

## CHECKING CAPITAL STRUCTURE IN ACCEPTED FIRMS IN IRAN'S SECURITIES EXCHANGE BASED ON DATA PANEL: CASE STUDY OF STEEL FIRMS

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**Abstract-** the main aim of this research is comparison of trade off theory and packing order theory in describing finance structure of accepted steel firms in Tehran's securities exchange by using data panel method. To this, using sampling, 22 active steel firms in Tehran's securities exchange during 2009- 2014 have selected as samples. To this work, relation between variables, by using econometrics software of sign data is evaluated and tested. The results showed that deficit variable in packing order model has a negative and meaningful effect on pure debit also deficit variable in trade off model has a positive and meaningful effect on pure debit. Due to different effectiveness of deficit variable on net debit signally and based on amount in both theories, packing order and trade off, none of both theories with complete decisiveness, cannot describe firms' structure.

**Keywords:** securities exchange, trade off theory, packing order theory, capital structure.

### 1 Introduction

Capital structure issue is a significant and controversial issues in firms' finance area. Offering different theories, researchers try to offer the best pattern and theory to determine optimum capital structure and minimize firm's capital cost to maximize market's value of firm's stock. There are many theories, each of them prescribes a version to support finance for the firms, some prescribe finance support by offering debit securities, some by equity securities, and some by both of available sources. But note that none of available theories and patterns solely cannot theorize firm's capital structure without considering firm's conditions and characters such as profitability, firm's size, current firm dominance level in the firm and so on (Ahmadinia, et al., 2012).

One of the basic financial managers' decisions in public stock firms is determining debit and stock composition that these decisions must be taken to maximize stockholders' wealthy. Traditional view in capital structure based on this theory that one can increase firm's value by using lever. But start of modern theories of capital structure can be primary article of Modigliani and Miller who assert that under special conditions (presence of complete competitive market, lack of tax on income, lack of presence of bankruptcy and agency costs, presence of informational symmetry among capital market actors), firm value doesn't depend on capital structure. Later in 1963, these two thinkers by adding debit tax exempts for firms using debit, know making financial lever as increase firm value. So, Miller in 1977, by adding tax on personal incomes to model, finds that tax interests are deleted by personal incomes. Yet, testimonies of empirical studies showed that real behavior of financial support of the firms doesn't fit with literature of capital structure. Therefore, later, publishing theories of Modigliani and Miller and 1963 and paradoxical behavior of firms, new theories such as trade off and prefer are offered. In trade off theory, it supposed that the firm determines a proper debit rate and moves toward it. In prefer theory, firms prefer internal financial supply rather than external financial supply and there is no proper and certain debit rate for firms. In capital market more sophisticated than Iran's capital market, many theories and hypotheses in field of capital structure and determining related factors are offered (Alinejad Saroklaei and Taghizadeh Khaneghah, 2012).

The steel is one significant and effective good in growth and development of the countries. This good after oil and gas is second volume good of global trade and many basic industries such as transportation, building, making machinery, mine and other industries related to producing and transferring energy, depend on steel. So improvement and development of steel industry is important in economic development of countries. So in this research plot, we tried to by doing trade off theory and packing order theory in description of financial structure of accepted steel firms in Tehran's securities exchange by using data panel method, evaluate weakness and strengths of this industry for capital structure (Etemadi and Montazeri, 2013).

### 2 Review on research literature

In checking structure of firms' capital, we try to theorize various sources composite used in financial supply of actions and required investments. Additionally, one can say that the aim of determining capital structure is specifying composite of financial sources of any firm, to maximize its stockholders' wealthy, because cost of firm's capital is subject to its capital structure. Selecting proper capital structure decreases cost of firm's capital and increases market value (Jolahzadeh, 2010).

This matter that how firms select and adjust own strategic financial sources, has attracted many financial economists and yet result in many discussions. Of course, sometime one believes that nature of such problems so complicated that no one can address editing reasonable theory. Since half century before that Weston offers possibility of editing such theories, Modigliani and Miller deliver own theory. Studies show that since publishing their article, various theories and patterns about structure of firms' capital and way of selecting them has been edited.

