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Financial Crises and Marketing Expenditure Effect: Dynamic Panel Data Approach

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ABSTRACT: Attentions to the acceleration of globalization and the global economic crisis that all countries will be affected directly and indirectly, through the crisis is important for the companies and one way out of the crisis, manages the marketing costs. One of risk and management dimensions is financial crisis in small and large companies. Management of marketing expenditure is very significant in this case. This study examines impact of marketing costs upon performance of 25 companies in Iran in period of economic stability, during financial crisis, and after financial crisis from 2002 to 2012. The result of this study using dynamic panel data model showed softened impact of marketing expenditure upon net sales in financial crisis period as compared with period of economic stability.

***Keywords*:** Marketing expenditure, Financial crisis, Net sale.

INTRODUCTION

One of globalization's unsatisfactory outcome is financial crisis which is usually precipitated worldwide by industrial countries and hit economy of countries and free-market-based corporates (Kokemuller,2013). One of these crisis arose worldwide in 2008. With the advent of crises in USA housing market and subsequently financial crisis in world, a large number of detailed studies attempted to discover causes of this crisis. Irrespective of causes, this crisis are permeated through the whole world by foreign trade and financial market of USA. Due to their interaction and relationship with global market, economics are affected differently by this crisis i.e. in countries with internationally financial interaction, this crisis is precipitated directly and countries without any such interaction are affected indirectly due to their foreign trade.

In the case that governments pursue tight fiscal policies, activities and revenues of corporates are affected by financial crisis (Furceri & Zdzienicka, 2012). Foreign and domestic competitive markets have deeper significance in cases of economic and political changes including increased inflation rate, decreased economic growth, increased interest rate, changed demands of consumers, changed market structures, and shocks given by changes in exchange rate. In these unavoidable changes, corporates are required to implement flexible strategies and practical plans (Candemir & Zalluhoglu, 2011).

Review of Literature:

Global financial crisis arose from mortgage market in USA and was precipitated to the extent that a large number of financial institutions were thrown into bankruptcy (Tong & Wei, 2009). Due to financial crisis in 2008, returns declined and indices of international share markets became volatile. Europe parliament and European banks asked for expenditure cuts because of negative growth in gross domestic product (GDP) and decrease in sale level (Leopold, 2014). Also, as studies showed, after temporary reduction in advent of financial crisis, oil price soared, which subsequently caused inflation in OPEC countries. Additionally, global crisis exerts impact upon foreign financial outcomes i.e. it is significantly correlated with devaluation of stock exchange (Tong & Wei, 2008). However, influence of such crisis on economy of Iran has opened up serious discussions among professionals and scholars. The first matter of concern is oil price. In other words, in case of such crisis, the oil price slumps and therefore Iran's economy

experiences serious difficulties. International financial crisis and expectations of global growth caused prices to go from $150 per barrel in the first months of 2007 to approximately $65 per barrel in 2008. Consequently, OPEC countries experienced great difficulties with exportation and investment in 2009 and 2010.

During international financial crisis, demands on domestic and foreign markets fall. Indeed, corporates' sale and profitability level goes down. As a result, in the first months of the financial crisis, Iran's exchange market reached one of highest-ranked stock exchange in world, unlike industrial countries. But, after 6 months, Tehran's stock exchange indices dropped sharply to the extent that they went from relatively 14000 units in April of 2008 to 8500 units in autumn of 2008. Consequently, investment rate slowed down slump in capital market.

Iran's macroeconomic indices became volatile from the beginning of global financial crisis. These volatilities are as follows:

❖ Economic growth rate extremely became volatile from 2007 to 2008. Even, it reached -5.4 in 2012.

❖ Inflationary pressures, inflationary expectations of citizens, and increased inflations rate caused by oil shocks in OPEC countries showed potential for increase in prices. Prices of domestically-manufactured goods and services increased at a rate of %9.1 in 2011. This rate increased by %30 in 2012.

