THE 19TH EDITION OF THE INTERNATIONAL CONFERENCE
EUROPEAN INTEGRATION
REALITIES AND PERSPECTIVES

The Mediation Effect of Product Market Competition on the Relationship between Cash Flow Management and Capital Structure

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Abstract: **Objectives**: Financial Economics Theory indicates company decisions for liquidity may include making balance between cash reserves and cost of accessing managers to cash assets. The goal of this research is studying the effect of Product Market Competition (PMC) on relationship between Cash Flow Management (CFM) and capital structure. **Prior Work:** The results of past studies showed that product market competition can act as a controlling mechanism for decrement of agency problems between managers and investors, because managers gravitate toward no-added value activities and non-useful projects to preserve their situations and to prevent dissolution in order to maximize their company values. **Approach:** Using data from 86 listed companies in Tehran Stock Exchange from 2010 to 2020, this is a descriptive-correlational research and multi-variable pooled data, so multi-variable regression was used to test the assumptions, and Extended Least Square Method (ELS) was used to estimate it. **Results:** The results show that the relation between cash flow and capital structure management is affected by competition in product market. **Implications:** Therefore, companies with severe competition and low concentration utilize high cash flow. Meanwhile, these companies have lower debt ratio in their capital structure. **Value:** Additionally, competition in product market decreases excess investment or removes ignoring benefits of stockholders by lowering flexibility of management towards accumulation of cash reserves. One of the innovative aspects of the present research is notice to the equalizing role of product market competition against cash flow management and capital structure of companies.

Keywords: Product market competition, Cash flow management, Capital structure.

JEL Classification: M41

1. Introduction

Bolkuyi (1999) introduces capital structure as a general claim for firm's assets (Fama, 2015). The static trade-off theory argues that optimal CS is determined by the costs and benefits of debts against equity (Bawuah, 2024). The composition of a company's capital structure, encompassing the mix of debt and equity utilized for financing operations, plays a pivotal role in determining its competitive performance (Al-Haddad, 2024). One of the financing methods is borrowing. Since borrowing prevents exit of cash reserves, it can be construed as a negative cash reserve. On the other hand, a company that has supplied most part of its resources by borrowing, encounters problems in attracting new resources, because the more the leverage, the more the bankruptcy probability. Risk increment accompanies with increment of

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expected return of suppliers and increases leverage cost. Therefore, companies with more leverage encounter more problems in accessing external resources and have no remedy to rely on internal resources. Obviously, cash flow of such companies is very important (Arsalan et al.; 2006 & Ozkan, 2004). The discussion of capital structure in developing countries is important because most companies have financing limitations (Ansari et al.; 2013).

Boston & Stin (1990) believe that companies exposing limited financial resources cannot invest by progress perspective, so they relegate investment opportunities and market stocks to their competitors (Jain et al.; 2013). In fact, if a company has no limitation for its financial resources, holding cash reserves has no special advantage (Opler et al.; 1999). Studies show that companies reserve cash amounts to insure themselves against financial needs and future investments (Maligan, 1997 & Opler et al.; 1999; Almeida et al.; 2004).

However, managers' decisions for cash flow management follow personal beneficent (Rompotis, 2024). Of course, it may be due to non-acceptance of financing risk through debt and suitable reaction of competitors for excess production and price struggle. Anyway, high cash flow increases agency cost. Thus, making balance and coordination between relation of cash and financing policies of companies is necessary. One of the innovative aspects of the present research is notice to the equalizing role of product market competition on the relationship between cash flow management and capital structure of companies. Therefore, this research is seeking the answer of this question: "Does product market completion can provide a better balance between cash flow management and capital structure"?

2. Theoretical Foundations and Hypotheses

Financial Economics Theory indicates company decisions for liquidity may include making balance between cash reserves and cost of accessing managers to cash assets. According to the complex subject of financing, company managers prefer cash reserving than external resources (Opler et al.; 1999). Evaluation of relation between liquidity policy and capital structure stems from two opposite trends from holding cash amounts for financing companies.

