

Relationships between corporate diversification with economic performance variables (EVA, REVA)

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Abstract

In the latter half of the twentieth century, due to the specialized companies vulnerable to rapid and unexpected changes in the environment, "diversity" became the basis necessary for survival and growth companies. Thus, economic units, particularly units that can survive in this arena, they needed their own resources as a competitive advantage to provide the best possible allocation to different products and innovative. In this study, the relationship between corporate diversification and economic performance variables by panel data are examined. In this study, various tests (unit root test Dickey-Fuller, Phillips-Peron test, Pearson correlation test and Granger causality test) is used. The results show that the diversification strategy with EVA and REVA has a negative relationship in the automobile company.

Keywords: Corporate diversification, value-added economy, refined economic value added.

Classification JEL: G34, H20, H20

1. Introduction

Diversification was originally developed as one of basic research axis in strategic management. This strategy gradually entered into different field such as industrial economy, financial economy, organization theory and marketing (Javaid, 2008). By introducing this strategy, the firms become able to select having one operational unit (concentrated firm) or multi operational units (varied firm). When a firm extends its activity lines in all industries for acquiring or developing other businesses and products, it is said that it has performed diversification. Evidence shows that diversification strategies can improve firm performance (Gourlay & Seaton, 2004; Nachum, 2004). Various criteria (economic and financial) have been developed for performance evaluation. Economic value added was introduced as one of the main economic criteria in evaluating performance by Stewart in 1989. It considers opportunity cost of investment used in the firm.

Although economic value added technique have many advantages compared to traditional techniques, recently it is been criticized for some reasons including its reliance on historical figures for calculating opportunity cost of investment based on book value and distorting the results due to inflation. The authors have introduced Refined Economic Value Added (REVA) for overcoming this deficiency. Refined

economic value added is the remaining net profit obtained after subtracting investors' cost opportunity to market value from net operating profit after tax.

2. Diversification Definition

Different definitions have been provided for diversification some of which are given in below table.

Table 1. Definitions of diversification

Definition	Source
business strategy for entering new product lines and new markets	Ansoff,1958
Entrance of a company to produce new products using new resources to enter new markets	Pitts & Hopkins, 1982
heterogeneity of output	Gort,1962
Extent to which institutions in different business activities are working simultaneously	Ragunathan,1995
Diversification is regarded as the firm moves in some markets (sectors, industries) in which it was not present previously	Park&Jang,2011
Differences between internal businesses of a firm	Kenny,2009

Diversification is regarded as a corporate strategy and it is considered as way of continued growth and change. Ansoff (1958) stated that diversification is more difficult than other strategies because in addition to market and product development it requires new skills and techniques and organizational changes in corporate structure. Diversification has often been defined as tendency to extend beyond current markets limitations or tendency to reducing business risk using extension of new units.

3. Diversification History

Since early in 1900s when economic outcomes of diversification become clear, different trends and tendencies were developed. Chandler (1969) examined changes of USA economy industrial structure and organizations' centralization during 1090-1963 and found that:

- Orientation of concentration was ascending from the beginning of World War II and then gradually declined.
- Depression of the 1920s led to a variety of organizations taking part in diversification, especially pharmaceutical companies and electric companies like General Electric
- World War II led organizations to create new opportunities for new products, especially equipment and implements of war to get diversification
- After World War II by increasing demand and government costs in research and development, economic boom occurred which caused facilitating diversification for 1940s to 1950s
- Diversification mainly occurred in industries that used scientific methods, such as chemistry and physics for production
- Non-centralized organizational structure became common since 1960s

Turner (2005) summarized diversification history in three stages as follows:

1960s-1970s: diversification was fashionable and it was regarded as the cure for organizations which their main business had been matured.

1980s: organizations attempted to sell secondary businesses for being smaller, better management of business and dominance on the market

since 1980s: companies which had turned again to centralization and failed extending their diversity, went to international diversification (compared to product diversity) which led to better financial performance for them (Turner, 2005).

4. Advantages and Disadvantages of Diversification

4.1. Advantages

Diversification leads to optimal resource allocation. Weston holds that managers have information and supervisory advantages on external capital market. Thus, diversification leads to more effective resource allocation in all businesses. Its reason is creation of a bigger internal capital market through diversification. Having an internal capital market eliminates the firm need for offering capital for investment in some resources valuable for the firm's owner (Martin and Sayrak, 2003).

The second advantage is that diversification allows the firms to benefit from economic saving and varied economy. Chandler (1977) argues that diversification cause that the firms are diversified and benefits from savings at managerial scale. Teece (1980) emphasized that diversified firms can enjoy diversity economy.