❖ Dollar-Rial currency price rose from 2010 i.e. price of one dollar went to 19000 Rials in 2011 and increased by 32000 Rials in 2012.

In financial and economic crisis, companies should undergo necessary changes by formulating new strategies in order to have accountability to their shareholders. More specifically, they are required to improve marketing techniques, reduce general costs, and to increase productivity. Also, they should increase budgets of marketing. As studies show, companies with higher level of marketing activities during and after inflation can increase their sales, revenues, and market shares (Candemir & Zalluhoglu, 2011). Marketing aims are higher market shares, sales, and profitability. Therefore, this activity should not be curbed during economic inflation and financial crisis because shareholders do not expect to experience such curb. In the case that tight fiscal policies of firms include reduction in marketing costs, they cannot acquire market share.

MATERIALS AND METHODS

In this paper by static and dynamic the effects of marketing expenditure on comparing performance during financial crises has examined. In accordance with theoretical principles and studies of Joshi and Hanssens (1995 & 2009), Bagwell (2005), Candemir and Zalluhoglu (2011), and Crespo and Storckl (2011), this study takes Equation 1 into consideration for the purpose of evaluating impact of marketing costs upon sales of companies.

$$Ns_{it} = \alpha_1 + \beta_1 Me_{it} + \beta_2 Growth_{it} + \beta_3 Inf_{it} + \beta_4 Usd_{it} + \varepsilon_{it} \quad (1)$$
$$i=1,\ldots,N \quad t=1,\ldots,T$$

in the above specification Ns, INF, Growth, and Usd are respectively net sales of companies which are subject to marketing costs (Me), Inflation rate, economic growth rate, and currency rate.

In the case that the following dynamic panel is used, dynamics of model is created by inserting intervals of dependent variables as independent variables into the right part of the model. Accordingly, results become more accurate (Baltagi, 2008).

$$y_{it} = \sum_{j=1}^{p} \alpha_j \, y_{i,t-j} + \beta(l) x_{i,t} + \eta_i + \vartheta_{i,t} \quad (2)$$

Dependent variable interval in the right side of panel disproves non-correlation between independent variables and error terms as one of traditional assumptions. Accordingly, method of ordinary least square (OLS) (in panel model of fixed effects and random effects) produces biased results and inconsistency (Arellano & Bond, 1991; Baltagi, 2008), which are as follows in this study:

In equation (1), η_i is particular unobservable effects in any company with time constant, mean of $E(\eta_i) = \eta_i$, and variance of $Var(\eta_i) = \sigma_\eta^2$. $\vartheta_{i,t}$ is assumed to distribute independently among countries with mean of Zero. $Y_{i,t}$ and x_{it} *are* respectively GDP per capita growth and vector of explanatory variables. Additionally, η_i complies with a random process and a fixed effect.

$$E(Y_{i,t-1}\,\eta_i) \neq 0$$
$$E(x_{i,t}\,\eta_i) \neq 0$$

$\beta(L)$ is a polynomial interval for avoiding biased and inconsistent results in OLS method. By calculating the first-order difference, we can rewrite equation (1) as follows:

$$\Delta y_{it} = \sum_{j=1}^{p-1} \alpha_j^* \,\Delta y_{i,t-j} + \beta^*(l)\Delta x_{i,t} + \Delta\vartheta_{i,t} \qquad (3)$$