From one hand, companies with high cash flow use lower debts for financing. According to Predatory Model, it is assumed that increasing debt in capital structure cause probable financial crisis and bankruptcy. During insolvency, companies expose financial disturbance against their creditors. Brander and Luis (1986) & Belton (1990) argue that bankruptcy of companies is lower by cash reserves. Therefore, companies not only prolong their survival but may push their rival companies to bankruptcy by "Deep Purses", which was propounded by Telser (1966). In this case, companies can follow the impertinent policy of production and price decrement to limit competitors' activities and directing them toward financial crises. This strategy helps companies to achieve their goals by price predatory method, especially by using external resources. In other words, non-leverage companies try to bankrupt their rivals by deep purse policy, that is, high profitability and larger cash reserves. Therefore, high leverage companies are threatened by low leverage companies (Opler & Titman.; 1994). Thus, companies desire to use lower debts.

On the other hand, Jensen (1986) believes that if companies expose with high cash reserves, they increase opportunistic behaviors of managers, and they hold more cash amounts by cost of stockholders to increase their operational flexibility in seeking their goals. By this view, the assumption of existing agency cost means that managers can hold cash amounts by cost of stockholders. Therefore, agency difference is higher in cash flow areas, because there are inadequate investments or excess allowances in this area (Yu-LunChen et al.; 2015).

In other words, high cash flow intensifies conflictions between benefits of stockholders and managers (Goo & Jain, 2012). However, the policy of holding cash amounts and financing companies depends on product market competition (Giroud & Mueller, 2010).

 The results of past studies showed that product market competition can act as a controlling mechanism for decrement of agency problems between managers and investors, because managers gravitate toward no-added value activities and non-useful projects to preserve their situations and to prevent dissolution in order to maximize their company values (Wang & Chaw, 2015). There are other researches, such as Giroud & Mueller (2010), Guadalupe & Perez-Gonzalez (2010), and Yu-LunChen et al.; (2015), who have found that product market competition has potential to decrease this beneficial factor of manager. In addition, managers of active companies in more competitive environments less likely spend cash flow for achieving their goals (Seyrani & Seyfgholi, 2014). Meanwhile, product market competition is a mighty factor to overcome agency problems between stockholders and managers. A strong management in product market competition improves financial performance and makes better decisions (Chaw et al.; 2011). Therefore, market competition helps coordination between benefits of managers and stockholders, and companies in lower competitive industries are less likely engaged in managers' opportunistic behaviors (Dianati & Bayati, 2015). Thus, the goal of the present research is studying the effect of product market competition on relation between cash flow management and capital structure.

3. Research Literature

There is no similar research that studies the effect of product market competition on cash flow management and capital structures of companies. Thus, here we point to some of related researches.

3.1. Relation between Cash Flow and Capital Structure

Rezaei & Jafari (2015) studied the effects of cash flow and financial leverage of listed companies in Tehran Stock Exchange from 2009 to 2013. They concluded that there was a negative significant relation between cash flow and financial leverage. Setayesh & Selihinia (2015) studied the effect of financial leverage on free cash flow in Tehran Stock Exchange companies from 2004 to 2011. The evidences showed that there was a significant and reverse relation between debt ratio and free cash flow. Jabarzadeh et al.; (2014) in a research titled "The effect of operational cash amounts on financial leverage adjustments of Tehran Stock Exchange companies during 2003-2012" concluded that there was a negative and significant relation between operational cash amounts and financial leverage. Also, Mustapha & Chyi (2012) studied the determinants of relation between cash flow and financial leverage in Malaysia. They found a positive relation between cash flow and financial leverage by Signing Theory, and a negative relation between them by Priority Theory. Another research was done by Harford et al.; (2012) to study the reasons of holding cash amounts for financing during 1985-2009. They concluded that US holding companies held cash amounts to finance through internal resources and profitable projects, but they paid profits to stockholders by increment of cash reserves. A research was done by Malekian et al.; (2011) about cash amounts holding factors. They found that there was a negative and significant relation between financial leverage and cash flow held by listed companies in Tehran Stock Exchange. This means that when investments were supplied by accumulated profits, cash amounts decreased and debts increased. Betis et al.; (2009) in a research titled "The reasons for holding cash amounts during 1980-2006" found that US companies held cash amounts to finance new investments. In fact, holding cash amounts helped decrement of financing during lack of cash amounts, which this confirmed contingent intents of managers for holding high cash amounts. Also, they didn't find

