Science Arena Publications
Specialty Journal of Accounting and Economics
Available online at www.sciarena.com
2016, Vol, 2 (3): 58-63

Investigating the impact of free cash flow on product diversification of the listed companies in Tehran stock exchange

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Abstract: The goal of this investigation is to examine the impact of free cash flow on products diversification of the listed companies in Tehran stock exchange. The locative domain of the research includes all listed companies in Tehran stock exchange and the time domain is during between 2010 to 2013. This investigation is a kind of applied and quantitative research. Lehn & Poulsen model (1989) is used to measure free cash flows, and Vinktash & chiang (1986) is provided a model to calculate information asymmetry. 336 firms were selected based on the systematic elimination method as the statistical population and 79 firms were finally selected regarding DeMorgan table. The results suggested that there is a free cash flow significantly impact on products diversification of the listed companies in Tehran stock exchange.
Keywords: Free cash flow; Firm products diversification; Tehran stock exchange.

Introduction

Corporate diversification leads to agency problems. Regarding corporate diversification, managers may keep their human capitals, increase their personal interests or maintain their strength (Schlifer & Vishney, 1989). In diverese companies, managers can easily gain wealth with regard to financial assistance (Mir et al, 1992). This leads to intensified agency problems in cash flow and overinvestment (Jensen, 1986; Berger & Afek, 1995). Corporate diversification, therefore, may lead to creating higher costs or interests. The researches already look for how corporate diversification impacts on shareholders' value (Jensen & Robak, 1983) or how corporate diversification impacts on firm value (Caplan & Visbach, 1992). Some researches have indicated that corporate diversification leads to firm value consistency. (Potter, 1987; Caplan & Visbach, 1992), while some investigations have believed that corporate diversification leads to decreased firm value (Long & Stalls, 1994; Berger & Afek, 1995).

According to Jensen's definition about free cash flow, it is necessary that projects to be evaluated in terms of net present value using a reliable capital cost rate, and minus from available cash flow in a business unit, if positive, and the remainings are regarded as free cash flow. Joggy & Givel believe that calculating free cash flow based on Jensen model is very difficult, because it is impossible to identify quickly all projects with expected positive net present value of a business unit. Additionally, the information about determination of reliable capital cost rate is not usually available. Hence, it has been tried to use alternative models (for Jensen) in order to calculate free cash flows of a business unit.

Martin & petti also believe that the traditional accounting such as earnings per share and return on assets cannot solely represent a business unit performancfe, but this criteria should be used along with others such as free cash flows in a business unit. Because, denying and manipulation of free cash flow is very difficult, while earnings are always manipulated by managers of a business unit. The results of the performed researches show that there are various views about free cash flows and its way of measuring (Kevin et al, 2009). Jensen was of the first people provided free cash flow theories and its definition. Though Grassman & Hart identified the conflict of interests problems originated from fee cash flow, but Jensen publicized this idea in 1986. He stated in his studies that firms' managers are representatives of shareholders, a relationship full of conflict interests of the agency theory (Altman, 2009). This research tries to find an answer to the following question:

- Does free cash flow impact on products diversification of the listed companies in Tehran stock exchange?

Research background

Salmanzadeh et al, (2014) examined the impact of capital sructure, free cash flows and diversification on performance of the listed companies in Tehran stock exchange. Rahavar Novin software and website of Tehran stock exchange is used to collect data in this research. The obtained results showed that capital structure and corporate diversification positively impact on firm performance, and free cash flows negatively influence on firm performance.

Marinelli (2011) investigated the relationship between product diversification and firm performance. The aim of the study is to analyze the relationship between corporate product diversification and performance, regarding financing strategies and abnormal return control. According to the made analyses and using accounting and market indices, it showed that firms with diverese products, steadily create value for shareholders and enjoy from less volatility. The results generally show that there is a relationship between firm value and corporate product diversification, but it is not cause and effect relationship.

