

STUDYING THE EFFECT OF FINANCIAL LEVERAGE ON AGENCY COST RESULTING FROM FREE CASH FLOW OF MANUFACTURING COMPANIES ACCEPTED IN TEHRAN STOCK EXCHANGE

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Abstract

In current research is examined the relationship between financial leverage and agency cost resulting from free cash flow of manufacturing companies accepted in Tehran stock exchange (Iran). Data of 80 companies, during 2007-2012 is used for doing research. Panel analysis method is used to test hypotheses. Indices of financial leverage in this research are the ratio of debt to shareholder's equity and ration of long-term debt. The result of research denotes negative and significant relationship between ratio of debt to shareholder's equity and ratio of long-term debts with agency cost resulting from free cash flow. Also the result of this research corresponds to the theories of free cash flow of Jensen.

Keywords: Agency Cost, Free Cash Flow, Data Panel, Financial Leverage

1. Introduction

Theory of Jensen free cash flow (1986) explains that companies with high free cash flow always faces difference related to the profit between shareholders and managers. Shareholders ask managers to invest in projects that maximize the value of their stocks but managers tend to invest for their personal goals. Jensen and Meckling (1976) in their paper state that agency cost in companies with additional free cash flow is a lot. Based on the theory of free cash flow sometimes companies obtain much free cash than what is needed for investment on projects with net present value (NPV)(Khan et al,2012). However since managers have the authority of using free cash flow and it potentially creates agency problem so managers can use free cash flow in the direction of their personal benefits or investment for increasing resources under their control (Jensen,1986) this investment by managers creates extravagant investment problem.

Extravagant investment points the situation in which managers participate in many investment projects even while they don't have benefits for shareholders. The differences created by free cash flow can be controlled by using debt in capital structure. By using debt managers are required to periodical refund from capital and its profit. These periodical payments, reduces free cash flow in managers hand and so reduces agency problem between owner and manager. Also using debt increases supervision on managers activates. Shareholders as creditors have necessary motivation for supervising companies performance (Jensen,1976).Therefore in this research we are going to find the answer of this question that what is the effect of financial leverage on agency cost resulted from free cash flow.

2. Theoretical Principles of Research

2.1. Agency Costs

By conformation of the relationship between agency and creation of agency problems such as conflicts of benefits between parties, the cost of delegacies will be created. Agency cost has diverse effect on value that is if market has the expectation of such costs, company's value will reduce. Jensen and Mackling (1976) have counted agency costs as below:

*cost of supervision (control) of a manager by owner: these costs from owners are done through plans of reward, authority of buying stock, using services of independent auditor.

*commitment cost: costs related to organizational structure as to be able to limit unfavorable behavior of management.

*residual losses: residual losses is the difference between real operation of a manager and his expected operation that is related to following personal benefits, residual losses reduces shareholders' welfare (Moradiet al,2013).

2.2. Financial Leverage

Financial Leverage shows amount of used debt in structure of company's capital. Using debt affects agency cost through some ways. Firstly using debt of free cash flow decreases managers' authority (Jensen, 1986). It reduces available free cash flow for investment as payment of profit promised to the shareholders.

Also this reduction at free cash flow limits extravagant investment (Harvey et al, 2004). Secondly due to this reality that managers may not follow highest benefits for creditors, there is conflict of benefits between managers and creditors and it leads to the motivation in creditors for supervising managers (Agrawal and Knoeber, 1996).

Thirdly due to the danger of bankruptcy managers lose benefits they got from companies (Grossman and Hart, 1992).

3. Research Background

Zhankoli (2008) considered the effect of financial leverage on agency cost of 323 companies accepted in England stock exchange. The result of this research showed that increasing financial leverage may reduce agency cost. In this study they reported that if financial leverage goes upper than optimized level, it causes conflicting effect on agency cost resulted from free cash flow. They reported that increase in debt sometimes increases bankruptcy cost. They mentioned that increase in debt level reduces agency cost but increases bankruptcy cost. The result of their studies is compatible with theory of agency of free cash flow that states increase in debt helps reduction of free cash flow.

Zhang (2009) considered the function of capital structure and compensation of managerial losses at controlling agency problem resulted from free cash flow. The result of his study shows that debt can cause reduction of agency cost. He also showed that agency cost in companies with low growth opportunity is more. Therefore it is a mean for controlling profit and there is a negative relation between financial leverage and free cash flow.

Baird (2010) showed that there is a difference between manager profit and shareholders about the way of consuming free cash flow. The result of his research shows that there is a diverse relationship between financial leverage and agency cost as companies with high free flow which pay attention to the degree of financial leverage tolerate higher agency don't cost than companies which pay attention to the degree of debt.