evidences indicating an agency conflict by holding higher cash amounts. Rajan D'Mello et al.; (2008) studied determinants of cash amounts in 149 US holding companies during 1985-2000. Their results showed that higher cash amounts correlated with high external capitals and low cash amounts accessibility from internal resources. Guney et al.; (2007) studied holding cash amounts in French, German, Japanese, English, and American companies by data of 4069 companies during 1996-2000. This research concentrates the relation between financial leverage and holding cash amounts, and the evidences indicate a non-linear relation between holding cash amounts and financial leverage.

3.2. Relation of Product Market Competition and Agency Cost

Yu-LunChen et al. (2015) by studying Taiwan Stock Exchange companies during 1992-2009, found that product market competition could determine financial leverage to decrease agency problems and maximized wealth of stockholders in companies with weak sovereignty. Jain et al.; (2013) studied the effects of product market competition on holding cash reserves in US Stock Exchange companies during 1997-2007 and found that the more the product market competition, companies were more desired to hold cash reserves. In fact, product market competition decreased agency in respect of cash policy of US companies. In addition, cash reserves in competitive conditions enhanced performance level of novel companies. Michaely et al. (2012) studied the effect of product market competition on agency costs in US Stock Exchange companies during 2000-2006. Their findings showed that product market competition could decrease agency cost. Also, companies in industries with lower competition had lower efficiency than those in industries with higher competition. Sarvestani et al. (2012) studied the effect of market competition on agency cost in Tehran Stock Exchange companies during 2002-2010. They found that the less the market power, the more the agency cost. Baggs & Bettingnies (2007) in a paper titled "Study of the effect of product market competition and agency cost" found that product market competition affected agency cost significantly.

3.3. Relation of Holding Cash Amounts and Agency Cost

Taghavi et al. (2015) studied the effect of product market competition on holding cash amounts in Tehran Stock Exchange companies during 2006-2013. They found that increment of product market competition had a positive effect on holding cash amount by companies. Seyrani & Seyfgholi (2014) studied the effect of product market competition and corporate leadership on holding cash amounts policies in Tehran Stock Exchange companies during 2006-2010. They found that product market competition as a strong mechanism prevented accumulation of cash amounts in companies. Drobetz et al.; (2010) found that benefits conflict between stockholders and managers could related with holding cash flow in companies. In a similar research, Dittmar et al.; (2003) found that agency problems were one of the most important determinant factors for holding cash amounts. Also, more cash flow is held in countries in which stockholders are protected well.

3.4. Research Hypotheses

The Hypotheses are as follows regarding to the theoretical fundamentals of research:

1-Cash flow management is related with capital structure.

2-Product market competition affects the relation of cash flow management and capital structure.

4. Research Method

This research is an applied one with pseudo-experimental plan by a post-event approach. The estimation model of this research is from combinational panel data one. Sampling was done by systematic deletion and with the following conditions:

1- The company was accepted in Tehran Stock Exchange up to 2010.

2- Its fiscal year was ended on Mar. 20 and its data are available from 2010 to 2020.

3- The company had a continuous activity and has not changed its fiscal year.

4- The company was not among financial brokers, investment companies, or banks.

The final sample contained 86 companies. Financial data of companies was extracted by Rahavard Noving and Tadbir Pardaz Software and Tehran Stock Exchange site, and the assumptions were tested by EViews and Stata software.

Calculation of dependent variable: This ratio measures a company ability to pay its long term debts:

$$\text{Capital structure} = \frac{\text{Total debts}}{\text{Total assets}}$$

Calculation of independent variable: The independent variable of this research is Cash Flow Balance (CFB) of sample companies, which reflects policies of managers against cash reserves. CFB is cash amounts and bank inventories extracted from the audited balance sheets of sample companies (Brown & Chen, 2010; Seyrani & Seyfgholi, 2014).