Δ is first-order difference. Equation 2 faces difficulties by employing OLS method because of correlation between individual effects and explanatory variables. Additionally, correlation between dependent variable interval and error term $E(\Delta y_{i,t-1}\Delta\vartheta_{i,t}) \neq 0$ imposes linearity. All these parameters produce biased and inconsistent results in Equation 2 due to OLS method (Arellano & Bond; 1991). For removing linearity, dependent variable interval is used as instrumental variable in GMM method. Matrix of optimal instrumental variables (Z matrix) including preset repressors (x), which are correlated with individual effects, is written as follows:

$$z_i = \begin{pmatrix} y_{i1} & x_{i1} & x_{i2} & 0 & 0 & 0 & 0 \ldots\ldots & 0\ldots\ldots & 0 & 0\ldots\ldots & 0 \\ 0 & 0 & 0 & y_{i1} & y_{i2} & x_{i1} & x_{i2} \ldots\ldots & 0\ldots\ldots & 0 & 0\ldots\ldots & 0 \\ & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \\ & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & y_{i1} & y_{i(T-1)} & x_{i1} & x_{i(T-1)} \end{pmatrix}$$

Rows indicate first-order differential equation for the person I in t=3,4,…..T and moment condition;

$$E[z_i' \quad \Delta\vartheta_i] = 0 \qquad for\ i = 1,2,3 \ldots\ldots N$$

$$\Delta\vartheta_i = (\Delta\vartheta_{i3}, \Delta\vartheta_{i4}, \ldots\ldots, \Delta\vartheta_{iT})'$$

In general, asymptotic and efficient GMM minimizes the following criterion on the basis of these conditions of moment;

$$J_n = \left(\frac{1}{N}\sum_{i=1}^{N} \Delta\vartheta_i' \, Z_i\right) W_N \left(\frac{1}{N}\sum_{i=1}^{N} Z_i' \, \Delta\vartheta_i\right)$$

In order to accomplish this objective, the below weighted matrix is used;

$$W_N = \left[\frac{1}{N}\sum_{i=1}^{N} \left(Z_i' \;\; \widehat{\Delta\vartheta}_\iota \, \widehat{\Delta\vartheta}_i' \;\; Z_i\right)\right]^{-1}$$

$\Delta\vartheta_i$ is consistent calculation of first-order differential residues which is gained from primarily consistent estimators, and therefore is viewed as two-stage estimator. Given the variance, evenness of components in first-order differential model involves asymptotic estimator of GMM which is gained from the following matrix in a single stage:

$$W_{1N} = \left[\frac{1}{N}\sum_{i=1}^{n} Z_i' \, HZ_i\right]^{-1}$$

H is a square matrix with two sides of main diagonal, one side of first non-diagonal surface, zero point, and other points. Note that W_{1N} is not dependent on any calculated parameters. For use of one-stage or two-stage estimators, Bond (2002) points out that a large number of applied functions of GMM estimators are taken into greater consideration as compared with others.

Accordingly, in the second stage, by using GMM estimators proposed by Arellano and Bond (1994) and the function suggested for impact of marketing costs, economic growth, inflation rate, and value of dollars upon net sales of corporations, we will have:

$$NS_{it} = \varphi + \alpha \sum_{i=1}^{n} NS_{it-1} + \beta_1 ME_{it} + \beta_2 Growth_{it} + \beta_3 INF_{it} + \beta_4 USD + \varepsilon_{it} \quad (4)$$

Ns_{it}, Me_{it}, Inf_{it}, Usd_{it}, NS_{it-1}, ε_{it}, α and β_1, and φ are respectively volume of net sales, marketing costs, economic inflation rate, price of US Dollars, volume of net sales in case of interval, randomly indefinite effects, regressional coefficient of variables, and constant coefficient.

RESULTS AND DISCUSSION

25 companies were selected in industries of plastics, food, and ceramics, which had at least 13-year experience in stock exchange. We gathered the required data from annual financial reports and data bases of Tehran's stock exchange.

Table 1 shows the results of static model , estimation for sample companies during 2002-2012. Since data are panel data, first, the type of model estimation must be indicated by Leamer f Test and Hausmen Test. Since p value from Leamer Test for three period, are 0.000, null hypothesis indicates model of pool data is rejected. The opposite hypothesis that indicates using panel data (probability less than 0.00) is accepted. Since p value from Hausman test for two period (before crises and after crises) are more than 0.05 null hypothesis that indicates using method of random effects is accepted and

Since p value from Hausmen Test for during total period (2002-20012) is 0.000, null hypothesis that indicates using method of random effects is rejected. The opposite hypothesis that indicates using fixed effects (probability less than 0.05) is accepted.