The second one is that diversification causes increasing power in the market. Bernheim, and Weston stated corporate diversification may increase market power by mutual agreement between competitors. Tirole (1995) maintains that corporate diversification may cause corporate market power increase due to predatory pricing.

The fourth advantage is that diversification allows the firm to seek for businesses which are adopted with its possibilities Matsusaka (2001) believes diversification helps value maximization because a firm possesses organizational possibilities which make profit for it by entering into other businesses since diversification is regarded as search and entrance in business well adopted to the firm's possibilities.

4.2. Disadvantage

Diversification has agency costs. Agency theory shows that diversified firms have less value because diversification is as tool for managers who can pursue their interests in stakeholders' cost using this tool. Especially diversification allows managers to increase their wage, power and prestige (Jensen and murphy,1990) and reduce personal risk.

Diversification may make an inefficient internal capital market. Jensen (1986) states that firm managers by not using loaning power and high free cash flow are more willing to accept investments with low value. Its result is investment of diversified firms in projects with positive net present value. Stulz (1990) argues that diversified firms mainly invest in businesses with low and limited opportunities.

Diversification is associated with asymmetric information costs. Harris et al. (1982) maintain that asymmetric information costs is between center management and managers of the units is higher in diversified firms compared to centralized firms.

5. Economic Value Added

Economic value added is a criterion which subtracts opportunity costs of all firm's commercial resources from operational net profit.

In other words, positive EVA represents optimal resource allocation for shareholders and negative EVA suggests resource waste and loss of shareholder wealth. EVA advocates argue that it is the best performance criterion because as an evaluation criterion it considers opportunity costs of owners and stocks and temporal value of money and eliminates distortion due to using accounting principles (Amihud and Lev, 1981).

6. Refined Economic Value Added

One of the main criticisms to EVA is its reliance on historical figures for calculating opportunity cost of investment based on book value and distorting the results due to inflation, while investors expect market based return. If investors sold the firm by its market value and invest proceeds with equal risk, then they can expect acquiring return equal to capital costs based on company's total market value and not just book value of investments shown in balance sheet. Therefore, capital cost inevitably should reflect real opportunity cost of investors (Shariat-Panahi and Badavar-Nahandi, 1999, p. 79). In order to overcome this deficiency, Jefri et al. (1997) suggested replacing it with a measurement criterion called REVA. Refined economic value added is the remaining net profit obtained after subtracting investors' cost opportunity to market value from net operating profit after tax.

7. Review of Literature

Many works have been done on relationship between organizational diversity and performance of organizations. The authors have found three contrasting conclusions on the relationship between these variables. Some have evaluated it as positive, some have considered it is negative and others have not found any relationship, therefore regardless of the way of diversity measurement, diversity literature regarding discovering relationship between diversity and organizational performance have failed.

Tehrani (2006) studied relationship between products diversity and stock risk and return of manufacturing companies in Tehran Stock Exchange and found that almost there is no significant relationship between any of organizational diversity dimensions with firms' return and risk (Tehrani and Ahmadi, 2006). Tehrani et al. (2008) investigated diversification strategy impact on financial performance of manufacturing companies in Tehran Stock Exchange for a 4-year period (2002-2005). They concluded that using diversification strategy has no impact on financial performance of manufacturing companies.

Rumelt (1974) studied 500 industrial companies during 1949-1969 and observed that firms with dominant constrained diversity and linked constrained diversity were the most profitable ones. Hall and Lee (2007) investigated relationship between diversity and performance measurement issues. They considered some financial and economic variables (EVA, MVA) and concluded there is inverse relationship between diversify and economic added value. Söllner investigated product diversification and labor productivity in German manufacturing industries and found during 2003-2006 in average the degree of product diversification across industries had a positive relationship with labor force efficiency within the industry.

Singh et al. (2010) studied impact of product diversification and geographical diversification on performance of the firms. Their findings show that there is inverse u-shaped relationship between firms' performance and geographical diversification. Zhao (2010) in their study titled as 'ownership structure

and group diversification strategies' in Chinese businesses found that businesses with governmental structure are more willing to diversification.

Wan Daud et al. (2009) studied relationship between diversification impact on performance using accounting scales and the market and observed performance was better in firms accepting centralization strategy compared to firms adopting diversification strategy. Tong (2009) investigated firm diversification impact on value of corporate cash holdings and found cash value is lower in diversified firms than non-diversified ones and corporate diversification is related to lower cash value in both centralized and non-centralized firms.