Calculation of adjusting variable: Herfindal-Hirshman Index (HHI) is used to calculate product market competition. This index is sum of squares of market shares of companies:

$$\text{HINDEX} = \Sigma \, Ni = S_i^2$$

in which, N is the number of companies in the industry, and Si is market share of selling of each company in the specified year; which market share of selling is calculated by dividing company sale to industry sale in that year. The results are between 0-1; whatever is nearer to 1 indicates concentration and lower competition, and whatever is nearer to 0 indicates non-concentration and higher competition (Hasas Yeganeh et al.; 2008). This variable was used in the researches of Guney et al.; (2011) and Setayesh & Jahromi (2011) similarly.

Calculation of control variables: Some of observable features of sample companies are considered as control variables to control the other effective factors on capital structure. These variables are:

Profitability index (ROA): According to Pecking Order Theory, companies firstly use internal resources, and then go toward external resources. Myers & Majluf (1984) proposed a Signaling Model by asymmetric data and showed that companies with higher profitability had lower debt. By this theory, the relation between profitability and debt ratio can be negative. On the other hand, according to Free Cash Amounts Model, some of high profitable companies may intend to increase their debts to control agency problems related to using internal resources wisely (Jensen & Meckling, 1976). Thus, the relation between profitability and debt ratio can be either positive or negative. This variable is equal to ROA that is net profit to total assets ratio.

Company size (SIZE): Theoretically, there is no distinct relation between company size and debt ratio. Some researches show that large companies desire diversification more. Consequently, they have lower bankruptcy probability and they can increase their debts (Istaitieh & Rodriguez, 2006; Kurshev & Strebulaev, 2015; Khajavi & Gorgani, 2014). On the other hand, Rajan & Zingales (1995) found that

company size may had a revers relation with debt ratio, because large companies are more desired to disperse their information, which cause they turn toward financing by stockholders. Thus, the relation between company size and debt ratio can be either positive or negative. This variable is natural logarithm of sum of assets (Setayesh & Jahromi, 2011).

Growth rate (GR): Companies with better growth situations expect better profitability expectations and have more flexibility for selection of future investments. Consequently, their debt ratios have positive relation with their growth (Guney et al.; 2011). In this research, sale rate, namely the difference between sale in year t and t-1 divided by sale in year t-1, is used.

5. Research Model

Multi-variable regression was used to evaluate the effect of product market competition, as adjusting variable, on relation between cash flow management and capital structure, by the conceptual model of Figure 1. This research assumes that product market competition can affect relation between the independent variable and the dependent variable.
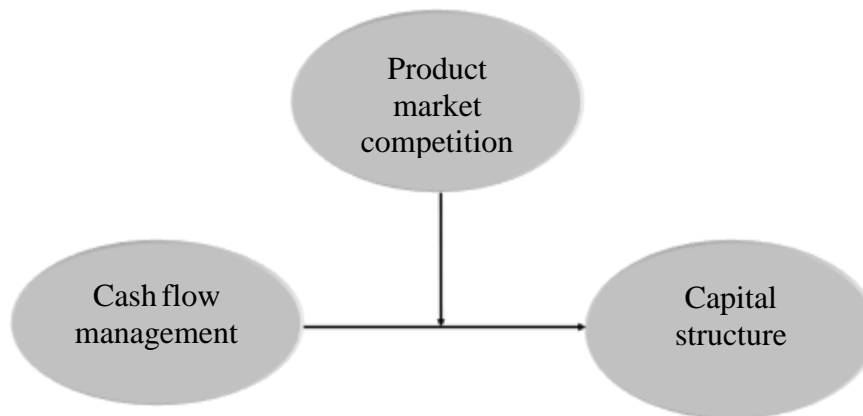

Figure 1. Conceptual Model of the Research

Model (1) for test of assumptions is as follows:

$$Y_{it} = \beta_0 + \sum_{k=0}^{n} \beta_1 X_{it} + \beta_2 Z_{it} + \sum_{k=0}^{n} \beta_3 DX_{it} + \beta_n Contorol\ variables_{it} + \varepsilon_{it}$$