On the basis of results of F test, null hypothesis was significantly rejected. In other words, calculated coefficients were accepted.

Table 1. Results o f Leamer F- test and hausman- test

Test	Before Crises (2002-2008)	After Crises (2008-2012)
F	1.38	55/74
	(0.000)	(0.000)
Chi2(x^2)	1.38	-6/53
	(0.70)	(0.000)

Values in parenthesis are P-Value.

Companies participating in the study, 25 subjects Ceramic tile, rubber, plastic and food, which has at least 11 years on the stock exchange, were selected. Selected data from annual reports and financial company database Tehran Stock Exchange was received.

Table 2. Results of Static Model Calculation & Calculation of Variables' Impacts upon Net Sales of Companies in Tehran's Stock Exchange

	Coefficients of Estimation before Financial Crisis (2002-2008)	Coefficients of Estimation in Total Period (2002-2012)
Me	*** 96.785	*** 125.12

	(8.45)	(8.83)
Growth	8.59 e + 9	* -2.59 e + 10
	1.33 e + 10	
Inf	*** 1.16 e + 10	2.71 e + 9
	(5.49 e + 9)	(7.17 e + 9)
Usd	*** 2.31 e +9	6.77 e + 7
	(5.08 e + 8)	(8.26 e + 7)
-cons	*** -2.10 e + 12	1.97 e + 11
	(5.41 e + 11)	(1.89 e + 11)

Values in parenthesis are standard errors.
*, **, and *** are levels of significance (%1, %5 & %10).

Results of Table 1, in accordance with static model, show that:

❖Economic growth, inflation rate, and exchange rate has no significant effects in net sales of in period after financial crisis in 2008; and The impact of some of these variables was not supported by economic theories. For instance, coefficients of economic growth before, during, and after financial crisis were negatively correlated with volume of net sales, which was not consistent with economic theories. Accordingly, results of static model were not considered valid. Instead, model of dynamic panel was used in order to determine effects of other variables including marketing costs upon net sales.

Table 3. Results of Dynamic Model Calculation & Calculation of Variables' Impacts upon Net Sales of Companies

	The estimated coefficients for the model before the financial crisis(2002-2008)	The estimated coefficients for the model after the crisis(2008-2012)
NS_{t-1}	***850/	***1/24
	)12(0/	)09(0/
Me	***59/10	#26/68
	)(5/48	)19/77(
Growth	1/78 **10e+	10e+1/63
	9e+6/42	10e+1.65
Inf	9e+4/07	9e+2/69
	9e+3/77	10e+2/25
Usd	8e+1/41	7e+1/38
	7e+7/9	7e+1/95
-Cons	12e+1/47*	11e+5/12**
	11e+3/47	11e+2/48
Wald Test	Chi^2: 4069/21***	2691/25***

Values in parenthesis are Robust standard errors.
*, **, and *** are levels of significance (%1, %5 & %10).
is probability coefficient of marketing costs in period of financial crisis, which is 0.121 in value.

Sem provides two options to modify how the standard-error calculations are made: vce(robust)and vce(cluster clustvar). These standard errors are less efficient than the default standard errors, but they are valid under less restrictive assumptions.