Delios et al. (2008) studied within-country product diversification and foreign subsidiary performance and found that high diversification in host country's products lead to improved performance in firms. Bae et al. (2008) investigated impact of diversification on Korean firms along with the type of diversification and in financial crisis time. They discovered that Korean firms' diversification has led to decreased firms average value, but its impact varied depending diversification type.

8. Research Hypotheses

1. There is significant relationship between corporate diversification and economic value added (EVA)
2. There is significant relationship between corporate diversification and refined economic value added (EVA)
3. There is difference between results obtained from relationship between economic value added (EVA) and refined economic value added (REVA).

These hypotheses are tested by selecting population (automotive industry) a sample size as 29 automotive companies in Tehran Stock Exchange was selected using exclusion method for period of 2001-2009.

9. Methodology

9.1. Calculation of Variables

a. Diversification

In order to measure diversification, using ISIC classification system, all products of firms 2 and 4-digit ISIC codes were extracted from manual for coding of all goods and industrial servicesⁱ and UN siteⁱⁱ. Thus it was specified that each firm is active in how many industries and businesses.

Caves factor was used for obtaining diversification:

$$\text{Caves index} = \sum_{i=1}^N d_{ij} p_{ij}$$

where p_i is total ratio of sale in SIC 4-digit code, i denotes business, and d_{ij} is weight value which is function of relationships between business 4-digit code or product i and business or basic product. Value of d is zero. If business or product i and j are common in three digits in SIC 4-digit code, value of d is one. They are different in 3-digit code but are in the same 2-digit code of industrial group its value is 2 (Caves et al., 1980).

These indices have been used in various studies, for example by Robins and Wiersema (1995), Wan and Hoskisson (2003) and Gedajlovic and Shapiro (2003).

b. Economic Value Added

Following formula was used for EVA calculation:

$$EVA_t = NOPAT_t - WACC(Capital_{t-1})$$

Where,

NOP: Net operating profit after tax at end of period t

WACC: Weighted average of capital cost

Capital: Total capital employed at the beginning of period t (at the end of t-1)

To calculate the rate of cost of capital asset pricing method (CAPM) was used;

$$\text{Cost of Equity} = r_f + \beta (r_m - r_f)$$

r_f : risk free return

β : systematic risk

r_m : market return

c. Refined Economic Value Added

Refined economic value added means remaining net profit resulting from the difference between net operating profit after tax and opportunity cost of investment based on market value (Heydar-Pur and Mostofi, 2009).

$$REVA_t = NOPAT_t - (WACC \times Mcapital_{t-1})$$

Where,

REVA: refined economic added value in period t

$NOPAT_t$: operational net profit after tax in period t

WA: weighted average of capital cost

$Mcapital_{t-1}$: firm market capital at the beginning of the period t

9.2. Statistical Population

The population consisted of automotive companies accepted in Tehran Stock Exchange with following conditions:

1. all companies should be present in Stock Exchange from the April 2001 to March 2009
2. their information should be completely available
3. financial mediators including investment firms, banks and insurances are excluded, because they are not final producers of the products thus they were excluded from list of companies present in population

Considering limitations, statistical sample of this study consisted of 29 companies.

9.3. Data Analysis

Data were analyzed using EViews software. Hypotheses were tested using panel data and Dickey-Fuller, Phillips Peron test, Pearson correlation test and Granger causality test.

9.3.1. Reliability Test

Non stasis in time series used in a model may causes wrong statistical interpretations and thus false regression. Therefore, for obtaining stasis, unit root tests are used. Since the study is of time series type and it is extracted from time series data and because ordinary least squares method was used for estimation in hypotheses and prerequisite for using linear regression model in ordinary least squares method is reliability of pattern variables, it is necessary to perform reliability and unreliability test for research variables. To this end, Augmented Dickey-Fuller test (ADF) was used.

H_0 and H_1 hypotheses are as follows:

H_0 : respective variable has unit root

H_1 : respective variable doesn't have unit root (statement of stasis condition for the variable)

Results for Dicky Fuller test at variables level are given in table 2.

Regarding Prob value for diversification variable, H_1 is supported, that is, the variable doesn't have unit root, and thus it is static. However, for two other variables (EVA and REVA) H_0 is supported, so they have unit root and are not static. By differencing at higher orders these variables are made static. Thus Dickey Fuller test was performed on first order differential of model variables, results of which is given in Table 3.

Therefore, regarding ADF test results on first order differential of model variables' values (Table 3), H_0 is rejected and H_1 is accepted implying that model variables are static. Two variables (EVA and REVA) follows inertia in difference process and are $L(1)$ type.