Khan et al (2012) considered the effect of financial leverage on agency cost resulting from free cash flow of productive companies of Pakistan. They have considered 54 companies at Pakistan stock exchange during 2006-2010. They used Panel analysis method for testing hypothesis. The result

showed that financial leverage of a company plays important function at increasing agency cost resulted from free cash flow or reducing free cash flow that is under the control of a manager.

4. Research Hypotheses

For getting proper and reasonable response to the main question of research, the relationship between financial leverage indices that includes ration of debt to shareholders equity and ration of long-term debt with agency cost resulting from free cash flow in the form of following hypothesis has been considered.

4.1. Main hypothesis: there is significant relationship between financial leverage and agency cost resulting from free cash flow.

4.2. Sub- hypothesis

First subordinate hypothesis: there is significant relationship between ratio of debt to shareholders' equity and free cash flow.

Second subordinate hypothesis: there is significant relationship between ratio of long term debt and free cash flow.

5. Research Methodology

Since current research concentrates on the relationship between financial leverage and agency costs, strategy of this research is descriptive-correlation. For considering the relationship between independent and dependent variables of the research multivariable regression model to the method of combined data method has been used. Hypothesis has been tested through result of econometric and regression models. In this research for testing meaningfulness of the regression equation Fisher statistics (F) at 95% level of certainty and for testing significance of each coefficients t-student statistic at 95% level of certainty are used.

5.1. Statistical Population

Statistical population of the research includes all productive companies accepted at Tehran stock exchange. For determining sample volume, companies were chosen from statistical population that has the following conditions:

1. They are accepted in Tehran stock exchange before 2007
2. For comparing information the end of financial year should be the end of February.
3. In all considering years, they should have financial supply through long-term debt
4. They should not experience losses during considering period of the research.
5. Required financial information should be available for extracting data.

By regarding above limitations, 80 companies were chosen during 2007-2012.

5.2. Data Collection

Quantitative data required for doing the research regarding considered variables was obtained from various resources includes financial statements and reports of activity of board of directors published by stock exchange organization, Tehran stock exchange technology management company with internet address of (www.fipiran.com) and Islamic studies development and research management of Tehran stock exchange organization with internet address of (www.rdis.ir).

In the step of collecting and primary processing of data Excel software was used. After doing calculations and primary processing, output data is used for implementing the model and testing hypothesis by using Eview software.

Variables of research and the way of measuring them

Regarding experience of others studies and in the framework of research hypothesis In this part 3 groups of fundamental variables consist of dependent variable, independent and control variable that has been used for modeling and testing hypothesis are introduced.

5.3. Dependent variable

In this research agency cost is used as dependent variable. In these research criteria of introducing agency cost is free cash flow.

There isn't compromised definition for free cash flow and researchers has used different methods for its calculation (2004) and identified free cash flow as: an operational income before depreciation minus cost of benefit minus tax minus stock profit divided by assets book value. Khan et al (2012) defined free cash flow as operational income before depreciation divided by total assets. In this research following Jutami et al (2011) free cash flow is defined as:

$$\text{free cash flow} = \frac{\text{net profit} - \text{changes at fixed assets} - \text{changes at net working capital}}{\text{total assets}}$$

In which net working capital is defined as:

Net working capital= current assets- current liabilities

For calculating changes of net working capital firstly net working capital in every year and then its difference with previous net working capital is calculated.

Independent variable

In this research financial leverage is independent variable that for calculating financial leverages the following criteria is used:

1. Ratio of debt to shareholders equity that is as below:

$T = (D/E)_{it}$ at the year I total debt of the company t/in year I shareholders' equity

2. Ratio of long-term debt and following Khan et al(2012) is defined as:

$$\text{ratio of long - term debt} = \frac{\text{long - term debt}}{\text{short - term debt} + \text{long - term debt}}$$

5.4. Control Variable

Control variable of the research includes:

Company size:

Company size is identified sometimes as natural logarithm of sale and sometimes as natural logarithm of total assets(of course in some cases dependent on the nature of the research logarithm of market value is used)(HasasYeganeh et al, 2008). In this research it is defined as natural logarithm of total assets of the company.

Profitability: profitability in some researches has been defined as operational profit divided by total assets or net profit on total assets. In this research it is defined as ration of especial value output that is obtained from dividing net profit on total shareholders' equity.