By replacing variables in model (1), the main model, model (2), is obtained:

$$DR_{it} = \beta_0 + \beta_1 OCF_{it} + + \beta_2 HHI_{it} + \beta_3 HHI_{it} * OCF_{it}3 + \beta_4 ROA_{it} + \beta_5 SIZE_{it} + \beta_6 GR_{it} + \varepsilon_{it}$$

The descriptive variables of this model include independent, adjusting, and auxiliary variables. Since the goal of this research is studying the effect of adjusting variable on intercept and slope of regression line, their product was added to the model (Woorldridge, 2006).

6. Analysis of Results

Data analysis method of each research is affected by its research method. Since the method of the present research is based on correlation, we use correlation analysis. This research uses a set of panel data including 86 observations for 10 years –totally 860 years– among the listed companies in Tehran Stock Exchange by Extended Least Square Method (ELS) by model (2).

6.1. Descriptive Statistics

Comparing variations of dependent, independent, and control variables for all companies, we conclude that the dependent variable of "capital structure" has less variance and dispersion in comparison with independent and control variables, except company size; thus it is more stable. Additionally, the statistic of "capital structure" (debt ratio) indicates more than 57 percent of total assets of selected companies were supplied by debt.

Table 1. Descriptive Statistics of Variables

Variable	Average	Median	Max.	Min.	SD	Variation factor
DR	0/573	0/552	1/865	0/249	0/172	0/301
CFM	0/482	0/471	0/947	-1/782	0/168	0/348
PMC	0/497	0/461	0/493	0/025	0/193	0/388
PMC × CFM	0/188	0/159	0/144	0/326	0/0256	0/136
ROA	0/128	0/119	0/584	-0/197	0/129	1/007
SIZE	4/754	4/787	7/965	4/652	0/598	0/125
GR	0/211	0/158	4/09	-0/693	0/357	1/691

6.2. Results of Main Model

Regarding to Table 2, the significance level of F (0/000) implies significance of regression equation. Therefore, the regression has clarification power. By Im & Sons & Shin Test we notice that all variables have stability level of 95%. Consequently, using them will not produce dummy regression. The significance level of F-Limer (0/000) is less than the accepted error level (5%), thus Panel Data has priority than Pool Data. The significance level of Hausman Test (0/011) is less than the accepted error level (5%), thus this method is confirmed by fixed effect. $R^2=0/744$; namely, 74/4% of variations of capital structure is described by independent and adjusting variables. In addition, the Durbin-Watson value is 2/11, which indicates lack of autocorrelation in the model. R2 and Durbin-Watson value are normally 54/71% and 1/26, respectively. Durbin-Watson statistic indicates autocorrelation of remainders and adjusted parent test significance ($P<0/05$) indicates variance incompatibility problem. Therefore, first order AR of model and autoregression models were used. Hence, Ordinary Least Squares (OLS) cannot be used, and ELS is used instead. If R^2 is high and insignificance of most model coefficients, there is colinearity, which has not been observed in any model before.

Results of testing assumption 1: The negative coefficient of CFM indicates a reverse relation between this variable and capital structure, which is significant regarding to ($P<0/05$). Therefore, the assumption 1 is accepted, which means CFM affects capital structure significantly. This result complies with those of Rezaei & Jafari (2015), Setayesh & Salehinia (2015), Jabarzadeh et al. (2014), Mustapha & Chyi (2012), Harford et al. (2012), Malekian et al. (2011), Bates et al. (2009), and Ranjan D'Mello et al. (2008).

Results of testing assumption 2: The adjusting effect of PMC on CFM and capital structure of Tehran Stock Exchange companies is negative by regression coefficient (–0/471). The significance level probability for this variable is (0/038), which is significant. Thus, the main assumption is confirmed. This result is compatible with those of Yu-LunChen et al. (2015), part of Michaely et al.; (2012), Baggs & Bettignies (2007), and Sarvestani et al.; (2012). But it is not compatible with those of Seyrani & Seyfgholi (2013), because they found that PMC refrains holding cash amounts. The present research concludes that PMC is a strong effective mechanism for financing and is a suitable reaction against predatory behaviors of competitors.