9.3.2. Phillips-Peron Test

According to econometric concepts, existence of serial correlation leads to incorrect estimations of the standard error and thus, wrong incorrect statistical inference for equation factors. Since serial correlation is probable in these time series, Phillips-Perron test is used. It is used for determining statistic condition of a time series when serial correlation is probable in time series. Thus two hypotheses are introduced:

H_0 : variable has unit root (it is not static)

H_1 : variable doesn't have root unit (it is static)(Table 4)

Regarding Prob value for all variables except diversification, H_0 is supported, that is, these variables have unit root, and thus they are not static and they should be made static by differencing at higher orders. Thus Phillips-Perron test was performed on first order differential of model variables, results of which is given in Table 5.

Regarding Phillips-Perron test results on first order differential of variables (EVA and REVA) H_0 is rejected and H_1 implies that model variables are static.

9.4. Testing Hypotheses

To investigate the relationship between EVA and REVA and variables influence, Granger causality test and Pearson correlation coefficient were used.

Secondary Hypothesis 1

There is significant relationship between corporate diversification and stock's economic value added.

Statistical hypotheses are as follows:

H_0 : there is not significant relationship between corporate diversification and EVA

H_1 : there is significant relationship between corporate diversification and EVA

Pearson correlation coefficient is used for investigating relationship between two variables, results of which are as follows(Table 6):

Regarding above table ($R=0.042$) it is found that there weak positive relationship between diversification and EVA. But since significance level is higher than 0.05, thus there is not significant relationship between corporate diversification and EVA therefore, H_0 is supported and H_1 is rejected. Granger causality test was used to examine influence of variables on each other. Results of Granger causality test are summarized in table 7. To this end, two hypotheses are raised:

H_0 : corporate diversification doesn't influence on EVA

H_1 : corporate diversification influences on EVA

Regarding Table 7, H_0 is supported and H_1 is rejected, that is, corporate diversification doesn't influence on EVA.

Hypothesis 2

Is there relationship between diversification and refined economic value added?

Statistical hypotheses are as follows:

H_0 : there is not significant relationship between corporate diversification and REVA

H_1 : there is significant relationship between corporate diversification and REVA

Pearson correlation coefficient is used for investigating relationship between two variables, results of which are as follows (Table 8):

Regarding above table ($R=0.042$) it is found that there weak positive relationship between diversification and REVA. That is, there is not significant relationship between corporate diversification and REVA. Therefore, H_0 is rejected and H_1 is supported. Granger causality test was used to examine influence of variables on each other. Results of Granger causality test are summarized in table 9. To this end, two hypotheses are introduced:

H_0 : corporate diversification doesn't influence on REVA

H_1 : corporate diversification influences on REVA

Regarding Table 9 (based on prob), H_1 is supported and H_0 is rejected. But as it can be seen in above table, corporate diversification influences on REVA with 3-year delay.

Hypothesis 3

Is there difference between results obtained from relationship between economic value added (EVA) and refined economic value added (REVA)?

Statistical hypotheses are as follows:

Pearson correlation coefficient is used for investigating relationship between two variables, results of which are as follows:

Considering Table 10 ($R_{EVA}=0.042$ and $R_{REVA}=-0.042$) it is concluded that there is difference between results obtained from relationship between diversification and EVA and REVA. This relationship is negative for REVA and positive for EVA.

10. Conclusion

Relationship between corporate diversification and economic value added (EVA) was investigated in H_1 and it was found that there is weak positive relationship. However, it is not significant. Positive relationship between diversification and EVA suggest that increase (decrease) in diversification leads to lower increase (decrease) in EVA. Although diversification doesn't affect EVA significantly, it is recommended that automotive companies increase diversification in order to increase EVA. Result of this study is not consistent with study by Hall and Lee (2007).

Relationship between corporate diversification and refined economic value added (REVA) was investigated in H_2 and it was found that there is weak negative relationship. Thus, it can be concluded that increase (decrease) in diversification leads to lower decrease (increase) in REVA. Measured REVA was negative for most years. Regarding related literature it can be attributed to such factors as weak market effectiveness, high market price share to intrinsic value, lack of ability for value creation as expected by shareholders, lack of optimal combination of capital structure and high costs of corporate finance. Although there was weak relationship between diversification and REVA, it is recommended that

investors and users of REVA predict impact of this variable considering diversification index for next 3 years so that they would be able to measure its real value.