Park & Jung (2013) examined the relationship between capital structure, corporate diversification and firm performance. The results indicated that the unrelated diversification is not influenced by frree cash flow, but influenced by firm performance. Free cash flow leads to increase in related and unrelated diversification in firms. Overinvestment from free cash flows impacts on corporate diversification.

Rafael et al, (2013) examined the relationship between agency cost, free cash flow, internal capital market and unrelated diversification of firm products. The findings suggested that internal capital market has strong impact on related decisions to unrelated diversification, and the obtained interests from unrelated diversification would increase agency cost and opportunistic behaviors, and prevent from costly external financing.

Chi Yo et al, (2014) investigated the relationship between corporate diversification and firms' earnings management on seasoned equity offerings. The prior researches showed that the diverse firms are engaged more in earnings management than other firms. As well, diverse firms have more motivations to progressve earnings management. The results also indicated that discretionary accruals in diverse firms is higher than other firms. This diversification is directly related to earnings management level.

Research methodology

Research hypothesis

- Free cash flow significantly impact on product diversification of the listed companies in Tehran stock exchange.

Variables' way of measuring

Free cash flow

Calculating free cash flows are very difficult based on Jensen model, because it is possible to dentify positive net present value of a business unit. Moreover, the information about determination of reliable capital cost rate is not usually available. Hence, it has been tried to use alternative models (for Jensen) in order to calculate free cash flows of a business unit. Lehn & Poulsen model (1989) is used to measure free cash flows of a business unit in this study.

According to the above model, free cash flows are calculated based on the following formula:

$$FCF_{it} = (INC_{it} - TAX_{it} - INTEP_{it} - PSDIV_{it} - CSDIV_{it}) / A_{i,t-1}$$

In which:

FCFit: Free cash flows of firm i in year t

INCit: Operating profit before depreciation of firm i in year t

TAXit: Total tax paid by firm i in year t

INTEPit: Payable interest expense of firm i in year t

PSDIVit: Interests of preferred shareholders paid by firm i in year t

CSDIVit: Interests of ordinary shareholders paid by firm i in year t

Ai,t-1: Total book value of assets in firm i in year t

Corporate diversification

Ramlet divided business practices in terms of amount and diversity into different classifications in 1974. His two main criteria was Specialization Rate (SR). This rate includes the ratio of obtained income from the biggest business of a firm to total annual income in a given year (Sajjadi et al, 2011). Based on this classification, Ramlet has classified firms into three category in terms of diversity:

1. Single-product companies (individuals business) SR≥0.95

2. Firms with medium diversity $0.7 \leq SR \leq 0.95$
3. Firms with high diversity $SR < 0.7$

Firm size
Natural logarithm of total book value of total assets (Nosrati et al, 2012).

Financial leverage
Total debtt to total assets ratio (Rezvan et al, 2009).

Return on assets (ROA)
Net income to total assets ratio (Saeidi et al, 2013)

Statistical population and sample
The statistical population of the research includes all listed companies in Tehran stock exchange during 2010 to 2013. In this research, the following condition should be observed with regard to the nature of the research and some dissonance between the listed companies in Tehran stock exchange:

1. Its fiscal year should end in march to increase comparable condition.
2. The firm should not change its fiscal year during the study.
3. Banks, insurance and investment companies are not considered which have different financial disclosure and various governance principles structure.
4. The firms' data should be available.
5. Their stocks should be traded in Tehran stock exchange.

336 firms were selected using the systematic elimination method as the statistical population and the final sample was 79 firms through De Morgan table.

Data analysis method
Regarding the subject, variables, hypotheses and research method, Eviews 7 software is used to analyze data and examine hypotheses and signifcance test between the variables, and EXCEL software is used for calculations. To examine the normality of data, Jarque-Bera test is used. The significance test in the regression pattern includes Regression significance test and Coefficient signifiance test. As well, the default tests for using regression models include heteroskedasticity test, F-Limer test and Hausman test.

Results
Heteroskedasticity examination
In this section, we examine heteroskedasticity originated from different firm traits. When cross-sectional units have identical variance, but its variance is different cross units, it is called "group wise heteroskedasticity". We use modified Wald statistics to examine group heteroscedasticity among remaining of fixed effects regression model.