Opportunities for investment and growth: opportunity for investment and growth has been defined in different forms at various researches and for its calculations Q tobin or changes in assets to assets of the beginning of the period is used. In this research criteria of growth sale is used that is defined as below:

$$\text{sale growth} = \frac{\text{current year sale} - \text{previous year sale}}{\text{previous year sale}}$$

For considering the effect of financial leverage on agency of free cash flow, the following relation is used as basic model:

$$ACF_{i,t} = \alpha + B_1 (D/E_{i,t}) + B_2 (LTDR_{i,t}) + B_3 (PBFT_{i,t}) + B_4 (SIZE_{i,t}) + B_5 (GROWTH_{i,t}) + \varepsilon_{i,t}$$

In which:

- *ACF it=Agency cost resulted from free cash flow of company I at year t
- * α =mean of the effect of all eliminated variables from the model on dependent variable
- *D/E=ratio of debt to shareholders equity of the company I in year t
- *LTDR it=ratio of long-term debt of company I at year t
- *PBFT it= profitability of company I at year t
- *SIZE it=size of company I at year t
- *GROWTH it=growth opportunity of company I at year
- * ε =model hysteresis

In this study by using a multivariable regression pattern and annual data, the effect of financial leverage on agency cost resulted from free cash flow is assessed and based on the result of regression coefficient testing and concluding about rejection or acceptance of hypothesis is done. Applied strategy in this research is combine data model (panel data).

6. Data analysis

6.1. Stability

For being certain about the result of research and unfake relation at regression and meaningfulness of variables stability test and calculation of variable unit root has been done. The mentioned test has been done by using Eviews 7 software and Fisher-Dicki fouler test. The result of tests (table 1) shows stability of variables, so null hypothesis based on unit root of variables is rejected and variables are stable.

H0: existence of unit root

H1: lack of unit root

Table 1: Result of Stability

		Fisher – Augmented Dickey-Fuller
ACF	Coefficient	187.170
	Sig	0.0000
D/E	Coefficient	106.512
	Sig	0.0178
LTDR	Coefficient	85.3991
	Sig	0.0133
PBFT	Coefficient	54.6349
	Sig	0.0091
SIZE	Coefficient	89.9458
	Sig	0.0599
GROWTH	Coefficient	155.888
	Sig	0.0001

6.2. Chaw Test or Structural Changes Test

In order to test hypothesis of the research, firstly model of fixed time effects is estimated and then for considering significance difference structural changes test is used. This test is hypothesized for considering the existence of fixed effect as below:

$$\begin{cases} H_0: \text{lack of fixed effect} \rightarrow \text{pool model} \\ H_1: \text{existence of fixed effects} \rightarrow \text{model of fixed effects} \end{cases}$$

The result of this test has been presented in table 2. Significance level under 5% shows rejection of H₀ hypothesis: that is the model of fixed effects is chosen as the best model.

Table 2: Result of Chaw Test

Cruss-cutting	Statistic	Freedom degree	Sig
F statistic	3.164406	(79,384)	0.0000
Chi-square	240.666063	79	0.0000

6.3. Hasman test

As it is regarded, the result of Chaw test is from choosing model of fixed effects. Now model of fixed effects should be tested in contrast to the random effects model of the test. For those action Hasman test is used. Hasman test is set for considering the random effects as below:

Table 3: Result of Hasman Test

Test effect	Statistic	Freedom degree	Sig
Random	81.220845	11	0.0000

As it is considered regarding obtained significance level H_0 is rejected and model of fixed effects is chosen as the best model.

6.4. Heteroskedasticity

In sequence statistics, random variables that have different variances are called variance anisotropy. In contrast it is said a sequence of random variables of equal variance if having fixed variance. Tests have been suggested for identifying problem of variance anisotropy such as: park test, Breusch-pagan-Godfrey, Harvey, Glejser, ArCH, White, Gold field-Quant test and so on that is usually benefited in these tests is using a help regression. Therefore it is extracted after estimation of model of waste sentences (as the closest variable that can represent error sentences) and their square is regressed on variables explain the model if the resulted regression is significant it will be a control on existence of variance anisotropy. In this research Breusch -Pagan Godfrey test has been used for finding anisotropy variance.

{ H_0 : lack of Heteroskedasticity
 H_1 : existence of Heteroskedasticity

As it is obvious from table 4: significance level under 0.05 shows rejection of h_0 hypothesis therefore existence of variance anisotropy is confirmed. Under these conditions the method of ordinary least square (OLS)¹ is not the best linear estimator (BLUE) and instead of it generalized least square²(GLS) should be used for model estimation.

Generalized least square method (GLS) is the same OLS method in which data is changed into a specious so that hypothesis that is required for ordinary least square is supplied. GLS method is introduced as weighted least square³because in this method weight collection of remains square is minimized whereas in OLS method non-weighted collections minimized.