These options are allowed only when default estimation method method(ml) is used, or option method(mlmv) is used. ml stands for maximum likelihood and mlmv stands for maximum likelihood with missing values;

vce(robust) specifies an alternative calculation for the VCE, called robust because the VCE calculated in this way is valid under relaxed assumptions. The method is formally known as the Huber/White/sandwich estimator. The VCE obtained in this way is valid if the errors are independently distributed. It is not required that the errors follow a normal distribution, nor is it required that they be identically distributed from one observation to the next. Thus the vce(robust) VCE is robust to heteroskedasticity of the errors.

vce(cluster clustvar) is a generalization of the vce(robust) calculation that relaxes the assumption of independence of the errors and replaces it with the assumption of independence between clusters. Thus the errors are allowed to be correlated within clusters.

Additionally, coefficients were estimated by using robust standard error which was indicated by mean standard errors. This calculation method is used to a lower extent as compared with general mean standard deviation; yet the latter are valid due to limited number of assumptions.

Findings on Outcomes before Financial Crisis Period:

From 2002 to 2008, marketing costs had significantly positive impact upon volume of net sales of these companies. This finding was consistent with theoretical expectations. In accordance with calculated coefficients (Table 3), the following outcomes were produced:

❖ The calculated coefficient of marketing costs (59.10) showed that sale volume increased by 59 Rials per one-Rial marketing cost;
❖ Economic growth was significantly and positively related with net sales. 1 percent of economic growth increased net sales by 17.8 Million Rials;
❖ Within 7-year period before financial crisis, inflation did not create significant impact upon net sales;
❖ Net sales increased by 13.8 million Rials per one-Rial increase in currency price.

Analysis of self-regression of error terms in this model indicated first order of self-regression between error terms. Therefore, measurements of these model were valid.

Findings on Outcomes after Financial Crisis Period:

Findings demonstrated significant impact of financial crisis on Iran's industrial sectors within (2009-2012) to the extent that impact of their marketing costs on net sales were lessened. However, it was still the most crucial variable in this study.

Moreover, the following findings were revealed:

❖ The calculated coefficient of marketing costs (26.68) showed that sale volume increased by 26 Rials per one-Rial marketing cost even in period of financial crisis. This increase occurred to a lower extent as compared with the period before financial crisis;
❖ Net sales were not significantly affected by economic growth as compared with the period before financial crisis in which they were significantly correlated with each other;
❖ Inflation rate did not bring about significant effect upon net profits of the studied companies while the calculated coefficient for economic growth was 3.25 Million Rials before financial crisis. Perhaps, increase in inflation rate caused increase in net sales, which was in agreement with theoretical principles; and
❖ Net sales were not significantly affected by increased currency price while the studied companies experienced an increase in net sales by 146 million Rials per one-Rial increase in currency price before financial crisis.

Findings on Outcomes within Total Financial Crisis Period:

Marketing costs, economic growth rate, and currency price were significantly and positively correlated with net sales of studied companies from 2002 to 2012. This finding was consistent with theoretical principles.

Also, coefficients of Table 2 showed the following:

❖ Net sale volume increased by 41 Rials per one-Rial marketing cost (with a coefficient of 41.13);
❖ Economic growth (30.5) was significantly and positively related with net sales. 1 percent of economic growth increased net sales to 17.8 Million Rials;
❖ %1 increase in inflation rate caused an increase by 11.8 million dollars in net sales; and
❖ Net sales increased by 18 million Rials per one-Rial increase in currency price.

CONCLUSION

Our findings highlighted very significant impact of marketing costs upon net sales of studied corporations as one of variables of market performance from 2002 to 2012. In period of economic stability, sale volume increased by 59 Rials per one-Rial marketing cost. Similarly, sale volume increased by 26 Rials per one-Rial marketing cost in period of financial crisis in which macroeconomic indices dropped. Also, an increase by 41 Rials in net sales occurred per one-Rial marketing cost. Accordingly, marketing cost is a satisfactory solution for resolving financial crisis. Tight fiscal policies should not involve marketing costs since industrial managers can achieve their profitability through domestic and international marketing. Membership of countries in World Trade Organization (WTO) are positively and negatively affected by its performance. Therefore, more detailed studies should concern impact of financial crisis upon members of WTO.

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