Table 1.1. The results of heteroskedasticity test using the modified Wald statistics

Description	Chi-square statistics	Significance level
Modified Wald statistics	-8415.99	0.7255

* 5% error level

Regarding table 4-1, due to the significance level of Chi-square statistics is not significant in 5% error level, homogeneity of variance is confirmed and heteroskedasticity of error terms is rejected.

Determination of a model's estimation method- Significance test of fixed effects method

Table 2.1. The results of F-statistics test

Description	Statistics amount	Freedom degree	Probability
Cross-section F	1.962335	78	*0.007
Cross-section Chi-square	141.004725	78	*0.003

* 5% error level

Hausman test

Table 3.1. The results of Hausman test

Description	Statistics amount	Freedom degree	Probability
Cross-section F	7.482336	25	*0.006

* 5% error level

Regarding the results of both table (F and Hausman), the obtained probability was less than 5% in each tests, so fixed effects method should be used in the related regression model.

Lin-Levene method

Table 4.1. Test of cumulative unit root test on variables by Lin-Levene

Variables	Statistics	Probability
Products diversification	5.264	*0.0254
Free cash flow	6.325	*0.0135
Firm size	3.926	*0.0432
Financial leverage	7.184	*0.0010
Return on assets	5.336	*0.0263
Return on assets	5.336	*0.0263

* 5% error level

According to the table 4.1, the examination of calculated statistics and their acceptance probability indicates that H0 is rejected and all variables of the study are durable.

The first hypothesis test

Table 5.1: The regression and model significance test

Variable	Estimated coefficients	Estimation of deviation	t-statistics	Significance level
Fixed	0.335	0.103	3.252	*0.039
Free cash flow	-0.618	0.137	-4.511	*0.024
Firm size	2.625	0.418	6.279	*0.000
Financial leverage	0.447	0.426	1.049	0.087
Return on assets	-0.619	0.218	-2.839	0.053

* 5% error level

Table 6-1: Description and significance ability of whole model

R		DW	ANOVA	
Sig	F		Adjusted coefficient of determination	Coefficient of determination
*0.000	39.263	1.741	0.636	0.648

** 1% error level

Regarding the table 5-1, since Durbin-Watson statistic test value is determined among 1.5 to 2.5, there is no correlation between errors and regression can be used. Due to significance level of F-test (39.263) in

error level less than 0.01, it can be concluded that the regression model is a suitable model and the independent and control variables are able to describe the dependent variable changes. The adjusted coefficient of determination is 0.636; indicating that 63.6% of all dependent variables changes depend on the independent and control variables. The impact factor of free cash flow on products diversification is -0.618, suggesting that free cash flow has negative and adverse impact on corporate diversification. Also, due to significance level of t-statistics of free cash flow on products diversification (0.024), H0 is rejected in 5% error level with 95% confidence level. It can be stated that free cash flow significantly impact on products diversification of the listed companies in Tehran stock exchange.

Conclusion and recommendations

The results showed that free cash flow significantly impact on products diversification of the listed companies in Tehran stock exchange. In this regard, Ye et al, (2013) in his research examined the impact of investment opportunities, information asymmetry and free cash flows on products diversification of the listed companies in Tehran stock exchange during 2000 to 2009. Teir findings have indicated that free cash flows significantly impact on corporate diversification. Park & Jung (2013) examined the relationship between capital structure, corporate diversification and firm performance. The results showed that free cash flow leads to increased related and unrelated diversification in firms. Overinvestment obtaining from free cash flow impacts on corporate diversification. According to the conducted examinations, there has not been performed any similar research so that it can be compared with other studies. Therefore, the results of Ye et al, (2013) and Park & Jung is consistent with the crrent hypothesis. It can be concluded that if a free cash flow is increased in a firm, its product diversification is decreased and the firm would not positively o diversification and customers' need. It is suggested to Tehran stock exchange to rate firms based on their products diversification so that people and stakeholders can use these information when they want to make decisions; because these people can make more informed decisions with regard to these information.

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