Researches show that no one of current theories and patterns solely cannot theorize effective factors in determining structure of firms' capital and provide certain answer to below questions:

Why in various conditions, some firms to supply finance of own actions, releasing stock select option, some select utilizing internal and some select borrowing way. Therefore, it seems that the greatest available problem is lack of comprehensive theory that can describes and predicts treatment of financial supply and structure of firms' capital completely.

According to studies, tax, costs of financial distress (bankruptcy), transaction costs, adverse selection and agency conflicts are main factors that firms introduce to financial supply through making debit and forming structure of their capital structure. To determine above factors, already various theories and patterns are offered that most important of them are trade off theory and packing order theory.

In various countries, due to composite of market and various economic conditions, trade off theory and packing order in various periods are checked and compared, and place of such research in Iranian firms id blank. This research wants to compare these two models while check power of description of these two theories about Iranian firms by implementing these two theories on data panel of accepted steel firms in Tehran's securities exchange (Khalifeh Soltani et al., 2014).

#### 2.1 History of research

Ahmadinia, et al., (2012) in own study under title of determining difference of strategic and non-strategic industries of Tehran's securities exchange by highlighting on structure of capital and cash value added by data panel approach, address financial structure category and its effect on firm value due to kind of firm. The results represent that both groups of strategic and non-

strategic industries and also all industries, there is meaningful relation between financial structure and cash value added. Also, adjusted coefficients and independent variables coefficients in regression models shows that relations between financial structure and cash value added in strategic and non-strategic industries are different.

Alinejad Saroklaei and Taghizadeh Khaneghah, (2012) in his research by title of "determining pattern of structure of accepted firms in Tehran's securities exchange" checked capital structure of 158 production firms during 1998 to 2002. The results of this research show that there is a direct relation among profitability, visible constant asset and size of firm. Findings of this research confirm trade off theory by rejecting packing order theory.

Shojaei et al., (2015) in a research by title of "over analysis of determining factors of capital structure in firm level" by checking 127 studies during 1900 to 2013 conclude that size, asset structure, growth opportunities, profitability, cash flow and oscillation play major role in deciding about capital structure. Checked factors in this research in the countries with various development degrees, have different impact on capital structure and effect of these factors has been different during various times.

Khalifeh Soltani et al., (2014), in a research to compare power of description of two models, trade off and packing order in treatment of Japanese firms conclude that based on outputs, packing order theory is better than trade off theory. This researcher showed that if quarter regression model is used, packing order model has better prediction power.

### 3 Statistical population

Due to great number of steel firms and their wideness throughout state and lack of access to audited financial forms, all of them are statistical population firms to test hypotheses, available firms in Tehran's securities exchange. Sampling done by systematic delete method, so that firms have been selected among statistical population according to below conditions:

- 1) Are production firms. 2) Since 2009 to 2014 are in exchange.
- 3) During 2009 to 2014, offer required information to doing this research completely. 4) Their financial year end is February. 5) During research, has no change in financial period. 6) Firm has no operation pause in 2009 to 2014.

Finally, considering above conditions, 22 firms are selected as sample studied in this research.

### 4 Research hypotheses

Among two models, packing order and trade off, packing order model has predicting power more about capital structure of accepted steel firms in securities exchange.

Packing order (preferred theory) about capital structure of accepted steel firms in securities exchange is predictor.

Trade off model about capital structure of accepted steel firms in securities exchange is predictor.