Results of testing control variables: These results are shown in Table 2. There is a negative relation between profitability and capital structure (which ROA was used here to calculate profitability). This finding is compatible with that of Myers & Majluf (1984), but it is not compatible with that of Jensen & Meckling (1976). Furthermore, there is a negative relation between company size and capital structure, which is compatible with that of Rajan & Zingales (1995), but is not compatible with those of Kurshev & Strebulaev (2015), Khajavi & Gorgani (2014), Istaitieh & Rodriguez (2006). There is a positive and significant relation between growth rate and capital structure. The agency variable in this research is GR, which is compatible with the result of Guney et al.; (2011).

Peripheral results: This indicates the effect of HHI on capital structure, which is significant regarding to (P<0/05). Since this index has a reverse relation with PMC, then PMC has a reverse and significant relation with capital structure. These results are compatible with those of Michaely et al.; (2012), Sarvestani et al.; (2012), and Bagges & Bettignies (2007).

Table 2. Results of Regression Model (2) by Fixed Effect Panel Data Method

Variable	Regression coefficient	t	Sig. level	Unit square test of Im & Sons & Shin		
Fixed value	1/057	8/0062	0/000	-		
CFM	-0/057	-1/4635	0/013	0/0000		
PMC	0/095	0/8215	0/046	0/0000		
PMC × CFM	-0/471	-1/8568	0/038	0/0000		
SIZE	-0/057	-2/7317	0/006	0/0000		
ROA	-0/007	-14/377	0/000	0/0000		
GR	0/023	2/0511	0/040	0/0000		
AR(1)	0/273	7/1280	0/000	-		
Adjusted parent test statistic			5/4e	Prob	0/0000	
F-Limer test statistic			85/682	Prob		0/0000
Hausman test statistic			10/1142	Prob	0/011	
F statistic (sig. level)			21/816 (0/000)	Durbin-Watson statistic (D.w)		1/26
Determination factor (R2)			0/744	Adjusted determination factor		0/710

7. Summary and Conclusion

The goal of this research is studying the effect of Product Market Competition (PMC) on relation between Cash Flow Management (CFM) and capital structure of 86 listed companies in Tehran Stock Exchange from 2010 to 2020. The Deep Purse Policy of Telser (1966) is a preventive factor for predatory behavior of rivals and studies show that it holds cash flow, which are strategic resources for companies, because removal of financing limitations through internal resources is an important competitive factor. However, cash flow has high risk and may be used for personal benefits of managers. Sensitivity of financing than cash flow caused companied notice to cash reserves balance. The results of the assumptions of this research indicate that PMC has a significant effect of relation between CFM and capital structure in Tehran Stock Exchange companies. It means that more competitive and low concentrated companies have higher cash reserves, and naturally they have less debt ratios in their capital structure. In other words, companies with higher cash flow are less leverage. Furthermore, product market competition allows companies to coordinate their cash amount holding methods with production market. In other words, companies in active industrial environments can reserve cash flow more easily, which decreased dependency of such companies to finance by expensive resources and debt. Therefore, it is concluded that disputes in competitive companies are less probable than less competitive companies. This result implies that the more the competition, companies are more capable

to hold cash reserves. Additionally, PMC decreases extravagant investment or ignoring benefits of stockholders by managers. By this reasoning, higher cash reserves belongs to those companies with higher competitive situations in industry.

7.1. Suggestions

The suggestions of this research are:

1- Company managers shall consider market share in their cash amount level planning's and evaluations, because if the company is competitive, its market share is increased by increasing its competition power. This requires holding high cash flow and using low debt in the capital structure.

2- Main shareholders in lower competitive companies must pay attention to accumulation of cash flow. Such companies shall use control methods to prevent any unsuitable application of cash reserves, because agency cost decreases company value.

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