distribution of residuals. Also, the value of Durbin-Watson is equal to 2.09 and between the ranges of 1.5 to 2.5 which indicates the lack of auto-correlation in the final estimation mode.

CONCLUSION

Conclusion and recommendations

This research shows that there is a positive and significant relationship between the cash flow and cash holdings which indicates that companies that have more cash flow hold more cash. Findings of the research, is consistent with findings of Han and Qui (2007) and Almeida et al. (2004). Also, cash flow volatility has a negative effect on cash holdings, that is, companies that have a higher cash flow volatility hold lower cash. This is consistent with the findings of Opler (1999), Ozcan Ozkan (2004) and Ferreira et al, (2004). The results show that cash flows and cash flow volatility have a significant effect on cash holdings. These findings may show us that corporate managers in order to adopt the appropriate policies to the cash held in the firm, note a factor other than cash flow and cash flow volatility. On the other hand, the actual and potential investors and other stakeholders can consider this factor when deciding about the amount of cash held by the companies. And also it seems that Iranian companies greatly tend to hold cash

for their investments and precautionary needs. For this, the government needs to create a durable and sustainable economy to encourage the companies to further investments and reducing the cash holdings. Future researches can investigate the subject of present research in separate industries in Stock Exchange and in more time periods, and use other models and formulas to measure the volatility and sensitivity of cash flows.

CONFLICT OF INTEREST

There is no conflict of interest

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