### 5 Research pattern and variables

Variables in packing order model:

1. Cash flow after payable interest and tax ( $C_{it}$ )
2. Gain ( $DIV_{it}$ )
3. Investment ( $X_{it}$ )
4. Net increasing capital in flow ( $\Delta W_{it}$ )
5. Net debit ( $\Delta D_{it}$ )
6. Deficit: deficit in investment and internal financial sources stated by below relation:

$$DFF_{it} = DIV_{it} + X_{it} + \Delta W_{it} - C_{it} \quad (1)$$

In this condition, packing order model is:

$$\Delta D_{it} = a + b_{FO} DFF_{it} + \varepsilon_{it} \quad (2)$$

Variables in trade off model:

Addition to effective variables in packing order model,  $DIF_{it}$  is defined as:

$$D_{it}^a = \text{optimum borrowing level}$$

And in this condition, trade off model is calculated as:

$$\Delta D_{it} = a + b_{TO} DIF_{it} + e_{it} \quad (3)$$

## 6 Findings of research

### 6.1 Assessing first pattern of research

#### 6.1.1 Non-covariance

In statistics, as standard variances of a variable in considered certain number of below observations, always are not constant. Non-covariance issue occur as various periods of error lack equal variances, so that diagonal elements of covariance matrices are not equal. In fact, non-covariance occurs as various observations have various error variance (Gajarati, 2006). Probable presence of non-variance one important concern and problem in using regression analysis includes variance analysis, because presence of non-covariance can delete validity of meaningful statistic tests.

There are two option related to non-covariance and first solution that is very usual is using efficient evaluator OLS. But at same time, they use constant standard errors that make presence of non-covariance possible. Better and second solution occur when we know pattern, the pattern which we usually don't know using weight limit square to calculate effective and efficient evaluators about non-covariance pattern, if we have correct knowledge.

#### 6.1.2 Self-correlation

Serial (sequence) correlation of disorder in time periods is defined under title of self-revolve. With supposing that all other suppositions of OLS are true, under conditions of self-correlation, OLS evaluator also always lacks diagonal. In result, OLS is not BLUE no longer, and usual standard errors OLS and other test statistics have no validity and credit.

#### 6.1.2.1 Solving non-covariance and self-correlation problems

There are two methods to considering non-covariance and self-correlation problems that are:

- a) Constant standard errors
- b) GLS (generalized minimum squares)

#### 6.1.3 F Limer test and research first pattern Hausman test

To assess and hypotheses test, first F Limer test done to specify integrated data or sign data and also Hausman test to determine constant effects or accidental effects. F Limer test is used to determine using composite data model or sign model. If (prob 0.05); (sign data method) and otherwise, integrated data model is confirmed. Hausman test is done to determine using constant effect model against accidental effect model. Hausman test is formed based on exist or non-exist of relation between assessed regression error and independent model variables. If there is such relation, accidental effect model is used and if there is no relation, constant effect model is used.  $H_0$  hypothesis shows lack of relation of independent variables and assessment error and  $H_1$

hypothesis shows presence of relation (table 1). H0: random effect, H1: fixed effect

Table 1: research first pattern variance non-equality test (packing order model)

model	F Limer test			Hausman test		
	Statistics	Possibility (0.005)	Result of test	Statistics	Possibility (0.005)	Result of test
	2.01	0.0000	sign	23.52	0.0004	Constant effect

Due to above table, since F Limer statistics is less than 5 percent, data is used in form of panel. Here, to determine proper model, Hausman test is used because achieved possibility is less than 5 percent. Zero hypothesis is rejected and constant effects model is used (table 2).

**6.1.4 Assessment of research first pattern**

$$\Delta D_{it} = a + b_{it}DFF_{it} + a_{it} \tag{4}$$

Table 2: results of assessment of research first pattern (packing order model)

variables	Assessment coefficients	T statistics	Standard deviation	Meaningfulness level
Constant coefficient (y-intercept)	-4.29	-7.07	6.36	0.0000***
Deficient (DIFF)	-0.26	-2.28	0.78	0.0231**
Determination coefficient	Adjusted determination coefficient	Durbin-Watson statistic	F statistic possibility	F statistics
R-squared	Adjusted squared	Durbin-Watson statistic	Prob (F-statistic)	F-statistic
0.72	0.68	2.06	0.000000	7.29

\* In 10 percent level, \*\* In 5 percent level, \*\*\* In 1 percent level

Due to F statistic (7.29) and achieved error level (0.000000) is less than 0.05 error level, in result, in 95% assurance level, one can say that in research model, it is fits well and has high meaningfulness.