The difference between results obtained from relationship between economic value added (EVA) and refined economic value added (REVA) was studied in H3. And it was observed that there is difference between results obtained from these two variables relationship. As it was mentioned, the difference between EVA and REVA is that EVA considers book value, while REVA considers market value. This difference regarding relationship between diversification and these variables ($(R_{REVA}=-0.042)$ ($R_{EVA}=0.042$)) shows gap between book value and market value, because book value depends on national or international standard based on which accounts have been prepared and may in effect change book value. On the other hand, stock value in market is always changing which validates obtained results just for a short period of time.

11. Recommendations for Future Works

1. It is suggested that authors in future works investigate relationship between diversification and market value added and cash value added
2. It is suggested that authors in future works study relationship between diversification and other criteria of economic performance evaluation in different industries
3. It is suggested that authors investigate the firms accepted in the Stock Exchange in two groups of diversified and centralized and study them in terms of financial and economic performance evaluation criteria.
4. The authors can use other indices for diversification measurement and compare the obtained results.

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Notes

ⁱ Guide for coding all goods and industrial services based on third edition of ISIC, ministry of Industries, Department of Statistics, spring 1997.

ⁱⁱ www.un.org

Tables

Table 2. Dickey Fuller test results for pattern variables

Variables	The number of appropriate intervals	Intercept	Trend	Augmented Dickey-Fuller test statistic	Test critical values			Prob
					1%	5%	10%	
Corporate diversification	Level	+	+	-5.664	-4.58	-3.32	-2.80	0.00
Economic added value	Level	+	+	-1.8040	-4.58	-3.32	-2.80	0.3
Refined economic added value	Level	+	+	-2.720	-4.58	-3.32	-2.80	0.11

Table 3. Dickey Fuller test results for first order differential of variables

Variables	The number of appropriate intervals	Intercept	Trend	Augmented Dickey-Fuller test statistic	Test critical values			Prob
					1%	5%	10%	
Corporate diversification	Level	+	+	-5.664	-4.58	-3.32	-2.80	0.00
Economic added value	1	+	+	-3.638	-5.11	-3.51	-2.80	0.04
Refined economic added value	1	+	+	-6.190	-5.11	-3.51	-2.80	0.00

Table 4. Phillips-Perron test results

Variables	The number	Intercept	Trend	Phillips-	Test critical values	Prob
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	of appropriate intervals			Perron test statistic	1%	5%	10%	
Corporate diversification	Level	+	+	-16.49	-4.58	-3.32	-2.80	0.00
Economic added value	Level	+	+	-1.739	-4.58	-3.32	-2.80	0.37
Refined economic added value	Level	+	+	-2.86	-4.58	-3.32	-2.80	0.09

Table 5. Dickey Fuller test results for first order differential of variables

Variables	The number of appropriate intervals	Intercept	Trend	Phillips-Perron test statistic	Test critical values			Prob
					1%	5%	10%	
Corporate diversification	Level	+	+	-16.49	-4.58	-3.32	-2.80	0.00
Economic added value	1	+	+	-5.46	-4.80	-3.40	-2.84	0.00
Refined economic added value	1	+	+	-5.207	-4.80	-3.40	-2.84	0.00

Table 6. Pearson correlation coefficient results

Variables	Diversification	Economic value added
Diversification t-statistic	1.000	0.042
		0.683
EVA t-statistic	0.042	1.000
	0.683	

Table 7. Granger causality test results for secondary H1

Delay Number	One-Year Delay			Two-Year Delay			Three-Year Delay		
	F-Statistic	Prob	Obs	F-Statistic	Prob	Obs	F-Statistic	Prob	Obs
Diversification on EVA	0.26	0.60	232	0.04	0.95	203	0.50	0.67	174

Table 8. Pearson correlation coefficient results

Variables	Diversification	Economic value added
Diversification	1.000	-0.042
t-statistic		-0.681
REVA	-0.042	1.000
t-statistic	-0.681	

Table 9. Granger causality test results for secondary H2

Delay Number	One-Year Delay			Two-Year Delay			Three-Year Delay		
	F-Statistic	Prob	Obs	F-Statistic	Prob	Obs	F-Statistic	Prob	Obs
Diversification on EVA	0.885	0.34	232	0.54	0.58	203	5.235	0.00	174

Table 10. Pearson correlation coefficient results

Variables	Diversification	Economic value added	Refined economic value added
Diversification	1.000	0.042	-0.042
t-statistic		0.683	-0.681
EVA	0.042	1.000	-
t-statistic	0.683		
REVA	-0.042	-	1.000
t-statistic	-0.681		