Table 4: Identifying Heteroskedasticity

¹ Ordinary least square

² Generalized least square

³ Weighted least square

	Statistic		Statistical probability	
Breusch-Pagan-Godfrey test	F-statistic	3.145120	Prob. F(11,468)	0.0004
	Obs*R-squared	33.04090	Prob. Chi-Square(11)	0.0005
	Scaled explained SS	105.5719	Prob. Chi-Square(11)	0.0000

6.5. Autocorrelation

As it is observed in result of estimation related to hypothesis: camera statistics of Watson shows the number 2.03 that is the symbol of lack of autocorrelation.

6.6. Result of Testing Hypothesis

Applied statistic method in this research is regression method by using combined data, for estimating regression method with board data, estimation generalized least square (EGLS) is used. Hypothesis have been tested through the result of econometric and regression models. For considering significance of independent variable coefficient in each model t-student statistic has been used at 95% level.

The result of testing hypothesis has been presented by using EGLS method in table 5. The result of testing model and coefficient of independent variables obtained by using mentioned method shows this subject that variables used in the model explains totally 68 percent of behavior of dependent variable. As it is regarded in mentioned table F statistic shows significance of regression equation.

Table 5: Results of estimate obtained from hypothesis test using EGLS method

Variables	Coefficient	SD	T statistic	Sig
C	0.477546	0.111552	4.280926	0.0000
D/E	-0.008857	0.003160	-2.803055	0.0053
GROWTH	-0.031455	0.008182	-3.844449	0.0001
LTDR	-0.445262	0.046511	-9.573297	0.0000
PBFT	0.161043	0.027640	5.826512	0.0000
SIZE	0.050833	0.008353	6.085401	0.0000
Determination	0.738985		Modified determination	0.678596
Camera-watson statistic	2.027643		F statistic	12.23705
			Sig level f	0.000000

Regarding table 5, coefficient and t statistic related to the variable of debt ratio to shareholders equity denotes diverse and significant relationship between this variable and free cash flow. Then the first subordinate hypothesis is confirmed. The result of testing this hypothesis denotes that with the increase of debt ratio to shareholders equity, agency cost decreases and leads to alignment of activities of company's executive managers and shareholders. The result of research of Khan et al (2012) shows that there is significant and negative relationship between ration of debt to shareholders equity and free cash flow. The result of this research corresponds with the result of the research of Khan et al (2012).

Coefficient and t statistic related to variable of ration of long-term debt denotes significant and diverse relationship between this variable and free cash flow. Thus second subordinate hypothesis of the research is confirmed. The result of this test denotes that with the increase of long-term debt,

agency cost resulted from free cash flow will decrease and leads to alignment of most activities of company's executive managers and shareholders. Therefore the result of this research corresponds with the result of the research of Khan et al (2012).

The result obtained for policy of company debt with theory of free cash flow mentions that optimized level of the degree of financial leverage in a manager's capital structure gives the authority to creditors that if they can't pay the profit and sum of debt, evoke managers to the court, in this way that due to high debt in structure of capital, concern of creditors about the profit and main debt increases and caused they control manager's action. On the one side more application of debt increases danger of failure of a company and danger of losing job for a manager and causes a manager avoid investment of free cash flow in projects that their net present value (NPV) is negative. Therefore debt is a controlling work for agency cost resulted from free cash flow.

Also result of the research mentions significant and positive relationship between companies sizes (natural logarithm from total assets) with agency cost resulted from free cash flow. That is with development of a company agency cost increases which is according to the findings of Khan et al (2012).

Also there is significant and negative relationship between growth opportunity (sale growth) with agency cost resulted from free cash flow that be concluded that companies with high growth opportunity are managed better than companies with low growth opportunity.

Finally there is significant and positive relationship between profitability (special value output) and agency cost resulted from free cash flow the reason of this action is that a profitable company always save more cash and it is probable company's manager use it correctly and for useless activities. The result of this research corresponds to the result of research of Jutami et al (2011) and Khan et al (2012).

7. Discussion and Conclusion

Theory of free cash flow of Jensen states that agency cost of companies in which their free cash flow is high can be a lot and agency costs causes decreasing values. On reason of decreasing agency costs is using debt in this research considering the effect of financial leverage on agency cost is done. The result denotes significant and negative relationship between ration of debt to stockholders equity and ration of long-term debt with agency cost resulted from free cash flow.

Based on the result of research investors and managers of a company are suggested for controlling agency cost of free cash flow, firstly by organizing determined sessions between managers and shareholders for limiting management decisions about investment of free cash flow of a company take action in projects that don't have profit for shareholders. Secondly setting contracts between managers and shareholders of a company about using free cash flow in proper projects can preserve shareholders equity. Agency cost can be decreased by using some rules as these rules prevent managers' behavior that is against shareholders benefits.

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