R<sup>2</sup> = 0.65 represents adjusted determination coefficient represents description of independent variables. It means that dependent variable is justified by independent and control variables, while Durbin-Watson statistic amount is 2.06.

(1.5 < DW < 2.5). due to Durbin-Watson statistic, one can say that there is no serial correlation model among residual statements and acclaim lack of existence of self-correlation.

Due to result of first pattern assessment, it is clear that deficient variable in packing order has negative and meaningful effect on net debit, so that one unit increase in deficient makes 0.26 decrease in net debit (table 3).

**6.2 assessing second research pattern**

**6.2.1 F Limer test and research second pattern Hausman test**

Table 3: variance non-equality of research second pattern test (trade off model)

Model	F Limer test			Hausman test		
	statistic	Possibility (0.05)	Result of test	statistic	Possibility (0.05)	Result of test
1	2.27	0.0000	sign	19.76	0.0008	Constant effects

Due to above table, since F Limer statistic possibility is less than 5 percent, data is used in form of panel. Here, to determine proper model, Hausman test is used because achieved possibility

is less than 5 percent. Zero hypothesis is rejected and constant effects model is used (table 4).

**6.2.2 Assessment of research first pattern**

Table 4: results of assessment of research second pattern (trade off model)

variables	Assessment coefficients	T statistics	Standard deviation	Meaningfulness level
Constant coefficient (y-intercept)	0.58	1.24	11.47	0.2849
Deficient (DIFF)	0.59	3.56	0.29	0.0000***
Determination coefficient	Adjusted determination coefficient	Durbin-Watson statistic	F statistic possibility	F statistics
R-squared	Adjusted squared	Durbin-Watson statistic	Prob (F-statistic)	F-statistic
0.65	0.60	1.81	0.000000	3.83

\* In 10 percent level, \*\* In 5 percent level, \*\*\* In 1 percent level

Due to F statistic (3.83) and achieved error level (0.000000) is less than 0.05 error level, in result, in 95% assurance level, one can say that in research model, it is fits well and has high meaningfulness.

R<sup>2</sup> = 0.65 represents adjusted determination coefficient represents description of independent variables. It means that more than 65 percent of dependent variable changes is justified by independent and control variables, while Durbin-Watson statistic amount is 1.81.

(1.5 < DW < 2.5). due to Durbin-Watson statistic, one can say that there is no serial correlation model among residual statements and acclaim lack of existence of self-correlation.

**7 Conclusion**

Main aim of doing this research is comparison of trade off theory and packing order theory in describing financial structure of accepted firms in Tehran's securities exchange by using data panel.

Due to results of research patterns assessment, these results are achieved:

Due to result of first pattern assessment, it is clear that:

Deficient variable in packing order model has negative and meaningful effect on net debit, so that one unit increase in deficient make 0.26 decrease in net debit.

Due to result of second pattern, it is clear that:

Deficient variable in trade off model has positive and meaningful effect on net debit, so that one unit increase in deficient makes 0.59 increase in net debit. Results suggest positive relation between longtime debit changes of studied firms and necessary adjustment to gain optimum debit level. In other words, steel industry firms tried to average usage amount of long time debit (optimum debit amount) that these results support trade off theory. Result related to trade off theory is different from Sandra and Mirez (1998) research that already confirmed by packing order theory. But it fits with result of Flannery and Ranjan (2006) research in U.S and also with general result of Bagherzadeh (2002) research in Iran that already confirmed by trade off theory.

## 8 Suggestions

It suggested that due to trade off theory, the firms in steel industry with decrease deficient, try to decrease own net debit.

It suggested that research subject is checked in various industries.

It suggested that detailed research about this subject separately is done by considering various definitions of capital structure.

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